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PRESERVICE TEACHERS' CONCEPTIONS OF INTELLIGENCE AND GIFTEDNESS

by

ELLA L. TAYLOR

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
Department of Interdisciplinary Education
College of Education
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August 2001

Co-Major Professor: James L. Paul, Ed.D.
Co-Major Professor: Daphne Thomas, Ph.D.

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PRESERVICE TEACHERS' CONCEPTIONS OF INTELLIGENCE AND GIFTEDNESS

By

ELLA L. TAYLOR

An Abstract

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Major Professor: James L. Paul, Ed.D.
Co-major professor: Daphne Thomas, Ph.D.

This study examined preservice teachers' conceptions of intelligence and giftedness, the relationship between preservice teachers' conceptions of intelligence and giftedness, and how conceptions of intelligence or giftedness correlated with certain educational goals. Results indicate that preservice teachers conceptions of intelligence and giftedness are similar to, but not identical to, laypersons' and inservice teachers' conceptions of these constructs. Demographic characteristics such as major, sex and race have a relation to preservice teachers' conceptions of intelligence and giftedness. The relation of race on preservice teachers' conceptions may have the greatest bearing upon the underrepresentation of minority students in gifted education. Preservice teachers view intelligence and giftedness as somewhat indistinguishable from one another. This may have serious consequences for those students who are seen as nonconforming to preservice teachers expectations that gifted students are teacher pleasers and productive students. Additionally, preservice teachers' conceptions of intelligence and giftedness are related to their beliefs about certain educational goals. Given that teacher expectations are related to behavior toward students, and given this study's finding that conceptions of intelligence and giftedness are related to preservice teachers' support for certain educational goals, then it is important for teacher educators to address preservice teachers' conceptions of intelligence and giftedness. Based upon the results of this study, preservice teacher education programs should consider expanding preservice teachers' exposure to research on intelligence and

giftedness. Although the limitations of this study require that the results be interpreted with caution, the results may still help teacher educators target the need for exposing preservice teachers' to broader information about intelligence and giftedness.

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Chapter One

Introduction

Intelligence and giftedness are ambiguous terms, but ones we use as if we all agreed upon the definition. Many school decisions are based upon whether a teacher believes a student to be intelligent or not intelligent and/or gifted or not gifted. However, rarely do teachers explicitly state their definition of these terms other than in a psychometric sense when they interpret standardized tests designed to numerically represent a student's intelligence. Vast amounts of literature exist that explore definitions of these constructs; however, little research documents teachers' or preservice teachers' conceptions. When the disproportionate number of minorities identified for special education is considered, along with the disproportionate number of European-Americans identified for gifted services, and the swelling tide advocating for inclusion, the importance of understanding how those who will become teachers, in this milieu, conceptualize intelligence and giftedness becomes clearer.

This study examined preservice teachers conceptions of intelligence and giftedness. Over 500 preservice teachers were surveyed during the Spring 2001 semester in a large, metropolitan university in the Southeast. Students were asked to complete a questionnaire examining their beliefs about characteristics associated with intelligence and giftedness. In addition, the questionnaire

explored whether the preservice teacher held an entity or incremental view of intelligence and their beliefs about the relative importance of several educational goals. Questionnaires were statistically analyzed to determine preservice teachers' conceptions of intelligence and giftedness, the relationship between preservice teachers' conceptions of intelligence and giftedness, and how conceptions of intelligence or giftedness correlated with certain educational goals

Background of the Study

Preservice teacher education programs prepare students to enter the world of the classroom teacher. In an extensive meta-analysis of the literature, Wideen, Mayer-Smith and Moon (1998) document the preconceived notions about schooling and students that preservice teachers bring into professional development programs. Many of their conceptualizations are based on personal beliefs and personal experience.

Vast amounts of research exist documenting the connection between teacher beliefs and teacher behavior (Brophy, 1983; Darley & Fazio, 1980; Harris & Rosenthal, 1985; Kagan, 1992; Rosenthal, 1987, 1997; Rosenthal & Jacobson, 1968). This line of research posits that the beliefs that a teacher holds about a student not only impacts that teacher's expectations for the student, but also the teacher's behavior toward the student. In addition, the way a teacher interacts with a student impacts the student's achievement and sense of self. Teachers may formulate expectations based upon a variety of factors such as physical characteristics of the child (Braun, 1976), how the teacher conceptualizes the

role of teaching (Brophy, 1983; Swann & Snyder, 1980), or how the teacher perceives the effort expended by the child (Clark & Artiles, 2000). These expectations are then communicated through a variety of factors such as classroom climate, direct interaction with the child, and teaching more, or teaching more complex material to the child (Harris & Rosenthal, 1985). Clark and Artiles (2000) note that the anger or pity a teacher displays toward a child can have a long-term effect on the child if the child internalizes the teacher's behavior.

Preservice teachers enter their professional development with well-established beliefs about teaching (Nespor, 1987; Nisbett & Ross, 1980; Weinstein, 1988; Wilson, 1990). In general, these individuals have 18 years of developed views about teaching through their experiences as a student (Calderhead & Robson, 1991; Pajares, 1992). Through their experience as a student, preservice teachers develop a lens through which they interpret both content knowledge and pedagogy (Goodman, 1988). The lens preservice teachers use to interpret their professional development program also impacts their expectations for students (Wilson & Martinussen, 1999).

Conceptions of intelligence and giftedness are a component of the beliefs, or interpretive lens, through which teachers and preservice teachers view students. Sternberg, Conway, Ketron, and Bernstein (1981) found that knowledge of an individual's implicit beliefs about intelligence could be used to accurately predict their rating of another individual's intelligence. In the general

public, Sternberg et al. (1981) found that individuals identified verbal ability, problem solving and social competence as characteristic of intelligence. Lynott and Woolfolk (1994) note that preservice and inservice teachers not only differed from the general public, but also from each other in their conceptions about intelligence. Whereas inservice teachers identified conceptual thinking and practical knowledge as characteristic of intelligence, preservice teachers identified social adaptiveness as well. In addition, preservice teachers separate academic abilities from conceptual abilities. Neither inservice nor preservice teachers identified verbal ability as a stand alone category.

Conceptions of giftedness have changed dramatically over time. Beginning with Aristotle's connection between genius and madness, conceptions of giftedness have moved from focusing on children with "supernormal abilities" to those who are "gifted", and most recently to those who are "talented" (Feldhusen, 1998; Passow, 1981). Teachers' conceptions of giftedness, however, have remained more stable. Consistently, inservice teachers and preservice teachers have expressed beliefs that gifted students are those who are teacher pleasers and academically successful (Crammond & Martin, 1987; Jacobs, 1972; Rohrer, 1995; Schack & Starko, 1990; Tomlinson, Tomchin, Callahan, Adams, Pizzat-Tinnin, Cunningham, Moore, Lutz, Roberson, Eiss, Landrum, Hunsaker & Imbeau,1994). Tomlinson et al. (1994) note that while preservice teachers may profess that all students' needs should be met in the

classroom, they often have little knowledge or ability in how to differentiate for high ability students, and thus often do not differentiate for this group.

Statement of the Problem

An examination of the literature regarding teacher beliefs and teacher behavior supports the contention that teacher beliefs do impact teacher behavior which in turn impacts student achievement and self-esteem. This research combined with the research on conceptualizations of intelligence and giftedness provides a foundation for the importance of examining preservice teachers' conceptions of intelligence and giftedness. When we consider that 30 states mandate identification of gifted students and that classroom teachers are often the ones responsible for initial screening, how the classroom teacher views intelligence and giftedness is critical for identification of students. If, as several researchers have noted, teachers equate giftedness with teacher pleasing behavior and academic success then those high ability students who may exhibit nonconforming behavior will continue to be overlooked (Moon, Callahan & Tomlinson, 1999; Tomlinson et al., 1994). If, as other researchers note, classroom teachers do not have the knowledge or teaching strategies to differentiate curriculum for high ability students then those students will not receive instruction commensurate with their abilities.

