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Student and Teacher Perceptions of Teacher Immediacy Behaviors and the Influence of Teacher Immediacy Behaviors on Student Motivation to Learn Science

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Student and Teacher Perceptions of Teacher Immediacy Behaviors and the Influence of Teacher Immediacy Behaviors on Student Motivation to Learn Science

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Abstract

Student Perceptions of Teacher Immediacy Behaviors and the Influence of Teacher Immediacy Behaviors on Student Motivation to Learn Science, Littlejohn, Vania, 2012: Dissertation, Gardner Webb University, Immediacy/Teacher Verbal and Nonverbal Immediacy Behaviors/Student Motivation/Affective Learning in Science

The National Assessment on Educational Progress signals that American students are not being adequately prepared to compete globally in an ever changing scientific society. As a result, legislation mandated that all students be assessed and show proficiency in scientific literacy beginning in Grade 4 with the reauthorization of the Elementary and Secondary Education Act of 2002 also known as No Child Left Behind. Research indicates a disturbing decline in the number of U.S. students pursuing more rigorous science courses in high school, majoring in scientific areas in college, and choosing future careers in science. With a need to improve science instruction and enhance science literacy for all students, this study focuses on immediate communication behaviors of the classroom teacher as a deciding factor in the opinions of high school students towards science. The purpose of this study was to reveal high school science student perceptions of teacher communication patterns, both verbal and nonverbal, and how they influence their motivation to learn science.

The researcher utilized a nonexperimental, quantitative research design to guide this study. Teacher and student data were collected using the Teacher Communication Behavior Questionnaire (TCBQ). The Student Motivation to Learn Instrument (SMLI) across gender, ethnicity, and socioeconomic status survey was used to evaluate student motivation in science. Participants were encouraged to be honest in reporting and sharing information concerning teacher communication behaviors.

The data revealed that teacher immediacy behaviors, both verbal and nonverbal, were perceived differently in terms of student gender, ethnicity, and socioeconomic class. The results showed that teachers who display positive communication behaviors and use challenging questioning followed with positive responses create pathways to potentially powerful relationships. These relationships between teachers and students can lead to increased student motivation and academic achievement in the science classroom.

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Chapter 1: Introduction

Background Information

The United States faces a new, and more complex, economic future in which past assumptions are no longer valid, and proposed solutions for government, financial institutions, commerce and industry, and people are evolving almost daily (Jackson, 2009). Our national ability to contend with the consequences of global trends, the imperative for global competitiveness, and, indeed, the revival of our own economy, will rest largely upon our ability to bring scientific knowledge effectively to bear on the multiple challenges we face (Jackson, 2009). This will occur through the new discoveries and innovations that give birth to new thinking, and to the creation of thriving new enterprises, and the rejuvenation of existing industries (Jackson, 2009). These demand a robust contingent of scientists, engineers, mathematicians, and technological professionals (Jackson, 2009).

While there will be competition for federal resources, U.S. Congresswoman and House Minority Leader, Nancy Pelosi and the assembled leaders concurred in 2009 that investing in science is the most important investment we could make for progress in health, education, energy security, national security, and job creation (Jackson, 2009). Congresswoman Pelosi pledged that an economic recovery package must emphasize science, as well as public works, as a path forward for the nation (Jackson, 2009).

Despite the global recession, the U.S. must work to decrease its deficit in the number of individuals pursuing careers in science, technology, engineering, and math (STEM) fields (Carey, 2008). The United States in underrepresented in STEM fields by women, African Americans, Hispanics, and American Indians (Carey, 2008). The country's global competiveness relies heavily on its ability to attract and retain future

generations in areas such as biology, chemistry, physical science, mathematics, and the computer sciences (Carey, 2008).

In 1969, The National Assessment of Educational Progress (NAEP) was initiated as the primary means for tracking the long-term achievement trends of 9, 13, and 17 year olds in science. Although performance on assessments of science achievement by the National Assessment of Educational Progress (NAEP) has improved since the 1970s, few students are attaining levels deemed proficient or advanced by a national panel of experts (National Science Foundation, 2002). Science performance on the NAEP long-term trend assessment declined in the 1970s, increased during the 1980s and early 1990s, and has remained mostly stable since that time (National Science Foundation, 2002).

The NAEP (2000) science assessment results provided alarming evidence which suggests that most of our students are not being prepared for the challenges ahead. Results from the 2000 National Assessment of Educational Progress (NAEP) science assessment show no significant change since 1996 in Grades 4 and 8, and a 3-point decline in students' average score at Grade 12. In 2000, an average 62% of males tested scored at or above basic proficiency, whereas 58% of females tested scored at this same level or higher. Caucasian students scored highest, on average, with 72% of students scoring at or above basic proficiency. An average 62% of Asian students scored at or above the basic level of proficiency in comparison with 27% of African American students, 36% of Hispanic students, and 47% of American Indian students. Students who were eligible for free/reduced price school lunch, an indicator of poverty, had an average scale score that was 25 points lower than the scores for students who were not eligible for free/reduced price school lunch (National Center for Educational Statistics, 2005).

These results signal that the U.S. is not adequately preparing students to face

future challenges in a world that increasingly demands its citizens be scientifically literate (United States Department of Education 2008). With the most recent results reported in 2009, the National Assessment of Educational Progress (NAEP), also known as The Nation's Report Card, states that only 34% of the nation's fourth graders, 30% of eighth graders, and 21% of twelfth graders are performing at or above the proficient level in science, meaning that less than one-half of students in the United States are demonstrating academic performance and competency over challenging subject matter (NAEP, 2009).

On the 2007 TIMSS science assessment, U.S. fourth-graders' average score (539) was higher than the average science scores of fourth graders in 25 of the 35 other participating educational systems, such as Italy, Norway, Indonesia, and Turkey, but lower than the scores of Chinese Taipei, Hong Kong SAR, Japan, and Singapore. In 2007, U.S. eighth-graders' average science score (520) was higher than the average scores of eighth graders in 35 of the 47 other educational systems, but again lower than the scores of Chinese Taipei, the Czech Republic, England, Hungary, Japan, the Republic of Korea, the Russian Federation, Slovenia, and Singapore (Gonzales, Williams, Roey, Kastberg, & Brenwald, 2007).

Current efforts in science education are failing to prepare the general masses of American students to compete in a global society, as illustrated by TIMSS (1996), Gonzales et al. (2007) and NAEP (2000). The performance of U.S. students continues to rank substantially below that of foreign students, thereby enabling more opportunities for foreign advances in basic science to continue to rival and exceed America's efforts (Broad, 2004).

Academic performance and interest in secondary science is lower in the United

States than in prior years and the choice of a science major in universities across the United States continues to decline (Business-Higher Education Forum [BHEF], 2007; Elster, 2007; National Academy of Sciences, 2005). Within the last 2 decades small gains have been observed in the number of female graduates at the university level in science (Heylin, 2008). However, the largest gains have been in the number of doctoral non-U.S. citizen science graduates (Heylin, 2008). By graduation, men outnumber women in nearly every science and engineering field, and in some such as physics, engineering, and computer science the difference is dramatic, with women earning only 20% of bachelor's degrees. Furthermore, representation of women in science and engineering continues to decline at the graduate level and yet again in the transition to the workplace (Hill, Corbett, & St. Rose, 2010). In 2006, women earned almost one-half of the doctorates in the biological and agricultural sciences; around one-third of the doctorates in earth, atmospheric, and ocean sciences, chemistry; and approximately one-fifth of the doctorates in computer science, engineering, and physics (Hill et al., 2010).

In addition to gender, ethnicity has also played a factor in the decline of American students pursuing science careers. It has been shown that Blacks and Hispanics in American high schools are less likely than Whites to enroll in advanced science courses, even when they attend the same schools (Ferguson, 2007, chapter 6). Recent results of the National Center for Education Statistics (NCES) National Assessment of Educational Progress (NAEP) Transcript Study demonstrate significant differences in the science courses that high school students of differing race/ethnicity complete. For high-level science or physics courses, 62% of Asian/Pacific Islander graduates completed these courses, compared to 46%, 34%, and 32% of White, Black, and Hispanic graduates, respectively (NCES, 2007).

Adelman (1999) determined that college completion is most likely when students take high intensity and high quality coursework during high school. He suggested that high quality coursework should prepare students with the information and skills that higher education institutions would expect of them prior to entrance. Adelman (1999) noted that enrollment in such courses not only prepares students for college, but also helps students complete college prerequisites. Nevertheless, until these disparities in course enrollments are addressed they will continue to perpetuate racial achievement gaps (e.g., Braddock & Slavin, 1993; Golderg, Passow, & Justman, 1966; Oakes, 1983, 1985, 1987).

In an effort to strengthen a nationwide failing educational system, the reauthorization of the Elementary and Secondary Education Act of 2002, also known as No Child Left Behind (NCLB) (United States Department of Education, 2004) requires that all students be assessed and show proficiency in reading and math. In an effort to close the science achievement gap, legislation passed a mandate requiring that by the 2007-2008 school year, all states must administer science assessments to students in three different grade ranges: third to fifth, sixth to ninth, and tenth to twelfth (United States Department of Education, 2004). In North Carolina, the first statewide operational end-of-grade tests of science were administered in the spring of 2008 with Grades 5 and 8 (North Carolina Department of Public Instruction, 2004).

In accordance with the increased importance given to scientific literacy (*Science for All Americans [SFAA]*, *Benchmarks for Scientific Literacy [Benchmarks]*, and *National Science Educational Standards [NAES]*) and the heightened NCLB requirements, the state of Delaware in agreement with the *Delaware State Testing Program (DSTP)* began assessing students' science knowledge as early as Grade 4

beginning with the 2007-2008 school year in an effort to demonstrate student proficiency.

Standardized testing has become the means of accountability for students across the nation. As a result, the emphasis placed on state standardized assessments in science, now beginning as early as Grade 4, has not only impacted curriculum changes, but is consequently often blamed for stifling interest, motivation, and understanding in science (Settlage & Meadows, 2002; Stiggins, 2004; Yager, 2000). Due to increased pressure placed on educators to show proficiency and growth in student achievement on standardized tests, there is a growing concern that teachers are no longer teaching for depth and understanding, but simply are practicing testing and memorization drills (National Center for Fair and Open Testing, 2007).

In today's schools, students are not given many opportunities to explore, interact with peers, or use their own creativity to learn. With such a focus on testing, activities and learning experiences that are most likely to excite students are being excluded (Carey, 2008). When failing to take into account student motivation and engagement in learning, high-stakes testing policies fail to engage students who are most likely to drop out of school (National Center for Fair and Open Testing, 2007). This may explain why national assessments of performance of students during the past decade reveal moderate improvement in basic skills and show students' poor performances continuing on tests that require critical thinking and problem-solving skills such as forming hypotheses, making inferences, and drawing conclusions (Riley, 1999).

The majority of the jobs America's students will have in the future do not exist as of yet (National Academy of Sciences, 2008). This situation magnifies the need to be able to problem solve effectively and to think critically, skills of vital importance. Research by Musella (2004) indicates a disturbing decline in the number of U.S. students majoring in

scientific areas while the number of jobs requiring science is growing. The demand for engineers and scientists is growing at a rate four times faster than the need for other types of labor (Newton & Scott, 2008). With the rapid expansion of knowledge and sophisticated technology, greater demands have been placed on workers to adapt and learn quickly to prepare for scientific advances into the 21st century.

An analysis by the National Academies Institute of Medicine (National Research Council [NRC], 2003) of student motivation at the high school level revealed that many students in high school often lack any sense of purpose or real connection with what they are doing in the classroom (Gehring, 2003). Research by Harter (1981) indicates that "during the middle grades, students often exhibit a disturbing downturn in motivation" (p. 86). In a longitudinal study conducted by Gottfried, Fleming, and Gottfried (2001), results suggest that academic intrinsic motivation declines in the areas of math, science, reading, and school in general for the same students at ages 9, 10, 13, 16, and 17.

This decline has been specifically documented in the area of science (Hidi & Harackiewicz, 2000; Singh, Granville, & Dika, 2002; Wigfield, Eccles, & Rodriguez, 1998). In fact, after analyzing numerous surveys and interviews of middle school students, Speering and Rennie (1996) revealed that most middle school students anticipate high school science to be exciting, hands-on, and fun. However, in reality, these students soon discover that science lessons in high school often involve teacher lecture, note-taking, and textbook generated assignments; all of which can result in a lack of interest from students. As a result, high school students often see science as boring, difficult, and basically irrelevant to happenings in their everyday lives (Lunetta, 1998; Yerrick, 2000).

Project 2061 (American Association for the Advancement of Science [AAAS],

1989) established the goal for all students to possess a positive attitude toward science. Previous studies have revealed that students' attitudes toward science may have an effect on students' motivations, interests, and achievements in the sciences, as well as on their enrollment in elective science courses and other science related behaviors (Koballa & Crawley, 1985; Laforgia, 1988; Rennie & Punch, 1991; Shrigley, 1990). The lack of student interest in science at the secondary level may be to blame for lower achievement in science as well as fewer students choosing science as a major in college (Texas Education Agency [TEA], 2007). As students decide whether to pursue science beyond high school, motivation is believed to be a vital component in the support and development of a lifelong interest in scientific learning for students of all ethnic backgrounds (National Research Council, 2000).

In order to improve teacher effectiveness, it is imperative that science teachers understand the need to maximize student motivation within the science classroom. Suggested approaches to help teachers become more effective include an enthusiastic presentation that communicates excitement to students (Murdock & Miller, 2003; Theobald, 2006), building rapport with students to demonstrate teacher caring (Coleman, 2001), and creating a positive classroom climate conducive to learning (Theobald, 2006). However, if teachers do not take notice of what motivates their students to learn, more and more students will continue to fail academically.

