Investigation of the Relationships

Among Teachers' Immediacy and Creativity, and

Students' Perceived Cognitive Learning

A Thesis

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Dedications

This dissertation is dedicated to my late grandparents Michael Offidani, my mother's father and Fortunada Tabasco, my father's mother. Although they were from opposite sides of my family, they were oddly similar. They both taught me that a lot can be spoken from very few words. They were extremely creative people who always found a way of making 'something' out of 'nothing'.

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Abstract
Investigation of the Relationships Among
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In this study the researcher studied the relationships between teachers'

immediacy, creativity, and students' perceived learning at the secondary level, thus

merging teacher immediacy and teacher creativity for the first time. This study has

several purposes: (a) to analyze the relationship between a teachers' immediacy and

creativity as scored by the Teacher Immediacy Inventory and the Torrance Tests of

Creativity Thinking (TTCT) respectively (b) to determine if teachers' immediacy and

creativity impacted their respective 9-12 students' perceived mathematics learning, and

(c) to analyzing the relationship between teachers' self-scored immediacy with their

student-scored immediacy.

In this quantitative study, the researcher did not manipulate the variables or

arrange for events to happen. The research was completed under natural conditions with

existing instruments already proven valid and reliable. Data was collected from a

suburban high school in the Mid-Atlantic area with 304 students and 16 teachers

participating.

The results of this study showed that the more flexible a teacher, the more

nonverbal immediacy the students felt from that teacher. The same occurred with the

fluency of a teacher, the more fluent the teacher, the higher their nonverbal immediacy

score. With the creativity traits of originality, elaboration, and resisting premature closure the significant findings were very interesting to analyze as the immediacy scores did not rise as the creativity scores increased. With these three creativity traits there was a specific point in which too much creativity produced lower immediacy scores. Interestingly, the point in which this happened was very similar with each specific pairing.

Student's perceived learning scores were significant when analyzed with creativity and with nonverbal immediacy. Teachers' self-scored immediacy was also significant when analyzed with the scores given by their perspective high school students.

While research independently supports teacher immediacy and creativity impacting various levels of learning, numerous gaps were addressed in this dissertation: (1) immediacy studied at the pre-college level, (2) merging teacher immediacy and creativity and (3) analyzing the perceived learning of secondary students.

CHAPTER 1: INTRODUCTION

1.1 An Overview of Current Research

Teacher creativity and immediacy have been studied independently for decades (Pagano, 1979; Dev, 1997; Fleith, 2000; Andersen, 1979; Richmond, Gorham, and McCroskey, 1987). This is the first time these two topics will be merged into one study. Both areas discuss the importance of teachers giving up traditional control tendencies by allowing the students to take center stage. Numerous creativity experts expressed the need for teachers to increase student-teacher communication to better understand their students. With communication being at the core of immediacy, it seemed natural to this researcher to study the relationships between teacher creativity and immediacy and its impact on student perceived learning.

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, p. 168). To this researcher, the question is: 'What makes a teacher effective?'

There is "a difference between knowing and teaching, and that difference is communication in the classroom" (Hurt, Scottland, and McCroskey, 1978, p. 3), meaning that teaching well is a function of good communication. West (1994) identified a framework for communication in grade and high school classrooms stating that " students

ultimately determine what constitutes productive educational experiences" (West, 1994, p. 109). 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, and McCroskey, 1987). Over thirty years ago, Mehrabian (1967) defined immediacy as communication behaviors that diminish the physical and psychological distance between people. Andersen and Andersen (1982) defined the term 'Teacher Immediacy' as verbal and nonverbal behaviors generating perceptions of physiological closeness with students. Such behaviors include, but are not limited to eye contact, use of gestures, movement around the classroom, smiling, appropriate touch, and the use of humor (Andersen 1979; Downs, Javidi, and Nussbaum, 1988).

It was only within the last 30 years that educational researchers were willing to agree 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, and Perry, 1982: Ware and Williams, 1975), have been acknowledged by communication researchers as immediacy behaviors. Unfortunately, these discrepancies in 'vocabulary' were not surprising because throughout the past 30 years educational and communication researchers worked independently to identify the behaviors that make a teacher effective. The fields of communication and education were merged in 1978, by the faculty and

students at West Virginia University, whose investigators were the 'founding fathers' of teacher immediacy research. Subsequent studies have been instrumental for both disciplines as verbal and nonverbal teacher behaviors were identified and positively linked to both affective learning (Christophel, 1990; Frymier, 1994; Kelley and Gorham, 1988) and cognitive learning (Richmond, McCroskey, Kearney, and Plax, 1987; Richmond, Gorham, and McCroskey, 1987; Comstock, Rowell, and Bowers, 1995).

A teachers' ability to increase their understanding of their students is critical in building and maintaining a communicative student-teacher relationship. As the student population changes, educators must learn to change as well. Educators can become more effective communicators with their students by developing their skills as teachers, continuing to expand their skills and expertise, and by gaining more insight into the students they teach (Simplicio, 2000). This is where the researcher noticed an overlap between communication in the classroom and teacher creativity. As Amabile (1996) explains, there is a motivation that drives teacher creativity. Creative teachers are better communicators because they recognize difficult behavior, incorporate positive and constructive evaluations, support and encourage their students, and help their students resist peer pressure and conformity (Amabile, 1996).

Good, creative teachers are never satisfied with the status quo. These teachers accept, act, and react to the fact that they are not the sole disseminators of knowledge (Simplicio, 2000). Torrance's definition of creativity is a perfect fit with creative teachers. Creative teachers are willing to change, are not afraid to go off the main track, step into the unknown, and welcome new experiences (Simplicio, 2000). "Creative

teachers are perpetually curious…as such, they are among the most elite of their profession" (Simplicio, 2000, p. 5).

Below is a chart displaying some of the overlapping traits of immediacy and creativity. The left-hand column identifies the immediacy researcher(s), the middle column the overlapping trait, and the right-hand column the creativity researcher(s).

Table 1.1 Overlapping Immediacy and Creativity Traits

Immediacy Researcher	Overlapping Trait	Creativity Researcher
Gorham and Christophel (1990) Gorham, (1988) Richmond, Gorham, and McCroskey (1987)	Humor	Davis, G.A. (1993) Black, R.A. (2006) Coleman, K. (2001)
Nussbaum, (1992)	Flexibility	Black, R.A. (2006) Dacey J. & Lennon K., (1999)
Gorham, (1988)	Solicit Different Points of View (Curiosity/Open-Mindedness)	Davis, (1993) Fleith, (2000)
Richmond , McCroskey , Plax, and Kearney, (1986)	Praising Students Work	Dev, (1997)
Richmond , McCroskey , Plax, and Kearney, (1986)	Allowing wait time for students to respond to questions	Fleith, (2000)

1.2 Definition of Terms

Affective Learning: The development of favorable or unfavorable attitudes toward

course, the teacher, or learning in general (Bloom, 1956).

Creativity: "a successful step into the unknown, getting off the main track, breaking out

of the mold or rut, being open to experience and permitting one thing to lead to

another, recombing new ideas or seeing new relationships" (Torrance, 1994, p.28)

Elaboration: Attention to detail of an idea.

Flexibility: Freedom to switch from one way of thinking to another.

Fluency: Generation of numerous ideas.

Immediacy: The degree of perceived physical and/or psychological closeness between

people (Mehrabian, 1967).

Learning Loss: The score obtained when the student answers the two questions found in

the Learning Loss Scale (see pages 15 and 40). The lower the difference between

these two questions, the more the student learned cognitively. (Richmond,

Gorham, and McCroskey, 1987).

Nonverbal Behaviors: Teachers' use of face-to-face interactions with students, eye

contact, smiling, and body movement (Richmond, Gorham, and McCroskey,

1987).

Originality: Being able to produce remote, unusual or novel ideas.

Resistance to Premature Closure: One's ability to avoid simple solutions and continue

with more complex ideas in completing the task at hand.

Teacher Immediacy: verbal and nonverbal communication in the classroom such as

     smiles, head nods, use of inclusive language, and eye contact (Butland and Beebe,

     1992).

Verbal Behaviors: Teachers use of humor and praise. Conversing with students outside of

     class, encouraging students to talk, and soliciting other points of view (Gorham,

     1988).

1.3 Research Questions

1. Is there a significant correlation between teachers' verbal immediacy and teacher creativity/flexibility?

2. Is there a significant correlation between teachers' verbal immediacy and teacher creativity/fluency?

3. Is there a significant correlation between teachers' verbal immediacy and teacher creativity/originality?

4. Is there a significant correlation between teachers' nonverbal immediacy and teacher creativity/flexibility?

5. Is there a significant correlation between teachers' nonverbal immediacy and teacher creativity/fluency?

6. Is there a significant correlation between teachers' nonverbal immediacy and teacher creativity/originality?

7. Is there a significant correlation between teachers' nonverbal immediacy and teacher creativity/elaboration?

8. Is there a significant correlation between teachers' nonverbal immediacy and teacher creativity/ability to resist premature closure?

9. Is there a significant correlation between students' perceived learning and teacher overall figural creativity?

10. Is there a significant correlation between students' perceived learning and teacher overall verbal creativity?

11. Is there a significant correlation between students' perceived learning and teacher verbal immediacy?

12. Is there a significant correlation between students' perceived learning and teacher nonverbal immediacy?

13. Is there a significant correlation between teachers' nonverbal immediacy (as scored by the students) and teachers' **self-scored** immediacy?

(See Chapter 4 for a summary table of Hypotheses, Variables, Instruments, and F-Statistics/Correlations)

1.4 Significance of the Study

There is extensive research supporting the effects of teacher immediacy on affective learning and perceived cognitive learning. However, 'despite findings of meaningful relationships between teacher communication behaviors and student cognitive learning, additional investigation is warranted" (Titsworth, 2001, p. 283); for example, as this study does with high school students.

The majority (in 1980 McDowelle, McDowelle, and Hyerdahl, looked at secondary students) of the teacher immediacy research and perceived cognitive leaning has been performed with college students and instructors. Elementary and secondary students are an overlooked population in instructional communication research (West, 1994) although much has been done in creativity (Fleith, 2000; Sefer, 1995). Christophel (1990) suggested that a study conducted at an elementary or secondary level may produce even stronger data since 'teachers are seen as a more potent factor in student learning' (Christophel, 1990, p. 339). The present study is being conducted at a grades nine through 12 high school, focusing on all levels of students and math teachers with varying teaching experience and education.

Finally, perhaps the most critical component to potentially add to the field of education is the study of the relationship between teachers' immediacy and creativity. To this researcher, teacher immediacy and teacher creativity seem to go 'hand-in-hand'. As Simplicio points out, teachers who wish to be creative must not only increase their knowledge and skills, understanding their students must increase as well. Increasing these skills and awareness will lead the teachers toward more effective communication with their students (Simplicio, 2000). Despite numerous overlapping behaviors (e.g.,

flexibility, encouraging different points of view, sense of humor, praising students' work), the relationship between teacher immediacy and teacher creativity has yet to be investigated.

The world is changing at a rapid pace, and the importance of creativity in our everyday lives is likely to escalate (Sternberg and Lubart, 1996). As Simplicio (2000) points out, traditional teaching is no longer sufficient in the 21st Century classroom. The creativity of teachers is becoming more and more important as educators are now 'competing' with technology to capture and maintain students' attention. The learning process of America's children has changed dramatically, and now teachers are being challenged to change as well (Simplicio, 2000). Technology is obviously one area educators must address. But, couple that with the additional demands from schools (ex: Standards Movement and No Child Left Behind Law), and it is apparent that the teachers' need to change. This is becoming an expectation as opposed to a choice.

If the relationships investigated in this study are significant, a huge door will be opened for teachers nationwide. This study has the potential to provide educators with a better understanding of what makes a teacher effective. This unveiling may motivate the design and implementation of pre-teacher and in-service teacher professional developmental programs that will teach the skills needed to be immediate and creative. And research has shown that creativity can be cultivated and taught (Csikszentmilhalyi, 1996; Torrance, 1994) and through awareness and training, teacher non-verbal behaviors can increase (Nussbaum, 1984).

1.5 Purpose of the Study

The study has several major purposes: (1) to determine if there is a relationship between teachers' immediacy and their creativity, (2) to investigate if secondary teachers can assess their own immediacy level, and (3) to determine if teacher immediacy and/or creativity impact perceived learning. The results, if significant, will contribute to the field of education by adding immediacy and creativity curricula to the current teacher education programs nationwide – especially in light of such negative evaluations of teacher education resulting from the Arthur Levine report (Honawar, 2006).

1.6 Limitations

1. The sample is based on voluntary participation thus allowing for potential bias.

2. Although the surveys administered to the students were done anonymously (no names), they may have been influenced to score the teacher immediacy scale higher in 'fear' that their teacher does read the class responses.

1.7 Delimitations

1. This research represents a portion of the mathematics and science departments. While all of the mathematics teachers volunteered, all but one of the science teacher volunteered for the study.

2. This research is looking exclusively at mathematics instruction in one school district.

CHAPTER 2: REWIEW OF LITERATURE

2.1 Introduction

In this study the researcher investigated the relationships between teacher immediacy, teacher creativity, and student perceived cognitive learning. The subsequent literature review will be divided into sections that include the following: 1) teacher immediacy; nonverbal and verbal, 2) student perceived cognitive learning, 3) creativity: in and out of the classroom, and 4) measuring creativity.

2.2 Teacher Immediacy

Mehrabian first defined immediacy in 1967, as communication behaviors that diminish the physical and psychological distance between people. Immediacy research is grounded in approach-avoidance theory that suggests, "people approach what they like and avoid what they don't like" (Mehrabian, 1981, p.22). Immediacy and liking are "two sides of the same coin…liking encourages greater immediacy and immediacy produces more liking" (Mehrabian, 1971, p.77).

2.2a Nonverbal Teacher Immediacy

Andersen (1978, 1979) has become the pioneer of nonverbal teacher immediacy. Her initial instincts that nonverbal immediacy was significant in effective teaching quickly turned from a 'gut feeling' to a 'fact' when nonverbal teacher immediacy behaviors were found to be highly correlated with positive student attitudes (Andersen, 1979; Andersen, Norton, and Nussbaum, 1981; Andersen and Withrow, 1981). Andersen

defined nonverbal immediacy as *eye contact*, *gestures*, *relaxed body position*, *directing a body position toward students*, *smiling*, *vocal expressiveness*, *movement*, and *proximity* (Andersen, 1979).