NCATE (1997) strongly encourages teacher preparation programs to not only prepare preservice teachers for content knowledge, but also prepare them for diversity. Professional development programs must prepare students to enter

a multicultural school environment, often very different from their own schooling experiences. How preservice teachers conceptualize intelligence and giftedness will be brought into their classroom if their professional programs do not address these constructs.

The underrepresentation of students from minority backgrounds in gifted education programs has been discussed in the literature for over 30 years (Gallagher, 1959; Gallagher, 1963; Gallagher, 1974, 1991; Passow, 1986). However, the disparity in participation of minority students remains in spite of increased awareness, programmatic restructuring, and the use of multiple criteria for identification. One reason may be that intelligence test scores remain "the most universally advocated and used criterion for the identification of giftedness" (Shore, Cornell, Robinson, & Ward, 1991, p. 53). According to Frasier (1997), "One reason for this continuing challenge may be that the problems that negatively affect the identification and education of minority students essentially have not changed" (p. 498). She identifies the differences in test performance, and the effects of cultural, economic and language differences on the ability of minority students to perform at "levels associated with giftedness" as the paramount problems contributing to the underrespresentation of minority students in gifted education programs. Again, teacher beliefs can easily impact teacher behavior. If a teacher does not recognize characteristics of giftedness in students from underrepresented populations then those students will not be

identified for gifted programs, thus perpetuating stereotypic conceptions of intelligence and giftedness (Frasier, 1997; Gallagher, 1974).

How teachers conceptualize intelligence and giftedness impacts their treatment of students; therefore, it is important for teacher educators to understand preservice teachers' conceptualizations of these constructs since preservice teachers will soon be in charge of their own classrooms. Once we understand preservice teachers understandings about intelligence and giftedness, then we can determine whether intervention is needed to broaden these beliefs.

Purpose of the Study

The purpose of this study was to examine preservice teachers' conceptions of intelligence and giftedness. In addition, the correlation between their conceptions of intelligence and giftedness were examined since the terms are so often interrelated. In this descriptive study, preservice teachers in elementary education, secondary education and special education at a large, metropolitan university were administered a questionnaire during the Spring 2001 semester. Responses were analyzed to determine preservice teachers' conceptions of intelligence and giftedness, the relationship between preservice teachers' conceptions of intelligence and giftedness, and how conceptions of intelligence or giftedness correlated with certain educational goals.

Research Questions

The following research questions were examined in this study:

1) What are the conceptions of intelligence among preservice teachers?

1a) Are there differences in preservice teachers' conceptions of intelligence based upon major, sex, and race?

2) What are the conceptions of giftedness among preservice teachers?

2a) Are there differences in preservice teachers' conceptions of intelligence based upon major, sex, and race?

3) What correlation exists between preservice teachers' conceptions of intelligence and their conceptions of giftedness?

4) What correlations exist between preservice teachers' conceptions of intelligence and certain educational goals?

5) What correlations exist between preservice teachers' conceptions of giftedness and certain educational goals?

Significance of the Study

An examination of preservice teachers' conceptions of intelligence and giftedness yields important information about how preservice teachers' think about these two constructs. Many school decisions regarding placement of students into gifted education or special education programs are based upon teacher recommendation. These placements depend upon teacher beliefs regarding expectations for students which in turn can be influenced by the students' physical characteristics, achievement, and effort level (Braun, 1976; Brophy, 1983; Clark & Artiles, 2000; Swann & Snyder, 1980). Since how one conceptualizes intelligence impacts how one views another's intelligence

(Sternberg et al., 1981), it is reasonable to expect that how inservice and preservice teachers' conceptualize intelligence influences their view of students' intelligence. Both preservice and inservice teachers equate giftedness with teacher pleasing behavior and academic success (Crammond & Martin, 1987; Tomlinson et al., 1994). These views in combination with already formed teacher beliefs have very real consequences for student achievement and success.

Preservice teachers enter professional development programs with already formed beliefs about teaching. These beliefs serve as screens through which information and experience is processed. Very little research exists that examines preservice teachers' beliefs about intelligence and giftedness, and the studies that have been done do not examine variables such as academic major, gender, and ethnicity. This study is significant in that it takes into account academic major, gender and ethnicity in examining preservice teachers' conceptions of intelligence and giftedness.

Definition of Terms

Conceptions of Intelligence

The implicit theory individuals carry with them regarding characteristics of intelligence. According to Sternberg (1985) implicit theories tell us what people believe intelligence is.

Conceptions of Giftedness

The implicit theory individuals carry with them regarding characteristics of giftedness.

Preservice Teacher

Students participating in professional development programs to become teachers.

Delimitations and Limitations of the Study

The sample selected for this study was comprised entirely of preservice teachers at one large, metropolitan university in the Southeast. Results may not generalize to preservice teachers from outside the Southeast, smaller institutions, or rural institutions. Generalizability of the results may be impacted due to the use of a convenience sample. Unintentional bias may result from the willingness of course instructors to permit administration of the questionnaire in their classes. Due to violations of the assumptions for analysis of variance, results must be interpreted with caution.

Chapter Summary

This chapter introduced the importance of examining preservice teachers' conceptions of intelligence and giftedness. Numerous researchers have noted that teacher beliefs not only impact teacher behavior toward students, but also impact student achievement and student self-esteem. Teacher beliefs are impacted by a variety of factors including physical characteristics of the student, the teachers' beliefs about teaching, and the teachers' beliefs about the effort expended by the student. Preservice teachers bring with them into professional development programs views about teaching that have been shaped by their personal attitudes and experiences. Research on conceptions of intelligence

indicate that both preservice and inservice teachers have different views about intelligence than the general public. In addition, research on conceptions of giftedness indicate that teachers tend to view students as gifted if they exhibit teacher pleasing behavior and are academically successful. All of these factors come together to impact preservice teachers views on intelligence and giftedness.

This chapter introduced the research questions for examining preservice teachers conceptions of intelligence and giftedness as well as the significance of the study. In addition, definitions of terms and the possible limitations were discussed. Chapter Two reviews the literature relevant to this study and covers the theoretical background for examining conceptions of intelligence and giftedness. Chapter Three describes the methodology used in this study including the research design, instruments to be used, procedures to be followed and method of data analysis to be used. Chapter Four examines the results of the study. Chapter Five discuses the study's findings and their implications. Limitations and recommendations for future research conclude chapter five.

Chapter Two

Literature Review

This chapter discusses previous research addressing central concerns to preservice teachers' conceptions of intelligence and giftedness. The relationship between teachers' beliefs and their behavior is a pivotal element. If teachers' beliefs have no bearing on their behavior, then teachers' conceptions of intelligence and giftedness is of little concern. However, if teachers' beliefs do impact their behavior, then our understanding of how teachers think about intelligence and giftedness will be of importance. This chapter begins with an examination of the literature dealing with teachers' beliefs and teacher behavior.

According to Viens, Chen, and Gardner (1997), "the construct of intelligence is essential to our understanding of what it means to be human.... Constructs of intelligence can and have had tremendous social impact and educational implications" (p. 122). Taking into account the overrepresentation of minority children in special education programs and the heavy emphasis on intelligence test scores to place those children, it is important to examine teachers' beliefs about intelligence. After exploring the relationship between teacher beliefs and teacher behavior, conceptions of intelligence will be discussed.

