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Urban middle school students’ perceptions of math and science teachers’ caring behaviors and student’s self reports of academic competence

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URBAN MIDDLE SCHOOL STUDENTS' PERCEPTIONS OF MATH AND SCIENCE TEACHERS' CARING BEHAVIORS AND STUDENTS' SELF REPORTS OF ACADEMIC COMPETENCE

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This research examines urban middle school students' perceptions of their math and science teachers' behaviors. Specific caring behaviors (challenging questions, encouragement and praise, non-verbal support, understanding and friendly, and controlling--which refer to teacher's expectations for classroom behavior) were evaluated by 101 students (72 girls and 29 boys) in grades 7, 8, and 9 by means of a survey instrument. Research findings support earlier investigations confirming that boys and girls interpret teacher friendliness differently. However, both male and female students reported similar perceptions of their teachers' behaviors with respect to praise, non-verbal support, and controlling. In addition, a strong correlation existed between students' perceptions of teachers' behaviors and student self reports of academic competence.

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Introduction

If students fail to learn basic mathematical and scientific concepts in middle school it will be difficult for them to advance to higher level mathematics and science courses during high school. As a result, students may not be qualified to enter STEM (Science, Technology, Engineering, or Math) disciplines in college which lead to technological careers. While the monetary compensation for those working in STEM careers will be one of the most lucrative in the 21st century (Gupta & Houtz, 2000) women and minorities are underrepresented in them (Blickenstaff, 2005; Powell, 1990). In the year 1990 females constituted 44% of the workforce, yet only 6% were engineers and 4% computer scientists (Felder, Felder, Mauney, Harmin, & Dietz, 1995). Although the number of racial minorities completing degrees in science and engineering has increased (Payton, 2004) the number of African American IT workers has decreased from 9.1 to 8.2 percent between the years 1996 and 2002 (Payton, 2004).

In an effort to bring attention to the under-representation of women and minorities in STEM careers various books and scholarly reports have been published. These works suggest pedagogical practice and teacher behaviors that create optimal learning environments (Balfanz & Byrnes, 2006; Clewell, 2001). Overall, it has been found that teacher behaviors (i.e. perceived friendliness, interpersonal relationships, understanding and caring, clarity) influence student outcomes including levels of learning and motivation as well as attitude toward the subject matter (Nussbaum, 1992; Skinner & Belmont, 1993; Wubbels, 1993; McCroskey, Richmond & Bennet, 2006; Chesebro, 2003; Chesebro & McCroskey, 2001).

Since student perceptions of their teacher's behaviors effect learning, it is important to understand what urban middle school students think of their science and math teacher's behaviors in order to pinpoint successful communication methods that will improve teaching practice culminating in student retention along the STEM pipeline.

Background

The mathematical and scientific aptitude of students in American schools was questioned in the Spring of 1990 (April) when the International Association for the Evaluation of Educational Achievement presented data from a study which compared test scores of American students with those of international students spanning the globe. The study corroborated the low standing of America's students in core scientific disciplines including chemistry, physics, and biology (Bailey, 1990). This trend in underachievement is confirmed by statistical data. For example, there are over 200,000 students annually who graduate with STEM degrees yet only 70,000 or less of these are from the U.S. (US Department of Education, 2005). Of this number, 70,000 are not U.S. citizens but are students studying abroad.

These statistics coupled with the current decline in mathematical achievement in middle school students is cause for concern. In 2003 only 7 percent of eighth graders in America achieved high scores on an international mathematical test while forty-four percent of 8^{th} grade students in Singapore did (U.S. Department of Education, 2006).

However, the aforementioned statistics do not take into account differences in achievement scores between African American, Hispanic and White students.

Osborne (1999) reports that minority students test scores may decline as much as two grade levels below White students by sixth grade. Yet, it is projected that minorities by the year 2050 will account for approximately 50 percent of America's population (U.S. Census Bureau, 2007). This means that the possibility exits for an increase in the number of minorities who may be interested in pursuing technological professions in college; but, at the present time women and minorities are underrepresented in STEM careers (Clewell, Anderson & Thorpe, 1992**;** Tan, 2002; Spalter-Roth, 2007). Hence, they are not advancing through the STEM pipeline to reach graduation. The leak in the pipeline begins during the middle school years and continues to increase through college and beyond (Lee, 1998). The goal of the Elementary and Secondary Education Act of 2001, known as the *No Child Left Behind Act (NCLB)* is to engage students in the process of learning and repair the leak in the pipeline.

Since the establishment of the No Child Left Behind Act, the National Governors Association implemented plans in various states for improved math and science curriculums in schools (Lewis, 2007). It is the objective of this initiative, and others like it, to facilitate increased learning. For example, President Bush's 2006 Education Agenda includes an intervention "Math Now for Middle School Students" (U.S. Department of Education, 2006) whose goal is to help middle school students deficient in math build proficiency in order to pass Algebra (U.S. Department of Education, 2006).

It is crucial to drastically improve opportunities for learning in math and science, since it is predicted that if declining test scores continue America will lose its innovative edge which will have major financial repercussions and undermine the economic stability and future of the nation (Clewell, Cohen, Tsui, & Deterding, 2006; Thomas, 2006). Therefore, it is the goal of NCLB to improve literacy in all subject areas including math and science.

When this objective is achieved, then perhaps there will be an increase in the number of women and minorities entering technological fields of employment. However the path of career development begins in the classroom as teachers dialog with students and impart information. As discussion ensues between teachers and students, students form perceptions about their teacher's behaviors. For example, "my teacher will listen to me", or "I feel understood", or "my teacher is friendly".

Research has shown in the past that student perceptions of teacher verbal and non-verbal behavior is an indicator to how well that student will perform in a given subject taught by that instructor (Rodriguez, Plax, & Kearney, 1996; Assor, Kaplan & Roth, 2002), If the communication practices of urban middle school math and science teachers can be improved so that they match student perceptions of effective communication behaviors then students may become more academically engaged and ultimately choose STEM careers. For this reason, this study will examine minority middle school students' perceptions of their math and science teacher's behaviors.

Specifically, the questions raised by this research are:

Q1: Do urban middle school boys and girls maintain different perceptions concerning their math and science teachers' behaviors?

Q2: How do urban middle school students perceive their language arts aptitude when compared with perceptions of their math and science aptitude?

Q3: Is there a relationship between students' self reports of teachers' behaviors and students' self reports of academic competence?

Rationale

This study will expand upon the body of literature investigating teacher immediacy within the context of science and math classrooms. The study will present student self reports of caring teacher behaviors (challenging, encouragement and praise, non-verbal support, understanding and friendly, and controlling). While considerable research has explored teacher immediacy at the college level and beyond, fewer studies have examined middle school students' perceptions.

In urban middle schools settings, student perceptions of math and science teachers' behaviors relating to student self reports of aptitude in these subject areas does not dominate the literature; therefore, this study enhances the body of research in teacher immediacy.

In addition, this study invites further exploration into the development of research for minority and non-minority urban and rural youth in order to define multi-cultural norms affecting communication processes between teachers and students in middle schools.

Literature Review

Urban School Environments

While the No Child Left Behind Act expresses a commitment for educational excellence, the fact remains that secondary urban school districts maintain high attrition rates (Campbell, 2003). In order to curtail student dropout and retain student interest, educational administrators, teachers, and communication specialists have developed specialized training to equip teachers in urban school districts with the pedagogical and communication tools required to competently teach diverse minority populations (Belfanz & MacIver, 2000, Holder & Hicks, 1977).

Supplemental training for teachers in city school districts is desired to alleviate teacher burnout. Smith & Smith (2006) report that newly hired teachers working in urban districts leave the profession within five years as a result of teacher burnout. Specifically, teacher burnout may be linked to challenges teachers face in urban districts such as overcrowded classrooms, inadequate books, lack of classroom supplies, and lack of parental/administrative support (Belfanz & Mac Iver, 2000; Shann, 1998).

In addition to the aforementioned conditions, teachers in urban schools deal with students' "personal, economic and family situations" (Bowers, 2000, p. 235). For example, high absenteeism may be related to personal or family problems that students experience such as the lack of funding for transportation to school (Bowers, 2000).

However, one of the most challenging issues teachers face on a daily basis is the display of inappropriate behavior in class (Bowers, 2000).

In addition, the climate of urban schools is affected by the neighborhood the school resides in and to a larger extent by the distinctive culture of the students (Shann, 1998). For example, higher percentages of students in urban districts will be headed single mothers with lower economic resources to care for their families. Moreover, urban schools may have greater numbers of students who are at risk for drop-out due to low achievement scores (Shann, 1998). One reason students in middle school achieve lower test scores is due to inadequate and weak curriculums (Brown, Anfara & Roney, 2004). Moreover, Brown, Anfara & Roney (2004) report that lower test scores for students from lower socio-economic backgrounds attending large schools may be attributed to the middle school which does not supply students with the support needed. In addition, Balfanz & Byrnes (2006) report that math achievement scores for minority students in elementary and middle school (grades 4-8) is not commensurate with the students' grade and age (Balfanz & Byrnes, 2006).