Teachers are identified as key factors in making learning effective (Nasr, Booth, & Gillett, 1996). According to Whitaker (2004), the main variable in the classroom is not the student, but the teacher. Great teachers have high expectations for their students, but even higher expectations for themselves (Whitaker, 2004). These teachers recognize the importance of establishing a positive teacher-student relationship by connecting

emotionally with their students. The inability to emotionally connect with students cripples the possibility of influencing unmotivated minds to learn (Whitaker, 2004). "A fundamental question for a student is 'Does my teacher like me?' Given a rigorous, aligned curriculum, the answer to that simple question is our best predictor of student achievement" (Terry, 2008, p. 1*).* A student wants to feel connected to people and to feel as though he or she deserves to be loved and respected (Stipek, 2002). According to Stipek (2002), many of the children who are not doing well academically are the same ones who have a poor relationship with their teachers.

Therefore, in order to facilitate learning, a classroom atmosphere in which the students do not feel threatened or intimidated is needed (Boyle, 2000). Despite the emphasis on instructional strategies and content preparation, the promotion of a positive, enjoyable classroom experience can actually be a predictor of content understanding (Wilson, 2006). In a supportive classroom climate where a teacher creates an atmosphere of warmth, safety, acceptance, and genuineness with his or her students, the student becomes a more self-initiated, self-confident, self-directed, and less anxious learner (Rogers, 1983). Shaughnessy (1991) recommended an educational climate consisting of communication, consensus, consistency, clarity, coherence, consideration, community, cohesiveness, commitment, concern, care, and cooperation. As a result, students experience the comfort and enjoyment of learning, and more positive instructional outcomes are likely to occur (Banfield, Richmond, & McCroskey, 2006; Sorensen & Christophel, 1992).

Knowing that motivation and achievement can be highly correlated (DiPerna & Elliott, 1999; DiPerna, Volpe, & Elliott, 2005; Whang & Hancock, 1994), it is critical that students maintain an optimal level of motivation. Research has shown a positive

correlation between teacher immediacy behaviors and student motivation (Christopel, 1990; Menzel & Carrell, 1999; Rodriguez, Plax, & Kearney, 1996; Witt & Wheeless, 2001). These teacher immediacy behaviors can be characterized by the psychological availability to students, thereby providing a relationship in which students perceive the instructor as available and welcoming (Mehrabian, 1969).

Teacher immediacy behaviors are defined as approachable behaviors between communicators which result in the perception of interpersonal closeness, warmth, and friendliness (Rodriguez et al., 1996). Immediacy has also been linked to attentive, response, and reaction to unplanned events in the classroom resulting in little, if any, time for reflection (Arends, 1998).

When teachers demonstrate immediacy behaviors as defined by Rodriguez et al. (1996), they create through verbal and nonverbal forms of communication a supportive classroom climate in which students feel encouraged and accepted (Frymier, 1994; Frymier & Weser 2001; Li, 2003; Witt & Wheeless, 2001). Guided by the immediacy principle that "people are drawn toward persons and things that they like, evaluate highly, and prefer" (Mehrabian, 1971, p.1), students have consistently reported to like teachers that exhibit immediacy behaviors (Andersen, 1979; Andersen, Norton, & Nussbaum, 1981; Kearney, Plax, & Wendt-Wasco, 1985; Rodgers & McCroskey, 1984). Woolfolk and Brooks (1985) suggested that teachers' nonverbal immediacy behaviors play a major role in developing and maintaining student cooperation in the classroom. Validating this relationship, Kearney, Plax, Smith, and Sorensen (1988) found that students were more willing to comply with teachers who demonstrated immediacy behaviors.

Statement of the Problem

With an increasing number of students choosing to limit or end their science

studies while still in high school, a decrease in student enrollment of rigorous science courses and a lack of interest in science related careers has developed. This study explored the relationship between teachers' verbal and nonverbal immediacy behaviors in relation to students' motivation for learning science.

As students embark upon the 21st century, it is detrimental that today's American high schools are not adequately preparing the masses of these students to be the leaders of tomorrow's world in science and technology. The teachers in our high schools are the ones who must be depended upon to teach and assure mastery of the "concepts and vocabulary outlined in the standards," as well as assure that students acquire and develop "the key cognitive strategies necessary to think like scientists" (Educational Policy Improvement Center [EPIC], 2007, p. 42). In an effort to prepare scientifically literate citizens for the future, public high schools have expanded requirements in science to meet the demands of national standards (TEA, 2007). However, simply requiring more science does not ensure that students will have an interest in the discipline or pursue a career in the sciences.

Expanding the science curriculum may provide more choices for students, but there is no guarantee that students will remain or become interested in science. The placement of influential, qualified, and effective science teachers in the classroom who connect with their students may be more important than just offering additional courses. "Teaching science requires a hands-on, minds-on, and hearts-on approach," because "they [students] need to have good attitudes toward science to learn it better" (Ekman, 1998, p. 23).

For years, researchers have been wrestling with traits of effective teachers (Brophy, 2004; Rosenshine & Furst, 1973). Often, effective teacher traits are linked with

perceivably unchangeable constructs such as personality (Clayson, 1999). Perhaps by capitalizing on certain aspects of teachers in the vein of improving the quality of teachers, student achievement will also increase.

Almost completely absent from the research is any attempt to determine how high school students describe an effective science teacher. Research is needed that will examine the provider-consumer (teacher-student) interaction in the classroom from the student perspective. This interaction is a key factor in student achievement, motivation, and engagement, but too often the student perspective is not investigated (Osborne & Collins, 2001; Rodgers & Raider-Roth, 2006). The rationale of this study is to examine teacher verbal and nonverbal immediacy behaviors as positive teacher characteristics that can motivate and intrigue the interest of secondary science students from the student perspective.

Purpose of the Study

The amount of research on the effects of teacher immediacy behaviors in secondary science education is minimal. Therefore, the purpose of this study was to investigate teacher and student perspectives on the motivation of high school science students and to explore specific teacher immediacy behaviors used by teachers as they attempt to enhance student motivation.

Research Questions

Four hypotheses emergent from the literature and research review of verbal and nonverbal instructor immediacy behaviors underpin the nine research questions of this study.

The first hypothesis is that students, irrespective of their gender, ethnicity, or socioeconomic status, perceive their science instructors' verbal and nonverbal immediacy

behaviors differently. In a like manner, the second hypothesis is that students' perceptions of their science instructors' verbal and nonverbal immediacy behaviors, irrespective of their gender, ethnicity, or socioeconomic status, have no influence or impact on student achievement. The third hypothesis is that teachers who demonstrate verbal and nonverbal immediacy behaviors impact student motivation to learn. Lastly, the fourth hypothesis is that teachers, irrespective of their ethnicity, gender, or age, perceive their verbal and nonverbal immediacy behaviors differently.

In concert with the four hypotheses, nine research questions have been developed. They are:

1. Is there a difference of verbal and nonverbal instructor immediacy behaviors, student motivation, and student achievement by student gender?

2. What are the verbal and nonverbal instructor immediacy behaviors, student motivation, and student grades by student ethnicity?

3. What is the student motivation to learn and achievement based on teacher verbal and nonverbal immediacy behaviors as categorized by student socioeconomic status?

4. Is there a difference between student motivation to learn and student achievement based on perceived verbal and nonverbal teacher immediacy behaviors as categorized by student socioeconomic status?

5. What is the relationship between high school science students' perceptions of teacher immediacy behaviors and their motivation to learn science?

6. Is there a difference within and between student motivation to gender, ethnicity, and socioeconomic status?

7. Is there a difference of verbal and nonverbal instructor immediacy behaviors

and teacher ethnicity?

8. Is there a difference of verbal and nonverbal instructor immediacy behaviors and teacher gender?

9. Is there a difference within and between teacher communication to ethnicity, gender, and age?

Significance of the Study

Research has not revealed specific reasons for the decline in the number of university science graduates or the decrease in the number of students enrolling in science courses in college. According to the Texas Education Agency (2007), a lack of interest in science and scientific careers appears to be a factor. Thus, considering the idea that student disinterest in science may be predeterminant of poor science achievement and a possible reason fewer individuals are choosing a science career, it is imperative to determine why students are disinterested in secondary and postsecondary science in order to address the issue of student achievement.

Science education research must also include the student perspective in determining how best to accomplish both the promotion of interest and the mastery of content. Students (especially secondary) are rarely asked to describe an effective teacher even though student input should be both expected and encouraged (Desai, Damewood, & Junes, 2001). Students know best what promotes and retains their interest. Therefore, the current urgency for improving international and national progress in science achievement provides an opportunity for research to investigate the added value of explicitly using teacher immediacy behaviors in the classroom.

This study explored the relationship between student motivation for science and teacher immediacy behaviors. The information gained from this study will assist teachers,

principals, and administrators or professional development experts in effectively designing instructional methods to improve students' conceptual understandings that will ultimately impact student achievement (Cohen & Hill, 1998; Fennem, Carpenter, Franke, Jacobs, & Empson, 1996). An understanding of teacher immediacy behaviors, both from teachers' and students' perspectives, may help promote effective classroom communication that will impact student motivation to learn and translate into improved student achievement (Cirillo & Herbel-Eisenmann, 2006). The differences in teachers' perceptions of teacher immediacy behaviors may necessitate effective professional development opportunities that will equip teachers with the proper techniques to effectively communicate with their students, thereby shedding a new light on the field of teaching and learning.

On a broader scale, the possible lessons learned from this study will provide the higher educational system, particularly teacher preparation programs, with needed insight as to the impact and importance of teacher immediacy behaviors on student motivation. As a result, teacher education programs and the teaching profession, particularly in North Carolina, will see the benefit of shifting their curriculum to more actively incorporating affective teaching techniques through the use of teacher immediacy behaviors.

Limitations

There are several limitations acknowledged in this study. The first limitation exists due to the fact that the results are not generalizable to other classrooms unless they are in a similar school setting with the same context and population of students. As suggested by Padgett (1998), becoming saturated with information about the subject is accomplished by an emphasis on quality rather than quantity. Although the results of this study cannot necessarily be generalized to the larger population (Guba & Lincoln, 1985),

the foundation of case study research is particularization rather than generalization because the goal of the researcher is to understand and emphasize the uniqueness of a particular case (Stake, 1995). As a result, this research was limited to secondary level science students. Therefore, perceptions of other age groups may differ.

A second limitation to this study is the participant's potential loss of recall when surveying their teacher from the previous semester. Thirdly, a 40-question survey could have resulted in fatigue factors for some students in the study. A fourth limitation of the study is the researcher being a science teacher at the school in which the participants for the study were selected. Although the student participants were not current members of the researcher's class, some of the students previously knew the researcher by name from having been in her class the previous year. A fifth limitation is student perceptions of teacher immediacy behaviors may not indicate actual teacher immediacy behaviors, so the validity of these instruments could be problematic.

A sixth limitation is the issue of self-report data in the survey phase of this study. Though children as young as 8 years old have accurately reported data on attitudes measures (Alderman, 2004), there is always a concern that self-report data may not be truly representative of the participants' actual motivations, perceptions, or views. A seventh limitation to this study is the sensitive nature of the topic. Asking students to report their perceptions of teacher behaviors can be sensitive not only for students, but also for teachers.

Lastly, a critical limitation to this study could have been the cultural background of the students. Language barriers could have prevented student understanding of the survey questions. In a like manner, culture might have affected how a particular student perceived his or her teacher's behaviors. For example the nature of the questions could

have caused some students to be less likely to provide ratings of their teachers based on the position of the teacher's authority and the respect the student has for that authority.

Operational Definitions

Constructs represented within this study are defined and clarified below.

Ethnicity. As defined by Kottack (2002), cultural characteristics, affiliation, and identification that connects a particular group of people to each other.

Extrinsic motivation. Defined as the desire to be involved in an activity only to finish the assignment (Pintrich & Shunk, 2002; Wiseman & Hunt, 2001)

Immediacy skills. As defined by Mehrabian (1971), could create physical or psychological closeness between individuals. Mehrabian (1971) stated that, "people are drawn toward persons and things they like, evaluate highly, and prefer; and they avoid or move away from things they dislike, evaluate negatively, or do not prefer" (p. 1). Merhabian posited that immediacy skills were communication techniques that consisted of eye contact, gestures, body movements, facial expressions, and posture.

Intrinsic motivation. Defined as the desire to be involved in an activity purely for its own sake (Deci & Ryan, 1991; Wiseman & Hunt, 2001).

Nonverbal communication. "Often called 'body language' in the popular vernacular, is assumed to include gestures, facial expressions, body movement gaze, dress, and the like to send messages" (Knapp & Miller, 1994, p. 8).

Student motivation. As defined by Brophy (2004), a tool used by researchers to clarify the degree to which pupils show effort and interest in their pursuits, regardless of whether these tasks are desired by the teacher.

Verbal communication. As defined by Gorham (1988), included using humor, asking questions, telling personal stories, calling students by name, giving positive

feedback, and relaying self-disclosure.

Summary

In brief, Chapter 1 described the overall researcher's problem being addressed, independent and dependent variables, nature of the study, theoretical base, operational definitions, limitations, and significance of the study. The review of related literature and research on teacher verbal and nonverbal immediacy behaviors and science motivation are presented in Chapter 2. The literature clearly states its relation to the problem statement as expressed in the research questions and hypotheses. Chapter 3 includes the participants, research design, instrumentation, and materials used in data collection and analysis of this study. The results of data, analysis of findings from the quantitative phase, and tables to explain the outcomes are presented in Chapter 4. Chapter 5 contains a summary of findings from the study, conclusions, a discussion, implications for social change, and recommendations for future studies.

Chapter 2: Review of the Related Literature

History of Immediacy

In 1986, Brophy and Good concluded that (a) teachers do make a difference in the classroom; (b) it is a myth that anyone can teach; (c) effective teachers combine positive expectations for themselves, their classes, and their students; (d) effective teachers design effective academic tasks with their students; and (e) effective teachers motivate their students with an enthusiastic style of teaching (Nussbaum, 1992). Hurt, Scott, and McCroskey (1978) further explained that there is a difference between knowing and teaching, and that difference is communication in the classroom, therefore suggesting that teaching well is a function of good communication.