Gallagher (1991) posits that "gifted" is a term with surplus meaning much like "welfare mother". Although the term may provide useful descriptive information, it also connotes additional meaning that may or may not apply to the person or situation. For many, "gifted" implies privilege, often, unearned privilege. According to Gallagher (1991), "it appears to invoke images of a ruling elite of the type we fought in the American Revolution" (p. 355). Since many decisions about identification of gifted children originate through teacher recommendation, our understanding of teachers' conceptions of giftedness is critical. A discussion of conceptions of giftedness will close out this chapter.

Teacher Beliefs and Teacher Behavior

"The more one reads studies of teacher belief, the more strongly one suspects that this piebald form of personal knowledge lies at the very heart of teaching" (p. 85) states Kagan (1992) in her conclusion to a meta-analytic examination of research addressing the relationship between teacher beliefs and teacher behavior. She is not alone in her view. Pintrich (1990) notes that research on teacher beliefs will become the most valuable construct in teacher education.

Numerous research studies exist on the relationship between teacher beliefs and teacher behavior. Rosenthal, one of the original authors of *Pygmalion in the Classroom*, the seminal publication that launched this line of research, has periodically published meta-analysis of the literature (Harris & Rosenthal, 1985; Rosenthal, 1987; Rosenthal, 1991; Rosenthal, 1997; Rosenthal

& Rubin, 1978). In his 1997 examination, Rosenthal notes 479 research articles that addressed the concept of teacher expectancy (Rosenthal, 1997). According to Rosenthal (1997), "For many years, the central question in the study of interpersonal expectancy effects was whether there was any such thing. The meta-analytic evidence has answered that question sufficiently so that simple additional replications will add little new knowledge" (p. 5). Although Rosenthal may believe that the relationship is clear, it is still important to examine the findings relevant to teacher expectancy.

Teacher expectancy research posits that the expectations that a teacher has for a particular student will impact that teacher's behavior toward that particular student and impact that student's behavior and achievement. Although *Pygmalion* may have launched the explosion in research on teacher beliefs and teacher behavior, it was not the first study to examine the concept. Early research documented that children were punished by educators for living in poverty (Davis & Dollard, 1940), that teachers in high-poverty schools expected less from students that those in middle-class schools (Becker, 1952), and that variations in teachers' expectations contributed to differences in pupil attainment (Wilson, 1963). The authors contended that this helped to explain poor children's lesser academic attainment. Supporting this contention, the Harlem Youth Opportunities Unlimited (1964), posited that children seldom exceed low expectations of teachers. Examining the other end of the spectrum, Cahen (1963, as cited in Rosenthal, 1968) found a "halo" effect for high-ability students.

In a study in which intelligence was artificially assigned, Cahen found that teachers gave high-ability students more of a benefit of a doubt in grading than their average ability peers.

Although surrounded by controversy for its research methodologies and activist political stance (Elashoff & Snow, 1971; Jensen, 1969; Thorndike, 1968; Wineberg, 1987), Rosenthal & Jacobson's (1968) *Pygmalion in the Classroom* is still considered a seminal publication. The authors' Oak School experiment was conducted in an elementary school in a predominantly lower socioeconomic community. Approximately one-sixth of the school's population was Mexican-American, one family was African-American, and the remaining families were European-American. The elementary school followed the district policy of ability grouping based on reading performance. An over-representation of boys and Mexican-Americans were in the "slow" track.

In the Spring of 1964 the "Harvard Test of Inflected Acquisition" was given to all K – 5 students. Teachers and administrators were told that the test was a predictor of academic blooming and that the top 20% would show a spurt in learning over the next year. Children who were to experience a learning spurt were randomly assigned with no connection to the test. In reality, the Harvard test was Flanagan's Tests of General Ability (TOGA). Children were pre-tested, then tested again at the end of the first semester, after a full academic year, and after two full academic years. The researchers defined intellectual growth as the difference between a child's pretest IQ and post-test IQ. Rosenthal and

Jacobson (1968) hoped to determine whether the children whom the teachers believed to be ready for a learning spurt would show greater intellectual growth than the remaining children.

After one year, the control group gained an average of eight IQ points overall while the experimental group gained an average of 12 IQ points overall. Expectancy effect had the most impact on those in first and second grade. Over three-fourths (79%) of the experimental group gained at least 10 points while 49% of the control group gained this much. Twenty-one percent (21%) of the experimental group gained 30+ points while only five percent (5%) of the control group did so. According to the authors (1968), "that susceptibility to the unintended influence of the prophesying teacher should be greater in the lower grades comes as no special surprise. All lines of evidence tend to suggest that it is younger children who are the more susceptible to various forms of influence processes" (p. 81). The expectancy effect held true for all groups of children, boys, girls, European-Americans and minorities.

Rosenthal and Jacobson (1968) concluded that the results of the experiment provided evidence that a teacher's expectations of a student's performance may come to serve as a self-fulfilling prophecy. They note that "when teachers expected that certain children would show greater intellectual development, those children did show greater intellectual development" (Rosenthal & Jacobson, 1968, pp. 82 – 83).

Although Rosenthal and Jacobsen's *Pygmalion in the Classroom* was criticized for a variety of reasons including that the IQ of the youngest children was badly measured (Thorndike, 1968), that the findings resulted from the maximization of practice effects (Jensen, 1969), that results did not demonstrate teacher expectancy effects (Elashoff & Snow, 1971), and that the authors publicized the data inaccurately (Wineberg, 1987), volumes of additional research does support the impact of teacher expectancy on student outcomes (Braun, 1976; Brophy, 1983; Brophy & Good, 1970; Clark & Artiles, 2000; Darley & Fazio, 1980; Harris & Rosenthal, 1985; Jussim, 1989; Jussim & Eccles, 1992; Kehle, 1974; Radenbush, 1984; Swann & Snyder, 1980; Wadsworth, 1996). Noting that the *Pygmalion* study initiated much interest in teacher expectancy effects, Brophy & Good (1970) criticized Rosenthal and Jacobson for not examining the causes that produced the outcome effects. These authors proposed the following model:

1) The teacher forms differential expectations for the students.
2) The teacher begins to treat the children differently in accordance with the teacher's expectations.
3) The children respond differently to the teacher because they are being treated differently by the teacher.
4) Each child tends to exhibit behavior which reinforces the teacher's particular expectations for the child.

5) Since each child responds in accordance to the teacher's expectations, some children's academic performance will be elevated while others' academic achievement will be depressed.

6) These effects will appear in the end of year achievement testing, thereby providing support for the "self-fulfilling prophecy" idea.

Brophy and Good's (1970) resultant study examined teacher responses to children the teachers identified as high-ability and low-ability. Unexpectedly, the authors found that while teachers called upon the high-ability children more to answer open-ended questions, they initiated more contact with the low-ability children. In addition, when the low-ability children volunteered to answer a question, they were called upon more frequently than their high-ability peers. Interestingly, high-ability children were more frequently praised for correct answers and less frequently criticized for incorrect answers than low-ability children. When the high-ability children responded incorrectly or were unable to respond, the teachers were more likely to provide a second response opportunity by repeating or rephrasing the question. When a low-ability child provided an incorrect answer or was unable to respond, teachers were more likely to supply the answer or call upon another child. Teachers gave no feedback to the high-ability children three percent of the time, but no feedback to low-ability children 15% of the time. Brophy and Good (1970) concluded that "teachers systematically discriminate in favor of the highs over the lows in demanding and reinforcing quality performance. Teachers do, in fact, communicate differential

performance expectations to different children through their classroom behavior, and the nature of this differential treatment is such as to encourage the children to begin to respond in ways which would confirm teacher expectations" (p. 373).