Richmond, Gorham, and McCroskey (1987) did extensive research to identify specific nonverbal teacher behaviors that have the greatest effect on learning. This exhaustive review spanned over three decades and is the foundation for the Nonverbal Teacher Immediacy Scale. This 14-item questionnaire includes eight items spanning the following seven topics: *proximity*, *face-to-face interaction*, *touching*, *eye contact*, *smiling*, *body movement*, and *vocal expressiveness*. The remaining six questions are purposely *non*immediate, and are reflected for analyses. (For example, using the scale from one (low) to five(high), if a student selects a score of 2, the researcher must reflect/reverse that score to a 4 since the question was a *non*immediate matter.) These include (1) sitting behind the desk while teaching, (2) using a monotone/dull voice while addressing the class, (3) having a tense body position while teaching, (4) sits on a desk or chair while teaching, (5) looking at the board or notes while talking to the class, (6) standing behind a podium or desk while teaching. The comprehensive research, as reflected in Table 2.1, is the foundation for Richmond, Gorham, and McCroskey's (1987) Nonverbal Teacher Immediacy Scale.

Table 2.1   Nonverbal Teacher Immediacy Behaviors

Topic	Example	References
1. Proximity	Teachers who move around the room are perceived as warm, friendly, and effective	Mehrabian, 1981 Hesler, 1972
2. Face-to-Face Communication	More immediate communication occurs when people face one another	Aielloand and Cooper, 1972 Andersen, Andersen and Jensen, 1979 Bryne, Baskett, and Hodges, 1971 Mehrabian, 1967, 1968 Mehrabian and Friar, 1969 Patterson and Sechrest, 1970
3. Touching	Touching has been shown to indicate likeness and/or interpersonal closeness between teacher and student ---------------------------- Students feel rejected when teachers withhold touch	Andersen, Andersen, and Jensen, 1979 Fisher, Rytting, and Heslin, 1976 Henley, 1977 Montague, 1978 Morris, 1971 -- Hurt, Scott, and McCroskey, 1978
4. Eye Contact	Eye contact increases liking and provides positive student-teacher interactions ---------------------------- Lack of Eye Contact promotes negative feelings in students	Andersen, Andersen, and Jensen, 1979 Hodge, 1971 Bishop, 1976 Mehrabian, 1968, 1981 Kendon, 1967 Mehrabian and Friar, 1969 Thayer and Schiff, 1974 -- Breed, 1971

Table 2.1 (continued)

5. Smiling	Smiling indicates liking and arousal	Kraut and Johnston, 1979 Mehrabian, 1981 Andersen, Andersen, and Jensen,1979 Kendon, 1967 Stern, 1984 Rosenfeld, 196
6. Body Movements	Student attitudes were positively impacted by physically active teachers who utilized body gestures, head nods, and a relaxed body position.	Rosenfeld, 1966 Andersen, 1979 Andersen, Andersen, and Jensen, 1979 Mehrabian, 1968, 1971 Smith, 1979 Bebbe, 1980 Seals and Kaufman, 1975 McGinley, LeFevre, and McGinley, 1975
7. Vocalic Variable	While delivery, changes in pitch, and tempo are important factors in communicating immediacy, tone is not.	Bayes, 1970 Scherer, 1972 Andersen, Andersen, and Jensen, 1979 Weineke, 1981

Of these seven identifying nonverbal behaviors of teacher immediacy, subsequent studies identified the nonverbal immediate behaviors most valued by students to be *vocal expressiveness*, *smiling*, and a *relaxed body position* (Gorhman, 1988; Kelly and Gorham, 1988; Richmond, Gorhman, and McCroskey, 1987).

2.2b Verbal Teacher Immediacy

While research on nonverbal immediacy had its foundation in Mehrabian's earlier work on behaviors, the positive effects of verbal immediacy were unveiled in the mid

1980's. Award winning college instructors were studied and found to use three similar verbal behaviors: *humor*, *self-disclosure*, and *narratives* (Nassbaum, Comadena, and Holladay, 1987; Downs, Javidi, and Nussbaum, 1988). Humor was used spontaneously, as a break in the lecture routine. The self-disclosure and narratives were factual accounts utilized to enhance the clarity of the content, not personal stories unrelated to the topics being discussed. Educators must use these verbal behaviors cautiously because excessive use of self-disclosure or humor have been identified as inappropriate when relating to students (Downs, Javidi, and Nussbaum, 1988)

Shortly thereafter, in 1988, Gorham studied college students to identify specific verbal teacher immediacy behaviors that positively impacted their affective learning. She held small group brainstorming sessions with 47 undergraduate students and asked them to think about the best teachers they have ever had from kindergarten through college. They were asked to identify and list the characteristics and behaviors of these 'best teachers'. The compiled list was carefully studied and tested, thus contributing to the field of teacher immediacy by adding the Verbal Immediacy Behavior Scale (Gorham, 1988). These verbal behaviors include: *humor*, *conversing with students outside of class*, *praise*, *self-disclosure*, *asking questions that encourage students to talk and/or solicit different points of view*, *follow-up on student initiated topics*, and *encouraging communication through phone calls* (Gorham, 1988).

Teachers utilizing such verbal strategies "reduce psychological distance by recognizing individual students and their ideas and viewpoints by incorporating student input into course and class design by communicating availability and willingness to engage in one-on-one interactions, and by enhancing their own "humanness" via humor

and self-disclosure" (Gorham, 1988, p. 52). These verbal immediacy behaviors, coupled

with the nonverbal immediacy behaviors unveiled by Richmond, Gorham, and

McCroskey make up the Teacher Immediacy Inventory, and successive studies of teacher

immediacy incorporated both nonverbal as well and verbal communications.

While verbal immediacy and its scale was originally welcomed by immediacy

experts, it was later deemed unfounded. The instrument was found to measure the verbal

behaviors of good teachers as opposed to measuring the verbal immediacy of the teachers

(Robinson & Richmond, 1995). It is being included in this study solely due to the fact

that the Torrance Tests of Creative Thinking has two parts, a Figural part and a Verbal

part. The researcher is comparing verbal immediacy with verbal creativity to see if what

the immediacy experts mistakenly identified as verbal immediacy may in fact be verbal

creativity.

2.2c Teacher Immediacy and Cognitive Learning

Earlier studies of Teacher Immediacy did not present a link between teacher

immediacy and cognitive learning (Andersen, 1979; Chaiken, Gillen, Derlega, Heinen, &

Wilson, 1978) although teacher immediacy increases the students desire to be in the

classroom, thus providing a receptive environment for cognitive learning (Andersen,

1985). A contradiction arose when a replication of Andersen's study was performed on

secondary students and resulted in a positive correlation between nonverbal immediacy

and final course grades (McDowelle, McDowelle, and Hyerdahl, 1980). Arguments were

then raised stating that past studies of cognitive learning were unreliable due to their

testing measures. The skepticism developed because Andersen's study consisted of using

the results of one test administered to college students early in the semester, and McDowelle's study utilized final, end of year, teacher grades.

A decade later, the link between teacher immediacy and cognitive learning remained unclear for numerous reasons. The measurements used for determining cognitive learning were deemed unreliable and invalid. "These were rejected because of the obvious difficulty of obtaining scores from the teachers, the absence of norms from which to generate standard scores for each student, the general incompetence of individual teachers in generating reliable and valid tests, and finally, the fact that many teacher-made tests were not based on publicly stated objectives and are only marginally related to what is taught in the class" (McCroskey and Richmond, 1992, p. 107).

Richmond, Gorhman, and McCroskey (1987) introduced the *Learning Loss Scale* in 1987. It was an attempt to fill the growing gap of how to measure cognitive learning. This measure asks the students only two questions that have a 9-point semantic differential scale: (1) How much they learned in this class, with 0 meaning they learned nothing and 9 meaning they learned more than any other class they've had, and (2) How much do they think they could have learned in the class if they had the ideal instructor (Richmond, Gorham, and McCroskey, 1987). The actual learning loss is computed by subtracting question 2 minus question 1. The lower the difference the more the student learned cognitively. (Richmond, Gorham, and McCroskey, 1987). This method proved to be highly accurate (85% to 93%) as well as easier to administer and obtain data. In 2000, the learning loss scale was tested against other means of measuring cognitive learning, and is considered to be a moderately-strong indication of concurrent validity (Chesebro and McCroskey, 2000).

Numerous studies on teacher immediacy and cognitive leaning are somewhat misleading to the reader because the stated 'cognitive learning' is really 'student perceived cognitive learning'. This instrument was utilized in an abundance of subsequent studies and found a positive correlation between teacher immediacy perceived cognitive learning (Bainbridge-Frymier, 1994; Chesebro and McCroskey, 2000;Christensen and Menzel, 1998; Christophel, 1990; Comstock, Rowell, and Bowers, 1995; Frymier, 1994; Gorham, 1988; Kelley and Gorham, 1988; McCroskey, Sallinen, Fayer, Richmond, and Barraclough, 1996; Menzel and Carrell, 1999; Richmond, 1990; Richmond, Gorham, and McCroskey, 1987; Rodriquez, Plax, and Kearney, 1996; and Sanders and Wiseman, 1990). While direct measures of cognitive learning are a rare find, some do exist. One study found a positive relationship between eye contact, high physical proximity, and short-term cognitive recall (Kelley and Gorham, 1988). A second found a significant relationship among affective learning toward instructor and course, immediate recall, and student-teacher interaction (Wheeless, 1975).

2.3 DEFINING CREATIVITY

Attempting to unveil a global definition of creativity is practically impossible because creativity means so many different things to different people (Weisberg, 1986). For instance, art professors accentuate imagination and originality, physics professors put the accent on one's ability to find order in chaos, and businessmen encourage the

exploration of new ideas (Sternberg, 1985). Not only do the definitions of creativity vary, but creative productivity fluctuates among cultures as well (Martinez, 2000).

Creativity can be viewed as a trait of an individual or shown through productivity (Boden, 1994). In recent years, researchers (Lubart, 1994; Ochse, 1990; Sternberg and Lubart, 1991, 1995, 1996) define creativity as the ability to produce work that is novel (original and/or unexpected) as well as appropriate (useful, meeting a specific need), thus defining creativity as shown through a productivity perspective.

Taking the view of creativity as a trait, Gruber (1981, 1988) and Gruber and Davis, (1988) share that creative outcomes result from a person's growth over time in purpose, knowledge, and affect. Csikszentmihalyi (1988) contributes that creativity is the interaction between the individual, domain, and field. For example, "creativity occurs when a person makes a change in a domain, a change that will be transmitted through time" (Csikszentmihalyi, 1999, p. 315). This change needs to be adopted, and the leaders of the domain, the field, decide what is to be added in the domain. A few years later, in 1993, Gardner added to the work of Csikszentmihalyi, sharing those creative projects may result from inconsistencies within a system or 'moderate asynchronies' between the individual, domain, and field. Martinez adds that a persons' ability to produce work that is new and culturally significant requires skills and attitudes embedded in creative intelligence (Martinez, 2000).

This study will utilize the definition of E. Paul Torrance, a noted expert in the field of creativity, because it captures the essence of this research. Torrance summarized creativity "as a successful step into the unknown, getting off the main track, breaking out

of the mold or rut, being open to experience and permitting one thing to lead to another, recombining ideas or seeing new relationships." (Torrance, 1994, p. 28).

In an attempt to understand creativity, Sternberg and Lubart (1999) reviewed six approaches, or paradigms, sometimes referred to as roadblocks. The mystical approach is one of the earliest accounts of creativity that is based on divine intervention and/or a spiritual process. This theory dates back to the Greeks who believed that Gods and/or Muse's "breathed" creativity into artists. Creativity was considered an unexplained phenomenon that falls out of the realm of normal human abilities (Starko, 2001). The second paradigm, pragmatic, was seen as damaging to the study of creativity because its theorists did not attempt to validate their work with any serious psychological theory. An example would be Edward DeBono and his work on lateral thinking and "thinking hats". While these have had commercial success, his concern was with practice, not theory (Sternberg and Lubart, 1999).

The third approach to creativity, psychodynamic, is considered the first major twentieth century theoretical approach to creativity. An example of this approach stems back to Freud who suggested that "writers and artists produce creative work as a way to express their unconscious wishes in a publicly acceptable form" (Sternberg and Lubart, 1999, p. 6).

The psychometric approach, the one used in this study, made factor analysis possible when studying the creative person. In Guilford's APA address in 1950, he stated that creative people were difficult to study and proposed the development of paper and pencil tasks that are highly utilized today. Guilford's Unusual Uses Test and Torrance Tests of Creative Thinking (the one used in this study) have been evaluated both

positively and negatively. While the tests are brief, easy to administer, objectively

scorable, and useful with everyday people, some criticize that they are an inadequate

measure of creativity (Sternberg, 1986) and that there is little evidence that they actually

predict creative production (Wallach, 1971; Brown, 1989). However, after a considerable

amount of research, Torrance countered by stressing that "these tests would never argue

that possession of these abilities guarantees that an individual will behave creatively,

anymore than a high degree of intelligence guarantees intelligent behavior"(Torrance,

2000, p.1).

The cognitive approach to creativity attempts to disclose a mental process

responsible for triggering creative thoughts. While there have been studies on computer

simulations of creative thinking (e.g., BACON), Finke, Ward, and Smith (1992) studied

humans. Their Geneplore Model consists of a generative phase, the individual making

mental pictures, and the exploratory phase, utilizing the mental pictures to come up with

creative ideas.

Parallel to the cognitive approach is the sixth and final approach toward

creativity, the Social-Personality Paradigm. While the focus is still on the individual, here

the center of attention is on their personality, motivation, and sociocultural environment.

Numerous researchers have identified the personality traits of creative people as being

self-confident, displaying independence of judgment, attracted to complexity,

aesthetically oriented, and risk takers (Amabile, 1983; Barron 1968; Eysenck 1993;

Gough, 1979; Mackinnon, 1965; Starko, 2001). Falling under the realm of personality,

Abraham Maslow (1968) proposed 'self-actualizing creativity' as one using their talents

to the fullest. He describes the characteristics that lead a person to his or her fullest

potential to include expression, affinity for the unknown, boldness, courage, freedom, spontaneity, and self-acceptance (Maslow, 1987). After a creativity literature review, Dacey and Lennon (1998) found the following characteristics and behaviors contributing to the creative person to be: tolerance of ambiguity, stimulus of freedom, flexibility, risk-taking, preference for disorder, delay in gratification, freedom from sex-role stereotyping, perseverance, and courage.

The creative person has a complex personality that enables them to go from one extreme to another. This complex personality is summarized by Csikszentmihalyi as having ten dimensions of complexity. These include the creative individual having a lot of physical energy but sleeping a lot, is smart yet naïve, is playful/responsible and disciplined/irresponsible, can fluctuate between fantasy and reality, is humble yet proud, does not conform to gender stereotyping, is rebellious and independent, is passionate and objective about their work, and they endure suffering and pain but also a great deal of enjoyment (Csikszentmihalyi, 1996).