West (1994) identified a framework for communication in high school classrooms, stating that students ultimately determine what constitutes productive educational experiences. His study revealed that students perceived positive teacher communication experiences as helping with school, personal, and family matters. The students perceived negative teacher communication experiences as embarrassment, unjustified discipline, unwanted aggression, inappropriate affection, and unrealistic expectations (West, 1994). The communicative student-teacher relationship is critical to the learning-teaching process, and an important component of this relationship is immediacy (Andersen, 1978, 1979; Richmond, Gorhman, & McCroskey, 1987).

Within the last 3 decades, educational researchers have agreed that the classroom behavior of individual teachers does have a significant impact on student learning (Nussbaum, 1988). These behaviors once referred to by educational researchers as teacher enthusiasm or teacher expressiveness (Abrami, Leventhal, & Perry, 1982; Ware & Williams, 1975), have been acknowledged by communication researchers as

immediacy behaviors. Instructional communication scholars overwhelmingly agree that immediacy is an effective behavior that instructors must consider and utilize (Richmond, Lane, & McCroskey, 2006). Immediacy is defined as behaviors that reduce the physical or psychological distance between communicators (Mehrabian, 1971). Mehrabian (1967) suggested that these behaviors will reduce the distance between individuals and enhance closeness to one another. The behaviors that make up the immediacy construct "indicate an approach orientation towards others, resulting in interpersonal closeness, sensory stimulation, warmth, and friendliness" (Plax, Kearney, McCroskey, & Richmond, 1986, p. 45).

Based on the approach-avoidance theory from social psychology, Mehrabian (1971) asserted that people are drawn toward persons or things they like and avoid things they do not prefer. Immediacy behaviors may simply offer a limited number of concrete ways to communicate to students that their instructors like them (Wilson & Taylor, 2001). Students view teachers that are more immediate to be more positive and effective. In addition, students with more immediate teachers have greater positive affect toward the instructor and the course (Andersen, 1979; Andersen et al., 1981; Andersen & Withrow, 1981; Gorham, 1988). This positive effect, in turn, produces a reciprocal liking among teacher and student (Chaiken, Gillen, Derlega, Heinen, & Wilson, 1978; Kearney et al., 1988; Plax et al., 1986).

West (1994) suggested that teacher immediacy behaviors are critical in student learning because higher levels of perceived immediacy improve students' approach behaviors, increase levels of enthusiasm and commitment to the learning task, promote student arousal that enhances motivation, and ultimately increase student learning (Christophel & Gorham, 1995; Frymier, 1994). In order to highlight this research, verbal

immediacy, nonverbal immediacy, and their effect on student motivation to learn and teacher effectiveness are discussed below.

Verbal Immediacy

Verbal teacher immediacy refers directly to stylistic verbal expressions used by teachers to develop within students a degree of like or dislike towards the teacher. Typical verbal immediacy behaviors include humor, addressing students by name, using personal examples and experiences, and initiating a willingness to engage in conversations with students before, after, or outside of class (Ellis, 1995; Frymier, 1993; Frymier, 1994; Gorham, 1988; Montomery, 1981; Neuliep, 1995; Sanders & Wiseman, 1990). More specific examples include syntactic expressions of present or past tense verbs, probability (will vs. may), ownership statements (my/our class), and inclusive references (we vs. I) (Rubin, Palmgreen, & Sypher, 1994).

Verbal immediacy has shown to have a positive impact on relationships with student motivation, perceived cognition, and affective learning as well as increased student willingness to participate in and contribute to class discussions (Christensen, Curley, Marquez, & Menzel, 1995; Christophel, 1990; Menzel & Carrell, 1999). Verbal immediacy, when applied to teaching, appears to increase student cognitive, affective, and behavioral learning (Christophel, 1990; Gorham & Christophel, 1990; Gorham & Zakahi, 1990; Plax et al., 1987; Powell & Harville, 1990; Sanders & Wiseman, 1990).

Research has indicated that verbal immediacy behaviors are positively correlated with student motivation (Christensen & Menzel, 1998; Christophel, 1990; Christophel & Gorham,1995; Frymier, 1993, 1994), self-reported perceptions of amount learned (Christensen & Menzel, 1998; Gorham,1988; Gorham & Zakahi, 1990; Menzel & Carrell, 1999; Rodriguez et al., 1996), evaluations of the course (Andersen, 1979;

Gorham & Zakahi, 1990), and evaluations of the instructor (Andersen, 1979; Andersen et al., 1981; Moore, Masterson, Christophel, & Shea,1996).

Several researchers (Christophel, 1990; Gorham, 1988; Kearney et al., 1985; Powell & Harville, 1990; Sanders & Wiseman, 1990; Titsworth, 2004; Witt & Schrodt, 2006) examined the relationship between teacher verbal immediacy behaviors and student cognitive, affective, and/or behavioral learning, and reported significant correlations between variables.

Expanding on previous studies concerning teacher verbal and nonverbal immediacy behaviors (Andersen, 1979; Mehrabian, 1967, 1981; Richmond et al., 1987), Gorham (1988) conducted a study to identify the classroom effectiveness of specific teacher-to-student verbal immediacy behaviors, highlighting the relationship between student perceptions of teacher immediacy and student cognitive and affective learning. Through the use of a 20-item verbal immediacy and 14-item nonverbal immediacy survey Gorham's results indicated a significant relationship between both verbal and nonverbal teacher immediacy behaviors and student learning, regardless of class size or message type, showing a significant correlation with both student perceptions of cognitive learning and student affective learning.

Furthermore, this study showed the use of verbal and nonverbal immediacy behaviors are most effective when used together rather than separately. Many authors agree that the immediacy of teachers, combining both verbal and nonverbal constructs, appears to increase student liking for instructors, decrease student apprehension, and increase overall student liking for the course and subject matter (Butland & Beebe, 1992; Plax et al., 1986; Rodriguez et al., 1996).

Nonverbal Immediacy

Nonverbal communication, "…often called 'body language' in the popular vernacular, is assumed to include gestures, facial expressions, body movement gaze, dress and the like to send messages" (Knapp & Miller, 1994, p. 8). Nonverbal immediacy behaviors include positive head nod, close physical distances, vocal expressiveness, smiling, eye contact, relaxed body position, and using gestures while lecturing (Andersen, 1979; Richmond et al., 1987). Other nonverbal cues which have been identified as immediate include friendliness, gesturing or a dynamic delivery, decreased physical distance with students, socially appropriate touch, vocal variation and vocal expressiveness, professional physical appearance, and spending time with students before and after class (Comstock, Rowell, & Bowers, 1995; Frymier, 1993; Kearney, Plax, Hays, & Ivey, 1991; McCroskey, Richmond, Sallinen, Fayer, & Barraclough, 1995; Neuliep, 1995; Sanders & Wiseman, 1990).

Nonverbal immediacy has been defined as the implicit use of closeness-inducing behavioral cues (Andersen, 1979), associated with approachability and availability for communication, and also with increased sensory stimulation, interpersonal warmth, and closeness (Andersen, 1985). Nonverbal immediacy is largely a relational language perceived to convey affective feelings of warmth, closeness, and belonging (Richmond et al., 1987). Nonverbal immediacy increases student motivation to learn, and in turn increases student cognitive learning and information recall (Allen & Shaw, 1990; Gorham & Christophel, 1990; Gorham & Zakahi, 1990; Powell & Harville, 1990).

Not only does nonverbal immediacy increase affective learning (Kearney et al., 1985; Plax et al., 1986; Stewart & Wheeless, 1987), but nonverbal immediacy also increases students' perceptions of teacher effectiveness (Andersen et al., 1981; Butland &

Beebe, 1992; Collier & Powell, 1990; Sorensen, 1989), and teacher use of control strategies (Kearney et al., 1985; Kearney et al., 1988). Based on previous studies, several researchers agree that teachers who do not exhibit nonverbal immediacy behaviors frequently are thought to project avoidance, dislike, coldness, and interpersonal distance (Kearney et al., 1988).

Andersen's (1979) research findings posited and supported several hypotheses, including a positive relationship between teacher nonverbal immediacy and student affect and behavioral commitment to the course. Using survey data collected from student participants, Andersen developed the Behavioral Indicants of Immediacy Scale (BII). Through three separate studies, Andersen et al. (1981) tested the BII and noted a significant correlation between teacher nonverbal immediacy and perceived teacher communicator style, and student perception of instructor communicator style and cognitive, affective, and behavioral learning. Implementing again the use of survey data collected from student participants, researchers found students as more likely to report teachers as effective educators when students perceived said teachers as highly immediate and open communicators. This relationship is further supported by Plax et al.'s (1986) findings of a positive correlation between students' perceptions of teachers' nonverbal immediacy behaviors and students' affective learning.

Richmond et al. (1987) created and tested the Nonverbal Immediacy Scale, consisting of 14 teacher-to-student immediacy behaviors, concluding a significant association between teacher immediacy behaviors and student cognitive learning. Building on previous studies concerning immediacy, student motivation, and learning (Andersen, 1979; Gorham, 1988), Christophel (1990) sought to understand the extent to which teacher immediacy and student motivation are predictors of learning. Christophel

(1990) applied a split-class methodology using two separate studies for data collection to ward against "potentially inflated correlations" and allow for a comparison of data between both studies (p. 338). Study I required students (primarily undergraduate) to complete three instruments: Trait and State Motivation Scales consisting of 12 bipolar adjectives describing their feelings towards school in general (trait) and a specific class (state); an Immediacy Behavior Scale, based on Gorham's (1988) verbal and Richmond et al.'s (1987) nonverbal immediacy behaviors; and both Cognitive and Affective Learning Scales (Gorham, 1988; McCroskey, Richmond, Plax, & Kearney, 1985; Richmond et al., 1987; Scott & Wheeless, 1975). Study II applied the aforementioned split-class model, assigning approximately equal halves of classes to complete either a combination of motivation and immediacy or motivation and learning scales. Through these findings, Christophel (1990) successfully demonstrated the direct effects of teacher immediacy on student state motivation and of state motivation on student learning, clearly supporting "the interrelated nature of immediacy, motivation, and learning" (p. 335).

Types of Motivation

Intrinsic motivation. Researchers define intrinsic motivation as the desire to be involved in an activity purely for its own sake (Deci & Ryan, 1991; Wiseman & Hunt, 2001). At the core of intrinsic motivation lies the desire to seek and conquer academic challenges (Raffini, 1996). Because it is contextual by nature, intrinsic motivation changes often with the modification of views over time and changing circumstances (Linnenbrink & Pintrich, 2002); yet it is also considered to be durable and self-enhancing (Kohn, 1993; Strong, Silver, & Robinson, 1995). The literature provides evidence that students who are intrinsically motivated persist when facing failure, take on challenging

tasks, exhibit creativity, and remain engaged in cognitive tasks for a greater period of time than students who are motivated by extrinsic rewards (Ormond, 1995).

Students preparing for the transition to the postsecondary world from middle school to high school need to become more intrinsically motivated (Thompson & Thornton, 2002). Thompson and Thornton (2002) explained that incoming high school freshman for most of their lives have been motivated to do things from external pressure and support, usually that of the parent(s). The advent of high school forces the necessity for more self-motivation due to the rigors of courses taken, balancing emerging sociality (Wigfield & Eccles, 2000), and preparing for their movement into society (Longley, 1997).

Ellis (2004) found that instructors who display immediacy behaviors increase student motivation to learn. More specifically she reported that instructors who exhibit confirmation behaviors, behaviors that confirm student understanding, increase student intrinsic motivation to learn. In the Ellis (2004) study, two sets of instructor behaviors were used. The first set of instructor behaviors were used to explain a task and the second set of behaviors were used to demonstrate an increase in the interpersonal relationship between the instructor and student.

The confirmation behaviors addressed the instructor's task of covering class material and included taking time to answer student questions fully. The instructor behavior used to increase interpersonal relations with students involved the answering of student questions in a polite manner. This study is of importance to understanding teacher immediacy behaviors and student motivation to learn because it demonstrates that instructors can display immediacy behaviors to increase student motivation to learn, while covering class material. It is important for instructors to realize that displaying

immediacy behaviors does not take time away from their classroom teaching, but serves as an additive to the learning process.

Research supports increasing intrinsic motivation rather than extrinsic motivation for instructors to increase learning with students. Shim and Ryan (2005) found that external rewards are less effective for student motivation to learn than internal motivational factors. They found that grades are an external motivational factor that can drastically decrease student motivation to learn. However, they found that internal goals are more effective for increasing student motivation to learn. Students should have mastery goals for themselves in classes. When students accomplish personal goals in a class, their motivation is likely to increase more than students who solely receive grades for tasks and assignments completed (Shim & Ryan, 2005).

Chance (1992) suggested that rewards which are intrinsic in nature are generally successful reinforcers of learning because they have the innate ability to teach on their own. Intrinsic learning is especially appealing because it has the potential of translating into such desirable behaviors as exerting effort, choosing challenging tasks, and exhibiting persistence (Ferrer-Caja & Weiss, 2002). Research suggests that students are more intrinsically motivated to observe and learn when what they are experiencing assists them in solving life's problems (Swanson, 1995).

Extrinsic motivation. Another type of motivation exhibited by students in the classroom is referred to as extrinsic motivation. Researchers define extrinsic motivation as the desire to be involved in an activity only to finish the assignment (Pintrich & Shunk, 2002; Wiseman & Hunt, 2001) which is external to the student or to the task (Strong et al., 1995). Some researchers go so far as to refer to extrinsic motivation as coercion or bribery with no permanent results (Kohn, 1993). However, research indicates

that for certain students, extrinsic tools are necessary to initiate engagement with the hope that the strategy will eventually result in motivation that is more intrinsic in nature (Theobald, 2006).

Literature also suggests that although extrinsic motivation can be effective in some situations, reliance solely on external factors to produce a lasting commitment to a task has proven to be counterproductive (Daniels & Arapostathis, 2005; Kohn, 1993). In fact, extrinsic motivation has traditionally been perceived as the "bad boy" of motivational theories (Strong et al., 1995, p. 9).