Attempting to explain precisely what factors contribute to the formation of teacher expectancy, Braun (1976) provides a model that closely examines input and output factors. Sources of teacher expectancy formation include the child's physical characteristics (e.g., attractive, not attractive), sex, ethnic background, previous achievement, intelligence test results, knowledge of siblings, name of child, cumulative folders and student input (e.g., how the child interacts with the teacher). These input factors result in the teacher forming an expectation about the student. The teacher's expectation is then translated into teacher behavior which includes such factors as grouping, expectant voice for prompting, wait time, quantity of interaction with the child, differential questioning, reinforcement, feedback, and the levels of tasks presented to the child. The teacher's behavior toward the child is then interpreted by the child and influences the child's self-expectation which then shapes the child's behavior toward the teacher. Bruan (1976) contends that if a child thinks of themselves as inferior, then their actions will be those of an inferior person which then confirms to the child's teacher the reasonableness of treating the child as inferior. According to Braun (1976), "it is the teacher expectation of the pupil and the vicious cycle it triggers that will determine largely the child's self-image, and ultimately academic success or failure" (p. 209).

In an examination of the literature, Darley & Fazio (1980) identified six different forms of expectancy maintenance and confirmation. The authors refer to perceivers and targets which may easily be reinterpreted to mean teacher and student. Darley and Fazio's (1980) forms of expectancy maintenance and confirmation are as follows:

- The perceiver may avoid or terminate interaction with the target. Such termination permits the perceiver to maintain his or her impression of the target and effectively prohibits the target from changing that impression.
- The target may respond to the perceiver in an ambiguous fashion, but the perceiver interprets the response in a biased manner, concluding that the target's behavior actually confirmed the expectancy.
- The target's response disconfirms the perceivers expectations. However, the impression may persevere if the perceiver attribute's the target's disconfirming behavior to situational forces.
- The target's response to the perceiver's expectancy guided behavior confirms the perceiver's expectancy.
- In the fourth form, the perceiver underestimates his or her own role in producing the expected behavior from the target. The perceiver attributes the response to the dispositional qualities of the target, thus believing that the target confirmed the expectancy.
- The target's self-perception of his or her behavioral response may lead the target to infer a new attitude toward either the situation (prompting similar

confirming behaviors in subsequent situations), the perceiver (prompting expectancy-confirming behavior in latter contact with the perceiver) or him/herself (prompting a modification of self-concept).

All of the outcomes allow the perceiver to maintain the expectancy about the target. According to Darley and Fazio (1980), "If the perceiver is in a position of power over the target, then his or her actions can affect the life chances of that target, causing over the long term some very real changes in the target person that are finally consistent with the originally erroneous perceptions of the perceiver" (p. 879). If the perceiver is a teacher and the target is a child, then that teacher's perception can significantly affect the life of the child.

Brophy (1983) provides an extensive review of the literature involving teacher expectancy. He concludes that a minority of teachers have major expectation effects on their students' achievement, but that such effects are minimal for most teachers because their expectations are generally accurate and open to corrective feedback. He does note that expectancy effects impact student achievement either up, for high expectations, or down, for low expectations, by about 5 – 10%. Brophy notes that predicting the effects of teacher expectancy is difficult because the expectations interact with beliefs about learning and instruction to determine teacher behavior (so that similar expectations may lead to different behavior), and because students will differ in their interpretation of and response to teacher behavior (so that similar behavior may produce different student outcomes).

According to Brophy (1983), one of the mediating mechanisms on teacher expectancy is the teacher's beliefs about what constitute the central functions of the teacher role and how these functions should be accomplished. Teachers who believe that instruction in their subject matter is their primary teaching function will organize their teaching around teaching and learning of content with little social interaction. States Brophy (1983), "Most of their affect and reinforcement is likely to be directed to high achievers, especially those who participate often and communicate both comprehension and enjoyment of the content. Low achievers may be slighted and low participators ignored in these classrooms where the teachers are oriented mostly toward teaching the content" (p. 649).

Teachers who believe that promoting their students' general mental health is just as important as subject matter content may place greater emphasis on full participation and enjoyment of learning rather than breadth of coverage. Notes Brophy (1983), "Given the content that is presented, the potential for self-fulfilling prophecy effects in the classrooms of these socialization oriented teachers is greatest with the low achievers on whom they tend to concentrate. To the extent that these teachers see the low achievers as capable of learning (but in need of extra encouragement, attention, and instruction), the low achievers may end up doing better than their previous achievement records would predict. On the other hand, if the teachers see these low achievers as limited in potential due to inherent limitations in ability, they may begin to treat them in ways that are well

intended, but nevertheless likely to further retard their achievement progress" (p. 649 – 650).

Weiner (1979, as cited in Brophy, 1983) notes that teachers who attribute student failure to their own failure to explain the material adequately are likely to repeat their explanation or try to accomplish their objectives in another way, but teachers who attribute student failure to inherent limitations in student ability are likely to conclude that this particular student cannot learn this particular material, and thus give up further attempts at instruction. Taking into account both Brophy's (1983) findings and Weiner's (1979) findings, it becomes clearer that not only teachers' beliefs about students, but also their beliefs about teaching impact their behavior in the classroom.

Swann and Synder (1980) attempted to assess the combined impact of teacher beliefs about students and their beliefs about teaching on their students. In their experimental study, Swann and Snyder (1980) randomly assigned psychology undergraduates to one of three roles: instructor, high-ability student, and low-ability student. Neither the high-ability nor low-ability student knew of their designations. The instructor was afforded artificial information about grade point average and major of each student. The instructor was also told to use either direct instruction or nondirect instruction to achieve the best results. Those who were told to use direct instruction were informed that ability is produced by the careful and thorough instruction of teachers. Those who were told to use the nondirect instruction were informed that ability emerges from the natural and

spontaneous development of pupils' capabilities. The instructor was provided three methods for solving a card trick, memorization, intuitive or question mark. The instructor was told that the question mark method was most effective, but also most time consuming. Therefore, it was unlikely that the instructor could teach the question mark method to both students in the allotted ten minutes. The two students were placed in separate experimental rooms and the instructor went back and forth between the two. At the end of ten minutes, the experimenter invited the pupils to learn a new card trick. If the pupil had been exposed to the question mark method they could solve the second card trick. At the end of the testing period, instructors indicated how easily each pupil had "caught on" to the card trick during the training session. All three were queried on the method the instructor used to teach the card trick and pupils estimated how much confidence the instructor had in their ability to learn the card trick.

For instructors who were told to use direct instruction, the question mark strategy was most often taught to the high ability students. For those instructors who were told to use nondirect instruction, the question mark strategy was most often taught to the low ability students. The selection of which student to teach the question mark method to correlated with whether the instructors were informed that best pupil performance was achieved through a lot of teacher contact (direct instruction) or little teacher instruction (nondirect instruction). Regardless of teaching method, instructors opted to use their "best" method with the high-ability student. Those who were briefed about direct instruction used it

to teach the question mark strategy to the high-ability student. Those who were briefed on nondirect instruction opted to use it with the high-ability student by allowing the student to "spontaneously" discover the solution for themselves. Thus, these instructors focused on teaching the low ability student the question mark method believing that the high ability student would figure it out for themselves.

Additionally, in the direct instruction group, best performance was elicited by high ability students, while in the nondirect instruction group, best performance was elicited by the low ability students. In essence, whoever was taught the question mark strategy performed the best on the second card trick. Interestingly, regardless of performance, both direct instruction and nondirect instruction teachers indicated that the high ability student caught on most quickly, even though those labels were randomly assigned. High ability pupils also estimated that the instructor expressed more confidence in them than the low ability pupils estimated. This pattern emerged even within the nondirect instruction group, when pupils labeled as having high ability had in reality performed more poorly than those labeled as having low ability. It is important to note that the instructor's impression of the pupils as either high-ability or low-ability remained throughout their face-to-face encounters and in the face of the low-ability pupils' ability to solve the problem.