To rectify low achievement rates and engage students in science and math, teachers in urban districts may benefit from training that will teach them how to deploy instructional methods to improve teacher-student communication. Shann (1988) concludes that the dynamics of teacher-student communication exists within the context of the school climate that "communicates important messages for…student-teacher interaction" (p. 391). Considering the process of interaction (the use of language, touch, body movements) it is evident that teacher-student communication exists in the context of teacher-student behaviors.

In relation to math and science (the two disciplines that prepare students for careers in STEM) research has been conducted which emphasizes that what teachers say to students, and especially girls, can impact student perceptions of themselves, and their ability to perform well in the class.

Gender Identification in Girls and Boys

A factor contributing to girls' perceived inabilities are negative messages received through social interactions with parents, peers and teachers (Clewell, Anderson & Thorpe, 2004). For example, Oakes (1985) reports the social climate of schools in which teachers who convey high expectations for girls in STEM in grades 5-9 are criticized by peers, while it is acceptable for teachers to verbally encourage boys to excel. Unfortunately, this is not a new phenomenon, for in a study involving Geometry teachers' interactions with students, it is noted that instructors gave preferential treatment to boys by supplying them with more "attention, encouragement, and reinforcement" (Byrne, 1993, p. 163). In addition**,** Kommer (2006) reports that the American Association of University Women in 1992 found that math and science teachers offered boys prompts to assist them in rectifying their thinking when answering questions incorrectly; however, girls were not offered prompts.

Moreover, teachers selected boys more often than girls to respond to questions posed, and when boys were not selected "they were just as likely to shout out an answer, leaving girls to sit quietly" (Kommer, 2006, p. 247). Similar notions are presented by Berube (2000). She reports that teachers ask boys more conceptual open-ended, "higher order questions" (Berube, 2000, p. 2) while girls are asked closed ended questions that require a yes or no response.

In addition, girls are told by instructors that it will not be necessary for them to learn math since it is not relevant to their future (Berube, 2000, p. 2). Girls who encounter such experiences may internalize a message that says, "You are not expected to perform well in science or math"; and some girls may internalize this message incorporating it into their self-concept. While these studies focus on girls as a whole, African American girls living in urban districts may have a slightly different view of their gender-role and subsequent self-concept.

Buckley (2001) contends that African American women have historically taken on roles that have been traditionally deemed masculine. For example, in West African culture, women were expected to perform multiple roles as a business partner, wife, and mother. Moreover in the United States, African American women assumed responsibilities in the workplace and at home (Buckley, 2001). Consequently, Buckley (2001) hypothesizes these historic roles have influenced perceptions of gender and its associated attitudes and behaviors (Buckley, 2001). A survey conducted by the Greenberg Lake Analysis Group in 1991 found that black girls had high levels of self-esteem.

This high level of self-esteem may propel some girls to think that they can achieve in STEM courses. However, while black girls may perceive of themselves as performing well in STEM careers; the research today, over 15 years since the Greenberg findings indicates that women and minorities remain underrepresented in STEM careers. This means that women and minorities may not be interested in STEM as a career. One factor that may contribute to this notion is the visible absence in the media of women and minorities working in STEM (Barner, 1999).

Apart from the media, there exists a lack of role models to support those students interested in pursuing STEM (Pollock, McCoy, Carberry, Hundigopal & You, Heller & Martin, 1994). Overall, other factors contributing to non-participation of women in STEM careers includes: 1) the parental beliefs that boys will excel more than girls (Felson & Trudeau, 1991), 2) the perception that STEM subject matter is not useful in "real life" (Clewell, Anderson & Thorpe, 2004, p. 5), 3) inappropriate activities and lack of exposure to STEM activities (Dale, Eaton & Owens 2002), 4) parents purchasing more educational computer toys games for their sons as opposed to their daughters, (Entwisle, Alexander & Olson, 1994), 5) software games that do not appeal to the interests of girls (Gorriz & Medina, 2000), 6) inappropriate pedagogical approaches that do not appeal to the preferred learning style of girls (Clewell, Anderson & Thorpe, 1992), and 7) decreased self confidence (Kommer, 2006).

It is interesting to note that Ferreira (2001) reports that boys and girls are similarly interested in and feel confident about their abilities to learn science. However, in the 4th grade girls and boys begin to view their interest and rate their abilities differently. In the 4th grade 74% of girls and 81% of boys say they enjoy science (Ferreira, 2001). This shift in perceived ability according to Gottfredson (1981) occurs as a result of circumscription, a mental process in which boys and girls ages 6-9 dismiss engagement in activities that are not congruent with their perceived gender (Gottfredson, 1981). The Theory of Circumspection and Compromise suggests that attitudes about mathematical and scientific ability are inextricably linked with gender identification which influences formation of the self concept.

Consequently, girls will compromise and choose activities perceived as feminine and boys those that resonate with their male gender identities. Kommer (2006) reports that gender identification for middle school boys and girls is formed through messages received from adults, teachers, peers, and the media.

Moreover, Kelly (1985) hypothesizes that science is presented as a masculine field of study. For example, Pinkard (2005) argues that the choice of color, action characters, and language in the development of software products for student use can be orchestrated to attract more male than female users. In general, educational software products have a masculine appeal (Pinkard, 2005). Software which has greater appeal to one sex over the other is "gendered by design" (Pinkard, 2005, p. 59).

Therefore, if software, curriculum, and activities to present STEM concepts are deemed by girls to be masculine, then girls may shun STEM and detach themselves from school work. Research conducted by Clewell, Anderson & Thorpe (2004) substantiates this notion since girls view STEM related activities as unfeminine and "nerdy". When girls are detached from school work due to gender conflict issues the process of academic engagement and subsequent learning does not occur. Newmann, Wehlage & Lamborn define engagement as a "psychological investment in and effort directed toward learning, understanding, or mastering the knowledge, skills or crafts that academic work intended to promote" (Newmann, Wehlage, & Lamborn, 1992, p. 12). Detachment disrupts academic engagement and disinterest in school work and impedes learning and satisfactory test performance (Felson & Trudeau, 1991).

Consequently, low test scores girls historically earn in math and science may be linked to the girls' disinterest in STEM which may be attributed to pedagogical practice which is designed to appeal to the interests of boys. Entwisle, Alexander & Olson (1994), report that math performance for girls begins to decline in grade 7. This declining trend in test score performance continues through middle school into high school. For example, girls earn lower grades in mathematics when compared to other courses. Moreover, girls do not perform as well as boys on the SAT (Felson & Trudeau, 1991). As a result of the aforementioned factors, girls with the ability to perform well may drop out of the STEM pipeline.

Lee (1989) suggests that middle school girls who drop out of the STEM pipeline are academically prepared to pursue a STEM career but may fail to do so since their developed self-concept inhibits them. Therefore, the goal of developing new perceptions about STEM (particularly for girls) has been the objective of various initiatives. For example, Dale, Eaton & Owens (2002) conducted a study to measure seventh and eighth grade girls' attitudes toward IT. A total of forty-eight school girls from urban and rural districts participated in a three week intensive program conducted each summer over a period of two years (Dale, Eaton & Owens, 2002). Annually students completed a questionnaire, and at the conclusion of the study participants attitudes relating to their self concept, computer anxiety, and confidence were evaluated (among other variables). The results from the survey deduced that the participants' confidence level increased over time as a result of support from female role models and continued usage of computer applications (Dale, Eaton & Owens, 2002).

Similar results were found with the exclusive Techbridge program for girls. Staff interviewed girls to determine which activities they would like to engage in (Countryman, Feldman, Kekelis & Spertus, 2002**.** Overall, girls find the program interesting because the computer games created appeal to their interests as opposed to commercially developed programs that target boys (Countryman, Feldman, Kekelis & Spertus, 2002).

Other interventions to alter girls perceptions and instill computer confidence included GCG (Girls Creating Games) a summer school program for girls in grades 6,7, and 8 (Werner, Campe, & Denner, 2005) and Girls' POWER (***P***rogramming ***O***f the ***WE***b ***R***ocks) (Pollock, McCoy, Carberry, Hundigopal, & You, 2004).

Learning Styles and Pedagocial Approaches

As previously mentioned, pedagogical approaches in science and math do not mesh with preferred learning styles for females (Clewell, Anderson & Thorpe, 1992). Martinez (1989) suggests that girls prefer collaborative learning environments. In his study Martinez (1989) identified "A Model of Interest in Science" that was utilized to evaluate student interest in science experiments based on three interest levels; cognitive, mastery, and social appeal. The cognitive appeal defined interest levels in terms of curiosity, fascination or fantasy (Martinez, 1989). However, the mastery appeal defined the effort exerted to control environments and change them to suit specific desires or needs. The final component, social appeal, defined collaborative environments in which individuals work toward a common goal (Martinez, 1989). The results of the study concluded that girls are interested in science experiments with a social appeal and boys are more interested in experiments with a mastery appeal.