Policastro and Gardner (1999) identify reflection, leverage, and framing as what separates highly creative people from others, summarizing that highly creative individuals reflect on their successes as well as their failures. They maintain a balance by using their strengths to the maximum and not spending too much time and effort in areas in which they do not excel. And lastly, they have the unique ability to frame defeats/failures by appreciating the new lessons that were learned. Sternberg (1984) adds that 'stars' in a field have at least one extraordinary well-developed skill, one in which they capitalize upon. He adds that 'these people mold their jobs to fit their greatest talents' (Sternberg, 1984, p. 695). In a comprehensive review of literature, "Davis (1992,

pp. 69-72)…concluded that personality characteristics of creative people were awareness of their creativity, originality, independence, risk taking, personal energy, curiosity, humor, attraction to complexity and novelty, artistic sense, open mindedness, need for privacy, and heightened perception." (Plucker and Renzulli, 1999 p. 42).

"Creativity is quintessentially a developmental matter" (Feldman, 1999, p. 170). Feldman (1994a, 1994b) studied the progression an individual makes from novice to master, and shared the importance of this transition when investigating creative development. Herbert Simon and William Chase (1973) studied chess players and found that it took 10 years for a player to move from novice to master. Garder proposed a '10-year-rule' after noting similar developments when studying seven creative individuals, each from a different field. Csikszentmihalyi adds that 'genuinely creative accomplishment is almost never the result of a sudden insight, a light bulb flashing on in the dark, but comes after years of hard work' (Csikszentmihalyi, 1996, p. 1).

There are numerous issues, events, and qualities that can be attributed to creative development. Feldman (1999) summarizes the Dimensions of Creative Development as cognitive processes, social/emotional processes, family aspects: growing up and current, education and preparation: formal and informal, characteristics of the domain and field, social/cultural contextual aspects, and historical forces, events, trends. In the 1950's and 1960's, the characteristics of creative people were positive. Mackinnon used descriptors such as high levels of energy, cognitive flexibility, independence, and unquestioning commitment (Feldman, 1999). But in recent years the social and emotional well-being of highly creative people were found to be less than perfect when Gardner unveiled that highly creative people have a difficult time forming close relationships. "Friends, lovers,

wives, and husbands were important, to be sure, but more for what they contributed to the creator's purpose than for their intrinsic value" (Feldman, 1999, p.174).

"Some studies have tried to speculate on the reasons why factors like birth order, loss of parent, and others have been associated with exceptional achievement, but few clear-cut explanations have emerged thus far" (Feldman, 1999, p. 175). Although the family atmosphere is not overly warm, the children are supported, encouraged, and their needs are well met. "The importance in doing well in school varies with the field and the individual" (Feldman, 1999, p. 176). The sciences tend to rely more on education than the artistic fields. While it remains unclear whether or not formal schooling plays a critical role in creative development, teachers and mentors are especially important to child prodigies.

"Creativity is a process that can be observed only at the intersection where individuals, domains, and fields interact" (Czikszentimihalyi, 1999). It is a person, an individual, who makes a change within a domain. This change is transmitted over time. Then it is the 'gatekeeper' of the domain, known as the field, who decides whether or not the contribution of the individual is worthwhile. Societies cannot be an overlooked influence of creative development because this is where domains and fields are embedded. The society/culture encompassing a field can positively impact creativity by recruiting support, fending off threats, and celebrating achievements guaranteeing the continued existence of the field (Feldman, 1999, p. 179). "Among the "chance" events in the development of creativity are the many determinants of the process that are a straightforward function of time, place, and circumstances of one's birth

(Csikszentmihalyi, 1994; Perkins, 1988; Simonton, 1988, 1992, 1996)" (Feldman, 1999, p. 180).

2.3a Creativity in the Classroom

"Changing the classroom environment to develop a supportive, safe, professional climate where students feel in control of themselves must be a collaborative effort by groups of teachers, parents, administrators, and students" (Reisman and Torrance, 2002, p. 24). In a study focusing on teachers and students in Connecticut, Fleith (2000) found that teachers and students believe that the classroom environment most inviting of creativity is one that provides students with choices, accepts different ideas, boosts self confidence, and focuses on students strengths and circumvents their weaknesses. The environment that hinders creativity includes classrooms where ideas are ignored, teachers are controlling, and excessive structure exists. Fleith (2000) summarized an educational environment that fosters creativity as:

- Allowing time for creative thinking

- Reward creative ideas and products

- Encouraging sensible risks

- Allowing for mistakes

- Imagining other viewpoints

- Exploring the environment

- Questioning assumptions

- Finding interests and problems

- Generating multiple hypotheses

- Focusing on broad issues rather than specific facts

- Metacognition

And Pagano (1979) adds:

- A place where children are free to express emotions

- A place where children feel secure

- An environment not dominated by teacher as an authoritarian

- Balance between encouraging children's creative work and building resources for better work

- Time for critical feedback of students' work

Dev (1997) suggests that teachers can positively enhance the academic motivation of their students with strategically placed positive reinforcement . Teachers should praise their students, but they need to do it cautiously as too much will lose its value. Students should be given the opportunity to re-do tasks after the teacher provides them with more guidelines. Challenging and stimulating students need to be done vigilantly because if the task is too easy the students will get bored, and if it is too difficult they will not succeed (Dev, 1997). Providing such challenges outside of the curriculum and/or classroom setting shows the students that the teachers care, which is very important to the student-teacher relationship as creative people identify their most influential teachers as caring (Csikszentmihalyi, 1996). Amabile (1996), an expert in motivation and its contribution to creativity, suggests that teachers do the following:

- Reduce evaluations and include unevaluated practice

- Design positive/constructive evaluations

- Understand that behavior problems may be a manifestation of creativity

- Be supportive and encouraging without compromising professionalism

- Help students resist peer pressure

- Encourage intrinsic motivation.

Each and everyday teachers lead a class based on pre-planned lessons. The way in which teacher's enact their plans may be overflowing with creativity (Rejskind, 2000). Borko and Livingston (1989) assimilate the act of teaching as 'improv'. They explain that teachers perform improvisational acts as they are constantly adjusting and adapting these pre-planned lessons to meet the ever-changing needs of the students.

Subsequently, Moore (1993) added problem solving and problem finding to Barko and Livingston's improv-comparison. Reisman and Torrance (2002) summarized the Osborns/Parnes Creative Problem Solving Model of fact-finding, problem-finding, idea-finding, solution-finding, and acceptance-finding. Fact-finding entails listing as much information about the problem as possible (the who, what, where, when and why). In problem-finding the student identifies elements within the problem, and idea-finding is brainstorming. Solution-finding is identifying, through a grid method, which of the brainstorming ideas would most-likely solve the problem. And acceptance-finding is designing an action plan to come to a solution (Torrance and Reisman, 2000).

2.3b Measuring Creativity

In addition to being a paradigm to the study of creativity, the psychometric approach is one of the five categories of creative studies. The remaining four categories include the experimental, biographical, historiometric, and biometric approaches. The psychometric and experimental approaches are very similar, varying primarily in the research design. The psychometric approach utilizes correlational and causal comparative

designs focusing on personality and the environment, while the experimental and quasi-experimental designs focus on the cognition and problem solving aspects of creativity.

The approach that differs most from the psychometric approach is the biographical approach. Here, qualitative research methodologies are utilized on case studies of eminent creators. Although outdated, the best-known instruments for biographical studies include Schaefer and Anastasi's Biographical Inventory and Taylor's Alpha Biographical Inventory (ABI), both from 1968. More recently utilized is Michael and Colson's Life Experience Inventory (LEI) released in 1979. The historiometric approach is just what the title suggests, measuring creativity by gathering data primarily from historical documentation. And, the fifth category of creative studies is the biometric approach. Here an individual's brain activity is measured while performing purposefully designed cognitive tasks, which is accomplished by monitoring the glucose metabolism of the subject.

The birth of tests based on divergent thinking were a radical departure from achievement and standardized tests, such as IQ tests, which require only one correct answer. Traditional tests lack the ability to unveil the true intelligence of students across varying social and emotional environments (Garcia, 2001). "Divergent thinking tests historically occupy nearly the entire creative process spotlight" (Plucker and Renzulli, 1999, pg. 41). The first divergent thinking test was introduced by Guilford in 1967. In 1962, Torrance developed the Torrance Tests of Creative Thinking. And, in 1965, Wallach and Kagan developed a game-like assessment with no time limits. Amabile stresses that "time pressure squashes creativity…because it limits peoples' freedom to ponder different options and directions" (Murray, 2002, p. 24). Too often speed is

associated with intelligence, and even 40 years later, it is rare to find another test that is not timed (Sternberg, 1984). The creativity psychometric instrument utilized in this study is the Torrance Tests of Creative Thinking (TTCT), the best-known divergent thinking test (Cropley, 2000).

2.4 Chapter Summary

The age-old saying 'actions speak louder than words' was verified in 1969, by Dr. Moravian from Stanford University. His study found that communication was 93% nonverbal and 7% verbal. After extensive research, the faculty at West Virginia University studied the verbal and nonverbal behaviors of teachers and concluded that the nonverbal immediacy of teachers does impact their students' affective and cognitive learning. Verbal immediacy, one welcomed by immediacy experts, was later deemed

The nonverbal teacher behaviors that have the greatest effect on learning include proximity, face-to-face interaction, touching, eye contact, smiling, body movement, and vocal expressiveness. The behaviors most valued by students are vocal expressiveness, smiling, and a relaxed body position.

The teacher nonverbal behaviors that positively impacted students include humor, conversing with students outside of class, praise, self-disclosure, asking questions that encourage students to talk and/or solicit different points of view, follow-up on student initiated topics, and encouraging communication though phone calls. But, teachers must

be cautioned that excessive use of self-disclosure or humor is inappropriate when relating to students.

Finding relationships between teacher immediacy and cognitive learning has been difficult due to the reliability of testing measures. Using teacher final grades were deemed unreliable and invalid, so this gap was filled by the development of the *Learning Loss Scale*. This scale, which was introduced in 1987, consists of two questions with a 9-point semantic differential, is highly accurate (85% to 93%), and easy to obtain.

Torrance defines creativity "as a successful step into the unknown, getting off the main track, breaking out of the mold or rut, being open to experience and permitting one thing to lead to another, recombining ideas or seeing new relationships" (Torrance, 1994, p. 28). The creative person has a complex personality that allows them to go from one extreme to another. Reflection, leverage, and framing have been identified as factors that separate highly creative people from others. Various researchers have identified the personality traits of creative people as being self-confident, flexible, original, independent, risk takers, attracted to complexity, open-minded, free from sex role stereotyping, preference for disorder and having a need for privacy.

Creativity can be fostered in a classroom when teachers allow time for creative thinking, reward creative ideas and products, encourage sensible risks, allow for mistakes, imagine other viewpoints, explore the environment, question assumptions, and provide a place where children feel secure and safe to express emotion. Teachers can also hinder the creative environment by being too controlling, ignoring their students' ideas, and having too much structure.

CHAPTER 3: METHOLODOLOGY

3.1 Quantitative Research

The purpose of this study is to analyze the relationship between teachers'
immediacy and creativity, in addition to investigate if teachers' immediacy and creativity
impacted their respective 9-12 students' perceived learning. It is also examining the
relationship between the secondary teachers' self-scored immediacy results with the
students-scored immediacy results given by their perspective students to view possible
discrepancy between the two scores. In this quantitative study, the researcher did not
manipulate the variables or arrange for events to happen. The research was completed
under natural conditions with existing instruments already proven valid and reliable.

3.2 Participation and Instruments

The research was conducted in a suburban high school in the Mid-Atlantic area.
The school district utilized for this study only has one high school. This is a Blue Ribbon
High School with higher than average SAT scores (1153 in 2005 and 1143 in 2006). This
high school has 100% of the Junior Class passing the HSPA with 99% of the Senior Class
applying and accepted to college each year. The study focused on secondary teachers and
their respective students. All mathematics and science instructors were asked to
participate on a volunteer basis. Out of a total of 16 teachers, 15 chose to participate.

All participants, teachers and students alike, completed surveys. As shown in
Table 3.1, the participants and their perspective instruments are identified.

Table 3.1 Assessment Instruments

_____

Instrument	Measures
Torrance Test of Creative Thinking (TTCT), Verbal and Figural Form	Teachers' creativity †
Verbal Immediacy Behaviors Scale (VIB)	Teachers' verbal immediacy*
Revised Nonverbal Immediacy Measure (RNIM)	Teachers' nonverbal immediacy*
Learning Loss Scale	Students' perceived cognitive learning*
Nonverbal Immediacy Scale – Self-Report (NIS – S)	Teachers' perceived nonverbal immediacy †

_____

†completed by teachers
*completed by students

3.3 Data Collection Procedures

3.3 a. Recruiting participants

The participant recruiting was completed via two means. The first occurred at math and science department meetings early in the second semester. The Mathematics and Science Department Facilitators informed the secondary mathematics and science teachers of the opportunity to participate and introduced the researcher. A question and answer session followed where the researcher discussed the relevance of the study, reinforced the confidentiality of all participants, and the impact this study might have on the future of mathematics and science education. At the conclusion of the meeting, the faculty members were told to expect correspondence from the researcher the following

week for recruitment purposes. It is at that time the teachers were welcomed to volunteer

for the study.

The second means of recruitment took place via email. One week after being

introduced to the faculty, the researcher contacted all prospective participants via e-mail

inviting all to participate and opening the lines of communication. Details of the study

and its importance were provided at this time. This invitation was attached to the email

and all interested participants were asked to fill out the necessary contact information and

reply within one week. Hard copies of the e-mail attachments were also be placed into

each mathematics and science teacher's mailbox for any possible non-computer users.

This procedure adhered to and was approved by Drexel IRB.

3.3b Torrance Tests of Creative Thinking (TTCT)

All participants met in June 2005, at one central location for the TTCT

administration. The teacher creativity data collection occurred in the high school library

over two different days to meet the tight schedules at this demanding time of year. After

all participants arrived, each was given an envelope containing the creativity test (TTCT,

Verbal and Figural) and a perceived immediacy survey (NIS – S) with their assigned

number affixed to the envelope. The teachers were assigned one per table and pencils

were provided. The researcher read the directions aloud and asked if there are any

questions. The participants spent 60 minutes on the TTCT. They were given an additional

5 minutes to answer the immediacy survey. Upon completion, the teachers were asked to

place all items back in the labeled envelope. The researcher concluded by thanking the teachers for their time and sharing that their part in this study was now complete.