Swann and Synder (1980) note that this study could be extrapolated to a classroom situation. Teachers may communicate their beliefs about children's

ability to the children. This may then cause the children to behave in ways that confirm the teachers' beliefs. Additionally, since individuals are often blind to disconfirmation of their beliefs, the preconceived belief may not change. State Swann and Synder (1980), "for this perspective, it becomes easier to understand why so many (often erroneous) social stereotypes and idiosyncratic social perceptions are so resistant to change. For even if individuals adopt interaction strategies that produce behavioral disconfirmation, their insensitivity to disconfirmatory information and their tendency to communicate their expectancies to the targets of their beliefs may insure that their beliefs ultimately will receive behavioral confirmation" (p. 887).

Not swayed by the research documenting the impact of teacher beliefs on teacher behavior and student outcomes, Jussim (1989) contended that teachers' expectations and students' outcomes correlated because teachers could accurately predict achievement without influencing that achievement. In a study involving 27 sixth grade math teachers and 429 sixth grade students, Jussim (1989) examined teachers' evaluations of students' math talent, effort and performance in math as well as students' evaluation of their own math ability, effort and performance. These evaluations were correlated with students' final grades in math and their standardized achievement test results in math. Jussim (1989) found that teachers' perceptions of talent predicted both final grades and standardized achievement test scores. However, the only evidence of a self-fulfilling prophecy was the effects of teacher perceptions on student motivation.

Students perceived as performing high early in the year increased their self-concepts of math ability by the end of the year. Students whom teachers believed to try hard received higher grades, but not higher standardized achievement test scores. According to Jussim (1989), "this pattern supports the consensus emerging from educational research that teachers' expectations generally predict students' performance more because they are accurate than because they create self-fulfilling prophecies" (p. 478).

In a larger follow-up study, Jussim & Eccles (1992) found that 80% of the correlations between teacher expectations and standardized achievement test scores represented accuracy while 20% represented self-fulfilling prophecy. The correlation between expectancies and student grades was higher with 35% - 55% of student grades predicted by teacher expectancy. Of this 35% - 55%, about one-quarter to one-half of the expectancy effect on grades is due to teachers' expectations influencing students' actual performance. The remaining percentage is due to teachers' expectations influencing their own judgements about student performance. Jussim and Eccles (1992) do note that although accuracy accounts for the largest effect, teacher expectations do account for some of the variation in student achievement.

Harris & Rosenthal (1985) set out to examine the relations between the effect teacher expectancy has on students' behavior and the effect teacher behavior has on the immediate outcome for the student. Harris and Rosenthal discuss Rosenthal's (1981, as cited in Harris & Rosenthal, 1985) 10-arrow model

for the study of interpersonal expectancy effects (Figure 1). Rosenthal's model is divided into three classes of variables: predictor, mediating and outcome. Predictor variables are both the stable attributes of the expecter and expectee as well as the expectancy. Mediating variables are those behaviors by which the expectancy is communicated. Outcome variables are both immediate such as achievement on a test as well as follow-up such as internalized self-perception. Harris and Rosenthal (1985) examined the mediating relations between B – C and C – D (see Figure 1).

They identified 12 variables strongly associated with the mediation of positive expectations. The variables and the B – C and C – D effect size are as follows: (1) creating a less negative climate, for example, not behaving in a cold manner (.32); (2) maintaining closer physical distances (.30); (3) providing more

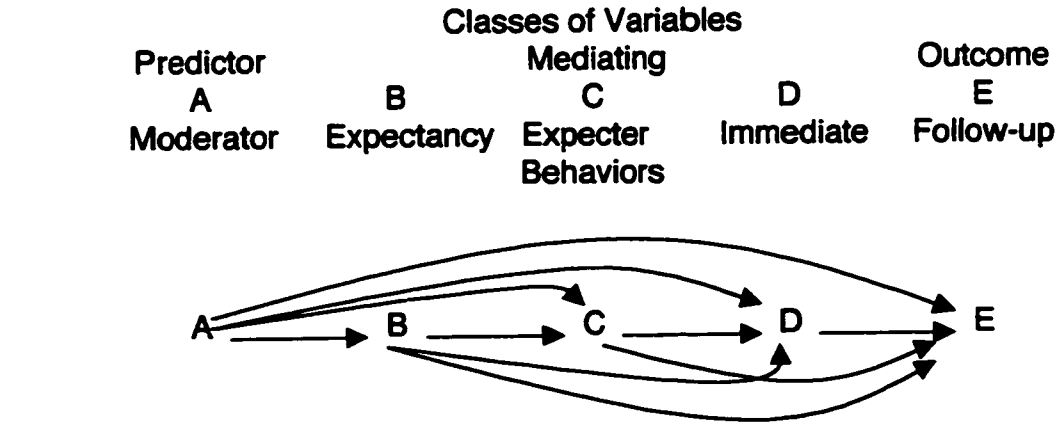

Figure 1. Rosenthal's 10-arrow model for the study of interpersonal expectancy effects.

input by attempting to teach more material or more difficult material (.29); (4) creating a warmer socioemotional climate by acting in a more globally warm manner (.29); (5) exhibiting less off-task behavior (i.e., teacher engaged in interaction with student about nonacademic matters) (.29); (6) having longer interactions (.28); (7) interacting more often (.21); (8) asking more questions (.20); (9) encouraging more (.19); (10) engaging in more eye contact (.19); (11) smiling more (.29); and (12) praising more (.12). Harris and Rosenthal (1985) conclude that "teachers who hold positive expectations for a given student will tend to display a warmer socioemotional climate, express a more positive use of feedback, provide more input in terms of the amount and difficulty of material that is taught, and increase the amount of student output by supplying more response opportunities and interacting more frequently with the student" (p. 377). The identification of certain behaviors that teachers incorporate after developing their student expectations is an important step in shedding light on the complex relationship between teacher beliefs, teacher behavior and student outcomes.

Teachers' emotional and behavioral reactions to their students' academic achievement have an impact on the behavior of the students by influencing both actions and student self-perceptions. In an examination of teachers' affective responses and feedback to students of various ability levels displaying various effort levels, Clark & Artiles (2000) found that teachers displayed the most anger towards high-ability students exhibiting low effort and the most pity for low-ability students exhibiting high effort. According to Clark and Artiles (2000), "the pity felt

by a teacher might prompt his or her offering of a reward or unsolicited help, even when a student is engaged in an easy task. These teacher reactions might send low-ability cues to the students, which may result in the child forming a negative view of her or his own competence as a student" (p. 77). Clark and Artiles (2000) findings corroborate Brophy and Good's (1970) model which outlines how teacher expectancy is translated into student outcomes. As teachers treat children differently based upon their expectations, the children will respond differently to the different treatment. This will not only confirm the teacher's expectancy, but also elevate some students' performance while depressing other students' performance.