Motivation with extrinsic rewards has been shown to actually undermine the intrinsic motivation of students (Kohn, 1993). Certainly the use of rewards can control some student behaviors, but indiscriminate use of extrinsic motivators can seriously undermine intrinsic motivation for the very behaviors and activities being controlled (Raffini, 1996).

Due to the fact that many teachers become frustrated by their inability to control student behavior, they resort to bribery and rely on it as a primary motivational strategy (Raffini, 1996). However, researchers believe that student motivation results not from extrinsic or intrinsic factors exclusively, but instead from a combination of the two types (Sansone & Harackiewicz, 2000; Skollingsburg, 2003) in coherence together to improve student motivation.

Student motivation. Student motivation is a tool used by researchers to clarify the degree to which pupils show effort and interest in their pursuits, regardless of whether these tasks are desired by the teacher (Brophy, 2004). Student motivation has been identified as a critical component to student success (Brophy, 2004; Deci, Vallerand, Pelletier, & Ryan, 1991). Former U.S. Department of Education Secretary, Terrell Bell,

stated, “There are three things to remember about education. The first is motivation. The second is motivation. The third is motivation” (Raffini, 1996, p. 9). Motivation has been defined as an internal process that arouses action, directs behavior, and results in a sustained effort over time (Howland, Laffey, & Espinosa, 1997; Wiseman & Hunt, 2001; Woolfork, 2001). Motivation also is described as the extent to which certain stimuli, objects, or events affect the occurrence or nonoccurrence of the behavior in question (Usova & Gibson, 1986). Gage and Berliner (1984) likened motivation to the engine (intensity) and steering wheel (direction) of a car.

According to Immordino-Yang and Damasio (2007), learning occurs when we “tag emotions” to the information we are acquiring or developing in the classroom (p. 5). Teachers are typically responsible for helping students with this tagging process. Immordino-Yang and Damasio argued,

> Knowledge and reasoning divorced from emotions and learning lack meaning and motivation and are of little use in the real world, simply knowing the knowledge does not imply that a student will be able to use it advantageously outside of school. (p. 5)

Student motivation in science. In the area of science, motivation is recognized as a necessity for the support of a lifelong interest in learning (National Research Council, 2000). Student motivation in science is of particular interest to researchers because of its relationship to student attitude, cognitive engagement, and academic achievement (Evans, 2004; Pintrich, Marx, & Broyle, 1993; Singh et al., 2002). Theobald (2006) indicated that the intricate task of stimulating a student’s desire to learn is one of the most significant challenges for educators in the 21st century. Many educators are frustrated and want to give up because they do not understand why students are unmotivated and do not want to

learn.

Unfortunately, the vast majority of students often view science as something that is stagnant: a myriad of boring facts that scientists know and students are required to learn (Heflich, Dixon, & Davis, 2001). As students enter high school, they typically view science as dull and tedious (Lunetta, 1998). Between the middle and high school years, the focus on learning in science shifts from one of participation to one of performance. This transition may be difficult for many students. When adolescents perceive that they do not possess the skills needed to meet such challenges, they are less likely to even attempt tasks (Csikszentmihalyi, 1990). Rinne (1998) reported that it is not the student's responsibility to motivate themselves. Instead, teachers must alter practices and make changes in the science classroom to meet the special challenges presented by unmotivated students. So it becomes the duty of secondary science teachers to meet the challenge of engaging these students (Rinne, 1998).

Educational research consistently supports the value of scientific inquiry as a motivational tool (Caton, Brewer, & Brown, 2000; Coleman, 2001). The National Research Council (NRC, 1996) defined *scientific inquiry* as the following: "…ways in which scientists study the natural world and propose explanations based on the evidence derived from their work" (p. 23). Inquiry also refers to the activities of students in which they develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world. Research has shown that in allowing students to control the directions of their investigations and mirror the work of real scientists, they not only discover important scientific concepts, but also have fun (Raloff, 1996).

When educators fail to convey to students the unpredictability and uncertainty of

science and allow them to explore scientific hypotheses, they dampen the student's natural curiosity and stifle their motivation (Genoni, 1995). Engagement as a motivational tool also has the potential to excite pupils and fill them with the wonder and amazement of scientific investigations (Evans, 2004). Furthermore, the science laboratory itself is a unique educational setting which can be used as a tool to enhance manipulative skills in the pursuit of increased student motivation (Debacker & Nelson, 2000; Hofstein & Walberg, 1995).

Researchers believe that motivation is absolutely essential to the educational process (Skollingsberg, 2003) because it gives teachers the ability to maximize learning. Frymier (1993) found that the use of immediacy behaviors may be linked to an increase in motivation for some students. Specifically, Frymier's research suggested students who begin a course with low or moderate levels of motivation may become more motivated when their teacher is highly immediate.

However, when a student is highly motivated at the onset of the course, the student will remain highly motivated regardless of the level of immediacy that was demonstrated by the teacher. Frymier's (1994) subsequent investigation which created a model for immediacy in the classroom found that the relationship between immediacy behaviors and affective learning is mediated by state motivation. When learning is increased, not only is misbehavior among students minimized (Wiseman & Hunt, 2001), but the overall learning environment in the classroom is greatly improved.

Research shows that increased motivation leads to improvement in cognitive and behavioral engagement while ultimately resulting in conceptual understanding (Patrick & Yoon, 2004). The expectation of a positive experience in secondary science has been shown to determine the attitude and motivation toward the act of learning (Singh et al.,

2002). An ideal classroom environment that promotes teaching and learning is characterized by fulfillment, enjoyment, engagement, and ownership in learning, along with an atmosphere of mutual respect between students and teachers (Clark, 1999; Goodrum, Hackling, & Rennie, 2001). A positive classroom environment created by teacher immediacy has been linked to student motivation, which reinforces the idea of affective learning.

Teacher Immediacy Behaviors and Affective Learning

Affective learning has been described as learning from focusing on a positive or negative attitude a student develops toward the subject or teacher (Christophel, 1990). Student affective learning is comprised of student attitudes that include concerns about the course, content, and instructor. Gigliotti (1987) reported that students have expectations about instructor communication behaviors such as use of examples, organization, ability to answer questions, clarity of new ideas, and the instructor's speaking ability. Gigliotti (1987) suggested that if these communication behavior expectations are met, then students experience a greater desire to learn. In addition, Bloom (1976) and Pogue and AhYun (2006) suggested that affective learning is not only dependent upon student expectations of their instructor, but also student attitudes toward recommended classroom behaviors of the course.

Allen, Witt, and Wheelers (2006) claimed that if a student already has a preconceived attitude or expectation about the subject matter or instructor teaching the course, it may ultimately affect the learning outcome of the student. Pogue and AhYun (2006) researched student attitudes on the value of content taught in courses, the credibility of the teacher, the overall equality portrayed in the classroom, the comparability to real life situations experienced in the course, the likeliness of taking a

different course offered by the instructor, and the probability of recommending the course. Pogue and AhYun (2006) predicted that when teachers practice high levels of immediacy, students will report high levels of motivation and affective learning. Their study revealed that students perceived highly immediate teachers to be credible, which in turn showed positive results in affective learning, showing a significant positive correlation between student motivation and teacher immediacy.

Affective learning associates with high levels of teacher immediacy, especially nonverbal immediacy (Andersen, 1979; McCroskey, Sullinen, Fayer, Richmond, & Barraclough, 1996; Pogue & AhYun, 2006). Measurements of affective learning often derive from student perceptions of instructor enthusiasm and expressiveness (Chesbro, 2003) and are frequently used to determine the impact of teacher immediacy on learning (Allen et al., 2006). Increased teacher immediacy can result in a desire to learn, which has been connected with a positive outcome of student understanding and recall (Allen et al., 2006).

According to Kennedy (2006), in order for students to be motivated to learn, they must want to learn. The wanting generally comes from an emotional connection between the student and the new material. Kennedy (2006) found that emotional reactions tell us what is important to learn and what to remember. Furthermore, evoked emotion drives attention, which drives learning and memory. Several studies have indicated that an emotional connection is needed to learn cognitively, affectively, and behaviorally (Kennedy, 2006; Wieder & Greenspan, 1993).

Allen et al. (2006) illustrated a connection between highly immediate teachers and affective learning. Specifically,

…results indicated a set of data consistent with the proposition that teacher

> immediacy behaviors predict or cause a level of affective learning and teacher behavior creates a motivational affective outcome that subsequently contributes to the generation of a cognitive outcome. (Allen et al., 2006)

As a result, this will simultaneously drive academic achievement and positively impact teacher effectiveness, while promoting academic success for all students.

Teacher Effectiveness

According to McCroskey, Richmond, and McCroskey (2002), effective teaching does not only lie in subject content and knowledge, it is also paramount to address how effective the communication is to the audience. Moore and Kuol (2007) reported, "Throughout most of the commentaries on what constitutes good teaching, an ability and a willingness to communicate effectively appears to be the most commonly cited factor …both by teacher and student groups" (p. 135).

Immediacy behaviors have been defined by Pogue and AhYun (2006) as one of the most important types of teacher behaviors to influence students. Allen et al. (2006) suggested, "The ability of a teacher to improve the outcomes of the educational environment by changing his or her communication behavior represents a major shift in perspective for persons studying classroom communication" (p. 22). Chesbro (2003) found teachers who exhibit immediacy behaviors tend to keep sustained eye contact, speak with vocal variety, and use positive facial expressions, which are all seen as effective communication attributes (Chanock 2005). Furthermore, Bashford (2009) noted that when one speaks, he sends out messages by other means, including smiling, frowning, body posture, head nods, and nonverbal elements of speech such as variation in pitch, quality, and tone.

Other attributes of these effective teachers include the ability to present

information visually, fluently communicate verbally, and structure information in an accessible fashion. King and Witt (2009) discussed the importance of using voice effectively and highlighted the importance of nonverbal communication including posture, movement, gesture, facial expression, and eye contact.

They continued by suggesting that body posture can offer significant insight into a whole range of human emotions. When combined with verbal and nonverbal communication, body posture can be a powerful mechanism in either enhancing or distorting student interaction or engagement. Chesbro (2003) and Cochran-Smith, Shakman, Jong, Barnatt, & McQuillan (2009) suggested that teachers who are effective in nonverbal immediacy communicate with clarity and credibility and, thus, are more successful at gaining student attention, allowing them to focus more on what is being taught.

According to McCroskey, Richmond, and McCroskey (2002), lecturers who show nonverbal immediacy behaviors are also perceived by their students as being caring, clearer, and generally better teachers than those who do not show nonverbal immediacy behaviors. They suggested that students of teachers that show immediacy behaviors are more motivated and have a higher positive affect for learning.

Summary

Chapter 2 provided a review of literature concerning teacher immediacy. Mehrabian (1971) stated, “people are drawn toward persons and things they like, evaluate highly, and prefer; and they avoid or move away from things they dislike, evaluate negatively, or do not prefer” (p. 1). Mehrabian, along with other researchers in this chapter, agreed immediacy “could create physical or psychological closeness between individuals” (p. 1). Chapter 3 will include the research design, setting, population sample,

instrumentation, and materials. Chapter 3 will also discuss data collection and analysis, and measures taken to protect the privacy and rights of all participants.

Chapter 3: Methodology

The purpose of this present study was to investigate teacher verbal and nonverbal communication behaviors identified by high school students as motivational factors to learn science. Additionally, this study wanted to determine whether there are differences by gender, ethnicity, or socioeconomic status in student perceptions of teacher verbal and nonverbal immediacy behaviors in science courses.

Research Design

The research design for the present study reflected a quantitative nonexperimental approach to aggregate data from the Teacher Communication Behavior Questionnaire (TCBQ) for both students (Appendix A) and teachers (Appendix B) and the Student Motivation to Learn Instrument (SMLI) (Appendix C). The intended questionnaires measured students' perceptions of their teachers' immediacy behaviors associated with student motivation to learn science.

Participants

The participants in this study consisted of high school science students (N=500) currently enrolled in science courses in a demographically and geographically diverse school system in North Carolina. The students represented a variety of grade levels including freshmen, sophomores, juniors, and seniors. For this present study students were asked to complete the TCBQ and the SMLI reflective on a previously enrolled science course. Science teachers (N=32) were asked to complete the TCBQ based on perceptions of their own communication behaviors.

Apparatus

Teacher Communication Behavior Questionnaire. The Teacher Communication Behavior Questionnaires (TCBQ) (Appendices A & B) for both teachers

and students were constructed by She and Fisher (1999). The instrument consists of a 40-item Likert-scale questionnaire measuring students' perceptions of teachers' immediacy behaviors. The instrument was first developed and used in Taiwan. The TCBQ instrument (Appendix A) was initially used to measure high school students' perceptions of their science teachers and teachers' perceptions of their own immediacy behaviors in the classroom (She & Fisher, 1999). The initial TCBQ included five scales (Challenging, Encouragement and Praise, Nonverbal Support, Understanding and Friendly, and Controlling), each with eight questions (She & Fisher, 2000).

According to She and Fisher (2000), the mean correlations of one scale with the other four scales ranged from 0.16 to 0.45 in previous studies. These values can be regarded as small enough to confirm the discriminant validity of the TCBQ, indicating that each scale measures a distinct, although somewhat overlapping, aspect of the teacher's communication behavior (She & Fisher, 1999, p. 8). After comprehensive analyses were conducted, the final and valid TCBQ which contained 40 items with eight items in each of the five scales was found to display satisfactory internal consistency, reliability, discriminant validity, and factor validity (She & Fisher, 1999, p. 12).

For the TCBQ to achieve reliability, a test-retest was conducted. The test-retest method is "used to assess the consistency of a measure from one time to another" (Trochim, 2006, p 2). She and Fisher's (1999) first study, which was conducted in Taiwan, established the instrument's validity as well as reliability as 0.86 to 0.93. Knowing the instrument was valid and reliable, She and Fisher (2000) conducted a similar study with 301 students in Australia to see if reliability scores would produce similar results. The reliability of the instrument was calculated using the Cronbach's alpha coefficient. The reliability scores for both studies ranged from 0.86 to 0.93. As a

result of these findings, the valid and reliable 40-item five scale questionnaire, with eight items in each scale, was established.