3.3c Teacher Immediacy Scale

Over a one-week period, the researcher visited each mathematics classroom, introduced herself to the students, explained the study, and distributed the permission forms. The researcher stressed that their participation was voluntary, and that their names would not be on the survey. The students were informed to return the signed permission form to their teacher, or to the researcher's mailbox, by a specific given due date. The researcher retrieved the forms from the teachers after the required due date (and gave a one week extension to allow for maximum collection of responses).

After all permission forms were collected, the data collection from the students began. The student data collection took place in their English classes, where surveys were distributed. The researcher chose to use these means for two reasons (1) while in their English class the students are not in the presence of their science and/or math teacher and (2) every student in the school takes English, thus allowing for broad student data collection.

Since the researcher/principal investigator, works at the school in which data collection took place, she only collected data from the students whom she did not teach. The researcher also took into account the possibility of teaching the freshman class in the future so she had two assistants (professors not affiliated with the high school), collect data from the freshman class. The assistants went into the English classes and distributed the Teacher Immediacy Scale and Learning Loss Scale to the students. After the English

teacher left the room, the session began with an introduction to the students and a brief overview explaining the importance of the study. The students were assured that their names were kept confidential; in fact they were instructed not to put their names on the surveys. The assistants then distributed the surveys, provided ample time for completion and collected them.

3.4 Descriptions, Validity, and Reliability of Instruments

   3.4a Torrance Tests of Creative Thinking (TTCT)

   The TTCT Verbal Form is made up of four activities: *Ask-and-Guess*, *Product Improvement Activity*, *Unusual Uses Activity*, and the *Just Suppose Activity*. The Act-and-Guess activities include three separate sections: Asking, Guessing Causes, and Guessing Consequences.

   In Activity 1, *Asking*, unveils the curiosity of an individual. It 'reveals the subjects' ability to become sensitive to what is unknown because the questions asked are those that cannot be answered by simply looking at the picture" (Torrance, 2000, p.2). Activities 2 and 3, *Guessing Causes* and *Guessing Consequences*, were designed "to reveal the subject's ability to formulate hypotheses concerning cause-and-effect" (Torrance, 2000, p. 3). In these three activities, looking at the number of relevant responses reveals the subject's ideation fluency. Their flexibility is measured by analyzing the shifts in thinking and the various categories the subject uses. The subject's mental leaps, coupled with their ability to depart from the obvious, measures originality (Torrance, 2000).

Activity 4, *Product Improvement Activity* is a "complex task with a high degree of face validity" (Torrance, 2000, p. 3). Through this activity, the subjects' fluency score comes from their number of relevant responses; the flexibility score is derived from the number of different ways the subject proposed improving the product, and the originality score is derived from the statistical infrequency and suitability of product ideas.

Activity 5, *Unusual Uses*, tests the subject's ability to think outside the box, and free their minds of well-established sets. This activity results in fluency, flexibility, and originality scores derived in a manner similar to the *Ask-and Guess* Activities 1, 2, and 3. In Activity 7, *Just Suppose*, Torrance adapted a consequences type test in Guilford's battery from 1959. This rendition "was designed in an attempt to elicit a higher degree of fantasy" (Torrance, 2000, p. 3). This activity is very similar to the *Guessing Consequences* Activity in that the subject is predicting possible outcomes. But the *Just Suppose* Activity goes a step further by introducing a new or unknown variable. Again, the fluency, flexibility, and originality scoring is similar to the Ask-and-Guess Activities.

The TTCT Figural Form is comprised of three activities: (1) *Picture Construction*, (2) *Picture Completion*, and (3) *Lines* (Form A) or *Circles* (Form B). In *Picture Construction* the subject is given a common shape (curve, teardrop, or jelly bean) and asked to come up with a unique picture incorporating the given shape. After completing the task, the subject is asked to give their drawings an original, clever, and unusual title. This activity taps the creative tendency of finding a purpose for something.

In *Picture Completion*, the subject is given ten incomplete figures and asked to sketch interesting objects or pictures, using lines, which no one else will draw. As with Picture Construction, the subject is asked to make up an interesting title for each drawing.

This activity required the subject to resist pre-mature closure as they attempted to get numerous original outcomes.

In the third activity, *Lines*, the subject is given three pages of sets of parallel lines. The subject is given ten minutes to make as many objects or pictures as possible. The subject is once again told to think of things no one else will think of, and to name or title each picture. Here, "the repetition of a single stimulus requires an ability to return to the same stimulus again and again, perceiving it differently each time, disrupting structure in order or create something new" (Torrance, 2000, p. 4).

Over the forty years that the TTCT has been used, it has consistently shown high reliability when administered under standard conditions. Puccio and Murdock (1999), identified the Torrance Tests of Creative Thinking as the most reliable and widely used tools to measure an individual's creative ability. When interpreting the reliability of data, it is important to remember that creative abilities are susceptible to development through education (Torrance, 2000). Students develop differently, some encouraged, some discouraged, to learn in creative ways. There have been numerous test-retest reliability studies (Goralski, 1964; Sommers, 1961; Mackler, 1962) demonstrating reliabilities ranging from .59 to .97.

To ensure content validity, Torrance made an exhaustive effort to base the test stimuli, tasks, instructions, and scoring procedures on the best theory and research to date (Torrance, 2000). "The test tasks selected for inclusion in the TTCT where chosen deliberately because the author believes they summon different parts of a universe of abilities that may legitimately be conceptualizes as 'creative thinking abilities'" (Torrance, 2000, p. 8).

Numerous studies utilizing the TTCT have lead to an increased understanding and awareness of the qualities measured by the test, thus achieving construct validity. Some of these studies compared the personality characteristics between high and low TTCT scores, while others researched the correlations between creativity and other variables (Torrance, 2000).

3.4b Teacher Immediacy Scales (Verbal and Nonverbal)

After extensive research, Richmond, Gorham, and McCroskey (1987) identified specific nonverbal teacher behaviors that impact student learning. The seven behaviors included in the Nonverbal Immediacy Measure (NIM) are as follows: proximity, face-to-face communication, touching, eye contact, smiling, body movement, and voice. "A 14-item version of the NIM instrument was developed to be a low-inference measure with a reference base consistent for all students, regardless of subject matter being studied or the culture of the student" (McCroskey, Fayer, Richmond, Sallinen, and Barraclough, 1996). Of the 14 items, six are *non*immediate and their scores are reflected for analyses (these are marked with an asterisk*). The students are asked to score their teachers using a five point scale: Never =0, Rarely = 1, Occasionally = 2, Often = 3, and Very Often = 4. The original NIM can be found in the table on the following page:

Table 3.2 Nonverbal Immediacy Measure (NIM)

_____

1. Sits behind desk while teaching.*
2. Gestures while talking to class.
3. Uses monotone/dull voice when talking to class.*
4. Looks at class while talking.
5. Smiles at the class as a whole, not just individual students.
6. Has a very tense body position while talking to the class.*
7. Touches students in the class.
8. Moves around the classroom while teaching.
9. Sits on a desk or in a chair while teaching.*
10. Looks at the board or notes while talking to the class.*
11. Stands behind podium or desk while teaching.*
12. Has a very relaxed body position while talking to the class.
13. Smile at individual students in the class.
14. Uses a variety of vocal expressions while taking to the class.

_____

*Presumed to be *non*immediate. Item scoring reflected for analyses.

In most reports, this measure has an acceptable reliability between .70 - .85, and was proven to have excellent predictive validity (McCroskey, Fayer, Richmond, Sallinen, and Barraclough, 1996). Items relating to sitting, standing, or touching were later found to be poor items when evaluating professors. McCroskey, Fayer, Richmond, Sallinen, and Barraclough (1996), modified the original 14-Item Nonverbal Immediacy Measure by eliminating #1, #7, #9, and #11, and introducing the Revised Nonverbal Immediacy Measure (RNIM).

After holding brainstorm sessions with 47 undergraduate students, Gorham (1988) compiled a list of verbal behaviors that positively impacted their affective learning. After this list was carefully studied and tested, she contributed to the field of immediacy by adding the Verbal Immediacy Behaviors Scale (VIB). The verbal behaviors include: humor, conversing with students outside of class, praise, self-disclosure, asking questions that encourage students to talk and/or solicit different points of view, follow-up on

student initiated topics, and encouraging communication through phone calls (Gorham,

1988). This scale is displayed in the table below.

Table 3.3 Verbal Immediacy Behaviors Scale (VIB)

_____

The students are asked to score their teachers using the same 5-point scale as the

NIM and RNIM: Never = 0, Rarely = 1, Occasionally = 2, Often = 3, and Very Often = 4.

1. Uses personal examples or talk about experiences she/he has had outside of class.
2. Asks questions or encourages students to talk.
3. Gests into discussions based on something a student brings up even when this doesn't seem to be part of his/her lecture.
4. Uses humor in class.
5. Addresses students by name.
6. Addresses me by name.
7. Gets into conversations with individual students before or after class.
8. Has initiated conversations with me before or after class.
9. Refers to class as "my" class or what "I" am doing.*
10. Refers to class as "our" class or what "we" are doing.
11. Provides feedback on my individual work though comments on papers, oral discussions, etc.
12. Calls on students to answer questions even if they have not indicated that they want to talk.*
13. Asks how students feel about an assignment, due date, or discussion topic.
14. Invited students to telephone or meet with him/her outside of class if they have question or want to discuss something.
15. Asks questions that have specific, correct answers.*
16. Asks questions that solicit viewpoints or opinions.
17. Praises students' work, actions, or comments.
18. Criticizes or points out faults in students' work, actions or comments.*
19. Will have discussions about things unrelated to class with individual students or with the class as a whole.
20. Is addressed by his/her first name by the students.

_____
*Presumed to be *non*immediate. Item scoring reflected for analyses.

As with the Nonverbal Immediacy Measure, items in the Verbal Immediacy Measure were eliminated as well. Item #9, #15, and #18 were eliminated as weak items. The remaining 17 verbal immediacy items had a half-split reliability of .94 (Gorham, 1988).

3.4c Learning Loss Scale

Richmond, Gorham, and McCroskey (1987) introduced The Learning Loss Scale in 1987 as an attempt to fill the gap in measuring cognitive learning. The Learning Loss Scale consists of two questions that, over the past fifteen years, have been proven to be highly accurate in measuring perceived cognitive learning. In 1988 the learning loss scale had a reported reliability of .94 (Gorham, 1988). A study conducted by McCroskey, Sallinen, Fayer, Richmond and Barraclough in 1996, identified a test-retest reliability of .85 and .88 respectively. Finally, in a 2000 article written by the same authors who developed the learning loss scale, it was reported that a "significant and meaningful correlation (.50) between students recall of lecture material and their reports on the learning loss measure, which indicated a moderately high validity coefficient" (Chesebro and McCroskey, 2000, p. 63). The Learning Loss Scale consisted of the two items:

1. *Using a scale from 0 – 9*: How much did you learn in this class, with 0 meaning you learned nothing and 9 meaning you learned more than any other class you've had?

2. *Using a scale from 0 – 9*: How much do you think you could have learned in

   the class had you had the ideal instructor?

The *learning loss* is measured by subtracting the score from question 1 from the score

from question 2. In past immediacy studies, the lower the difference the more the student

learned cognitively. (Richmond, Gorham, and McCroskey, 1987). In this study, the

learning loss score was used to measure student perceived learning.

3.4d The Nonverbal Immediacy Scale – Self Report (NIS-S)

This study utilized the NIS-S, the Nonverbal Immediacy Scale – Self Report.

Richmond, McCroskey, and Johnson (2003), developed this instrument. The instruments

used in the past had issues with reliability, so this scale addressed the reliability problems

as the need for self-reports in nonverbal immediacy have become great. This new tool,

with an alpha reliability of .87-.92, has proven successful. On the following page is the

26-item Nonverbal Immediacy Scale – Self Report (NIS-S). The individual filling out

this instrument uses a five-point scale ranging from 1-never to 5-very often.

Table 3.4 The Nonverbal Immediacy Scale – Self Report (NIS-S)

_____

1. I use my hands and arms to gesture while talking to people.
2. I touch others on the shoulder or arm while talking to them.
3. I use a monotone or dull voice while talking to people.
4. I look over or away from others while talking to them.
5. I move away from others when they touch me while we are talking.
6. I have a relaxed body position when I talk to people.
7. I frown while talking to people.
8. I avoid eye contact while talking to people.
9. I have a tense body position when I talk to people.
10. I sit close or stand close to people while talking with them.
11. My voice is monotonous or dull when I talk to people.
12. I use a variety of vocal expressions when I talk to people.
13. I gesture when I talk to people.
14. I am animated when I talk to people.
15. I have a bland facial expression when I talk to people.
16. I move closer to people when I talk to them.
17. I look directly at people while talking to them.
18. I am stiff when I talk to people.
19. I have a lot of vocal variety when I talk to people.
20. I avoid gesturing while I am talking to people.
21. I lean toward people when I talk to them.
22. I maintain eye contact with people when I talk to them.
23. I try not to sit or stand close to people when I talk with them.
24. I lean away from people when I talk to them.
25. I smile when I talk to people.
26. I avoid touching people when I talk to them.

3.5 Chapter Summary

This quantitative study was conducted at a suburban Mid-Atlantic 9-12 high school. All participation was on a volunteer basis. One purpose of this study was to analyze the relationship between teachers' immediacy and teachers' creativity, both figural and verbal.

Teacher immediacy was measured via student responses on the Revised Non-Verbal Immediacy Measure (RNIM)(with reliabilities between .70 - .85) and the Verbal Immediacy Behavior Scale (VIB) (with a half-split reliability of .94). Teacher creativity was measured by the Torrance Tests of Creative Thinking (TTCT); the figural and verbal forms. The TTCT has reliabilities range from .59 to .97.

This study was also analyzing the relationships between students' perceived cognitive learning and their teachers' immediacy and creativity levels. The Learning Loss Scale measures student cognitive learning, which in this study is being described as perceived cognitive learning. This two-question instrument has indicated a moderately high validity coefficient (Cheesebro and McCroskey, 2000).

CHAPTER 4: DATA COLLECTION AND ANALYSIS

4.1 Introduction

In this study the researcher wanted to determine: What are the relationships between teacher immediacy and teacher creativity? What are the impacts of teacher immediacy and creativity on students' perceived learning? And finally, can teachers really self-score themselves on immediacy?

This chapter includes the findings of the research study. The subjects, instruments, and analysis of data are presented. The final section of the chapter includes scatterplots that depict the relationships between each hypotheses of this study.

4.2 Subjects

In June 2005, a total of 320 high school students turned in completed consent forms to partake in this study. Due to absences the day of the data collection (12), and improperly filled out surveys (7) a total of 304 students took part in the study. These students filled out a Teacher Immediacy Survey (see appendix) and a Learning Loss Scale (see appendix).