This study suggests that in order for girls to find science attractive, more attention should be given to developing activities that are collaborative in design; thereby, permitting girls to exercise their preferred learning style (social appeal).

However, Berube (2000) postulates that girls and boys have more than just unique preferred methods of learning, but distinct and different ways of learning. According to Berube (2000) boys learn in linear ways and girls conceptually. This difference in learning may contribute to the disparity between girls and boys achievement scores in math and science. Once appropriate curriculums are developed that are gender friendly, then the mountain of disparity will level into a vast plain of opportunity and access for girls and boys. To create this state, Berbube (2000) suggests that relatively simple and standard math concepts be taught in conceptual blocks in grades 1-8 leaving the more advanced concepts for high school. She infers that this approach would allow students to become more competent as they apply previously learned concepts to solve new learning challenges.

While the previously cited research distinguishes differences between the ways in which girls and boys learn, further studies acknowledge preferred learning styles for both genders and the importance of developing training programs to suit student needs. Mckenna & Agogino (1998), discuss the benefits of a web-based engineering class for middle school students that is gender friendly. Students in the program solve engineering problems using simple machines.

Furthermore, the program is structured to include hands on activities that integrate the application of abstract principles (McKenna & Agogino, 1998).

Interventions in Urban Schools

The integration of hands on activities to teach abstract concepts is present in earlier interventions such as the Algebra Project which began in 1982 (Silva, Moses, Rivers, & Johnson, 1990). The initial vision encompassed teaching algebraic concepts to prepare urban middle school students for high school honors courses in math and science (Silva, Moses, Rivers, & Johnson, 1990).

In order to accomplish this goal, Silva, Moses, Rivers, & Johnson (1990), began addressing parental attitudes concerning mathematics education in middle school. Moses (1990) found that parents perceived mathematics as an activity not associated with real life. Parents were not cognizant of the fact that geometry and algebra skills are required to fulfill over 75 percent of all jobs (Beane, 1990). However, by addressing misconceptions a paradigm shift occurred that is reflected in the Algebra Project's philosophy that all students are capable of learning mathematics given the right context (Silva, Moses, Rivers, & Johnson, 1990). Consequently, the project accepted students experiencing difficulty mastering fractions and other mathematical concepts (Silva, Moses, Rivers, & Johnson, 1990).

If educational ventures (as the Algebra Project) may be used to increase student interest then negative attitudes concerning STEM may be reversed. Reversing incorrectly held concepts about STEM, increasing student confidence, and providing access to STEM is the focus of the DAPCEP (Detroit Area Pre-College Engineering Program).

This initiative was developed over thirty years ago. Kenneth Hill with a $250,000.00 grant from the Alfred P. Sloan Foundation began the Detroit Area Pre-College Engineering Program (DAPCEP) as a program to acquaint urban 7th graders with career options in math, science, and engineering (Mercer, 2002). Students participating in this program successfully matriculated through the STEM pipeline to find lucrative careers (Mercer, 2002). DAPCEP was unique in its appeal to urban middle school youth. In the 1960's and 1970's science, math, and engineering programs targeted high school and undergraduate students. It was not until the 1980's that STEM plans were devised for middle school students (Taylor, 1993). In conjunction with DAPCEP and other programmatic interventions, the practice of mentoring within the Hispanic and African American communities has been shown to be an effective method of generating school success.

Positive Effects of Mentoring

Holland (1996) reports the successful efforts of plumbers, physicians, and teachers in establishing mentoring relationships with at-risk African American boys that culminated in increased literacy in reading, math and science. Although the mentors held varied professions (i.e. plumber, physician, teacher) they were committed to helping the boys achieve a greater level of academic literacy (Holland, 1996). Project 2000 worked because male mentors functioned as teachers who took the time to develop positive relationships with boys. The disposition of the Hispanic & African American cultures to place an emphasis on religion and close family ties are attributed to the educational success of these minority groups.

Anthrop-Gonzalez, Velez & Garrett (2005) report that Puerto-Rican students who are church members have the opportunity to develop mentoring relationships with adults that instill constructive attitudes congruent with requirements for school success (Anthrop-Gonzalez, Velez & Garrett, 2005). The result of Project 2000 suggests that the significance of caring within the teacher-student relationship cannot be underestimated.

Caring and its Impact on Affective and Cognitive Learning

However, caring represents a dramatic shift from the earlier pedagogical constructs of the 20th century which emphasized the importance of the curriculum and meeting instructional goals (Cuban, 1993). The student was required to fit within the educational system as opposed to the system meeting the needs of the student.

The constructs that define caring have several common themes: 1) Caring teachers motivate their students to learn (Teven & McCroskey, 1996), 2) Caring teachers are not sentimentalists (Noddings, 1992; Cummins, 2006) simply moved by feeling and not principle, 3) Caring teachers have high standards for their students' academic achievement (Nelson & Bauch, 1999), 4) Caring teachers ask deep analytical questions and facilitate discussions, (Noddings, 1992), 5) Caring teachers form healthy relationships with their students and mentor them (Cummins, 2006) and; 6) Caring teachers empty themselves in order to hear and respond to student issues (Noddings, 1992). In addition, Nelson & Bauch (1999) assert that caring teachers are exceptional communicators understanding not only what is said, but understanding what is not said. Exceptional teachers communicate to all students a sense of perceived caring.

Moreover, teachers demonstrate behaviors so that all students feel connected to the teacher, and understand that he/she cares for them (Nelson & Bauch, 1999). Caring teachers can also read their students' facial expressions and take time to listen to what students have to say (Nelson & Bauch, 1999). Considering the behaviors that caring teachers demonstrate, it is fitting to conclude that caring teachers form positive relationships with students. It is this notion that Klem and Connell (2004) express in their study which reports that in urban schools a positive teacher-student relationship can be the catalyst to facilitate and encourage student academic achievement. Furthermore, when students perceive that they are in caring and supportive relations with instructors students have a more positive attitude about school and feel more satisfied with the school experience. Connell's study infers that within the dynamics of classroom communication caring teacher behaviors are felt, understood and appreciated by students.

Similarly, Cummins (2006) reports that students are more likely to engage in classroom activities if they believe that teachers care for them. This means that if math and science teachers practice caring behaviors, students may be more likely to become engaged in the subject matter. Flick & Dickson (1997) concur with this notion and report that it is important for teachers to practice caring behaviors since teaching practice influences the manner in which students will respond to technological subject matter (Flick & Dickson, 1997). For this reason, Comstock, Rowell, and Bowers (1995) contend that teacher immediacy impacts learning at both the cognitive and affective level.

While the cognitive domain impacts the intellectual processes that result in learning, the affective domain as defined by Bloom (1956) encompasses student attitudes about the course material and instructor. These domains of learning (affective and cognitive) may be positively influenced through teacher immediacy behaviors including humor, posing questions, and teacher praise. While debates arise concerning when and how to administer praise it is generally agreed that praise can function as a reinforcer to increase student's positive behaviors (Brophy, 1981). Therefore, if academic engagement is lacking, the effective use of praise may bolster engagement.

Teachers may personalize praise by: "a) using the student's name, b) specifically describing the actions taken by the student to merit praise, and c) providing brief but enthusiastically expressed praise such as nice going, well done, tremendous, and outstanding" (Burnett, 2001, p. 17). Wiltse (2002) suggests that teacher praise is a "communication tool that may be used to engage students in the process of learning, thereby developing student self-efficacy and autonomy" (Wiltse, 2002, p. 128).

Another method teachers employ in their dialogue with students to promote academic engagement is the utilization of the open ended question which supports autonomy (Long & Gove, 2004). Long & Grove (2004) state, "This method is versatile as it may be used in large or small group settings. It is most effectively employed when teachers display an attitude of respect for students by listening, responding to inquiries and encouraging students to analytically dissect class problems" (p. 351).

As teachers employ these strategies, they may observe harbingers of academic engagement noted by students investing more time in the classroom before or after school (Finn, & Rock, 1997). Overall, teacher behaviors involve interpersonal communication processes that provide students with feedback. As teachers implement structure within their classes they may: a) place stickers beside the names of children on class charts who adhere to rules, b) post class rules and review them with students, c) establish times to talk and periods of quiet time. Identifying the barriers to student learning through teacher behaviors is a crucial part of the educational process.

Self-System Process Model by Connell

One model that seeks to define a method for teachers increasing liking for a subject is the Self-System Process Model by Connell (1990). This model defines the psychological functioning of youth and how students mentally process teacher behaviors. The major components of the model include autonomy support, structure, and involvement (Connell, 1990). In each of the three dimensions of the model, teacher-student interactions occur that have the potential to impact student attitudes. In the first phase autonomy support, teachers communicate to students the choices they have to make. Characteristically, autonomy related messages effect perceptions as students feel understood and supported. These feelings lead students to respond by completing a specific task related to their personal goals and values (Connell, 1990).