Student Motivation to Learn Instrument. The Student Motivation to Learn Instrument (SMLI) (Appendix C) developed by Christophel (1990) measures student motivation to learn. The measurement instrument consists of a series of 12 bipolar adjectives with each set separated by a Likert scale of 1 to 7 (1=motivated, 7=unmotivated, 1=excited, 7=not excited, 1=interested, 7=not interested, etc.), with five numbered choices between the two opposites. The student circles the number closest to the word that best represents his or her motivation toward the class. Items 1, 2, 3, 6, 10, 11 are reverse scored. Reverse scoring some items encourages the participants to read each item carefully (Christophel, 1990). Therefore, participants cannot assume that all items are stated positively or negatively.

In 1990, Christophel developed the Student Motivation to Learn Instrument used in this study and found it reliable and valid. Christophel (1990) used the 12 items with a reliability coefficient of 0.96 for the 12-item measure. The Student Motivation to Learn Measurement Instrument achieved acceptable reliability for student motivation to learn. In comparison with Christophel's (1990) observed reliability coefficients ranging from .95 to .96, Rubin, Sypher, and Palmgreen (2004) noted that Christophel's 12-item scale resulted in higher reliability estimates than did prior versions, which contained only three, four, or five items. McCroskey, Richmond, and Bennett (2006) reported a Cronbach alpha of .95 for the scale, therefore, indicating that the internal consistency and reliability of the Student Motivation to Learn Measurement was excellent.

Construct validity was also evaluated for the Student Motivation to Learn Instrument used in this study. Rubin et al. (1994), evaluators of the reliability and validity

of Communication Studies Measurement instruments previously discussed, construct validity of the Student Motivation to Learn Measurement instrument used in this study. They stated that the construct validity based upon these previous studies provides evidence that the variables are related as one would expect for a measurement instrument measuring student motivation to learn:

> Considerable evidence for the construct validity of these scales has been published. Beatty et al. (1986) found that motivation scores interacted with communication apprehension in the prediction of the duration of student speeches; the simple correlation between motivation and speech duration was .54. Other studies indicated that variations of the motivation instrument are associated with teachers' use of power strategies, teacher immediacy, and various dimensions of student learning (cognitive, affective, learning loss, etc.). (Christophel, 1990; Richmond, 1990, p. 344)

Procedure

Participant selection. Permission to conduct research and survey students was obtained through the Institutional Review Board at Gardner-Webb. Individual letters requesting school district (Appendix D), principal consent (Appendix E), teacher participation (Appendix F), and student participation consent (Appendix G) were sent via email along with an explanation of the study. Lastly, permission to use the survey instruments was obtained via email from the survey authors She and Fisher (Appendix H). Participation was voluntary from both teachers and students. Participants for this research were high school science teachers (N=32) and students (N=500) in four school districts located in North Carolina. Anonymously teachers completed the TCBQ, teacher survey, (Appendix B) while students completed the TCBQ student survey (Appendix A)

along with the SMLI (Appendix C).

Administration of surveys. The survey was administered electronically in order to simplify data collection and analysis, as well as enable the quick generation of follow-up surveys if needed (Skulmoski, Hartman, & Krahn, 2007). Science teachers were emailed the Teacher Communication Behavior Questionnaire asking for their perception of communication behavior. Informed consent was indicated by the student's choice to participate in the survey. The initial statement on the student survey explained the purpose of the survey and informed the students that all answers would remain anonymous allowing students an option to decline.

Data Analysis

The demographic questions included information identifying the student gender, age, socioeconomic status, and racial/ethnic background. Participants were also asked to provide information concerning their last completed high school science class and the grade they earned so that the relationship of student achievement and the importance of student motivation could be analyzed.

The 40-item Teacher Communication Behavior Questionnaire for both teacher and student, along with the 12-item Student Motivation to Learn Instrument generated Likert-scale data which was stored and analyzed in a Statistical Package for Social Sciences. Participants chose from a Likert-scale with answers ranging from "almost always" (5) to "almost never" (1). The assignment of numerical values to the answer choices allowed for a mean to be calculated for each response and the responses to be ranked numerically.

Using the Statistical Package for Social Sciences (Green, Salkind, & Akey, 2000), descriptive statistics, Independent Samples *t* tests, Analysis of Variance, and the Pearson

Product-Moment Correlation Coefficient were calculated. The results are reported in Chapter 4. The specific statistical procedures used in data analysis for the Teacher Communication Behavior Questionnaire and the Student Motivation to Learn Instrument are described as follows.

Analysis of Variance

Analysis of variances (ANOVA) was conducted to examine the difference between means on each factor of the Teacher Communication Behavior Questionnaire and the Student Motivation to Learn Instrument. Specifically, the ANOVA was conducted on 1) perceived teacher immediacy behaviors by student gender, ethnicity, and socioeconomic status, and 2) teacher results from all three categories to determine whether each factor and the interactions between the factors were statistically significant.

Pearson Product-Moment Correlation Coefficient

To determine the relationship, if any, between teacher immediacy behaviors and student motivation to learn, a Pearson Product-Moment Correlation Coefficient was performed. Specifically, the teacher's ability to use both verbal and nonverbal communicative behaviors to encourage high school science students to learn science and possibly pursue future careers in science were examined to determine the direction and magnitude of a relationship, if any, between student achievement and teacher immediate behaviors.

In summary, the methodology and methods employed in this study answered nine research questions. The use of descriptive statistics, Independent Samples t-test, Analysis of Variance, and Pearson Product Moment Correlation Coefficient were used to determine differences and possible causal relationships between teacher verbal and nonverbal immediacy behaviors and student motivation to learn based on gender,

ethnicity, or socioeconomic status.

Chapter 4: Results

Introduction

The purpose of this study was to identify high school science student perceptions of teacher communication patterns, both verbal and nonverbal, and how they influence student motivation to learn science.

The results of this present study are presented through a framework organized into four sections. The first section consists of a summary of the demographic characteristics of the high school science students and teachers who participated in this study. The second section includes the results of four hypotheses. The third section is divided into nine subsections. Each subsection includes one of the nine research questions, statistical analysis, and the actual results. Finally, the fourth section includes a summary of results.

Data Analysis

Table 1 summarizes all demographic data for the participants. Fifty-four surveys were sent out to high school science teachers from 12 North Carolina high schools. Representing four school systems, 32 of the 54, or 59.26% of the surveys were completed and returned. Demographic data were compiled in three areas: 1) age, 2) gender, and 3) ethnicity. Nine teachers (n=9) were age 30 and below. Eight teachers (n=8) were age 31-40. Nine teachers (n=9) were over 40. Seventeen teachers (n=17) were female, while nine (n=9) were male. Twenty four teachers (n=24) were Caucasian and two (n=2) were African American.

Table 1

Demographic Data of High School Science Teachers

	Value Label	N
Age Groups	30 and Below	9
	31-40	8
	Over 40	9
Gender	Female	17
	Male	9
Ethnicity	White	24
	Black	2

Student Demographic Information

A total of 500 high school science students from six North Carolina high schools completed the public questionnaire. Of these 500 participants, 393, or 78.6%, reported demographic information. The students' demographic information in this study included gender, ethnicity, and socioeconomic status, and academic achievement (see Table 2).

The questionnaire asked participants to identify their gender as (1) male or (2) female. Of the participants, 393 respondents, 50.6% (n=199), were female and 49.4% (n=194) were male. Participants were also asked to identify their ethnicity, which was coded as (1) Caucasian, (2) African American, (3) Hispanic American, (4) Asian American, (5) Native American, and (6) Others/Mixed/Multi.

Of the 393 respondents, 65.9% (n=259) were Caucasian, 15.77% (n=62) were African American, 7.37% (n=29) were Hispanic American, 4.07% (n=16) were Asian

American, 3.56% (n=14) were Native American, and 3.33% (n=13) were other. In addition, students were asked to select whether they participated in their school's free and reduced lunch program as an indicator of socioeconomic status. To protect student identity this was coded as (1) yes and (2) no. Of the 393 participants, 69.7% (n=274) selected no, while 30.3% (n=119) selected yes.

Table 2

Student Demographics for Gender, Ethnicity, and Socioeconomic Status

	Value Label	N
Gender	Female	199
	Male	194
Ethnicity	White	259
	Black	62
	Hispanic	29
	Asian	16
	Native American	14
	Others/Mixed/Multi	13
Free/Reduced lunch	No	274
	Yes	119

Data collected from the teacher and student TCBQ (Appendices A & B) were coded using the following scales. Teacher communication was ranked using a Likert-type scale of 1-5 where 1 equaled "almost never" and 5 equaled "almost always." The mean for this type of scale can be viewed as 3.0, answering the question as "sometimes." Each

instrument included 40 questions allowing for a minimum score of 40 (40 x 1) and a maximum score of 200 (40 x 5). Once totaled, each factor was divided by the number of items in each factor resulting in a mean score.

In addition, students completed the Motivation to Learn Instrument (Appendix C) ranking their level of motivation on a scale of 1-7, with 1 identified as least motivated and 7 being highly motivated. There were a total of 12 questions allowing for a minimum score of 12 (12 x 1) and a maximum score of 84 (12 x 7). Once totaled, each factor was divided by the number of items in each factor resulting in a mean score.

Four Hypotheses

Four hypotheses emergent from the review of literature underpin the research questions of this study. The four hypotheses are:

Hypothesis 1. Students, irrespective of their gender, ethnicity, or socioeconomic status, perceive their science instructors' verbal and nonverbal immediacy behaviors differently.

Hypothesis 2. Students' perceptions of their science instructors' verbal and nonverbal immediacy behaviors, irrespective of their gender, ethnicity, or socioeconomic status, have no influence or impact on student achievement.

Hypothesis 3. Teachers who demonstrate verbal and nonverbal immediacy behaviors impact student motivation to learn.

Hypothesis 4. Teachers, irrespective of their ethnicity, gender, or age perceive their verbal and nonverbal immediacy behaviors differently.

To test the null hypothesis, nine research questions were identified. Statistical analysis on the collected data provided information to address these nine research questions. The results from each research question are described in the following

sections.

Research Question 1

Is there a difference of verbal and nonverbal instructor immediacy behaviors, student motivation, and student achievement by student gender?

Results showed differences between male and female students. Table 3 presents the descriptive statistics per gender comparing student perceptions of communication, motivation, and academic achievement. Specifically, means and standard deviations for all three factors were statistically higher in males than females. These results indicate male students perceived their teacher communication behaviors to be highly immediate. The results also indicate males reported their academic achievement higher than female students.

Table 3

Descriptive Statistics for Student Gender

Gender:		N	Mean	Std. Deviation
Communication	Male	195	145.91	37.620
	Female	200	142.36	36.148
Motivation	Male	208	55.34	16.770
	Female	218	53.60	14.342
Grade	Male	245	1.96	1.113
	Female	246	2.01	.941

Testing for differences, an independent samples *t* test was applied to determine if student perceptions of teacher immediacy behaviors based on student gender differed in

student motivation and academic achievement (Table 4). The test results: communication, t (393)=.959, p=.338; motivation, t (424)=1.153, p=.250; and academic achievement (Grade) t (489)=-.614, p=.540, failed to reject the null hypothesis at the $p < .05$ level of significance.

Table 4

Independent Samples t Test for Student Gender

Gender	F	Sig.	T	df	Sig. (2-tailed)
Communication	.029	.864	.959	393	.338
Motivation	6.389	.012	1.153	424	.250
Grade	6.030	.014	-.614	489	.540

Note: $p < .05$.

Research Question 2

What are the verbal and nonverbal instructor immediacy behaviors, student motivation, and student achievement by student ethnicity?

Descriptive statistics for student motivation and academic achievement per ethnicity are shown in Table 5. In terms of academic performance, Asian students reported having the highest grades (M=1.50, SD=.941), while African American students reported the lowest grades (M=2.46, SD=.909).

With respect to teacher immediacy behaviors, Hispanic students reported their teachers to be highly immediate (M=157.27, SD=36.551), while students in the "others" category reported having teachers exhibit the least number of immediacy behaviors (M=139.25, SD=33.374). Lastly, Asian students reported being highly motivated (M=49.93, SD=18.168), while Native American students reported being least motivated

(M=57.31, SD=20.246).

Table 5

Descriptive Statistics for Student Ethnicity

	Ethnicity	N	Mean	Std. Deviation
Grade	White	228	1.78	.909
	Black	52	2.46	.999
	Hispanic	22	2.41	1.333
	Asian	14	1.50	.941
	Native American	13	1.85	1.214
	Others/Mixed/Multi	12	2.33	1.073
Communication	White	228	142.59	36.551
	Black	52	144.13	38.544
	Hispanic	22	157.27	35.537
	Asian	14	140.86	32.711
	Native American	13	141.62	42.553
	Others/Mixed/Multi	12	139.25	33.374
Motivation	White	228	55.49	15.291
	Black	52	56.65	14.647
	Hispanic	22	54.55	20.644
	Asian	14	49.93	18.168
	Native American	13	57.31	20.246
	Others/Mixed/Multi	12	51.25	14.341

Research Question 3

What is the student motivation to learn and achievement based on perceived teacher verbal and nonverbal immediacy behaviors as categorized by student socioeconomic status?

Students enrolled in the free and reduced lunch program reported having teachers that demonstrated higher levels of immediacy M=148, SD=33.909, in comparison to students not receiving free or reduced M=142.09, SD=38.088 (see Table 6). Additionally, students enrolled in the free and reduced lunch program were more motivated while performing academically lower than students not enrolled in the lunch program (see Table 6).