Harris and Rosenthal's (1985) 12 teacher behavior variables combined with Clark and Artiles (2000) affective responses of teachers, begins to explain how teacher beliefs can and do impact teacher behavior which in turn impacts student achievement and behavior. As Braun (1976) noted, teacher expectancy can result from a variety of input such as the sex, ethnicity, previous achievement, name and attractiveness of a particular student. This combines with teachers' views about teaching (Brophy, 1983; Swann & Synder, 1980) to shape teachers' interactions with their students. Nespor (1987) contends that the nature of teaching and teachers' work is so ill-defined that teacher beliefs are particularly vulnerable to becoming what he calls an "entangled domain". Since teachers are not always able to consult an existing cognitive or information-processing knowledge base for each problem or scenario encountered, they

must fall back on their beliefs and belief structures to address the situation. States Nespor (1987)

> When a teacher encounters an entangled domain ... appropriate schema are disconnected and unavailable, and the teacher is uncertain of what information is needed or what behavior is appropriate. It is the episodic core of beliefs that makes their use so likely in just such a circumstance. Unable to use more appropriate knowledge structures and cognitive strategies in these situations, the teacher uses beliefs and belief structures, with all their problems and inconsistencies (p. 311 – 312).

Beliefs help individuals make sense of the world. Because beliefs are more readily tied to emotions and emotions facilitate the storage of information in long-term memory, beliefs shape the retrieval of information for problem-solving (Nespor, 1987).

Similarly, Erns, (1989) explored the effects of teachers' knowledge of mathematics and concluded that two teachers may have similar knowledge, but teach in different ways. He concluded that the effect of beliefs is very useful in understanding and predicting how teachers make decisions.

An examination of the relationship between teacher beliefs and teacher behavior does lead one to agree with Rosenthal (1997) that teacher expectancy and its impact on student outcomes does exist. Although its impact may be anywhere from five percent (Brophy, 1983) to 20% (Jussim & Eccles, 1992), teacher beliefs do shape teacher behavior which then shapes student

achievement and behavior. After exploring the literature, I am inclined to agree with Kagan (1992) that "researchers have found that a teacher's belief usually reflects the actual nature of the instruction the teacher provides to the students" (p. 73).

Preservice Teacher Beliefs and Preservice Teacher Behavior

While it is important to understand the relationship between teacher beliefs and teacher behavior, for the purposes of this study, it is also important to understand the formation of preservice teacher beliefs and behavior. Beliefs about teaching are well-established by the time a student enters a professional teacher training program (Nespor, 1987; Nisbett & Ross, 1980; Weinstein, 1988, 1989; Wilson, 1990). These beliefs are developed throughout a student's school career and include ideas about what it takes to be an effective teacher and how students ought to behave (Nespor, 1987). Unlike professions such as law and medicine, in which pre-professional students must construct new understandings of the profession as they encounter the courtroom or the hospital, preservice teachers do not need to construct new understandings as they encounter the classroom since they have had experience with teaching throughout their lives (Pajares, 1992). Calderhead and Robson (1991) reported that preservice teachers hold vivid images of teaching based upon their experiences as a student. These images influenced how the preservice teachers interpreted certain information and classroom practices. In addition, the images impacted

preservice teachers' selection of the knowledge and practices they would later use in their own classrooms.

In an ethnographic study of preservice students, Goodman (1988) explored how preservice teachers make sense of their preprofessional experience. Goodman (1988) found that preservice teachers bring with them "intuitive screens" through which they filter ideas, concepts, and experiences. These early screens are based upon their own experiences of childhood and school. Preservice teachers' professional preparation experiences are interpreted through their intuitive screen. Although the screens were not hardened, they did give students "an orientation point from which they made sense out of the activities and ideas presented to them. The alteration and/or reinforcement of prior experiences resulted from their emotional as well as intellectual response to the people, settings, ideas, and experiences found in the education program" (Goodman, 1988, p. 130). When students were exposed to new ideas that directly conflicted with their intuitive screens, these ideas were often rejected. This is in line with Swann and Synder's (1980) finding that disconfirmatory information of expectations is often ignored or disregarded.

In an attempt to address how expectations and observations impact preservice teachers assessment of student achievement, Wilson and Martinussen (1999) provided preservice students with material covering a 10-week period about a fictitious eighth-grade pupil. Students were given information about the pupil's parents, siblings, economic background, schools

attended as well as recent standardized achievement test results. Over the 10-week grading period, students were provided work and tests by the pupil which the students were responsible for grading. With the exception of the standardized test results and the final written assignment, the economic information and achievement information about the pupil varied across preservice students. The pupil's economic level and academic growth were found to be significantly related to the report card grade. Both accounted for 12% of the variability in the report card marks. Interestingly, when the pupil was described as being from a high socioeconomic background and even though that pupil demonstrated declining academic growth, grades were higher than for pupils from middle or low socioeconomic backgrounds who showed steady academic performance. According to Wilson and Martinussen (1999), "participants may have treated disconfirming information differently for those students for whom they had higher expectations and who were falling behind as the term progressed. Information about slowing performance was either ignored or explained away" (p. 276).

As can be seen from the research, preservice teachers are not blank slates upon which best practices in pedagogy and content knowledge can be inscribed. Rather, preservice teachers bring with them intuitive screens through which their professional development experiences are filtered. In order to address these pre-existing beliefs and conceptions, it is important that we understand what preservice teachers' beliefs and conceptions actually are.

Conceptions of Intelligence

As the above discussion evidenced, teacher expectations are the result of a variety of factors. If how a teacher responds to a particular child is based upon how the teacher views the child's physical characteristics (Braun, 1976), or how the teacher views the role of teaching (Brophy, 1983; Swann & Synder, 1980), or how the teacher views the effort expending by the child (Clark & Artiles, 2000), then how a teacher thinks about or conceptualizes intelligence may also impact behavior toward that child. According to Lund (1994), "when we as teachers refer to intelligence, we must also reflect on the possible implications implicit in this concept within the context of our educational system" (p. 65).

Research on understanding conceptions of intelligence has focused on both explicit theories and implicit theories (Sternberg, 1985). Explicit theories are those developed by experts based on observable data and are generally derived from one theoretical perspective such as the psychometric approach. Implicit theories are the beliefs that laypersons have about intelligence and intelligent behavior. Sternberg (1985) notes that explicit theories tell us what intelligence is in relation to various measurable factors whereas implicit theories tell us what people believe intelligence is. Weinberg (1989) draws our attention to the fact that explicit theories and their related measurements have dominated examinations of intelligence. He states that "often ignored in tackling the definition problem of psychological concepts such as intelligence are the implicit theories, the constructions which reside in people's minds" (p. 98). It is these

constructions or conceptions of intelligence that reside in preservice and inservice teachers' minds that this study is focused upon.

Neisser (1979) has posited that our conception of intelligence is only in relation to some prototype we have of what it means to be intelligent. He compares notions of intelligence to notions of "chairness"; we can recognize a chair because of its similarity to our prototype of chair. Similarly, we recognize intelligent behavior based upon our previous experience of prototypically intelligent behavior.

In an attempt to partially test Neisser's (1979) theory of "prototypical intelligence", Sternberg, Conway, Ketron, and Bernstein (1981) conducted a series of experiments with college students, laypersons, and experts in psychology. In the first experiment, people entering a grocery store, in a train station, and college students entering a library were asked to list behaviors characteristic of intelligence, academic intelligence, everyday intelligence, or unintelligence and to rate their own intelligence, academic intelligence and everyday intelligence. Based upon the frequencies of behaviors mentioned, they found that college students perceive a greater degree of similarity between intelligence and academic intelligence but not everyday intelligence. In contrast, train commuters and grocery store shoppers, saw a greater connection between intelligence and everyday intelligence than academic intelligence. Interestingly, both college students and grocery store shoppers rated themselves as higher in

academic intelligence, whereas train commuters rated themselves higher in everyday intelligence. Sternberg et al. (1981) conclude

> People appear to have organized conceptions of intelligent behavior, but if intelligence is to be understood in terms of prototypes, then the results of this experiment suggest that there may be more than one prototype. In particular, people seem to have at least somewhat different conceptions of the meanings of intelligence, academic intelligence, and everyday intelligence, and these conceptions may differ across populations of subjects (p. 42).