The students were purposely surveyed in their English classes for two reasons. The first was to obtain the broadest possible number of subjects since all students take English. The second reason was to intentionally afford the students with the most comfortable environment possible. Since the surveys were about their mathematics teacher, completing the surveys while in their English classes provided the students with the privacy of not being in the presence of their mathematics teacher. The surveys were

all completed in one day, taking at most 15 minutes to complete. The researcher had two

research assistants accompany her throughout the day, and although it was a large

sample, student data collection went very smoothly.

The teachers were a much more challenging group to recruit and gather in one

spot, especially since the month of June involves high school teachers grading final

exams and completing the school year. Although the teachers' schedules were very

diverse, the instruments were distributed over two separate days in late June to help

accommodate the busy time of year.

4.3 Instruments

While 17 teachers were invited to participate, 16 partook in the study taking the

Torrance Tests of Creative Thinking (TTCT), Figural and Verbal, and the Nonverbal

Immediacy Scale – Self Report (NISS-S). The measures utilized in this study are found in

Table 4.1 below:

Table 4.1 Instruments

Instrument	Participants	Complete Time
Teacher Immediacy Inventory	Students	< 12 minutes
Learning Loss Scale	Students	< 2 minutes
TTCT – Figural	Teachers	30 minutes
TTCT – Verbal	Teachers	30 minutes
NISS – S (Nonverbal Immediacy Scale – Self Report)	Teachers	3 minutes

4.4 Analysis of Data

The subjects' tests were sent to the publisher, Scholastic Testing Service, Inc. for scoring to ensure the reliability. Both tests, verbal and figural, are based on Torrance's four divergent thinking factors: flexibility, fluency, originality, and elaboration. *Flexibility* is scored as the individuals' ability to produce a variety of responses; *fluency* the number of responses; *originality* the number of unique/uncommon responses; and *elaboration* is the subjects' ability to embellish their responses. The Verbal TTCT includes Flexibility, Fluency, and Originality, with the Figural Test including Flexibility, Fluency, Originality, Elaboration, and Resistance to Premature Closure, which is one's ability to avoid simple solutions and continue with more complex ideas in completing the task at hand.

This study utilized the standard scores on the Torrance Tests for Creative Thinking (TTCT). Scores ranging from 90-110 indicate average creativity. The standard scores on the TTCT – Verbal for the teachers in this study were: Flexibility, 98: Fluency, 97.1, and Originality 102.1. While the Average Standard Scores for this group indicate average creativity, this is not the case for Figural Creativity.

The TTCT – Figural Standard Scores for the teachers are as follows: Flexibility, 107.9; Fluency, 122.8; Originality, 111; Elaboration, 100.1; and Resisting Premature Closure, 110.3. It is clear to see that this group had higher than average Figural Creativity Standard Scores in Fluency. The means and standard deviations for the TTCT verbal and figural tests can be found in Tables 4.2 and 4.3.

The following statistics and graphs were computed from the Statistical Package for the Social Sciences (SPSS) software. When analyzing creativity and immediacy, the

Torrance Tests for Creative Thinking (TTCT) was the Independent Variable and Immediacy was the Dependent Variable. The variables were assigned in this manner because a students feeling of immediacy depends on the teacher standing before them, and for this particular study, the amount of creativity that a teacher brings into the classroom. When studying immediacy and learning loss, Immediacy was the Independent Variable and Learning Loss the Dependent Variable. In this case, the researcher is studying how much the students feel they learned depending on the amount of immediacy they felt from their specific teacher.

Table 4.4 displays the results of a univariate test between the Torrance Tests of Creative Thinking/Figural Scores and the Nonverbal Immediacy Scores ($p<.05$). The relationships were all significant as shown in Table 4.4. The data analysis originally appeared to be easily computable with Pearson Correlations until the researcher took a close look at the scatterplots of the data (see pages 53-66) and discovered that some lines of best fit were linear while others were curvilinear. Understanding that r should not be calculated if the relationship is not linear, and numerous scatterplots had quadratic fits, Multiple Regression became necessary. Therefore, the F-statistic was utilized to analyze teacher creativity and nonverbal immediacy due to their quadratic/curvilinear fits and the Pearson Correlation was the statistic of choice when analyzing the teacher creativity and verbal immediacy data that had linear fits.

If the reader refers to the scatterplots (pgs. 57-61) of the figural creativity/nonverbal immediacy relationships, it is apparent that all but one (flexibility) scatterplot is curvilinear, thus the need for applying multiple regressions/correlations. Since the F-statistic can show the strength of any relationship, the researcher decided to use this

analysis for all of the figural creativity/nonverbal immediacy relationships, keeping the statistics in this cluster consistent. When creativity and nonverbal immediacy were correlated, the most significant relationships occurred with Flexibility ($F = 29.341$), Originality ($F = 32.09$), Resisting Premature Closure ($F = 31.88$), and Fluency ($F = 29.49$). Although significant, Elaboration ($F = 19.40$) had the lowest correlations of the five creativity traits when analyzed with nonverbal immediacy. With these scores, the higher the score, the more nonverbal immediacy the student felt from their particular teacher with the given creativity trait.

Table 4.2   Means and Standard Deviations for the Torrance Tests for Creative Thinking
– Figural Tests

Source	N	M	SD
Flexibility	8	107.9	13.7
Fluency	8	122.8	14.6
Originality	8	111.0	8.4
Elaboration	8	100.1	14.6
Resist Closure	8	110.3	12.7
Figural	8	122.9	10.6
Average	8	110.5	8.9

Table 4.3   Means and Standard Deviations for the Torrance Tests for Creative Thinking
– Verbal Tests

Source	N	M	SD
Flexibility	8	98.0	22.8
Fluency	8	97.1	17.8
Originality	8	102.1	17.1
Average	8	99.1	18.9

Table 4.4 The Relationship Between Torrance Test/Figural Scores (Independent Variable) and Nonverbal Immediacy Scores (Dependent Variables)

Source	df	F
Flexibility	6	29.341[*]
Fluency	6	29.49[*]
Originality	5	32.09[*]
Elaboration	4	19.40[*]
Resist Closure	4	31.88[*]
Figural	5	33.22[*]
Average	6	29.34[*]
Group Error	297	(9.41)

Note. Values enclosed in Parentheses represent mean square errors. *$p < .05$.

Table 4.5 shows the significant findings when pairing the Torrance Tests of Creativity Thinking (Verbal) with the verbal immediacy scores. Pearson Correlations were the statistic of choice when analyzing data that had linear fits. Teacher Flexibility and Fluency were almost the same and Originality was the lowest in this coupling.

Table 4.5 The Relationship Between Torrance Test/Verbal Scores (Independent Variable) and Verbal Immediacy Scores (Dependent Variables)

Source	r
Flexibility	.24[*]
Fluency	.25[*]
Original	.21[*]
Average	.24[*]

*indicated significant findings

$p < .05$.

Due to the large number of hypotheses, the following page displays a table comprised of all hypotheses, their corresponding variables, instruments, and Pearson Correlations used in the study. These were one-tailed tests with p<.05.

Table 4.6 Hypotheses and Results Table

Hypotheses	Variables	Instrument	F Statistic/ Correlation
H_1: There is a significant correlation between teachers' verbal immediacy and teacher creative flexibility.	Independent Variable: Creativity/Flexibility Dependent Variable: Verbal Immediacy	TTCT – Verbal (Torrance Tests of Creative Thinking-Verbal) & VIB (Verbal Immediacy Battery)	$r = .24^*$ Pearson Correlation
H_2: There is a significant correlation between teachers' verbal immediacy and teacher creative fluency.	Independent Variable: Creativity/Fluency Dependent Variable: Verbal Immediacy	TTCT – Verbal & VIB	$r = .25^*$ Pearson Correlation
H_3: There is a significant correlation between teachers' verbal immediacy and teacher creative originality.	Independent Variable: Creativity/Originality Dependent Variable: Verbal Immediacy	TTCT – Verbal & VIB	$r = .21^*$ Pearson Correlation
H_4: There is a significant correlation between teachers' nonverbal immediacy and teacher creative flexibility.	Independent Variable: Creativity/Flexibility Dependent Variable: Nonverbal Immediacy	TTCT – Figural (Torrance Tests of Creative Thinking-Figural) & RNIM (Revised Nonverbal Immediacy Measure)	$F = 29.341$ $R^2 = .31$

Table 4.6 (continued)

H$_5$: There is a significant correlation between teachers' nonverbal immediacy and teacher creative fluency.	Independent Variable: Creativity/Fluency Dependent Variable: Nonverbal Immediacy	TTCT – Figural & RNIM	$F = 29.49^*$ $R^2 = .19$
H$_6$: There is a significant correlation between teachers' nonverbal immediacy and teacher creative originality.	Independent Variable: Creativity/Originality Dependent Variable: Nonverbal Immediacy	TTCT – Figural & RNIM	$F = 32.09^*$ $R^2 = .26$
H$_7$: There is a significant correlation between teachers' nonverbal immediacy and teacher creative elaboration.	Independent Variable: Creativity/Elaboration Dependent Variable: Nonverbal Immediacy	TTCT – Figural & RNIM	$F = 19.40^*$ $R^2 = .18$
H$_8$: There is a significant correlation between teachers' nonverbal immediacy and teacher creative resistance to premature closure.	Independent Variable: Creativity/Resistance to Premature Closure Dependent Variable: Nonverbal Immediacy	TTCT – Figural & RNIM	$F = 31.88^*$ $R^2 = .27$

Table 4.6 (continued)

H$_9$: There is a significant correlation between the students' perceived learning and the teacher overall Figural Creativity.	Independent Variable: Creativity/OverallFigural Dependent Variable Learning Loss	TTCT – Figural & LLS	$r = -.13*$ Pearson Correlation
H$_{10}$: There is a significant correlation between the students' perceived learning and the teacher overall Verbal Creativity.	Independent Variable: Creativity/OverallVerbal Dependent Variable: Learning Loss	TTCT – Verbal & LLS (Learning Loss Scale)	$r = -.35*$ Pearson Correlation
H$_{11}$: There is a significant correlation between the students' perceived learning and the teacher nonverbal immediacy.	Independent Variable: Nonverbal Immediacy Dependent Variable: Learning Loss	RNIM & LLS	$r = -.31*$ Pearson Correlation
H$_{12}$: There is a significant correlation between the students' perceived learning and the teacher verbal immediacy.	Independent Variable: Verbal Immediacy Dependent Variable: Learning Loss	VIB & LLS	$r = -.40*$ Pearson Correlation
H$_{13}$: There a significant correlation between teachers' nonverbal immediacy (as scored by the students) and teachers' **self-scored** immediacy.	Independent Variable: NISS-S Dependent Variable: RNIM	RNIM & NIS-S (Non-Verbal Immediacy Self-Scored)	$r = .41*$ Pearson Correlation

When verbal immediacy was correlated with verbal creativity, the relationships were found to be significant. The results of the Pearson correlations for Hypotheses one through three indicated an affirmative answer to these three questions. While they are small, there are significant relationships between teacher verbal immediacy and each specific teacher verbal creativity trait of flexibility, fluency, and originality.

Hypotheses four through eight were analyzed using an F-statistic due to their curvilinear fits and were all found to have significance. The students identified the teacher creativity trait of elaboration to have the smallest significance in terms of producing feelings of immediacy. Interestingly, teacher flexibility was not statistically the highest correlation with immediacy, yet Figure 4.4 paints a very different story (see page 57). In this pairing, flexibility and nonverbal immediacy go hand-in-hand; as flexibility rises nonverbal immediacy rises as well. This is the only figural creativity trait, when coupled with nonverbal immediacy, to produce a linear fit.

As shown in the table above, the Pearson Correlations for hypotheses 9-11 are all negative. This is expected, as the dependent variable for these hypotheses was the Learning Loss Scale that has reverse scoring. The lower the student rates the teacher, the less loss the student experienced from their teacher. Therefore, the lower the score, the higher the perceived student learning. Although all of the Learning Loss correlations were significant, it is interesting to examine closely H_{10} and H_{12} whose results indicate that that the lecture works for this group of students. The final hypothesis (H_{13}) concluded that secondary teachers can score themselves on nonverbal immediacy as this significant finding analyzed the relationship between the teachers self-scores on nonverbal immediacy with the scores their perspective students gave them on immediacy.

4.5 Scatter plots for Teacher Immediacy and Creativity

As mentioned earlier in this chapter, when the researcher examined the graphical relationships between each of the hypotheses it became clear that a very interesting dynamic was occurring between teacher immediacy and teacher creativity. This is the section where each of the unique relationships between teacher immediacy and teacher creativity will be graphed and discussed. While the curvilinear phenomenon occurred only with nonverbal immediacy and not verbal immediacy, the researcher included both nonverbal and verbal immediacy graphs for consistency.

The reader must stress that while the student sample is 304, there is a small teacher sample thus the need for this disclaimer. Read the scatterplots with caution, understanding they represent the immediacy felt from 304 students from one mathematics department within one high school.