The second phase of the model – structure is epitomized by verbal and non-verbal messages perceived by the receiver as "optimally challenging" (Connell, 1990, p. 66).

As structure-based messages are communicated, students understand what they need to do to perform well, and are cognizant of the consequences of their decision or indecision to complete an action (Connell, 1990). However, in order for structure based messages to be effective, they need to be administered with consistency (Connell, 1990).

The third component of Connell's model is involvement and is communicated through messages that inform the receiver that he or she is cared for and is illustrated by the statement, "I think people like me, know and care about me (as a person)" (Connell, 1990, p. 66). (Stipek, 2006) suggests that when students in urban settings perceive that their teachers care about them, "students in turn feel that they owe their teacher something and don't want to disappoint them" (p. 46). Consequently, students will become academically engaged which is a fundamental precursor of student achievement (1986, Nussbaum, p. 674).

Understanding various aspects of teacher behavior has been the focus of a number of studies (Klem & Connell, 2004; Assor, Kaplan & Roth, 2002; Tucker, 2002; Skinner & Belmont, 1993; Ennis & McCauley, 2002; Dolezal, Welsh, Pressley, Vincent, M., 2003) which have reported a direct relationship between student perceptions of their abilities, subsequent academic engagement, and teacher behaviors. Nussbaum (1992) reports that between 1970 and 1992 over a thousand articles were published that discussed some dimension of teacher behavior.

These studies and others since 1992 reveal that perceived immediacy as reported by students (primarily in college) impacts the level of student learning, motivation, and communication apprehension (Plax, Kearney, McCroskey, Richmond, 1986; Witt & Wheeless, 2001).

According to McCroskey, Andersen, Richmond and Wheeless (1981) communication apprehension is developed in kindergarten and becomes usually fixed by the fourth grade remaining constant through middle school, high school and throughout college. However, the effective use of immediacy is found to reduce Communication Apprehension among middle school students (Comadena & Prusank, 1988). Reducing Communication Apprehension is a cause for concern since it is linked with low achievement in middle school students. Therefore, teachers may increase nonverbal and verbal immediacy in order to mitigate communication apprehension among their students.

In addition, immediacy is meshed with an individual's culture. Knight (2004), poses the question "How do teacher's cultural backgrounds inform their philosophies and practices of caring in teaching diverse learners?" (p. 212). This question infers that a teacher's concepts and actions intended to promote a sense of caring stem from one's culture. Therefore, the immediacy behaviors of teachers are influenced by culture.

Culture

According to Carter-Jones (1993) culture and non-verbal communication are initially learned in the home circle and then extend to one's community. This statement infers that both students and teachers possess non-verbal communication patterns that are shaped by both the culture and the community in which they reside.

For this reason, students will interpret a teacher's non-verbal communication patterns through the eyes of his or her culture, and teachers will do the same**.** Other researchers including Tomoko & Beebe (1992) postulate that, "communication and culture are inseparable" (p. 3).

This means that communication symbols, (for example nodding the head, smiling, and other gestures hand movements, walking, etc.) are learned in the context of the culture. Consequently, Tomoko & Bebe (1992) state that, "culture is the foundation of communication and meaning" (p. 4). Therefore, an individual's culture, race and sex play a significant role in how one interprets messages received from others and how one transmits messages to others.

In many instances non-verbal communications (i.e. facial expressions, tone of voice, posture) reveal feelings and attitudes of the one speaking. This means that when teachers develop positive feelings (affective) and beliefs (cognitive) about their students, their behaviors (verbal and non-verbal immediacy) may communicate to the student an attitude of perceived care. For example, when teachers possess an open and accepting attitude toward cultures that differ from their own, this attitude may be felt by students since messages of acceptance are transmitted to the student through the teacher's verbal and non-verbal communication; and this positive attitude will help to motivate the student toward academic engagement and success.

Anthrop-Gonzalez, Velez & Garrett (2005) report that female instructors who embraced high achieving Hispanic students "ethnic and linguistic" (p. 79) characteristics were perceived by students as "second mothers" (p. 79).

This suggests that the instructor's feelings and beliefs concerning the students' culture, race, and sex were positive to the extent that it was demonstrated in non-verbal and verbal behaviors.

As a result, students felt that the teachers were an extension of their family.

Teacher Immediacy

The aforementioned instructional strategies that ignited student interest were conducted in classrooms where the presence of a teacher to impart information to the students was required. Therefore, the teacher plays a significant role in shaping and influencing student attitudes (Comstock, Rowell & Bowers, 1995; Gorham, 1988; Christophel, 1990; Frymier, 1994; Nussbaum, 1992; Chesebro 2003; Plax, Kearney, McCroskey & Richmond, 1986; Anderson & Jensen, 1979). As students undertake coursework, instructors optimally desire for students to have a mental attitude that is ready to learn; so then, research has recommended that teachers employ behaviors to increase teacher immediacy (McCroskey, J., Richmond, V., Plax, T., & Kearney, P., 1985; McCroskey, J., Richmond, V., & Bennett, V.E., 2006).

Teacher immediacy is defined as behaviors both verbal and non-verbal that minimize psychological and physical distance between the teacher and student in the classroom (Anderson, 1979). The context in which psychological and physical distance may be reduced according to Cooper & Simons (2003) occurs in two dimensions simultaneously: 1) the content level; and 2) the relationship level.

The content level (verbal) includes informational messages in the form of words spoken to student, while the relationship level comprises non-verbal messages accompanying the content.

The latter may reveal emotional data such as how an individual perceives the relationship, or how the speaker may view himself/herself, or how the speaker views the one spoken to (Cooper & Simons, 2003).

In addition, Sime (2006) infers that non-verbal gestures are the outgrowth of verbal communication. Non-verbal gestures emanate from speech and are used to help decode communication patterns. For instance, during their interaction with students, instructors unconsciously make gestures with their "hands, arms, or head" (p. 212). Therefore, successful student learning is dependent upon the student's correct interpretation of the teacher's non-verbal and verbal gestures. In some instances, the non-verbal and verbal signals generated by teachers occur without the teacher taking notice of them (Babad & E. Bernieri, F., 2000).

Another notion is that non-verbal immediacy is linked with the speaker's thoughts (Sime, 2006). This position suggests that effective teachers will develop positive thoughts and attitudes toward their students. Severin & Tankard (2001) report that an attitude consists of three components the affective, cognitive and behavioral. For example, the affective component constitutes feelings a teacher may have toward a student, the cognitive component includes beliefs a teacher may have concerning a student; and the behavioral component includes the actions (verbal and non-verbal communication) directed toward a student. This construct suggests that teacher non-verbal and verbal immediacy stems from an attitude formed in the affective and cognitive components of the attitude model.

Consequently, it is important for science and math teachers in urban middle schools to practice non-verbal immediacy skills that heighten positive attitudes and liking for subject matter presented in each class period.

Although the field of communication within the classroom has been under scrutiny for decades, psychologists, educators, and communication specialists are only beginning to comprehend the settle nuances of teacher behavior and its impact upon student academic engagement. In summary, the literature review presented findings from research in the field of educational psychology and communication. It discusses urban school climates and its possible effects on both teachers and students. In addition, research findings highlighting differences between preferred learning styles for boys and girls are presented. Furthermore, prominent interventions assisting students in attaining higher academic levels in math and science, and in developing better perceptions concerning STEM (science, technology, engineering, and math) disciplines are discussed. Most significantly, the literature review presents research findings surrounding caring teacher behaviors and its reported effect upon student perceptions of ability to perform well in a given subject.

Method

This study was conducted to describe how urban middle school students evaluate their science and math teachers' behaviors and to examine relationships between student views of science and math teacher behaviors and student self reports of achievement in science, mathematics, and language arts.

Population

The population for this study consisted of urban middle school boys and girls in grades 7-9 who attend a middle school in Western New York. One-hundred and one (101) students participated in the study (seventy-two girls and twenty nine boys). Respondents were from low-income households and qualified for the free lunch program offered by the US Department of Education. Students who attend the middle school reside in the inner city and either walk or take a bus to school. In addition, respondents were familiar with their teachers' since the questionnaire was distributed at the end of the 2005-2006 school year.

Instrumentation

A modified version of the Teacher Behavioral Questionnaire developed by She & Fisher (2002) was used to gather student responses concerning perceptions of teacher behaviors. The instrument consists of 21 items on a 5 point Likert like scale with 1 being "Almost Never" and 5 being "Almost Always". The scale was grouped into five categories: 1. Challenging (items 1-4), 2. Encouragement and Praise (items 5-7), 3. Non-Verbal Support (items 8-11), 4. Understanding and Friendly (items 11-14) and, 5. Controlling (items 15-18).

One scale for each student perception of ability in math, science, and language arts represents items 19-21.

<u>Data Collection</u>

A letter of intent to explain the proposed research, and a copy of the survey instrument was submitted to the Rochester City School District to the attention of Dr. Mike Christman. Since this research fit within the parameters of normal school activities a letter of consent from parents for students wishing to complete a questionnaire was not required. This rationale was presented to Rochester Institute of Technology's IRB board and was also accepted.