Table 6

Descriptive Statistics for Student Socioeconomic Status

Free/Reduced Lunch		N	Mean	Std. Deviation
Motivation	Yes	128	54.77	14.762
	No	296	54.23	15.974
Grade	Yes	155	2.30	1.101
	No	334	1.83	.966

Research Question 4

Is there a difference between student motivation to learn and achievement based on perceived teacher verbal and nonverbal immediacy behaviors as categorized by student socioeconomic status?

The results of the independent samples *t* test conducted to assess whether a

statistical difference existed between student motivation and academic achievement categorized by student socioeconomic status and teacher verbal and nonverbal immediacy are shown in Table 7. The results motivation to learn t (422)=.327, p=.744 and academic achievement t (487)=4.794, p=.000 indicate that students, irrespective of their gender, ethnicity, or socioeconomic status, perceive their science instructor's verbal and nonverbal immediacy behaviors differently, thereby rejecting the null hypothesis (Hypothesis 2).

Table 7

Independent Samples t Test for Student Socioeconomic Status

	F	Sig.	T	df	Sig. (2-tailed)
Motivation	1.300	.255	.327	422	.744
Grade	6.728	.010	4.794	487	.000

Note: $p < .05$.

Research Question 5

What is the relationship between high school science students' perceptions of teacher immediacy behaviors and their motivation to learn science?

Correlation coefficients were computed for teacher immediacy behaviors and student motivation to learn science (see Table 8). The results of the Pearson Product Moment Correlational Coefficient analysis showed the relationship between teacher immediacy behaviors and student motivation was found statistically significant, r (395)=.443, $p < .000$, thereby rejecting the null hypothesis (Hypothesis 3).

Table 8

Pearson Product Moment Correlational Coefficient

		Communication	Motivation
Communication	Pearson Correlation	1	.443
	Sig. (2-tailed)		.000
	N	395	345
Motivation	Pearson Correlation	.443	1
	Sig. (2-tailed)	.000	
	N	345	428

Note: $p < .05$.

Research Question 6

Is there a difference within and between student motivation to gender, ethnicity, and socioeconomic status?

An analysis of variance (ANOVA) was conducted to assess whether student motivation score means were statistically significantly different among student gender, ethnicity, and student socioeconomic status (see Table 9). The tests results, $F(5,417)=1.332$, $p=.164$, failed to identify a statistically significant difference. Because the overall F test was not significant, no follow-up tests were conducted.

Table 9

Analysis of Variance for Student Motivation

Source	df	F	Sig.
Gender	1	4.523	.034
Ethnicity	5	2.348	.040
Free/Reduced Lunch	1	.522	.470
Gender * Ethnicity	5	2.415	.036
Gender * Lunch	1	.160	.689
Ethnicity *Lunch	5	1.403	.222
Corrected	18	1.332	.164

Note: $p < .05$.

Research Question 7

Is there a difference of verbal and nonverbal instructor immediacy behaviors and teacher ethnicity?

Table 10 presents the descriptive statistics per ethnicity for teacher perceptions of communication behaviors. The means and standard deviations were statistically higher for African American teachers (M=195.000, SD=2.828) than Caucasian teachers (M=170.000, SD=13.210).

Table 10

Descriptive Statistics for Teacher Ethnicity

	Ethnicity	N	Mean	Std. Deviation
Communication	White	24	170.000	13.211
	Black	2	195.000	2.828

Table 11

Independent Samples t Test for Teacher Ethnicity

					95% Confidence Interval of the Difference	
T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
-2.624	24	.015	-25.000	9.528	-44.664	-5.336

Note: p< .05.

The results of the independent samples *t* test in Table 11 indicate a statistically significant difference *t* (24) =-2.624, *p*=.015. Specifically the two-tailed significance score fell below the $p < .05$ level of significance; therefore, the null hypothesis (Hypothesis 4) was rejected.

Research Question 8

Is there a difference of verbal and nonverbal instructor immediacy behaviors and teacher gender?

Table 12 details the descriptive statistics per gender for teacher perceptions of

communication behaviors. The means and standard deviations were statistically higher for male teachers (M=176.444, SD=17.564) than female teachers (M=160.833, SD=12.015). This indicated that male teachers perceived themselves to be highly immediate in comparison to female teachers.

Table 12

Descriptive Statistics for Teacher Gender

Communication		N	Mean	Std. Deviation
Gender	Male	9	176.444	17.564
	Female	18	169.833	12.015

An independent samples *t*-test was conducted to evaluate if a statistical difference existed between the immediacy behaviors of male and female science teachers. The test result, t (25)=1.154, p=.259, was above the significance score indicating there was not a statistically significant difference between these two factors shown in Table 13.

Table 13

Independent Samples t Test for Teacher Gender

					95% Confidence Interval of the Difference	
T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
1.154	25	.259	6.611	5.729	-5.187	18.410

Note: p < .05.

Research Question 9

Is there a difference within and between teacher communication to ethnicity, gender, and age?

Table 14 denotes the descriptive statistics for teacher immediacy behaviors per teacher age. Means and standard deviations were significantly higher for teachers age 31-40 (M=176.375, SD=17.712) in comparison to teachers age 40 and over (M=175.375, SD=14.722), and age 30 and below (M=164.556, SD=7.860). Results indicate that teachers age 31-40 perceived themselves to have the highest levels of immediacy behaviors, while teachers age 30 and below perceived themselves to have the lowest levels of immediacy behaviors.

Table 14

Descriptive Statistics for Teacher Age

Age Groups	N	Mean	Std. Deviation
30 & below	9	164.556	7.860
31-40	8	176.375	17.712
over 40	9	175.375	14.722

An analysis of variance (ANOVA) was conducted to assess whether teacher communication score means were statistically significantly different among gender, ethnicity, and age (see Table 15). The tests results, F (5, 20)=1.708, p=.170 failed to identify a statistically significant difference. Because the overall F test was not significant, no follow-up tests were conducted.

Table 15

Analysis of Variance for Teacher Communication

Source	df	F	Sig.
Age	2	.725	.498
Gender	1	.956	.341
Ethnicity	1	6.922	.017
Age * Gender	2	.470	.632
Age * Ethnicity	1	.003	.960
Gender * Ethnicity	0		
Corrected	7	1.708	.170

Note: $p < .05$.

Summary

Demographic information describing the participants in the study was presented. In concert, descriptive statistics were presented to further describe statistically the participants and data collected. Research questions were explored statistically using Independent Samples *t* Tests, Pearson Product-Moment Correlation Coefficient, and Analysis of Variance. Chapter 5 provides an interpretation of findings and relates findings to theoretical framework as well as body of literature. It also discusses recommendations for further study.

Chapter 5: Conclusions, Discussions, and Recommendations

Introduction

Chapter 5 is organized in the following manner: 1) a review of the purpose of this study; 2) a discussion of the results including the demographic information reported in Chapter 4; and 3) a conclusion accompanied by recommendations for future study.

The purpose of this study was to define high school science student perceptions of teacher communication patterns, both verbal and nonverbal, and how communication patterns influence student motivation to learn science. While many science teachers have an opinion as to how to teach high school science in order to motivate students to learn, absent from the research is the student perspective. This research was an attempt to begin to fill that void.

Demographic Information

Thirty-two (N=32) science teachers from 11 different high schools in North Carolina participated in this study. As identified as a potential limitation, the sample size (N=32) was the total number of teachers that completed the survey out of 49 that were originally selected. Gall, Borg, and Gall (1996) stated, "[in] correlational research, it is traditional to use a minimum of 30 subjects" (p. 229). Though this study meets this minimum, the small sample size does bring into question the external validity or generalizability of results.

Five hundred (N=500) science students from Grades 9-12 completed the Teacher Communication Behavior Questionnaire (Appendix A). An electronic survey was developed to allow for easy collection of data. The survey was created as a public survey so that no students or teachers could be identified.

However, the design of the study was to look at verbal and nonverbal immediacy

behaviors of science teachers to ascertain if in fact these behaviors had an impact on student motivation to learn, whereby determining a statistical difference, if any, by gender, ethnicity, or socioeconomic status. Schools were identified according to the diversity of their student population. All the science teachers from those schools were invited to participate irrespective of the grade or level of science they taught at each school. It can be perceived that the demographic information could be a factor or influence in the level of reported teacher immediacy behaviors. Additionally, it may also be a factor or influence of student performance in individual science classes. Lastly, the demographic information did suggest a relationship between the student perception of immediacy behaviors and the gender and age of the teachers.

Four hypotheses were identified through the review of literature. As reported in Chapter 4, the null hypotheses for each of the four hypotheses were tested through nine research questions. Research Questions 1, 2, 3, and 4 were investigated to test the null hypotheses for the first two hypotheses. In concert, Research Questions 5 and 6 were investigated to test the null hypothesis for hypothesis number three. Lastly, Research Questions 7, 8, and 9 were investigated to test the null hypothesis for hypothesis number four. Accordingly, each hypothesis accompanied by the appropriate research question(s) is discussed in the following section.

Hypothesis 1

Students, irrespective of their gender, ethnicity, or socioeconomic status, perceive their science instructors' verbal and nonverbal immediacy behaviors differently.

Hypothesis 2

Students' perceptions of their science instructors' verbal and nonverbal immediacy behaviors, irrespective of their gender, ethnicity, or socioeconomic status,

have no influence or impact on student achievement.

Research Question 1. To determine the difference of verbal and nonverbal instructor immediacy behaviors and student gender, the means from student communication, motivation, and grade were statistically compared by gender using an independent samples *t* test. It was hypothesized that students, irrespective of their gender, ethnicity, or socioeconomic status, perceived their science instructors' verbal and nonverbal immediacy behaviors differently. The results failed to reject the null hypothesis.

Specifically, as reported in Chapter 4, *t* test findings were communication, $t(393)=.959$, $p=.338$; motivation, $t(424)=1.153$, $p=.250$; and academic achievement, $t(489)=-.614$, $p=.540$. Each failed to reject the null hypothesis at the $p < .05$ level of significance. This indicated that male students perceived their teacher's communication behaviors to be highly immediate, while increasing student motivation, and resulting in higher academic scores than female students.

These findings were consistent with previous studies that found highly immediate teachers use communication behaviors such as close proximity, eye contact, vocal expressiveness (voice inflection), smiling, leaning toward a student, appropriate touching, and gesturing (Andersen, 1979) to communicate positive feelings which in turn create acceptance for students.

Though beyond the scope of this research, it is generally understood that when these behaviors are exhibited they facilitate learning and avoid unproductive responses such as embarrassment, "tuning out," or "shutting down" by students. Though statistical significance was not achieved, the findings do suggest that when students perceive teachers' communication behaviors as positive, they are able and willing to modify their

behavior in a desired direction. Some judgments can be drawn from these findings that these behaviors initiated by effective teachers can engage, motivate, and stimulate the participation of most students. These include both male and female students, and students of diverse ethnicities and socioeconomic status.

Research Question 2. What are the verbal and nonverbal instructor immediacy behaviors, student motivation, and student grades by student ethnicity? The means for student communication, motivation, and academic achievement per student ethnicity are reported in Chapter 4. The findings point to a better understanding of the students based on individual ethnicity.

Asian students performed the highest academically, but reported their teachers as the least immediate of all teachers. Consequently, descriptive statistics showed Asian students the least motivated according to the reported student data on the SMLI (Appendix C). Caucasian students reported the next to highest grades academically, but their teachers were ranked third in terms of exhibiting immediacy behaviors which resulted in the students being ranked as the third highest group for motivation. Native American students reported the third highest grades in academic achievement, while being ranked fourth in student reported teacher immediacy behaviors, but reported being the most motivated of all students on the SMLI (Appendix C).

The others/mixed group reported the fourth highest scores academically. These scores could be attributed to them being ranked fourth in student motivation, while reporting their teachers to exhibit the next to lowest levels of immediacy. The data showed Hispanic students to score the next to lowest academically with the highest reported levels of teacher immediacy behaviors, while being ranked fourth in overall motivation. African American students performed the lowest of all students. These

students also reported the second highest motivation scores, while ranking their teachers the highest in immediacy.

The first explanation for the variability of results in the reported ethnic groups could be pointed to intrinsic motivation verses extrinsic motivation discussed in the review of literature. The findings are also explained, in part, by some students being internally self-motivated and not reliant upon external factors to motivate them as was indicated in the Asian students and Caucasian students; whereas, for various reasons, some students require a more immediate teacher that exhibits behaviors such as encouragement and praise in order to increase student achievement, as was shown in the African American students. Though beyond the scope of this study, still a plausible explanation is that motivation provided by teacher encouragement and support, or verbal praise to students, may enhance interest and more involvement in the class, while positively impacting student growth.

Research Question 3. What is the student motivation to learn achievement based on perceived teacher verbal and nonverbal immediacy behaviors as categorized by student socioeconomic status?

As reported, descriptive statistics identified students from the lower socioeconomic status as perceiving their teacher to exhibit more immediacy behaviors, possibly motivating them to learn. However, this finding was contradictory as these students also reported the lowest academic performance.

Research Question 4. Is there a difference between student motivation to learn and achievement based on perceived verbal and nonverbal teacher immediacy behaviors as categorized by student socioeconomic status?

The *t* test resulted in a statistical difference in terms of socioeconomic status and

student achievement. These results indicated that socioeconomically disadvantaged students respond and are positively motivated when they perceive teachers as exhibiting high levels of immediacy. This finding was consistent with previous studies where students responded positively to a teacher who was loving, encouraging, and praised them for the work they do (Andersen, 1979; Andersen et al., 1981; Andersen & Withrow, 1981; Gorham, 1988).

Hypothesis 3

It was hypothesized that teachers who demonstrate verbal and nonverbal immediacy behaviors impact student motivation to learn (Hypothesis 3). To test this hypothesis, Research Questions 5 and 6 were investigated. The following section discusses these findings.

Research Question 5. What is the relationship between high school science students' perceptions of teacher immediacy behaviors and their motivation to learn science?

The Pearson Product Moment Correlation was administered to answer this question. The relationship of teacher communication behaviors and student motivation to learn science was tested. As reported, the correlation was found statistically significant, $r(395)=.443$, $p < .000$ at the $p < .05$ level of confidence. This finding rejected the null hypothesis demonstrating with respect to immediacy behaviors and motivation to learn that highly motivated students rate their teacher communication higher than less motivated students.