4.5a Verbal Immediacy and Creativity

The first set of scatter plots (Figures 4.1 to 4.3) show positive linear effects of verbal creativity upon students' observations of verbal immediacy. Presented are separate plots for each scale for verbal creativity: flexibility, fluency, and originality. As verbal creativity in the classroom increased, there was a corresponding increase in students' perceptions of verbal immediacy. While these effects were significant, they were small in size.
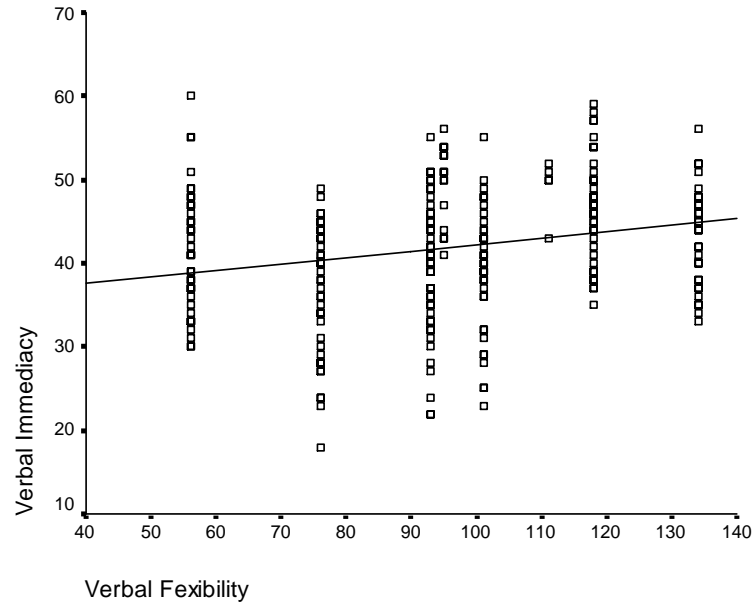
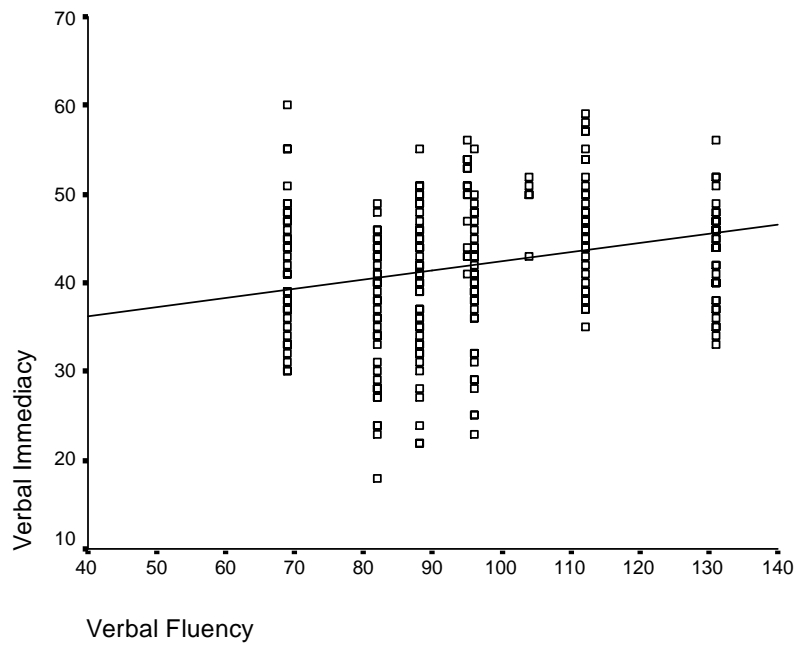Figure 4.1 Verbal Immediacy and Verbal Creativity/Flexibility (H_1)

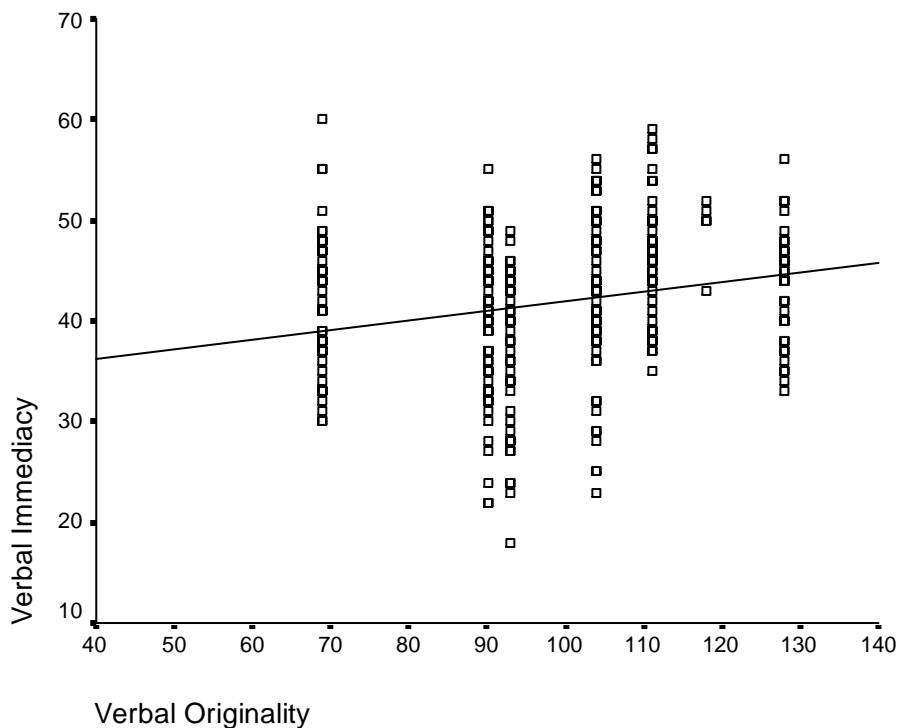Figure 4.2 Verbal Immediacy and Verbal Creativity/Fluency (H_2)

Figure 4.3 Verbal Immediacy and Verbal Creativity/Originality (H$_3$)

The research included verbal immediacy in order to compare it with Teacher Creativity/Verbal. The immediacy experts made it clear that verbal immediacy, although originally welcomed by immediacy researchers, was later deemed completely unfounded. Immediacy researchers now recognize the Verbal Immediacy Scale as measuring the verbal behaviors of good teachers as opposed to measuring the verbal immediacy of the teachers. Although it was later regarded as invalid, the researcher wanted to see if their own misconceptions were made because the immediacy experts were mistaking verbal immediacy for verbal creativity. The researcher was so convinced that teacher creativity and immediacy went hand-in-hand that she wanted to investigate a link between this Verbal Immediacy Scale and teacher creativity. Perhaps the Verbal Immediacy Scale was dipping so closely into the field of creativity that the immediacy experts could not

identify its place in the immediacy realm. Since there is a Verbal portion of the Torrance

Tests of Creative Thinking, the researcher attempted to see if indeed what was previously

viewed as verbal immediacy was in fact verbal creativity. The results of this comparison

were significant, but small in size, and therefore need further study.

4.5b Nonverbal Immediacy and Creativity

The second set of scatter plots (Figures 4.4 to 4.8) show positive effects of figural

creativity and students' observations of nonverbal immediacy. There is a separate plot for

each score of figural creativity; flexibility, fluency, originality, elaboration, and resisting

premature closure. When examining the scatter plots for figural creativity and nonverbal

immediacy a new pattern emerged. As previously mentioned in this chapter, some of the

lines of best fit were no longer linear, they were curvilinear in shape. In other words, for

the nonverbal effects, a more creative environment was linked with higher immediacy,

up to a maximum point, and then immediacy declined. Thus, for the nonverbal effects,

the researcher tested both the linear and curvilinear effects. In the subsequent section, the

scatter plots that provided the best fit to the data (linear or curvilinear) are presented.

In Figure 4.4, as seen on the next page, nonverbal immediacy and teacher creative

flexibility have a linear relationship ($R^2 = 31.3\%$). Two teachers had identical creativity

scores, so color-coding was employed to differentiate between the two subjects. With this

linear relationship, the more flexible the teacher, the more nonverbal immediacy the

student feels from that teacher. This is the only graph to produce this dynamic, where

more teacher creativity produces more immediacy. But if one thinks about what a

students wants from teachers this makes a lot of common sense. For instance, immediacy and creativity research states (Gorham, 1988; Pagano, 1997) that students want 'their' schedules taken into account when planning tests, they want a teacher who not only allows but welcomes lesson that 'go off track', and they want a teacher who can provide multiple responses/descriptions to questions/inquires during lessons. In simple words, students' feelings of immediacy soar whey they have a teacher who is flexible.
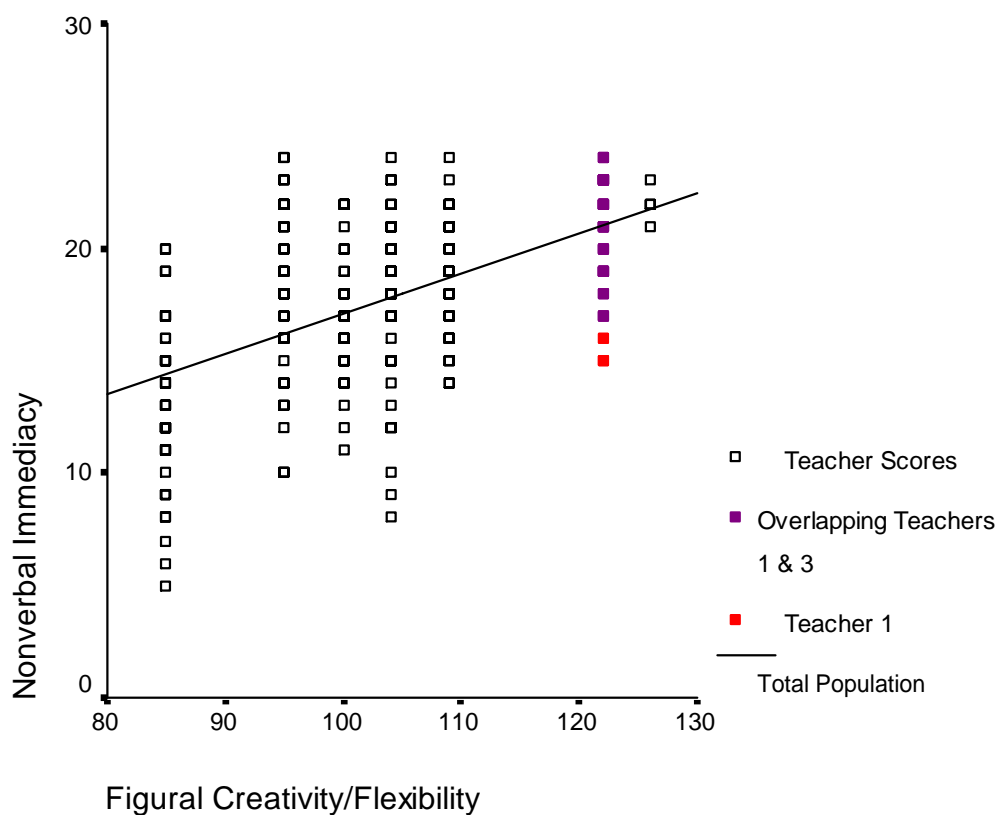

Figure 4.4 Nonverbal Immediacy and Figural Creativity/Flexibility (H_4)

Figure 4.5, on the following page, show the results of nonverbal immediacy and figural creativity/fluency. In this particular creativity trait, 60% of the teachers have higher than average creativity scores. Color-coding was used once again as two teachers shared a Fluency Creativity score of 110. The curvilinear effect provided a better fit than the linear effect. Notice the line bends downward a little bit on the right side of the scatter plot. As nonverbal fluency increases, nonverbal immediacy also increases, but only up to a maximum point of about 130. As nonverbal fluency scores move above 130, nonverbal immediacy scores tend to flatten out. Immediacy is not rising as creativity/fluency rises, but it is not taking a drastic fall either. Perhaps the teacher who scores in the above average to high range in this creativity category is doing too much talking in the classroom. With a teacher who has higher than average fluency, the students may not have a chance to share their own opinions, thus the slight decline in immediacy.
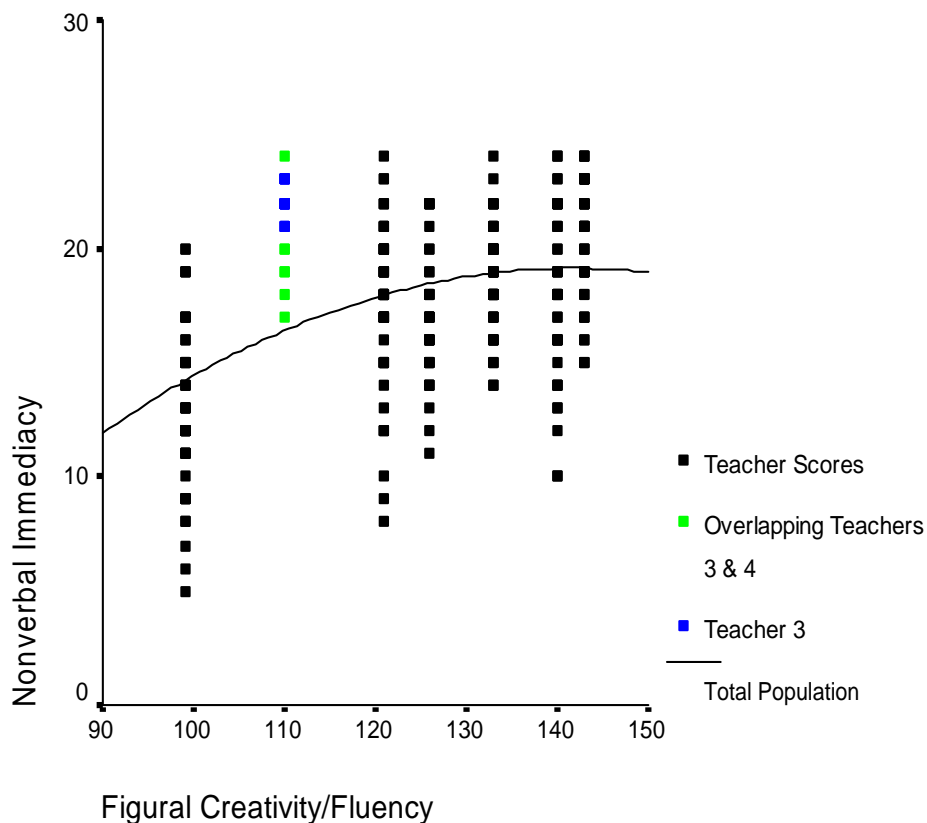
Figure 4.5 Nonverbal Immediacy and Figural Creativity/Fluency (H_5)

Figure 4.6 on the next page shows the relationships between nonverbal immediacy and figural creativity/originality. Color-coding was essential again to show teachers with overlapping scores on Figural Creativity/Originality. Once more, the curvilinear effect provided the best-fit line. In this visual, it is clear to see that as the student is exposed to teacher creativity/originality levels above 110, their feeling of nonverbal immediacy from that teacher begins to diminish.