Following approval from both entities to proceed, the researcher contacted the middle school, spoke with the principal by phone and met with her to discuss the research project in detail.

Two hundred copies of the instrument were distributed to students by school staff and the researcher. Students were informed that their participation was voluntary and that their names or opinions would not negatively impact them in any way. Copies of the completed survey instrument are on file and may be accessed upon request.

Results

The purpose of this study is to evaluate student perceptions of their math and science teacher's behaviors and to determine any differences in the way in which boys and girls view their own abilities in math and science. In addition, the research examined relationships between students' perceptions of their teacher behaviors and perceptions of their own abilities in these areas.

A total of 101 students (girls, n=72, boys, n=29) from 7th, 8th, and 9th grade participated in the study (7th grade boys, n=20, 8th grade girls n=16,9th grade boys, n=9, 9th grade girls, n=9). Statistical summary charts which define results are found in Appendix A.

Question 1

Q1: Do urban middle school boys and girls maintain different perceptions concerning their math and science teachers' behaviors?

Challenging

Items 1-4 asked students to consider how their teacher's questions facilitated their ability to analyze and retain concepts. Mean responses and p values derived from a T-test found no statistical differences between mean responses for boys and girls. These findings suggest that boys and girls hold similar views of teachers' behaviors (challenging).

Encouragement and Praise

The next series of items (5-7) were designed to evaluate students' perceptions of their teachers' administration of praise. Findings from the analysis deduced that there were no statistically significant differences between mean responses for each grade and gender.

Nonverbal Support

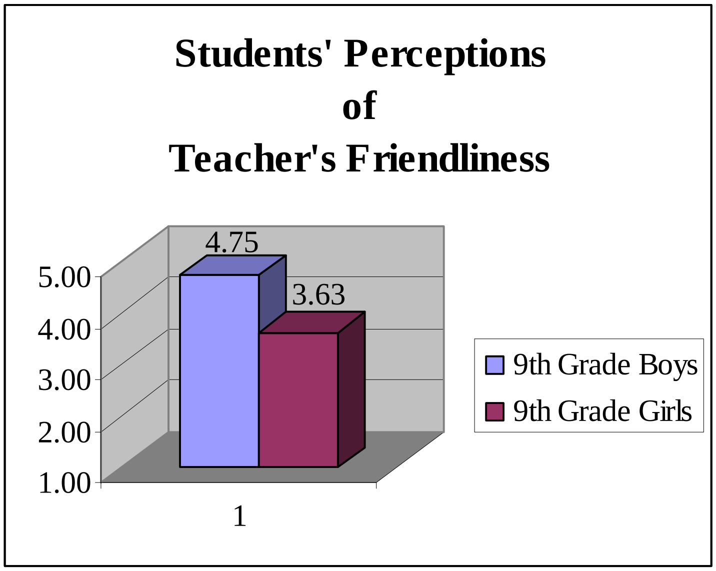
There are also no significant statistical differences with respect to items 8-10 measuring nonverbal support.

While the means differed (boys= 3.11, girls=3.67), the p value is greater than 0.5.

Understanding and Friendly

For item 14 which states, "My teachers are friendly to me.", the 9th grade boys and girls ranked their teachers differently (boys, M=4.75, and girls M=3.63). These mean responses were found to be statistically different and yielded a p value of 0.004. In addition, a statistical difference was found for perceptions reported by the 9th grade boys and 7th grade girls. Figure 1 and Figure 2 show 9th graders and 7th graders perceptions of teacher friendliness.

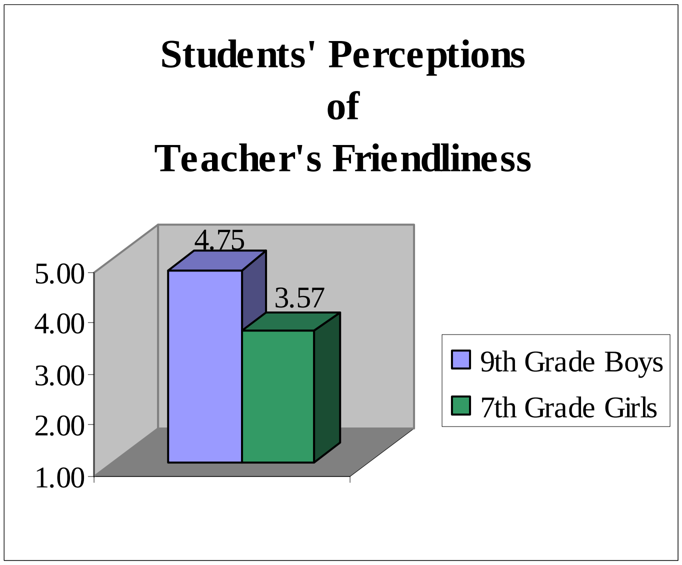
Figure 1



This graph represents students' responses to the following statement:
"My teachers are friendly to me."

1=Almost Never, 2=Seldom, 3=Sometimes,
4=Often, 5=Almost Always

Figure 2



This graph represents students' responses to the following statement:
"My teachers are friendly to me."

1=Almost Never, 2=Seldom, 3=Sometimes,
4=Often, 5=Almost Always

Controlling

Items 15-17 asked students to evaluate their teachers' standards for classroom behavior. Boys and girls rated their instructors' behaviors similarly, and no significant statistical differences were found. Item 16 which states, "My teachers expect me to obey instructions." had the highest mean response (M=4.33) for the *Controlling* scale.

Overall, students rated their instructors from a 3.75-4.33 on a scale of five, which was the highest mean responses for any of the five teacher behaviors.

Respect

Item 18 of the survey instrument measured students' perceptions concerning respect for their teachers' instructions. Item 18 read, "I respect my teacher's instructions." A T-test analysis of the mean responses for this scale found no statistical differences between mean responses of 7th and 9th grade boys and girls. Since the population sample did not contain eighth grade males, the 8th grade girls mean responses were compared with mean responses from the 9th grade boys and 7th grade boys. No statistical differences between mean responses for these sub populations existed.

Question 2

Q2: How do urban middle school students perceive their language arts aptitude when compared with perceptions of their math and science aptitude?

Items 19-21 expressed students' perceptions of their competency in math, science and language arts. T-tests were conducted for each sub-population by grade level, and compared mean responses given by boys and girls for items 19 to 21 of the survey instrument. The results of the analysis found that p values for boys and girls within their respective grade level (i.e. 9th grade boys and 9th grade girls, 7th grade girls and 7th grade boys) were greater than .05. These results suggest that boys and girls in grades 7 and 9 do not perceive of their language arts competency any differently than their competency in math or science. However, statistical differences in mean responses for math and science were found for the 7th grade boys and 8th grade girls and are noted in Table I.

Table I

Statistical Differences in Mean Responses
7th Grade Boys and 8th Grade Girls

Boys=0, Girls=1

Math			
Gender	Number	Mean	.Sig (two-tailed)
0	20	2.05	**.026
1	16	3.13	
Science			
0	20	2.25	**.008
1	16	3.31	

**=p value

Question 3

Q3: Is there a relationship between students' self reports of teachers' behaviors and students' self reports of academic competence?

In order to answer the above question, Spearman correlations were computed for variables representing teacher behaviors, and also for variables linked to students' self-report of academic competence. The variables *challenging, praise, nonverbal support, friendliness,* and *respect* were statistically compared with those representing students' self-reports of academic competence, and these variables included *math, science, and language arts*.

The results of the analysis indicated a strong correlation between teacher behaviors and student self reports of academic competence. While most correlations range from medium to strong, the analysis suggested that there is no relationship between teacher friendliness and self reports of academic competence for the ninth graders. Table II presents data indicating the degree of correlation that existed between each of the variables representing the students' perceived competencies and perceived teacher behaviors.

Table II

Correlations for Teachers' Behaviors

	7TH GRADE			**8TH GRADE**			**9TH GRADE**		
	M	**S**	**L**	**M**	**S**	**L**	**M**	**S**	**L**
Challenging	.803	.651	.652	.897	.941	.540	.798	.761	.885
Praise	.778	.780	.764	.946	.947	.571	.852	.728	.775
Nonverbal	.917	.845	.859	.942	.927	.751	.638	.747	.631
Friendly	.812	.805	.755	.922	.948	.713	N/A	N/A	N/A
Respect	.852	.824	.667	.956	.589	.915	.780	.872	.827

**All p values are less than .05
($p < .05$)

***M=Math
S=Science
L=Language Arts

N/A=No correlations

Discussion

Previous research has concluded that there is a relationship between teacher behaviors and student learning (Connell, 1999; McCroskey, Richmond, Bennett, 2007). Research in the field of teacher immediacy has been ongoing.

Over the past years, educational journals have published research obtained from survey instruments completed by post secondary learners. However, in recent years with the establishment of the No Child Left Behind Act focus has shifted from learning at the college level to methods to improve pedagogical practice at the secondary level.