Research Question 6. Is there a difference within and between student motivation to gender, ethnicity, and socioeconomic status?

As reported, an Analysis of Variance (ANOVA) was conducted to test if and to

what extent student motivation score means were statistically different within and between the factors student gender, ethnicity, and socioeconomic status. The test results failed to identify a statistically significant difference at the $p < .05$ level of significance. Although there were differences, the failure to achieve statistical significance is not without value. Other factors such as interest in subject matter, perception of its usefulness, general desire to achieve, self-confidence, and self-esteem are all possible confounding variables (Sass, 1989). Accordingly, the overall *F* test was not significant; no follow-up tests were conducted.

Hypothesis 4

It was hypothesized that teachers who demonstrate verbal and nonverbal immediacy behaviors perceive these behaviors differently by ethnicity, gender, and age. To test this hypothesis, Research Questions 7, 8, and 9 were investigated. The following section discusses these findings.

Research Question 7. Is there a difference of verbal and nonverbal instructor immediacy behaviors and teacher ethnicity?

The results of Research Question 7 produced a t (24)=-2.624 p=.015. This result rejected the null hypothesis at the $p < .05$ level of significance. This finding has significant import and utility for teachers as well as administrators. Teachers themselves perceive their immediacy behaviors through their own ethnicity. Descriptive statistics indicated African American teachers reported to exhibit higher levels of immediacy when compared to Caucasian teachers.

The two reporting African American teachers recorded having higher levels of immediacy in comparison to 24 Caucasian teachers. Additionally, the two African American teachers were between the ages of 31-40, the age range teachers reported as

being more immediate. However, caution must be exercised when drawing a conclusion based on the information presented concerning student motivation and teacher ethnicity due to the small sample size.

Research Question 8. Is there a difference of verbal and nonverbal instructor immediacy behaviors and teacher gender?

The independent samples *t* test evaluate if a statistical difference existed between the immediacy behaviors of male and female science teachers. The test result, $t(25)=1.154$, $p=.259$, failed to reject the null hypothesis.

Contrary to the results of this study, Boggs and Wiemann (1994) found significant differences between male and female instructors' communication patterns. Whereas, no statistical significant difference was shown, no conclusion can be drawn in terms of perceived teacher communication behaviors and teacher gender.

Research Question 9. Is there a difference within and between teacher communication to ethnicity, gender, and age?

Descriptive statistics reported differences. The highest levels of immediacy were reported for teachers in the age range of 31-40. Teachers age 40 and over reported the second highest levels of immediacy, while age 30 and below reported the lowest levels of immediacy.

The results also found that teachers age 40 and over are more immediate in terms of communication when compared to teachers age 30 and below. It is reasoned that years of experience and establishment in the teaching profession do have a positive impact on student success academically, but experience should not be viewed as a sole factor in teacher effectiveness.

An Analysis of Variance (ANOVA) was conducted to assess if and to what extent

teacher communication score means were statistically significantly different within and between the factors gender, ethnicity, and age (see Table 15). The tests results, F (5, 20)=1.708, p=.170 failed to identify a statistically significant difference and thus failed to reject the null hypothesis. However, a statistically significant difference was found between the factors teacher communication and student ethnicity, F (5, 20)=6.922, p=.017.

The research findings are consistent with previous findings on culturally responsive teaching which include pedagogy that recognizes the importance of including students' cultural references in all aspects of learning (Ladson-Billings, 1994). Therefore, teachers should be knowledgeable in various cultural references in order to reach diverse populations of students.

Discussion

The physical gap between instructor and student should no longer impede upon classroom communication, also known as immediacy behaviors (Richmond, Lane, & McCroskey, 2006). The *No Child Left Behind Act* defines highly qualified teachers through the lens of content knowledge and experience (NCLB, 2002). Legislators, administrators, teachers, and parents each have their own definition of the qualities possessed by a qualified teacher, including many attributes beyond content knowledge and experience. There is the possibility that a teacher could be highly qualified according to NCLB and not be an effective teacher in the classroom (Guarino, Hamilton, Lockwood, & Rathbun, 2006). Teaching effectiveness cannot be measured and guaranteed solely on content knowledge, years of experience, or student performance on standardized tests.

Student achievement goes far beyond a state assessment score and a final grade in

a course. Consequently, the underlying factor in ensuring that all students are academically successful has not been discovered. As education continues to seek ways to motivate students, perhaps student perception should be considered.

This study provides a valuable insight into the role of immediacy behaviors, albeit verbal or nonverbal. The perceptions of students as found in this study are important factors in the motivation to learn and achieve.

Adversely, students are rarely asked their opinions about the instructional process or their ideas for measuring teacher effectiveness. State legislators, local school boards, and school administrators fail to realize that students are the best way to measure the effectiveness of the educational system because they are the products of the system. Using student input is a *bottom-up* approach to determining the qualities of an effective secondary science teacher, but to ignore the student voice is to ignore an extremely valuable source of information (Faranda & Clarke, 2004).

For this reason, the purpose of this study was to identify teacher immediacy behaviors that impacted student motivation to learn science from the student perception, as well as explore initial differences and relationships within or between teacher immediacy behaviors and student motivation to learn by gender, ethnicity, and socioeconomic status. This present study suggests verbal and nonverbal immediacy behaviors of teachers may be related to certain aspects of student motivation. As a result, the perception of male students, minority students (Hispanic and African American), and students from lower socioeconomic backgrounds showed their science teachers to be highly immediate.

Although a multitude of other variables may affect the communication between students and teachers, immediacy behaviors could be useful tools in motivating these

particular groups of students, thereby enhancing teacher effectiveness. As a result of teachers becoming more effective an increase in learning will result.

Recommendations for Further Study

Recommendations emergent from this present study include 1) future studies to determine how students' and teachers' perceptions of immediacy change over time; (2) the use of multiple subject areas and different instructional settings; 3) research addressing how educators can adapt their immediacy skills to enhance students' academic, social, and emotional skills; and 4) research to determine verbal and nonverbal behaviors that contribute to student demotivation.

This study sought to ascertain if and to what extent teachers' immediacy behaviors directly or indirectly affected students' academic outcomes. The awareness of the influence of immediacy behaviors will assist in the development of in-service programs to teach educators how to provide and promote proper immediacy behaviors targeted at specific gender, ethnicity, and socioeconomic classes.

If educators are aware of students' perceptions of their immediacy behaviors, perhaps teachers will adjust their behaviors in their interaction with students of different genders, ethnicities, and socioeconomic classes.

It is recommended that professional development programs be designed and implemented to help teachers better understand that through the use of their positive levels of immediacy, they will have better chances of developing more positive student-teacher relationships. These relationships may lead to long-term interests in not only science, but learning as a whole. Perhaps teachers will acknowledge the importance of their immediacy behaviors directly or indirectly influencing students' academic growth and achievement at all academic levels.

Furthermore, because students relate to immediacy behaviors differently, educators should also acknowledge the importance of students' different communication styles and how teachers' immediacy behaviors could contribute to students' learning losses and/or learning gains (Myers & Bryant, 2002).

Conclusion

Based on the results of this study, teacher immediacy behaviors were perceived differently among different genders, ethnicities, and socioeconomic classes. Although research was conducted in the high school setting, the researcher must point out, regardless of age, gender, ethnicity, socioeconomic class, or instructional setting, it is important for teachers to use challenging questioning and positive responses in the classroom (Carlsen, 1991). Teachers who ask challenging questions and react positively toward students' answers establish good interaction, communication, and trust with their students (Walberg, 1984).

This study has the capability to assist teachers in becoming more effective in different instructional settings by using proper verbal and nonverbal immediacy behaviors. Specific verbal immediacy behaviors such as the use of challenging questioning also provides discourse which, in turn, establishes rapport between teachers and students (Carlsen, 1991). Encouragement and praise are also helpful for students of different genders, ethnicities, and socioeconomic classes. When teachers use encouragement and praise, they create caring and nurturing learning environments that promote positive emotions, such as self-efficacy and positive self-esteem (Lowman, 1995). Encouragement and praise can also lead to student motivation and motivation can lead to an appetence to learn (Frymier, 1994).

Teachers must also demonstrate nonverbal support for students. Nonverbal

supportive behaviors, such as eye contact, gestures, body movements, facial expressions, and posture can "reduce physical and/or psychological distance between teachers and students" (Mehrabian, 1971, p. 543). Teachers should also be present themselves in an understanding and friendly manner towards their students. When teachers are understanding and friendly, they are perceived as accessible and approachable individuals.

According to the differences reported in perceived teacher communication behaviors and student ethnicity, gender, and socioeconomic status, potentially powerful relationships between teacher-student interactions and these important components could contribute to an increase of student motivation to learn.

Lastly, in the impressionable words of Dr. Haim Ginott, a renowned psychotherapist, psychologist, parent educator, and writer, who dedicated his time and effort to helping caregivers connect with children, "I have come to the frightening conclusion that I am the decisive element in the classroom. As a teacher I possess a tremendous capacity to make a child's life miserable or joyous. I can humiliate, hurt, or heal" (Ginott, 1972, p. 54).

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Appendix A

Survey of Teacher Communication Behavior Questionnaire as Perceived by a Student in the Science Classroom

Survey of Teacher Communication Behavior Questionnaire as Perceived by a Student in the Science Classroom

Directions:

Please read each statement and circle the frequency (*Almost Never=1, Seldom=2, Sometimes =3, Often=4, Almost Always=5*) that best describes the communication behaviors of your instructor in your most recently completed science course. Please do not put your name or any identifying links on the questionnaire. All responses and data will remain anonymous. Your results are being used for a research study on teacher behaviors. Thank you for completing this questionnaire.

Please provide the following information:

Age:_____ Sex: _____M _____F

Primary ethnic background:
(check the ethnicity with which you identify **most**)

_____White/Caucasian ____Hispanic _____Asian American

_____African American/Black _____ Native American _____Other

Do you participant in the free and reduced lunch program? _____Yes _____No

What was the last science class you were enrolled? _____

What grade did you receive? _____

	Almost Never	Seldom	Some-times	Often	Almost Always
1. The teacher asks questions that require me to provide steps or ways of solving problems.	1	2	3	4	5
2. This teacher asks questions that make me think hard about things that I have learned in class.	1	2	3	4	5
3. This teacher asks questions that require	1	2	3	4	5

me to carefully analyze information in order to answer.					
4. This teacher asks questions that require me to use a judgment to answer.	1	2	3	4	5
5. This teacher asks questions that require me to apply what I have learned in class in order to answer.	1	2	3	4	5
6. This teacher asks questions that require me to integrate information that I have learned.	1	2	3	4	5
7. This teacher asks questions that require me to understand what I have learned in class in order to answer.	1	2	3	4	5
8. This teacher asks questions that require me to give explanations in my own words	1	2	3	4	5
9. This teacher asks for my opinions during discussions.	1	2	3	4	5
10. This teacher encourages me to discuss the answers to questions	1	2	3	4	5
11. This teacher encourages me to discuss my ideas with other students.	1	2	3	4	5
12. This teacher encourages me to express my opinions about a topic.	1	2	3	4	5
13. This teacher praises me for asking a good question.	1	2	3	4	5

14. This teacher praises my answers.	1	2	3	4	5
15. This teacher uses my ideas as part of the lesson.	1	2	3	4	5
16. This teacher uses my answer as part of the explanation of the lesson.	1	2	3	4	5
17. This teacher nods his/her head to show his/her understanding of my opinion.	1	2	3	4	5
18. This teacher nods his/her head to show support while I answer a question.	1	2	3	4	5
19. Without speaking, this teacher indicates support for me through his/her facial expression.	1	2	3	4	5
20. Without speaking, this teacher supports me when I have a problem through his/her facial expression.	1	2	3	4	5
21. Without speaking, this teacher shows he/she understands my opinion through his/her facial expression.	1	2	3	4	5
22. Without speaking, this teacher shows his/her enthusiasm about my answer through his/her facial expression.	1	2	3	4	5
23. Without speaking, this teacher shows his/her enthusiasm about my question through his/her facial expression.	1	2	3	4	5

24. Without speaking, this teacher shows his/her support through his/her eyes.	1	2	3	4	5
25. This teacher trusts me.	1	2	3	4	5
26. This teacher is willing to explain things to me again.	1	2	3	4	5
27. If I have something to say, this teacher will listen.	1	2	3	4	5
28. This teacher realizes when I do not understand.	1	2	3	4	5
29. This teacher is patient with me.	1	2	3	4	5
30. This teacher is friendly toward me.	1	2	3	4	5
31. This teacher is someone I can depend on.	1	2	3	4	5
32. This teacher cares about me.	1	2	3	4	5
33. This teacher's standards of behavior are very high.	1	2	3	4	5
34. This teacher expects me to obey his/her instructions.	1	2	3	4	5
35. This teacher insists that I follow his/her rules.	1	2	3	4	5
36. This teacher insists that I do everything he/she tells me to do.	1	2	3	4	5
37. This teacher demands that I do exactly as I am told.	1	2	3	4	5
38. This teacher does not allow me to do things differently from what	1	2	3	4	5

he/she expects.					
39. This teacher makes very clear to me that standard of behavior expected of all students in this class.	1	2	3	4	5
40. This teacher demands that I listen to instructions.	1	2	3	4	5

Note: Permission for survey use has been granted by author

Appendix B

Survey of Teacher Communication Behavior Questionnaire as Perceived by a Teacher in the Science Classroom

Survey of Teacher Communication Behavior Questionnaire as Perceived by a Teacher in the Science Classroom

Directions:

Please read each statement and circle the frequency (*Almost Never=1, Seldom=2, Sometimes =3, Often=4, Almost Always=5*) that best describes the communication behaviors of your instructor in your most recently completed science course. Please do not put your name or any identifying links on the questionnaire. All responses and data will remain anonymous. Your results are being used for a research study on teacher behaviors. Thank you for completing this questionnaire.