This curve is interesting to examine at the creativity score of 110, which is the upper limit of average creativity (The Average Standard Score for Creativity is 90-110). The students feeling of immediacy are increasing as teachers' scores of creativity/originality increase up to 110. Then as the teachers' scores go above this average creativity score, the students' feeling of immediacy decline. Why do the immediacy scores of teachers with above average Creativity/Originality decline? Are the teachers too consumed with their own uniqueness to connect with the students, to make eye contact, to smile, to walk around the room? The graph assists in seeing that teachers falling within either extreme, too little or too much creativity/originality, are viewed by the students as *non*-immediate.
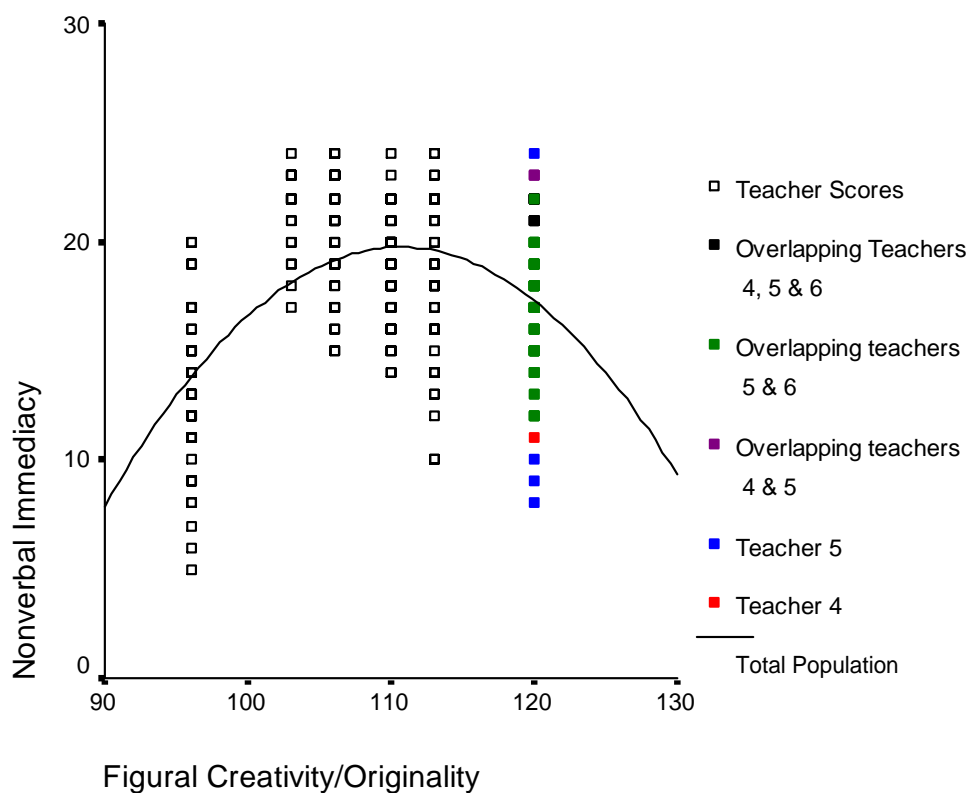

Figure 4.6 Nonverbal Immediacy and Figural Creativity/Originality (H_6)

Figure 4.7 on the following page shows the association between nonverbal immediacy and Figural Creativity/Elaboration. Again, the curvilinear effect provided the best-fit line. With this figure, color-coding was used in addition to diverse shapes due to two different overlaps of teachers, one at a creativity/elaboration score of 80 and one at 110. Any Creativity/Elaboration score above100 and the students begin to feel less nonverbal immediacy. This interaction is very interesting as the decline in the curve occurs at 100, the midpoint of the average standard score for creativity. With elaboration in the classroom, perhaps less is more. Maybe too much detail and embellishment makes the student feel withdrawn from the teacher. The teacher may begin to take-over the class with this type of instruction, creating a lecture-type environment as opposed to a learning environment where various points of view are welcomed and encouraged.
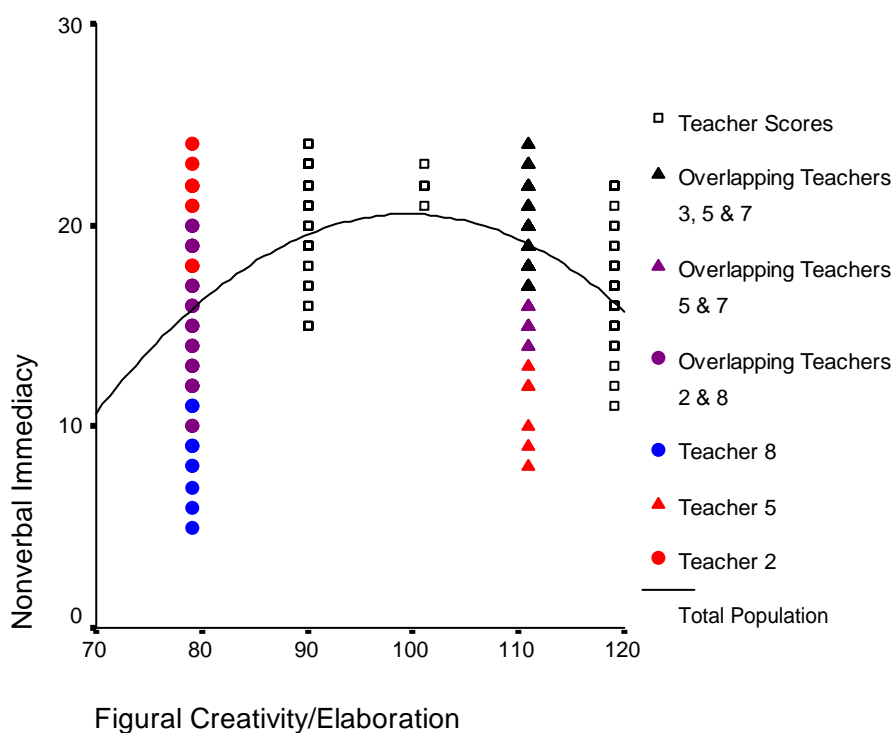
Figure 4.7 Nonverbal Immediacy and Figural Creativity/Elaboration (H_7)

Figure 4.8 represents the relationship between teachers' ability to Resist Premature Closure/Creativity and Nonverbal Immediacy. Color-coding was necessary at 113 due to overlapping teacher scores. Again this is a case of a maximum in the parabola, a peak in the curve occurring at (113,18) where the student experiences the most resistance to premature closure and nonverbal immediacy simultaneously. If a teacher's creativity score goes beyond 113, the student will begin to feel less nonverbal immediacy as the curve begins to decline. Aside from Figure 4.4, this may be the easiest to interpret. People who Resist Premature Closure bypass the simple 'way out', which, unfortunately, may be the route students' want to take. So if a teacher is taking a more complex approach, the student may interpret that as not connecting, or not even worse, not caring enough to 'want' to provide them with an easy way out.
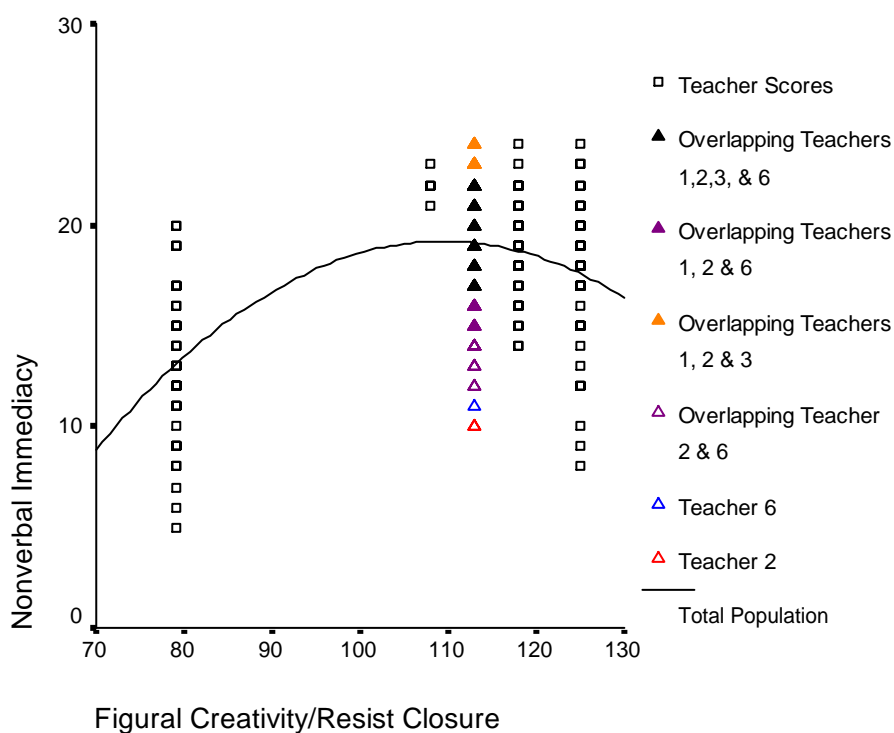

Figure 4.8 Nonverbal Immediacy and Figural Creativity/Resist Closure (H$_8$)

4.6 Summary

This chapter presented the results of hypotheses testing between teacher creativity, teacher immediacy, and student perceived learning. Higher levels of teacher creativity were shown to lead to students feeling higher levels of verbal and nonverbal immediacy from their teacher. But it was found that a students' feelings of nonverbal immediacy decreases when in learning environments of teachers who possess higher than average creativity in the following areas: fluency, originality, elaboration, and a teachers' ability to resist premature closure.

The analysis of Teacher Creativity on Student Perceived Learning also produced significant results. Therefore, perceived learning was obtained by students who had teachers with high creativity/verbal scores and teachers with high creativity/figural scores. The results on Immediacy and Student Perceived Learning were significant as well, following the same pattern as creativity. Perceived learning was obtained from students who had teachers who had teachers with high levels of nonverbal and verbal levels of immediacy.

And finally, the teachers' ability to score themselves on nonverbal immediacy came out significant with the student scores on their teachers. Thus, it appears that secondary teachers' perceptions of their own nonverbal immediacy correspond with the amount of immediacy their students feel while in their classroom.

CHAPTER 5: SUMMARY

5.1 Introduction

As introduced in chapter one, teacher immediacy and teacher creativity had never been linked together let alone studied concurrently. This research was the first to not only merge the two, but to pioneer the overall concept of immediacy and creativity and its impact on students in the secondary classroom. As mentioned in chapter two, most (all but one study) of the immediacy research has been done on the collegiate level, so with over 300 secondary students participating in this study, this will be a start in filling the gap in immediacy literature. With creativity, chapter two discusses a large amount of research on creativity in the classroom, but immediacy and creativity have never been linked, and certainly not at the pre-college level. Therefore, the results of this study will fill a gap in the immediacy literature and branch out another limb on the ever-growing tree of creativity.

Each hypothesis had significance, at various levels. The researcher embarked in this study as an attempt to unveil the overlap between teacher immediacy and creativity, and what emerged was even more impressive than ever anticipated. As viewed in chapter four, all hypotheses uncovered significant relationships between nonverbal immediacy and creativity. But the unexpected event in this study was that all but one (nonverbal immediacy vs. creativity/flexibility) of these results, when graphed, produced curvilinear graphs as opposed to linear graphs. This parabolic curve produced a vertex, a point in which the student was experiencing the optimal amount of creativity and immediacy in the classroom simultaneously. Each hypothesis producing a curvilinear graph had a

particular point in which too much creativity and the students' feeling of nonverbal immediacy began to diminish.

5.2   Teacher Immediacy and Creativity

5.2a   Teacher Verbal Immediacy and Teacher Creativity/Verbal

The research included verbal immediacy for one reason alone, to compare it with Teacher Creativity/Verbal. The immediacy experts made it clear that verbal immediacy, although originally welcomed by immediacy researchers, was later deemed completely unfounded. Immediacy researchers now recognize the Verbal Immediacy Scale as measuring the verbal behaviors of good teachers as opposed to measuring the verbal immediacy of the teachers. The immediacy experts obviously overlooked this verbal immediacy scale originally as a valid predictor for measuring a teachers' verbal immediacy. Although it was later deemed invalid the researcher wanted to see if their own misconceptions were made because the immediacy experts were mistaking verbal immediacy for verbal creativity. The researcher was so convinced that teacher creativity and immediacy went hand-in-hand that she wanted to find a link between this Verbal Immediacy Scale and teacher creativity. Perhaps the Verbal Immediacy Scale was dipping so closely into the field of creativity that the immediacy experts could not identify its place in the immediacy realm. Since there is a Verbal portion of the Torrance Tests of Creative Thinking, the researcher attempted to see if indeed what was previously viewed as verbal immediacy was in fact verbal creativity. The results of this study were not significant, and therefore insufficient to draw such conclusions.

5.2b   Teacher Nonverbal Immediacy and Teacher Creativity/Figural

All of the findings when analyzing nonverbal immediacy and teacher creativity/figural were significant. Only one of the creativity traits, when graphed, produced a linear line of best fit. With teacher flexibility ($F = 32.09$), the more flexible the teachers, the higher the students scored the perspective teachers on nonverbal immediacy. Therefore in the eyes of secondary students, flexibility and nonverbal immediacy go hand-in-hand. The more flexible the teacher, the more immediate that teacher.

Nonverbal immediacy and creativity fluency ($F = 29.49$) produced the similar results as described above, with the higher the teachers' fluency the more immediacy that teacher. But this curve is a bit more complex to interpret since it is not a straight line and it appears to take on the traits of a parabolic curve, the path of an upside down 'U'. There is an interesting aspect of the graph the researcher wants to bring attention to at this time. Below, take note of the curve, especially at the creativity/fluency score of 99. This score seems to be drastically pulling down this curve to the lower left, due to the lower Creativity/Fluency score of 99 coupled with the Nonverbal Immediacy scores under 20.
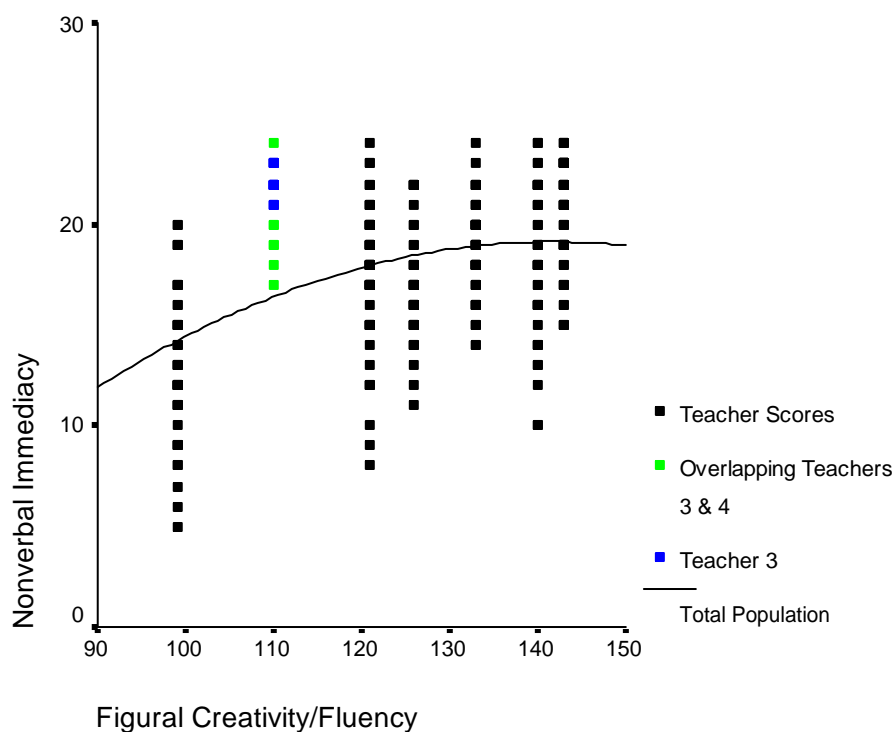
Figure 5.1 : Figural Creativity/Fluency and Nonverbal Immediacy