Of particular concern are the middle school years (grades 6-8), for it is during this educational phase that students increase their knowledge of mathematics and science to prepare for advanced courses in high school and college. However, the problem as discussed in the literature review is that women and minorities are not taking the rigorous coursework required in high school to prepare for future careers in STEM. As Lee (1998) has suggested, students begin to drop out of the STEM pipeline in middle school. This means early interventions are required to maintain student interest in STEM. Teacher behaviors can be considered as an intervention, since their proper application can inspire and motivate student learning (McCroskey, Richmond & Bennett, 2006). Therefore, the purpose of this research was to examine students' perceptions of their math and science teachers' behaviors to determine similarities and differences in students' perceptions per gender or grade level.

In addition, the research examined whether a relationship existed between students' perceptions of their teachers' behaviors and their own reports of academic competence in science and math.

The population chosen for this study consisted of urban minority middle school students who according to the research are at risk for dropping out of the STEM pipeline. Results from the study found that teacher friendliness was perceived by the 9^{th} grade boys and 9^{th} grade girls differently. Perhaps, a reason for this is that boys and girls may interpret teachers' behaviors through the eyes of specific gender communication preferences. For example, the literature review discussed that girls have a preference for learning activities that are collaborative in design while boys prefer activities that are competitive. If math and science teachers conduct learning activities that are primarily competitive in nature, girls may transfer attributes of the activity directly to the personal characteristics of the instructor. Given this logic, the girls' perceived attitudes (i.e. boring, difficult) may be transferred and linked to the personal characteristics of the instructor.

Another possible factor influencing girls' perceptions of teacher friendliness is the teachers' perceived ability to relate to diverse student backgrounds. Essentially the instructor can view student diversity as an opportunity to increase personal knowledge so that he or she may engage in meaningful conversation with students. As Lee (1999) reports, teachers who wish to be acknowledged as being friendly must recognize diversity existing among classroom learners. This diversity may express itself in varied student interests that may range from celebrating culturally related holidays to basketball.

If conversations are centered on topics of interest, then girls and boys may perceive that their instructors are friendly.

Next to teacher friendliness (item 14, M=4.75), respect (item 16, M=4.33) ranked highest for mean responses linked to teacher behaviors (challenging, encouragement and praise, nonverbal support, understanding and friendly, controlling and respect).

This finding suggests that behaviors associated with the *Controlling* scale (including teacher expectations for classroom behavior and perceptions for student conduct) may have resonated most with the students. It further suggests that the school's culture and climate may support teachers' standards for classroom decorum. As the literature review discussed, it is the school's culture that sets the tone for teacher behaviors in the classroom and for student/teacher interactions. Most significantly, this finding suggests that students may have assimilated the school's culture and now possess its standards of conduct as their own.

Apart from teacher friendliness, survey results inferred that students considered their math and science teachers' behaviors to be similar. This finding maybe contrary to research presented in the literature review which reports dissimilarities between math and science instructors' interactions with boys and girls.

Math, Science and Self Reports of Competency

Using the T-test analysis, statistical differences were not found for student perceptions of academic competency for 9^{th} grade boys and girls, and 7^{th} grade boys and girls. These findings support the idea that students within their respective grade levels feel confident about their abilities in math and science. However, statistical differences were noted when the T-test compared mean scores of 8^{th} grade girls with those of 7^{th} grade boys.

Seventh grade boys perceived themselves as being more competent than the 8th grade girls in math and science. This finding suggests that the boys' perceived level of competency may be linked with methodology that meshes with boys preferred learning styles.

In addition, as 8th grade girls may be experiencing social pressures and may find science and math uninteresting for reasons previously discussed in the literature review (i.e. lack of female role models and the inability to make the connection between science, math and the real world).

Relationships Between Student Behaviors and Academic Reports of Self Competence

The results of the present research revealed significant correlations between teachers' behaviors and students' perceptions of academic competence. This finding suggests that teachers continue to play a major role in students' learning. Also, within the context of STEM careers, this finding supports the idea that technology teachers could benefit from training to assist in the development of better communication practices so that ultimately gains in standardized test scores for math and science may be realized.

Conclusion

This study examined urban middle school students' perceptions of their math and science teachers' behaviors, student self reports of academic competence, and relationships between students' self reports of academic competence and teacher behaviors. Research results indicate that urban middle school students highly esteem both classroom rules and their instructors.

In addition, the study determined that boys and girls hold similar views concerning their math and science teachers' behaviors. This finding suggests that the gap between boys and girls educational outcomes in science and math may be narrowing. However, since girls perceive their teachers' as being less friendly than boys, instructors may wish to use pedagogical methods that appeal to both genders.

Recommendations

In the future researchers addressing STEM, teacher behaviors, and student perceptions should seek to develop a comprehensive set of survey items addressing student perceptions of teacher friendliness and respect. In addition, researchers may wish to conduct a study comparing urban students' perceptions of teachers' behaviors with suburban students' perceptions. Another area that could be considered in the future is the examination of one population (specifically, at risk African American middle school boys) to determine which communication and teacher immediacy behaviors resonate more with this group. It may also add to the body of research in teacher immediacy to conduct a longitudinal study that will track data over a period of time to ascertain how teacher behaviors influence STEM coursework and subsequent career choices.

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Appendix A - Approval Letter from Rochester City School District

Dear Ms. Rhyne:

This letter serves as formal Rochester City School District approval for your proposed study on students' perceptions of teacher behavior.

We approve in full your proposed survey without any modifications. Our compliments to you, as you have constructed an interesting and very useful survey. We can also confirm that as per federal guidelines, there will be no need to obtain parent consent of any kind, as the subject matter is strictly confined to instructional and teaching areas and is therefore exempt from requiring any parental consent.

Please note that schools and principals retain the right to decline participation projects such as these; we will leave it up to you to provide the incentives for schools' participation.

When you obtain approval from your Research Subjects Review Board, please forward it to our department, where we will keep it on file.

Lastly, when you are completed, we would appreciate a copy of your findings; it is something that almost certainly will merit distribution.

We wish you the best of luck on your endeavor. If you have any questions, please contact my liaison for projects such as these, Andrew MacGowan, III, Project Administrator, Department of Research, Evaluation and Testing, at Andrew.MacGowan@rcsdk12.org, or at (585) 262-8369.

Very truly yours,
Michael S. Christman, Ed.D.,
Managing Director

Appendix B – Survey Instrument

Part I.

INSTRUCTIONS: Think about the math and science teachers you have had over the past few years and respond to each statement below. Circle your choices.

	Almost Always	Seldom	Sometimes	Often	Never
My teachers ask questions that cause me to carefully analyze information.	1	2	3	4	5
My teachers ask questions that cause me to apply what I have learned in class.	1	2	3	4	5
My teachers ask questions that cause me to combine information that I have learned.	1	2	3	4	5
My teachers ask questions that cause me to understand what I have learned in class.	1	2	3	4	5
My teachers praise me for asking a good question.	1	2	3	4	5
My teachers praise my answers.	1	2	3	4	5
My teachers use my ideas as part of the lesson.	1	2	3	4	5
My teachers nod their heads to show their understanding of my opinion.	1	2	3	4	5
My teachers show support for me through their facial expressions.	1	2	3	4	5
My teachers show enthusiasm about my answer through their facial expressions.	1	2	3	4	5
If I have something to say, my teachers will listen.	1	2	3	4	5

	Almost Always	Seldom	Sometimes	Often	Never
My teachers realize when I do not understand.	1	2	3	4	5
My teachers are patient with me.	1	2	3	4	5
My teachers are friendly to me.	1	2	3	4	5
My teacher's standards of behavior are very high.	1	2	3	4	5
My teachers expect me to obey instructions.	1	2	3	4	5
My teachers insist that I follow rules.	1	2	3	4	5
I respect my teachers' instructions.	1	2	3	4	5

Part II.

Circle your gender: Male Female

Circle your current grade: 7th 8th 9th

Part III.