Please provide the following information:

Gender: _____M _____F

Age: _____ 21-25 _____ 26-30 _____31-40 _____over 40

Primary ethnic background:
(check the ethnicity with which you identify **most**)

_____White/Caucasian ____Hispanic _____Asian American

_____African American/Black _____ Native American _____Other

	Almost Never	Seldom	Some-times	Often	Almost Always
1. I ask questions that require students to provide steps or ways of solving problems.	1	2	3	4	5
2. I ask questions that make students think hard about things that they have learned in class.	1	2	3	4	5
3. I ask questions that require students to carefully analyze information in order to answer.	1	2	3	4	5
4. I ask questions that require students to use a	1	2	3	4	5

	judgment to answer.					
5.	I ask questions that require students to apply what they have learned in class in order to answer.	1	2	3	4	5
6.	I ask questions that require students to integrate information that they have learned.	1	2	3	4	5
7.	I ask questions that require students to understand what they have learned in class in order to answer.	1	2	3	4	5
8.	I ask questions that require students to give explanations in their own words	1	2	3	4	5
9.	I ask students for their opinions during discussions.	1	2	3	4	5
10.	I encourage students to discuss the answers to questions	1	2	3	4	5
11.	I encourage students to discuss their ideas with other students.	1	2	3	4	5
12.	I encourage students to express their opinions about a topic.	1	2	3	4	5
13.	I praise students for asking a good question.	1	2	3	4	5
14.	I praise students for their answers.	1	2	3	4	5
15.	I use students' ideas as part of the lesson.	1	2	3	4	5
16.	I use students' answers as part of the explanation of the lesson.	1	2	3	4	5

17. I nod my head to show my understanding of students' opinion.	1	2	3	4	5
18. I nod my head to show support while students answer a question.	1	2	3	4	5
19. Without speaking, I indicate support for students through my facial expression.	1	2	3	4	5
20. Without speaking, I support students when they have a problem through my facial expression.	1	2	3	4	5
21. Without speaking, I show students I understand their opinion through my facial expression.	1	2	3	4	5
22. Without speaking, I show enthusiasm about student answers through my facial expression.	1	2	3	4	5
23. Without speaking, I show enthusiasm about student questions through my facial expression.	1	2	3	4	5
24. Without speaking, I show support through my eyes.	1	2	3	4	5
25. I trust students.	1	2	3	4	5
26. I am willing to explain things to students more than once.	1	2	3	4	5
27. If students have something to say, I will listen.	1	2	3	4	5
28. I realize when students do not understand.	1	2	3	4	5
29. I am patient with students.	1	2	3	4	5

30. I am friendly towards students.	1	2	3	4	5
31. My students can depend on me.	1	2	3	4	5
32. I care about my students.	1	2	3	4	5
33. My standards of behavior are very high.	1	2	3	4	5
34. I expect students to obey my instructions.	1	2	3	4	5
35. I insist that students follow my rules.	1	2	3	4	5
36. I insist that students do everything I tell them to do.	1	2	3	4	5
37. I demand that students do exactly as I tell them.	1	2	3	4	5
38. I do not allow students to do things differently from what I expect.	1	2	3	4	5
39. I make it very clear to students the standard of behavior expected of them in this class.	1	2	3	4	5
40. I demand students listen to instructions.	1	2	3	4	5

Note: Permission for survey use has been granted by survey author.

Appendix C

Student Motivation to Learn Survey

Student Motivation to Learn Survey

Instructions: Please choose the number toward either word which best represents your feelings towards **the course from which you have COMPLETED**. Please pay special attention and read each word pair carefully because some of the word pairs state the positive first, while other word pairs state the negative first.

1.	Motivated	1	2	3	4	5	6	7	Unmotivated
2.	Interested	1	2	3	4	5	6	7	Uninterested
3.	Involved	1	2	3	4	5	6	7	Uninvolved
4.	Not stimulated	1	2	3	4	5	6	7	Stimulated
5.	Don't want to study	1	2	3	4	5	6	7	Want to study
6.	Inspired	1	2	3	4	5	6	7	Uninspired
7.	Unchallenged	1	2	3	4	5	6	7	Challenged
8.	Uninvigorated	1	2	3	4	5	6	7	Invigorated
9.	Unenthused	1	2	3	4	5	6	7	Enthused
10.	Excited	1	2	3	4	5	6	7	Not excited
11.	Aroused	1	2	3	4	5	6	7	Not aroused
12.	Not fascinated	1	2	3	4	5	6	7	Fascinated

Note: Permission for survey use has been granted by survey author.

Appendix D

School District Invitation Letter

December 13, 2011

[redacted]
Associate Superintendent
[redacted]

Dr. [redacted]
I am currently working as a Biology teacher at [redacted] while completing my doctorate at Gardner-Webb University in Curriculum and Instruction. For my research I am focusing on secondary science teachers and students perceptions of teacher communication behaviors in the classroom and the impact of these behaviors on student motivation to learn science. I have chosen this area of focus because research shows that an increasing number of students are choosing to limit or end their science studies while still in high school. There is also a decrease in student enrollment of rigorous science courses and a lack of interest in science related careers has developed. In an effort to improve teacher effectiveness, it is imperative that science teachers understand the need to maximize student motivation within the science classroom through the use of effective communication. Therefore, this study will determine the role of the secondary science teacher in promoting interest and achievement in science, student's decision to enroll in more rigorous science classes, and the teacher's influence on the students' choice of a science major in college. Additionally this study will determine whether there are differences by gender, ethnicity, or socioeconomic status in student perceptions of teacher verbal and nonverbal communication behaviors in science courses.
There are no risks to teachers or students in this study. All questionnaires will be answered voluntarily. All information is confidential, and no person or school will be identified in the study. Participants will be asked to complete a 40 question Likert-scale questionnaire measuring student and teacher perceptions. Results from this study will help students develop more positive attitudes about science and help teachers to make science a more positive experience for students in their class.
If you are willing to grant permission I would like to extend this research to all high schools in [redacted] County to ensure a diverse sample. If you have any questions regarding this study please feel free to contact me by phone [redacted] or e-mail at [redacted]

Thank you,

Vania Littlejohn

Appendix E

Principal Invitation Letter

Dear Principal,

As a Biology teacher and doctoral student at Gardner-Webb University I am asking for your help in assisting me with my dissertation research that seeks to conduct an initial study to identify, determine a difference, if any, and investigate any possible relationship between teacher communication behaviors and student motivation to learn science.

Specifically, I am asking that you support me by encouraging your science teachers and their students to complete the online Teacher Communication Behavior Questionnaire.

For my research I am focusing on secondary science teachers and students perceptions of teacher communication behaviors in the classroom and the impact of these behaviors on student motivation to learn science. I have chosen this area of focus because research shows that an increasing number of students are choosing to limit or end their science studies while still in high school. There is also a decrease in student enrollment in advanced placement science courses and a lack of interest in science related careers. Also, academic performance and interest in secondary science is lower in the United States than in prior years and the choice of a science major in universities across the United States continues to decline.

In an effort to improve teacher effectiveness, it is imperative that science teachers understand the need to maximize student motivation within the science classroom through the use of effective communication. Therefore, this study will determine the role of the secondary science teacher in promoting interest and achievement in science, student's decision to enroll in more advance placement science classes, and the teacher's influence on the students' choice of a science major in college. Additionally this study will determine whether there are differences by gender, ethnicity, or socioeconomic status in student perceptions of teacher verbal and nonverbal communication behaviors in science courses.

There are no risks to students in this study. All surveys have been approved by [redacted] County Schools and will be answered voluntarily via an electronic survey that will be accessed through your school's webpage. All information is confidential, and no person or school will be identified in the study. Participants will be asked to complete a Likert-scale questionnaire measuring student and teacher perceptions. Results from this study will help students develop more positive attitudes about science and help teachers to make science a more positive experience for students in their class. If you or any of your staff have any questions, please do not hesitate to contact me either by phone [redacted] or by email [redacted]

Thank you,

Vania Littlejohn

Appendix F

Science Teacher Invitation Letter

Dear Colleagues,

As a Biology teacher at [redacted] and a doctoral student at Gardner-Webb University, I am focusing my dissertation research on the impact of teacher verbal and nonverbal communication behaviors on student motivation to learn science.

In an effort to improve teacher effectiveness, it is imperative that science teachers understand the need to maximize student motivation within the science classroom through the use of effective communication. Therefore, this study will determine the role of the secondary science teacher in promoting interest and achievement in science, student's decision to enroll in more rigorous science classes, and the teacher's influence on the students' choice of a science major in college. Additionally this study will determine whether there are differences by gender, ethnicity, or socioeconomic status in student perceptions of teacher verbal and nonverbal communication behaviors in science courses.

I would like to ask you for your help by completing the teacher behavior survey and allowing your science classes to complete the student survey. The survey will take no longer than 10 minutes to complete. Of course, you are in no way obligated to complete the survey, but I do hope that you would consider it. I would ask that you fill out the survey completely and honestly as you feel. I can assure you that these surveys will only be used for data collection purposes for my study and will be destroyed once the data collection process is over.

I hope that by completing this study with your honest and accurate input on the survey, better and more relevant staff development opportunities can be aligned to meet the needs of teachers in the county. Results from this study will help students develop more positive attitudes about science and help teachers to make science a more positive experience for students in their class.

Knowing the demands on your time, please accept my sincerest appreciation for assisting me with this project. If you have any questions, please do not hesitate to contact me either by phone [redacted] or by email [redacted]

Thank You,

Vania D. Littlejohn
Doctoral Student
Gardner-Webb University

Appendix G

Survey Consent Form

Consent Form: Student and Teacher Perceptions of Teacher Immediacy Behaviors and the Influence of Teacher Immediacy Behaviors on Student Motivation to Learn Science

You are invited to take part in a research study to determine the role of the secondary science teachers in promoting interest and achievement in science, student's decision to enroll in more rigorous science classes, and the teacher's influence on the students' choice of a science major in college. You were chosen for the study because you are a high school student enrolled in a science course. Please read this form and ask any questions you have before agreeing to be part of the study. This study is being conducted by a researcher named Vania Littlejohn. I am a doctoral student at Gardner-Webb University.

Background Information: The purpose of this study is to determine if teacher immediacy, which is verbal/nonverbal communication, is perceived differently among different age groups, genders, or socioeconomic status.

Procedures: If you agree to be in this study, please complete all of the items on the questionnaire.

Voluntary Nature of the Study: Your participation is strictly voluntary. This means that everyone will respect your decision if you decide to participate or not. No one will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. If you feel stressed during the study you may stop at any time.

Risks and Benefits of being in the Study: There are no risks to students in this study. All information is confidential and no person or school will be identified in the study. This study might help teachers understand which immediacy behaviors can help foster students' social, emotional, and academic learning. This study may generate social change by informing professional development with regard to strategies for identifying immediacy behaviors to aid teachers in better addressing student needs.

Compensation: There is no compensation for this study; however, I would be very grateful for your participation.

Confidentiality: To protect your privacy, all data will remain anonymous.

Contacts and Questions: The researcher's name is Vania Littlejohn. The researcher's faculty advisor can be contacted at gfirn@gardner-webb.edu. You may ask any questions you have now or if you have questions later, you may contact the researcher via e-mail at [redacted]

By signing this form, I am say that I have read this form and have asked any questions that I might have. All of my questions have been answered so that I understand what I am being asked to do. By, signing, I am saying that I am willing and would like to participate in this study.

_____	_____
Signature of Student	Date
_____	_____
Signature of Parent or Guardian (If minors are involved)	Date
_____	_____
Signature of Researcher	Date

Appendix H

Survey Instrument Approval

Survey Instrument Approval

Dear Vania,

Hi again. As you can see, I am reviewing my email out-of-order. Thanks for your note and interest in my research. Your study focusing on high school student motivation sounds very interesting. It is not a problem to use my Student Motivation Scale in your dissertation. I appreciate your asking permission. However, since this scale has been published in a major journal, it is automatically available to use in research projects.

I would very much like to hear about the results of your study. Please let me know if you need anything else. Good luck on your dissertation!

Respectfully,

Diane

Diane M. Millette, Ed.D.
Associate Professor and Director
Communication Studies Program
University of Miami
millette@miami.edu
305-284-2340

From: [redacted]
Sent: Monday, December 12, 2011 3:53 PM
To: Millette, Diane M
Subject: Student Research

Hello Dr. Millette
My name is Vania Littlejohn and I am a doctoral student in Charlotte, NC preparing to write my dissertation. After searching the web I came upon your research on teacher communication behaviors and student motivation to learn. Being that I am a high school Biology teacher I am interested in studying the motivating and demotivating factors that effect high school students.

Your research provided me with alot of insight on this topic. I would like to know if I may have your permission to use your Student State Motivation Scale as an instrument in my research.
Thank you for your time and consideration.
Vania Littlejohn

Survey Instrument Approval

Thank you for your support.

Sent from my iPad

On Sep 21, 2011, at 1:04 AM, "Darrell Fisher" <D.Fisher@curtin.edu.au> wrote:

Hello Vania

It is alright to use the TCBQ. I am sure my colleague Professor Hsiao-Ching She and I would be interested in any results you might get with the TCBQ

Good luck with your research.

Darrell Fisher

Professor Darrell Fisher
Professor of Science Education

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From: [redacted]
Sent: Wednesday, 21 September 2011 12:26 AM
To: Darrell Fisher
Subject: Permission to use TCBQ

Hello

My name is Vania Littlejohn. I am a doctoral student in Charlotte, NC preparing to write my dissertation. After searching the web I came upon your research on students' perceptions of teacher behaviors. Being that I am a high school Biology teacher I am interested in studying the motivating and demotivating factors that affect high school students.

Your research provided me with a lot of insight on this topic. I would like to know if I may have your permission to reproduce and use the teacher communication behavior questionnaire in my research?

I really appreciate you helping me in this challenging endeavor. Thank you for your time and consideration.