In the second experiment, Sternberg and colleagues (1981) compared layperson's conceptions of intelligence to those of experts in the field of intelligence. Using the behaviors associated with intelligence, academic intelligence, and everyday intelligence generated by the groups in the first experiment, four questionnaires were developed. The first questionnaire asked experts and laypersons to rate the importance of the behaviors in defining an ideally intelligent person. The second questionnaire asked experts and laypersons to rate the behaviors as characteristic of an ideally intelligent person. The third questionnaire prompted laypersons to rate the behaviors as characteristic of intelligence, academic intelligence, or everyday intelligence. The fourth questionnaire asked laypersons to rate each of the behaviors as characteristic of themselves based upon how the other "adult one knows best" would rate them.

Factor analysis of the questionnaires yielded different although similar factors between laypersons and experts. Both groups identified problem-solving ability and verbal ability as characteristic of intelligence. The experts identified practical intelligence as a third factor and laypersons identified social competence as a third factor. The researchers concluded that "people do appear to have prototypes corresponding to different kinds of intelligence" ((Sternberg et al., 1981, p. 50) and that the prototypes were similar, although not identical between experts and laypersons.

The third experiment was designed to determine the extent to which an individual's prototype of intelligence, or their implicit theory of intelligence (i.e., their conception) impacted their evaluation of another individual's intelligence. Another questionnaire was developed in which respondents were asked to read a narrative description of someone and then rate that person on how intelligent the respondent considered the fictitious individual to be. Regression analysis of the questionnaires indicated that knowledge of a respondent's implicit theory (or prototype) of intelligence could be used with a high degree of certainty to predict their ratings of the intelligence of the fictitious individual.

The three experiments that Sternberg and colleagues (1981) conducted indicate that implicit theories of intelligence are powerful lenses through which individuals view their own intelligence and the intelligence of others. The most intriguing finding for educators is that implicit theories of intelligence profoundly impact the rating of another individual's intelligence.

Dweck and Bempechat (1983) posit two additional implicit theories of intelligence, incremental and entity. Individuals with an incremental approach see intelligence as malleable; those with an entity approach see intelligence as fixed. They suggest that teachers with an incremental conception of intelligence may stress learning goals, whereas those with an entity approach may stress performance goals. This is similar to Weiner's (1979, as cited in Brophy, 1983) contention that teachers who view student failure as inherent within the student (a more entity oriented approach) will not alter their instruction, whereas teachers who see student failure as a function of their teaching (a more incrementally oriented approach) will alter their teaching.

Extending the work of both Sternberg et al. (1981) and Dweck and Bempechat (1983), Lynott and Woolfolk (1994) examined teachers' conceptions of intelligence. In the first part of their study, Lynott and Woolfolk identified 43 preservice teachers and 41 inservice teachers from a large metropolitan area, to list behaviors characteristic of intelligence, academic intelligence, everyday intelligence and unintelligence. A list of 100 behaviors was developed into a questionnaire which was then administered to 115 elementary education majors. A factor analysis of the questionnaires revealed three factors that the researchers identified as practical/academic intelligence, conceptual thinking, and social adaptiveness. When comparing these factors to those generated by Sternberg and colleagues (1981), Lynott and Woolfolk (1994) conclude that preservice teachers may have implicit theories that differ slightly from those of

the general population. Whereas Sternberg's (1981) findings yielded a verbal factor, the preservice teachers did not. Additionally, preservice teachers separated general conceptual abilities from academic abilities.

In the second part of their study, Lynott and Woolfolk (1994) administered the characteristics questionnaire to 500 elementary teachers from around the nation. In addition to demographic information, the teachers were (1) asked to respond to a Nature of Intelligence questionnaire which measured Dweck and Bempechat's (1983) entity/incremental theory; and (2) rate the importance of 12 educational goals reflecting conceptual thinking, practical/academic intelligence, and social adaptiveness. Unlike their preservice counterparts, a factor analysis of inservice elementary teachers' questionnaire responses yielded only two factors that the researchers identified as practical knowledge and conceptual thinking. The findings from the various measures are as follows:

- There were no significant correlations between teachers' age, sex, years of experience, or the geographic setting of the school and the teachers' beliefs about intelligence.
- The more highly teachers rate practical knowledge as characteristic of intelligence, the more they endorse an incremental view of intelligence (r = .12, $p < .05$);
- The more years a teacher has been teaching, the more likely she is to see intelligence as a fixed, or entity, trait (r = -.30, $p < .01$);

- The greater the teachers' experience, the less they perceive conceptual thinking as characteristic of intelligence ($r = -.12$, $p < .05$);
- Correlations were noted between each dimension of intelligence (i.e., conceptual thinking and practical knowledge) and its complimentary educational goal. For example, practical knowledge was most strongly correlated with the practical/academic goal.
- Teachers with large percentages of Hispanic students rated Practical/Academic goals (such as fostering autonomy, teaching children to be hard-working) more highly than other goals ($r = .19$, $p < .05$);
- Teachers with large percentages of African-American children rated Conceptual Thinking goals (such as developing abstract reasoning, teaching children to be rational problem-solvers) more highly than other goals ($r = .22$, $p < .05$); and,
- There was no significant relationship between a teachers belief about the nature of intelligence as fixed or incremental and educational goals.

Lynott and Woolfolk's (1994) findings are significant for a variety of reasons. Their finding that preservice and inservice teachers' conceptions of intelligence differ may point to conceptual changes occurring through the professional development program and/or through greater contact with students. The connection between educational goals and predominant ethnicity of the classroom may indicate differing conceptions of intelligence based upon students' ethnicity. Finally, the researchers' findings that teachers' implicit

entity/incremental theory of intelligence was not correlated with educational goals may not extend to other populations of teachers (i.e., secondary or special education) or preservice teachers.

Focusing specifically on teachers' entity or incremental conceptions of intelligence, Lee (1996) used a ten-item, forced choice Teachers' Implicit Theories on Intelligence Questionnaire to determine teachers' implicit theories. Lee administered the questionnaire to 200 male and 200 female teachers in Korea and divided the group into the top 50 incremental and entity teachers of each gender (n = 200). These teachers were then provided a brief description of a fictitious student along with the mathematics work of the student. The teachers were asked to score, provide feedback and suggest future assignments for the student. An analysis of the data revealed that teachers' with an entity conception of intelligence (1) evaluated ability based on scores; (2) focused primarily on the student's performance by assigning the same problem to build the student's scores; and, (3) preferred homogenous ability grouping for the student. Teachers with an incremental conception (1) emphasized the effort of the student; (2) focused primarily on learning goals by suggesting assignments to build student's problem-solving skills; and, (3) preferred heterogeneous ability grouping for the student. Incorporating the work of Dweck and Bempechat (1983) that focuses on children's implicit theories of intelligence, Lee (1996) suggests that matching an entity-oriented student with an entity-oriented teacher would be detrimental for the student. According to Lee (1996), "teachers' low

expectations will induce students to expect their self-efficacy to be as low as their teachers do. . . . this can create motivationally helpless students who cannot overcome repeated failures and instead give up too easily" (p. 10).

Although the generalizability of Lee's (1996) findings may not extend to American teachers, his extensive analysis of teachers' responses to student work contributes to understanding the interaction between teachers' conceptions of intelligence and their treatment of students. Teachers bring preconceived notions about intelligence into their classroom interactions with students. Lee's (1996) study raises several unanswered questions such as is there a correlation between subject orientation and teachers' implicit theories of intelligence? Is there a correlation between experience and conceptions of intelligence? And, would teachers in another culture respond similarly?