The researcher wondered if this particular pairing would have produced a horizontal asymptote. Perhaps no matter how high the fluency a teacher, the student will only feel a certain amount of nonverbal immediacy from that teacher. Although this is something for future research to explore, the researcher wanted to see if this set of data could provide some insight. The researcher re-graphed this exact scenario without the outlier, purposing excluding the teacher who scored the 99 for creativity. This new graph is shown below in Figure 5.2, and interestingly, as creativity scores increase, immediacy scores remain consistent. The researcher strongly believes this relationship is worthy of further investigation as fluency is the only creativity trait to produce such a dynamic.
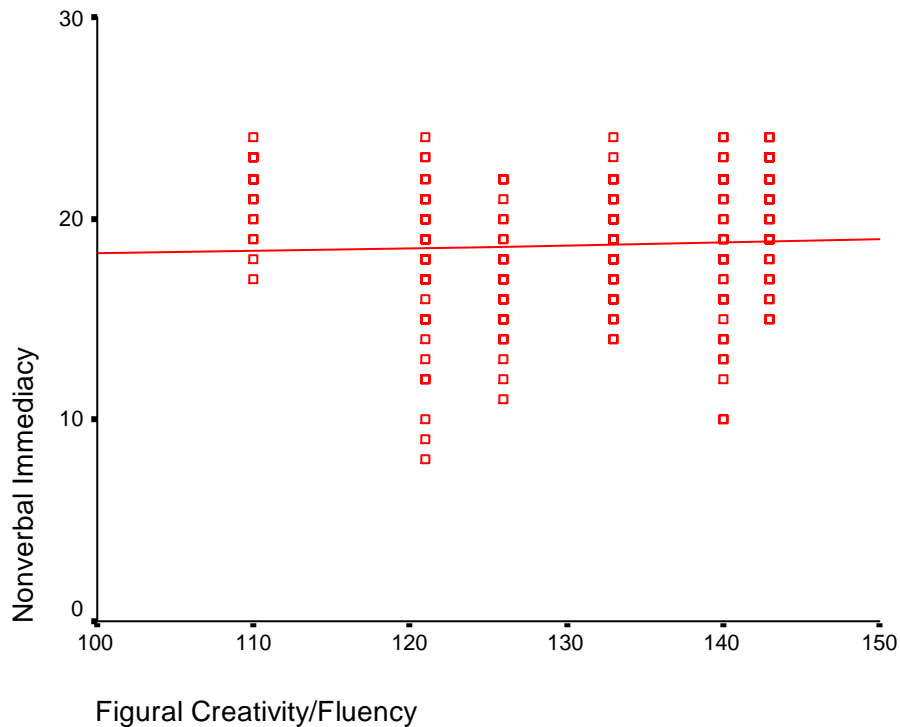
Figure 5.2: Adjusted Figural Creativity/Figural and Nonverbal Immediacy

The three remaining creativity/figural traits: originality, elaboration, and resisting premature closure all resulted in significant findings and curvilinear fits. Nonverbal immediacy and teacher originality ($F = 32.09$) had a vertex at (110,20), thus a specific point in which too much teacher creativity produces lower nonverbal immediacy scores. Nonverbal immediacy and teacher elaboration ($F = 19.40$) also had a vertex at (110, 20). And finally teachers' ability to resist premature closure and nonverbal immediacy ($F = 31.88$) had a vertex at (113, 18). These vertex points all occurred at similar points with

the ordered pairs for teacher originality and teacher elaboration being the same. This leads one to believe that there may be an ideal blend of teacher nonverbal immediacy and teacher creativity that provide secondary students with the optimal learning environment.

5.2c   Student Perceived Learning and Teacher Creativity and Teacher Immediacy

Students perceived learning as measured by the Learning Loss Scale was analyzed with teacher overall Figural Creativity and Overall Verbal Creativity. While both came out significant, Overall Figural Creativity ($r = -.13$) was lower than Overall Verbal Creativity ($r = -.35$). The negative correlations are due to the fact that a lower Learning Loss Score translates to the student feeling as if they learned more from their teacher (see chapter three for further discussion of the Learning Loss Scale). The results for teacher immediacy and student perceived learning with p <.05, were significant for nonverbal immediacy and learning loss ($r = -.31$) and for verbal immediacy and learning loss *($r = -.41$)*.

It is very interesting to see that for this particular school, the students felt like they learned more from creative/verbal teachers as opposed to creative/figural teachers and they learned more from verbally immediate teachers as they did from nonverbal immediate teachers. The 'verbal' component is prominent for this particular group of students. This is a very structured high school, rich in tradition and past practice. The results show that these students are comfortable with the 'teacher lecture' method of instruction, it still works for them.

5.2d   Teacher Immediacy and their own Self-Scored Immediacy

Teacher nonverbal immediacy, as scored by the students and teachers' self-scored nonverbal immediacy (NIS-S, Nonverbal Immediacy Self-Scale) were significant ($r =$ .41). The researcher was very surprised that this particular outcome was significant because this was the first time the teacher self-scores were being analyzed with high school students. An important finding is that this particular instrument was significant whether used with college students, as done in the past, or high school students, as in this study.

This specific outcome may prove to be the biggest time saver for principals and/or superintendents in the future as a hiring/screening tool as the instrument takes the test-taker approximately two minutes to take. And since it is significant in relating how the students would score the teacher's nonverbal immediacy, one could completely eliminate the student from the interview process while inadvertently have their voice heard through this instrument. This has the potential to be an extremely powerful tool.

5.3   Limitations

This study, although conducted with 304 students, only eight of the 16 teachers were included. It is extremely difficult to gather data from secondary students due to the strict laws not only protecting children, but the researcher as well. The researcher needed to meet with the entire student body, introduce herself and the study, hand out the consent forms, and wait (patiently) for the forms to be returned with the parents signatures. Perhaps the reason most of the immediacy research was conducted at the collegiate level

was due to the simplicity of working with adults as opposed to minors as this process was not only limiting but also painstakingly slow. Luckily the researcher got a very large return rate, but not large enough to include the remaining 8 science teachers as is explained next.

As the consent forms were returned, students names were crossed off lists for record keeping purposes. It became clear that the researcher's own obvious non-participation in the study had a tremendous impact on the sample sizes. The researcher teaches 75% of the advanced freshmen mathematics classes as well as 80% of the senior AP mathematics students. Since the researcher's students were obviously not invited to participate, this impacted the science teachers of these particular students. Unfortunately when the number of students were cross-referenced between the mathematics and science classes it became clear that the sample sizes in the science classes were too small. Three science teachers in particular were affected the most; one freshmen science teacher and two AP science teachers. Since these three science teachers and the researcher teach many of the same students, the number of non-overlapping students in their classes that had turned in consent forms was less than five. The remaining science teachers still had sample sizes smaller than the mathematics teachers because not all students take science for four years. Thus the decision was made to include only mathematics teachers where sample sizes were approximately 40 per teacher.

5.4   Recommendations for Future Research

This study was conducted at a grade nine through twelve suburban, upper-middle class

high school in the Mid-Atlantic Region. Numerous recommendations emerged

from this study as listed below:

1. This study should be replicated with a larger sample of secondary teachers from
    various disciplines.

2. This study should be replicated with a large sample of elementary teachers from
    various disciplines.

3. Research should be conducted to see if teacher creativity and immediacy are
    content specific. (do students in different subjects want/expect different things
    from their teachers?)

4. Future research should include conducting a similar study in a different region
    using various socio-economic classes.

5. Research should go into more depth, not only with a larger teacher sample but
    also by digging deeper into the academic levels of the students, the sex of the
    students, the age of the students, and the actual academic achievements of the
    students.

6. Another very interesting area is how the creativity and immediacy **<u>needs</u>** may or
    may not differ between the academic and age levels of students.

7. Also, specifically drawn from this research, why are these vertex points emerging
    in the curvilinear graphs? What is it about the teachers' creativity and
    immediacy that make such a phenomenon occur? How much creativity is too
    much and why? Is too much creativity necessarily a bad thing in a classroom

uniformly or just when being compared with immediacy? The opportunities to

further fuse these two areas are endless, and this research has just begun to

open the door, crack it if you will.

5.5 Significance for Secondary Education

With the technology era having come upon us so quickly, like crashing waves in

the ocean, teachers need to be experts in relating to children. Principals and

Superintendents can use the TTCT and Nonverbal Immediacy Scale (NISS - the Self-

Scaled Report) as a fairly quick, inexpensive assessment as to the 'type' of teacher that

candidate sitting before them in the interview will really be. As the curvilinear graphs

suggest, there is a perfect blend, mix, point in which the student feels the optimal amount

of creativity and immediacy. If a teacher is weak in either, the curve will have no chance

in making it to the vertex to begin with, the concept is quite simple. The researcher does

not think immediacy or creativity can stand-alone, they need each other for support.

Colleges nationwide are constantly striving to provide teacher education programs

that produce the strongest educators for our nations future leaders; our children. In this

study it is clear that teacher nonverbal immediacy and creativity do indeed go hand-in-

hand. Since both creativity and immediacy can be taught and enhanced now is the time to

take action. In an article written by Joyce Powell, elected President of the New Jersey

Education Association(NJEA) for 2006, she shares the need for research-based (as well

as job-embedded, collaborative, teacher-led, and content-based) professional development. Interestingly, her article begins with "Creative teachers have long known that much of the most meaningful learning takes place when students collaborate on projects they find interesting and relevant". She continues with the plan New Jersey has put into place to better provide professional development. What this researcher finds so interesting is that she is obviously praising creativity in an article stressing the need for better professional development; yet the concept of actually teaching teachers to be creative is never mentioned. Perhaps now is the perfect time for creativity and immediacy courses to be added not only to the curriculum of teacher education programs, but for in-service/professional development programs to be made available for the experienced tenured teachers as well.

Leaders in the field are obviously noting the shortcomings in the professional development opportunities of teachers as well as praising the accomplishments of good, creative teaching. Articles are stressing the need for educators to stop the talking and promote critical thinking. As Flanders reported in 1965, back then over two-thirds of classroom time was given over to teacher talk (Bracey, 1987). This researcher wonders how far we have really come in these forty years to overcome the concept as the teacher as the sole contributor of knowledge. Are teachers still preaching to children? After all, when one reads the reports made in 2006 by Levine, an expert in teacher education, as claiming that schools have "not kept pace with changing demographics, technology, global competition, and pressure to raise student achievement" (Fogg, 2006, p.10), one does ask, where is the progress?

5.6 Summary

As mentioned in chapter one, traditional teaching is no longer sufficient in the 21st Century classroom. The creativity of teachers is becoming more and more important as educators are now 'competing' with technology to capture and maintain students' attention. The learning process of America's children has changed dramatically, and now teachers are being challenged to change as well (Simplicio, 2000). It is not a matter of our children wanting to learn differently, it is as if they 'need' to learn differently then the students a half century ago. As one watches a child use a mouse, play a computer game, or manipulate a hand-held Game Boy, it is obvious that their minds are acquiring instantaneous, ongoing, feedback. How can we, as educators, expect them to sit still behind a desk, with no stimulation, while maintaining their interest? This researcher is not excluding the fact that pure educating needs to be addressed and completed on a daily basis, that is the point. How do we compete with this ongoing 'excitement'? Technology is obviously one area educators must address. But, couple that with the additional demands from school administrations and laws (ex: Standards, No Child Left Behind), and it is apparent that the teachers' need to change. This is becoming an expectation as opposed to a choice.

Research has shown that creativity can be cultivated and taught (Csikszentmilhalyi, 1996; Torrance, 1994) and through awareness and training, teacher non-verbal behaviors can increase (Nussbaum, 1984). This study has shown that there is a significant relationship between teacher nonverbal immediacy and teacher creativity. Teachers with high levels of nonverbal immediacy can raise students' levels of affective learning, thus assisting the teacher by having students who want to be in the classroom.

Then, if that immediate teacher is also creative, the days of students sitting in chairs being lectures 'to' will be long gone! Students will be in an environment not dominated by the teacher, they will be free to explore, express various points of view, take risks, and feel secure. Teachers who are both immediate and creative provide nurturing environments for students with fertile soil, clean air, and a soft place to fall if and when necessary.

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APPENDEX

As previously mentioned in Chapter 4, while the graphs are very telling for this study, it is only pinpointing this particular school district, in this particular blue ribbon school. This school was ranked as one of America's top 1,200 school in 2007 by *Newsweek* magazine, it is a very high achieving learning environment.

It was asked of the researcher to put the disclaimer in the chapter to draw attention to the fact that there was a small teacher sample. But as in most moderately sized schools with a student body of approximately 800, a mathematics department of 8 teachers is more than ample with each teacher instructing between 25-150 students per day. So while this may initially appear to be a small study that included eight teachers, it is indicative of a traditional secondary learning environment of this size. And, while analyzing the graphs, the results come from the voices of 304 secondary students, not the eight teachers.

The teachers that participated in this study range in age from 23 to 65. Their teaching experience is as vast as their age spans. There were four women and four men, and recruitment was extremely simple, they were more than happy to volunteer.

Vita

Denise Tabasco is a secondary mathematics teacher in a Blue Ribbon School in Southern New Jersey. She began her teaching career at the collegiate level prior to teaching high school. Ms. Tabasco's interest in the background of the college students' lead her to the secondary classroom, where she has been for almost 20 years. Over the years, Ms. Tabasco has been granted numerous awards including but not limited to: Teacher of the Year (an end of year award), Most Influential Teacher (awarded every five years), and Funniest Teacher (awarded by a graduating senior class). Ms. Tabasco is an Eleanor Roosevelt Teacher Scholar for her work in merging Calculus and Physics in the secondary level, and was featured in *Focus Magazine* for this work. She was the 2004 recipient of the American Creativity Associations' E. Paul Torrance Graduate Student Award.

Outside of the classroom, Ms. Tabasco has created a club at her school, Kutz 4 Kidz, that works closely with the Locks of Love program in Florida who makes wigs for children who lose their hair due to various illnesses. To date her school had donated over 500 ponytails, three of which came from Ms. Tabasco herself. Due to the success and impact of this club, Ms. Tabasco has been awarded numerous accommodations: Joint Legislative Resolution from The State and General Assembly in NJ, a Proclamation from the Borough of Haddonfield, a Congressional Commendation from the United States House of Representatives, and a Commendation from the State of New Jersey's Office of the Governor.

Denise Tabasco was born in Philadelphia Pennsylvania on August 16, 1967. She received both her B.A. in Mathematics and M.A. in Mathematics Education from Rowan University. She resides in New Jersey with her three-year old daughter.