Rate your abilities in the following subjects:

Math

Easy……………………………………………………….Very Difficult
1 5

Your Answer:________

Science

Easy……………………………………………………….Very Difficult
1 5

Your Answer:________

Language Arts/English

Easy……………………………………………………….Very Difficult
1 5

Your Answer:________

Appendix C – Tables

Table 1 – Group Statistics
7th Graders Perceptions of Challenging Behaviors

(Questions per item Q1="My teachers ask questions that cause me to carefully analyze information", Q2="My teachers ask questions that cause me to apply what I have learned in class", Q3="My teachers ask questions that cause me to combine information", Q4="My teachers ask questions that cause me to understand to understand what I have learned in class")

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Chlng_1	0	20	3.70	1.081	0.242
	1	44	3.50	0.876	0.132
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Chlng_2	0	20	4.00	1.124	0.251
	1	44	3.77	1.075	0.162
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Chlng_3	0	20	3.70	1.261	0.282
	1	44	3.91	1.137	0.171
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Chlng_4	0	20	3.90	1.373	0.307
	1	44	3.75	1.014	0.153

Table 2 – Independent Samples Test
7th Graders Perceptions of Challenging Behaviors

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Chlng_1	Equal variances assumed	1.898	0.173	0.786	62	0.435	0.200	0.254	-0.309	0.709
	Equal variances not assumed			0.726	30.825	0.473	0.200	0.275	-0.362	0.762
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Chlng_2	Equal variances assumed	1.284	0.262	0.773	62	0.443	0.227	0.294	-0.361	0.815
	Equal variances not assumed			0.760	35.395	0.452	0.227	0.299	-0.380	0.834
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Chlng_3	Equal variances assumed	0.430	0.514	-0.659	62	0.512	-0.209	0.317	-0.843	0.425
	Equal variances not assumed			-0.634	33.627	0.531	-0.209	0.330	-0.880	0.462

Table 2 - Independent Samples Test (continued)
7th Graders Perceptions of Challenging Behaviors

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Chlng_4	Equal variances assumed	1.948	0.168	0.490	62	0.626	0.150	0.306	-0.463	0.763
	Equal variances not assumed			0.437	28.820	0.665	0.150	0.343	-0.552	0.852

Table 3 (Group Statistics)
7th Graders Perceptions of Encouragement and Praise Behaviors

(Questions per item Q1="My teachers praise me for asking a good question", Q2="My teachers praise my answers", Q3="My teachers use my ideas as part of the lesson".

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Q1_Praise	0	20	3.15	1.182	0.264
	1	45	2.87	1.290	0.192
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Q2_Praise	0	19	2.79	1.273	0.292
	1	47	3.02	1.225	0.179
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Q3_Praise	0	20	2.85	1.424	0.319
	1	47	2.85	1.215	0.177

Table 4 – Independent Samples Test
7th Graders Perceptions of Encouragement and Praise Behaviors

Boys=0, Girls=1

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Q1_Praise	Equal variances assumed	0.084	0.773	0.838	63	0.405	0.283	0.338	-0.392	0.959
	Equal variances not assumed			0.867	39.635	0.391	0.283	0.327	-0.377	0.944

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Q2_Praise	Equal variances assumed	0.410	0.524	-0.689	64	0.494	-0.232	0.337	-0.904	0.441
	Equal variances not assumed			-0.677	32.227	0.503	-0.232	0.342	-0.929	0.465

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Q3_Praise	Equal variances assumed	1.281	0.262	-0.003	65	0.998	-0.001	0.342	-0.684	0.681
	Equal variances not assumed			-0.003	31.355	0.998	-0.001	0.365	-0.744	0.742

Table 5 – Group Statistics
7th Graders Perceptions of Nonverbal Support Behaviors

(Questions per item Q1="My teachers nod their heads to show their understanding of my opinion.," Q2="My teachers show support for me through their facial expressions.", Q3="My teachers show enthusiasm about my answer through their facial expressions."

Boys=0, Girls=1

	Gender	N	Mean	Std. Deviation	Std. Error Mean
NonVrbQ1	0	20	3.45	1.317	0.294
	1	46	3.37	1.271	0.187
	Gender	N	Mean	Std. Deviation	Std. Error Mean
NonVrbQ2	0	19	3.58	1.071	0.246
	1	44	3.23	1.138	0.172
	Gender	N	Mean	Std. Deviation	Std. Error Mean
NonVerbQ3	0	20	3.10	1.373	0.307
	1	46	3.26	1.273	0.188

Table 6 – Independent Samples Test
7th Graders Perceptions of Nonverbal Support Behaviors

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
NonVrbQ1	Equal variances assumed	0.034	0.855	0.234	64	0.816	0.080	0.344	-0.607	0.768
	Equal variances not assumed			0.230	35.082	0.819	0.080	0.349	-0.628	0.789
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
NonVrbQ2	Equal variances assumed	0.044	0.834	1.145	61	0.257	0.352	0.307	-0.262	0.966
	Equal variances not assumed			1.174	36.250	0.248	0.352	0.300	-0.256	0.959
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
NonVerbQ3	Equal variances assumed	0.016	0.900	-0.461	64	0.646	-0.161	0.349	-0.858	0.536
	Equal variances not assumed			-0.447	33.856	0.658	-0.161	0.360	-0.892	0.570

Table 7 – Group Statistics
7th Graders Perceptions of Understanding Behaviors

Q1="If I have something to say, my teachers will listen, Q2="My teachers realize when I do not understand, Q3="My teachers are patient with me"

Boys=0, Girls=1

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Understanding_Q1	0	20	3.55	1.356	0.303
	1	47	3.43	1.193	0.174
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Understanding_Q2	0	20	3.55	1.356	0.303
	1	47	3.30	1.284	0.187
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Understanding_Q3	0	20	3.75	1.209	0.270
	1	47	3.43	1.193	0.174

Table 8 – Independent Samples Test
7th Graders Perceptions of Understanding Behaviors

Q1="If I have something to say, my teachers will listen.", Q2="My teachers realize when I do not understand.,
Q3="My teachers are patient with me."

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Understanding Q1	Equal variances assumed	0.853	0.359	0.375	65	0.709	0.124	0.332	-0.538	0.787
	Equal variances not assumed			0.356	32.136	0.724	0.124	0.350	-0.588	0.837
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Understanding Q2	Equal variances assumed	0.083	0.774	0.723	65	0.472	0.252	0.349	-0.444	0.948
	Equal variances not assumed			0.707	34.200	0.484	0.252	0.356	-0.472	0.976
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Understanding Q3	Equal variances assumed	0.005	0.944	1.015	65	0.314	0.324	0.320	-0.314	0.963
	Equal variances not assumed			1.009	35.508	0.320	0.324	0.321	-0.328	0.977

Table 9 - Group Statistics
7th Graders Perceptions of Expectations for Classroom Behavior (Controlling)

Q1="My teachers standards of behavior are very high.", Q2="My teachers expect me to obey instructions."
Q3="My teachers insist that I follow the rules."

Boys=0, Girls=1

Gender		N	Mean	Std. Deviation	Std. Error Mean
Controlling_Q1	0	20	4.35	1.089	0.244
	1	46	3.87	1.024	0.151
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Controlling_Q2	0	20	4.25	1.070	0.239
	1	45	4.24	1.026	0.153
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Controlling_Q3	0	20	4.25	1.070	0.239
	1	46	4.26	1.063	0.157

Table 10 - Independent Samples Test
7th Graders Perceptions of Expectations for Classroom Behavior (Controlling)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference: Lower	95% Confidence Interval of the Difference: Upper
Controlling Q1	Equal variances assumed	0.260	0.612	1.718	64	0.091	0.480	0.280	-0.078	1.039
	Equal variances not assumed			1.676	34.276	0.103	0.480	0.287	-0.102	1.063
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Controlling Q2	Equal variances assumed	0.158	0.692	0.020	63	0.984	0.006	0.279	-0.553	0.564
	Equal variances not assumed			0.020	35.165	0.985	0.006	0.284	-0.571	0.582
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Controlling Q3	Equal variances assumed	0.311	0.579	-0.038	64	0.970	-0.011	0.285	-0.581	0.559
	Equal variances not assumed			-0.038	36.015	0.970	-0.011	0.286	-0.591	0.569

Table 11 – Group Statistics and Independent Samples Test
7th Graders Perceptions of Respect

Question 1: "I respect my teachers' instructions."

Boys=0, Girls=1

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Respect	0	20	3.85	1.424	0.319
	1	46	4.11	1.100	0.162

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Respect	Equal variances assumed	3.374	0.071	-0.801	64	0.426	-0.259	0.323	-0.904	0.386
	Equal variances not assumed			-0.724	29.300	0.475	-0.259	0.357	-0.989	0.472

Table 12 – Group Statistics
9th Graders Perceptions of Challenging Behaviors

(Questions per item Q1=”My teachers ask questions that cause me to carefully analyze information”, Q2=”My teachers ask questions that cause me to apply what I have learned in class”, Q3=”My teachers ask questions that cause me to combine information”, Q4=”My teachers ask questions that cause me to understand to understand what I have learned in class”)

Boys=0, Girls=1

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Challenging_Q1	0	9	3.11	1.364	0.455
	1	9	3.33	1.323	0.441
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Challenging_Q2	0	4	3.50	0.577	0.289
	1	8	2.63	1.302	0.460
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Challenging_Q3	0	8	3.50	1.195	0.423
	1	8	4.13	0.991	0.350
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Challenging_04	0	9	3.67	1.658	0.553
	1	8	4.13	0.991	0.350

Table 13 – Independent Samples Test
9th Graders Perceptions of Challenging Behaviors

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Challenging Q1	Equal variances assumed	0.082	0.778	-0.351	16	0.730	-0.222	0.633	-1.565	1.121
	Equal variances not assumed			-0.351	15.985	0.730	-0.222	0.633	-1.565	1.121

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Challenging Q2	Equal variances assumed	5.952	0.035	1.259	10	0.237	0.875	0.695	-0.673	2.423
	Equal variances not assumed			1.610	9.985	0.139	0.875	0.543	-0.336	2.086

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Challenging Q3	Equal variances assumed	0.000	1.000	-1.139	14	0.274	-0.625	0.549	-1.802	0.552
	Equal variances not assumed			-1.139	13.536	0.275	-0.625	0.549	-1.806	0.556

Table 13 – Independent Samples Test Continued
9th Graders Perceptions of Challenging Behaviors

		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Challenging Q4	Equal variances assumed	7.797	0.014	-0.680	15	0.507	-0.458	0.674	-1.895	0.979
	Equal variances not assumed			-0.700	13.272	0.496	-0.458	0.654	-1.869	0.953

Table 14 – Group Statistics
9th Graders Perceptions of Nonverbal Support Behaviors

(Questions per item Q1="My teachers nod their heads to show their understanding of my opinion.," Q2="My teachers show support for me through their facial expressions.", Q3="My teachers show enthusiasm about my answer through their facial expressions."

Boys=0, Girls=1

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Nonverbal_Q1	0	9	3.11	1.364	0.455
	1	9	3.67	1.225	0.408
Nonverbal_Q2	0	9	3.33	1.000	0.333
	1	8	3.13	0.835	0.295
Nonverbal_Q3	0	9	3.11	0.601	0.200
	1	8	3.13	0.835	0.295

Table 15 – Independent Samples Test
9th Graders Perceptions of Nonverbal Support Behaviors

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Nonverbal Q1	Equal variances assumed	0.886	0.361	-0.909	16	0.377	-0.556	0.611	-1.851	0.740
	Equal variances not assumed			-0.909	15.817	0.377	-0.556	0.611	-1.852	0.741
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Nonverbal Q2	Equal variances assumed	1.480	0.243	0.463	15	0.650	0.208	0.450	-0.751	1.168
	Equal variances not assumed			0.468	14.955	0.647	0.208	0.445	-0.741	1.157
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Nonverbal Q3	Equal variances assumed	0.075	0.788	-0.040	15	0.969	-0.014	0.350	-0.759	0.731
	Equal variances not assumed			-0.039	12.598	0.970	-0.014	0.357	-0.787	0.759

Table 16 - Group Statistics
9th Graders Perceptions of Encouragement & Praise Behaviors

(Questions per item Q1="My teachers praise me for asking a good question.", Q2="My teachers praise my answers.", Q3="My teachers use my ideas as part of the lesson."

Boys=0, Girls=1

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Praise_Q1	0	9	3.44	1.424	0.475
	1	9	3.33	1.323	0.441
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Praise_Q2	0	8	3.00	1.309	0.463
	1	9	3.22	1.093	0.364
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Praise_Q3	0	9	2.56	1.424	0.475
	1	8	3.38	0.744	0.263

Table 17 - Independent Samples Test
9th Graders Perceptions of Encouragement & Praise Behaviors

Boys=0, Girls=1

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Praise_Q1	Equal variances assumed	0.200	0.661	0.171	16	0.866	0.111	0.648	-1.262	1.485
	Equal variances not assumed			0.171	15.914	0.866	0.111	0.648	-1.263	1.485
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Praise_Q2	Equal variances assumed	0.079	0.783	-0.382	15	0.708	-0.222	0.582	-1.464	1.019
	Equal variances not assumed			-0.377	13.743	0.712	-0.222	0.589	-1.488	1.043
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Praise_Q3	Equal variances assumed	12.918	0.003	-1.457	15	0.166	-0.819	0.562	-2.018	0.379
	Equal variances not assumed			-1.510	12.338	0.156	-0.819	0.543	-1.998	0.359

Table 18 - Group Statistics
9th Graders Perceptions of Understanding Behaviors

Q1="If I have something to say, my teachers will listen.", Q2="My teachers realize when I do not understand.", Q3="My teachers are patient with me."

Boys=0, Girls=1

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Understanding_Q1	0	9	3.89	1.537	0.512
	1	9	3.44	1.236	0.412
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Understanding_Q2	0	9	3.67	1.658	0.553
	1	9	4.22	0.833	0.278
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Understanding_Q3	0	9	3.89	1.054	0.351
	1	9	3.33	1.225	0.408

Table 19 - Independent Samples Test
9th Graders Perceptions of Understanding Behaviors

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Understanding Q1	Equal variances assumed	0.420	0.526	0.676	16	0.509	0.444	0.657	-0.949	1.838
	Equal variances not assumed			0.676	15.298	0.509	0.444	0.657	-0.954	1.843

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Understanding Q2	Equal variances assumed	4.091	0.060	-0.898	16	0.382	-0.556	0.619	-1.867	0.756
	Equal variances not assumed			-0.898	11.798	0.387	-0.556	0.619	-1.906	0.795

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Understanding_ Q3	Equal variances assumed	0.241	0.630	1.031	16	0.318	0.556	0.539	-0.586	1.697
	Equal variances not assumed			1.031	15.653	0.318	0.556	0.539	-0.588	1.699

Table 20 - Group Statistics & Independent Samples Test
9th Graders Perceptions of Friendly Behaviors

Q1="My teachers are friendly to me."

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Friendliness Q1	0	8	4.75	0.707	0.250
	1	8	3.63	1.302	0.460

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Friendliness Q1	Equal variances assumed	7.118	0.018	2.147	14	0.050	1.125	0.524	0.001	2.249
	Equal variances not assumed			2.147	10.797	0.055	1.125	0.524	-0.031	2.281

Table 21 - Group Statistics & Independent Samples Test
9th Grade Boys & 7th Grade Girls Perceptions of Teachers' Friendliness

Q1: "My teachers are friendly to me."

Boys=0, Girls=1

Friendliness	0	8	4.75	0.707	0.250
	1	46	3.57	1.068	0.157

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Friendliness	Equal variances assumed	5.080	0.028	3.013	52	0.004	1.185	0.393	0.396	1.974
	Equal variances not assumed			4.010	13.327	0.001	1.185	0.295	0.548	1.821

Table 22 - Group Statistics
9th Graders Perceptions of Expectations for Classroom Behavior (Controlling)

Q1="My teachers standards of behavior are very high.", Q2="My teachers expect me to obey instructions."
Q3="My teachers insist that I follow the rules."

Boys=0, Girls=1

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Controlling_Q1	0	9	3.78	0.667	0.222
	1	8	3.75	0.707	0.250
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Controlling_Q2	0	9	4.33	0.707	0.236
	1	9	4.33	1.000	0.333
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Controlling_Q3	0	9	3.89	1.453	0.484
	1	9	4.44	0.882	0.294

Table 23 - Independent Samples Test
9th Graders Perceptions of Expectations for Classroom Behavior (Controlling)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Controlling_Q1	Equal variances assumed	0.058	0.812	0.083	15	0.935	0.028	0.333	-0.683	0.738
	Equal variances not assumed			0.083	14.507	0.935	0.028	0.334	-0.687	0.743
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Controlling_Q2	Equal variances assumed	0.405	0.533	0.000	16	1.000	0.000	0.408	-0.865	0.865
	Equal variances not assumed			0.000	14.400	1.000	0.000	0.408	-0.873	0.873
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Controlling_Q3	Equal variances assumed	3.941	0.065	-0.981	16	0.341	-0.556	0.567	-1.757	0.645
	Equal variances not assumed			-0.981	13.190	0.344	-0.556	0.567	-1.778	0.667

Table 24 - Group Statistics and Independent Samples Test
9th Graders Perceptions of Respect

Question 1: "I respect my teachers' instructions."

Boys=0, Girls=1

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Respect	0	9	3.56	1.236	0.412
	1	9	3.89	1.269	0.423

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Respect	Equal variances assumed	0.094	0.764	-0.564	16	0.580	-0.333	0.591	-1.585	0.919
	Equal variances not assumed			-0.564	15.989	0.580	-0.333	0.591	-1.585	0.919

Table I
Statistical Differences in Mean Responses
7th Grade Boys and 8th Grade Girls

Boys=0, Girls=1

Math			
Gender	Number	Mean	.Sig (two-tailed)
0	20	2.05	**.026
1	16	3.13	
Science			
0	20	2.25	**.008
1	16	3.31	

**=p value

Table II
Correlations for Teachers' Behaviors

	7TH GRADE			8TH GRADE			9TH GRADE		
	M	**S**	**L**	**M**	**S**	**L**	**M**	**S**	**L**
Challenging	.803	.651	.652	.897	.941	.540	.798	.761	.885
Praise	.778	.780	.764	.946	.947	.571	.852	.728	.775
Nonverbal	.917	.845	.859	.942	.927	.751	.638	.747	.631
Friendly	.812	.805	.755	.922	.948	.713	N/A	N/A	N/A
Respect	.852	.824	.667	.956	.589	.915	.780	.872	.827

**All p values are less than .05
($p < .05$)

***M=Math
S=Science
L=Language Arts

N/A=No correlations