In an article attempting to separate fact from fiction generated by the debates revolving around intelligence and it's measurement, Gottfredson (1997) notes that "...accumulating research evidence changed [scientists] understanding of the nature, measurement, origins, and consequence of differences of intelligence. The press and the public have yet to catch up to the new mainstream" (p. 20). We can see this discongruity when we compare recent theories about intelligence to the research on people's conceptions of intelligence. Although both Gardner and Sternberg address the experiential or practical aspects of intelligence, their theories encompass much more. Based upon the research of conceptions of intelligence, particularly in relation to

educators, the more encompassing aspects of their theories are not represented in the implicit theories of teachers. Given the vast amount of teacher activity material that touts multiple intelligences, it is puzzling why both preservice and inservice teachers' conceptions of intelligence appear quite traditional. Due to the small number of studies that actually examine preservice and inservice teachers' conceptions of intelligence, this question begs further research.

Conceptions of giftedness

Noting the importance of understanding conceptions of giftedness, Sternberg & Davidson (1986) state

> Giftedness is something we invent, not something we discover. It is what one society or another wants it to be, and hence its conceptualizations can change over time and place. If the definition of giftedness is a useful one, then it can lead to favorable consequences of many kinds, both for the society and of its individuals. If the definition is not useful, valuable talents will be wasted, and less valuable ones fostered and encouraged. It is thus important to us all to understand just what it is we, and others, mean by the concept of giftedness (p. 4).

As Sternberg and Davidson note, both explicit and implicit theories about giftedness need to be examined and understood.

Explicit Theories of Giftedness

Guy M. Whipple is credited as having established the term gifted as the "standard designation of children with supernormal ability" (Henry, 1924 as cited

in (Passow, A. Harry, 1981, p. 5). Prior to Whipple's designation, these children were referred to as "brilliant children", "pupils of more than average intelligence," and "pupils of supernormal mentality" to name but a few (Passow, 1981). Lewis Terman provided a more quantifiable definition when he sought gifted children within the top one percent of the school populations for his longitudinal study (Terman, 1926). Similarly, Leta Hollingworth defined gifted children as "those who are in the top one percent of the juvenile population in general intelligence" which she defined as the "power to achieve literacy and to deal with its abstract knowledge and symbols" (as cited in Pritchard, 1951, p. 49). These definitions all focus heavily on academic ability as the singular identifier for gifted children.

With the launching of the Russian satellite Sputnik, definitions of gifted were pressured to expand. Witty (1958) recommended that "the definition of giftedness be expanded and that we consider any child gifted whose performance, in a potentially valuable line of human activity, is consistently remarkable" (p. 62). Heeding Witty's recommendation, a conference was held in 1962 to develop consensus on the needs and trends in gifted education. Conference participants agreed on three generalizations: (1) giftedness needed to be considered multidimensional; (2) the notion that intelligence was exclusively determined by genetics needed to be replaced with a combination of genetics and environment; and, (3) motivation and personality variables contribute to giftedness (Gallagher, 1963).

In 1972 the federal government issued a definition of gifted that incorporated a multidimensional approach. The definition presented in the Marland Report states

> Gifted and talented children are those identified by professional qualified professionals who, by virtue of outstanding abilities, are capable of high performance.... Children capable of high performance include those with demonstrated achievement and/or potential ability in any of the following areas, singly or in combination:
>
> - general intellectual ability;
> - specific academic aptitude;
> - creative or productive thinking;
> - leadership ability;
> - visual and performing arts;
> - psychomotor ability (Marland, 1972, p. 10).

Psychomotor ability was later deleted from the report leaving only the first five.

In 1978, a researcher from the University of Connecticut asked the question "What makes giftedness" in *Phi Delta Kappan*. Joseph Renzulli (1978) promoted a broadened conception of giftedness. Influenced by Guilford's structure of the intellect model, Renzulli's (1978) conception of giftedness included three elements: (1) above-average ability; (2) task commitment; and (3) creativity. With this proposal, Renzulli brought together research in the fields of intelligence and gifted education. According to Renzulli (1978), "gifted and

talented children are those possessing or capable of developing this composite set of traits and applying them to any potentially valuable area of human performance" (p. 261). Once again, the term "gifted" underwent a definitional transformation.

In 1993, the U.S. Department of Education, Office of Educational Research and Improvement issued their report, *National Excellence: A Case for Developing America's Talent.* Not since the publication of the 1972 Marland Report had a federal document changed the field of gifted education so completely. This report called for a redefinition of the term "gifted". In its provision of a new federal definition for the education of high ability students, the report replaced the Marland report's "gifted" with the term "talented". In doing so the report stated that "the term 'gifted' connotes a mature power rather than a developing ability and, therefore, is antithetic to recent research findings about children" (p. 16). According to the *National Excellence* report (Ross, 1993), the current definition of children with outstanding talent is as follows:

> Children and youth with outstanding talent perform or show the potential for performing at remarkably high levels of accomplishment when compared with others of their age, experience, or environment.
>
> These children and youth exhibit high performance capability in intellectual, creative, and/or artistic areas, possess an unusual leadership capacity, or excel in specific academic fields. They require services or activities not ordinarily provided by the schools.

> Outstanding talents are present in children and youth from all cultural groups, across all economic strata, and in all areas of human endeavor (p. 16).

According to Feldhusen (1998), the *National Excellence* report, officially supplanted the term "gifted" with the term "talented". The traditional conceptions of gifted as a fixed, heritable trait were challenged by new conceptions of gifted as a malleable, educable talent.

Implicit Theories of Giftedness: Inservice and Preservice Teachers

While society's explicit theories of giftedness have evolved from a stable, singular concept to a dynamic, multidimensional concept, individuals' implicit theories have not progressed as quickly. A 1962 finding that *adolescents* rated the brilliant, non-studious, athlete as most popular and the brilliant, studious, non-athlete as least popular (Tannenbaum, 1962) is no different from the 1987 finding that *teachers* rated the brilliant, non-studious, athlete as most popular and the brilliant, studious, non-athlete as least popular (Crammond & Martin, 1987). Both of these findings provide a glimpse of the implicit theories surrounding giftedness. Both of these studies found that athleticism was much more highly valued than academic ability. In addition, both studies noted that studiousness was least highly valued. Although these attitudes might be expected from adolescents, it is quite surprising that experienced teachers feel the same way. State Crammond and Martin (1987), "the brilliant, studious, non-athletic character, often the stereotype of the gifted student, was rated the lowest" (p.

17). In conjunction with the research on teacher expectancy effects, these findings implore further examination of teacher conceptions of giftedness.

In an examination of elementary teachers attitudes toward high ability students, Jacobs (1972) found that kindergarten and first grade teachers were the most negative toward gifted children. Notes Jacobs (1972), "rather than learning that his [sic] high intellectual ability is a desirable asset, the gifted child will subtly be informed that their brightness, quickness is not as acceptable as the behavior of the less bright, more normal child" (p. 25). Given Rosenthal and Jacobson's (1968) findings that younger children are most susceptible to teacher expectancy effects, this finding is quite distressing. When coupled with the fact that many school districts do not begin to identify gifted students before the third grade, Jacobs' finding prompts alarm.

Although Jacobs' study is almost 30 years old, Rohrer's (1995) interviews with kindergarten and first grade teachers reveals similar findings. Rohrer (1995) found that primary grade teachers often failed to identify shy children or non-conforming children as gifted. These teachers placed heavy emphasis on verbal ability and socially acceptable behavior. Notes Rohrer (1995), "if behaviors the teacher regarded as immature stemmed primarily from the lack of sufficient intellectual challenge within the classroom, unidentified young gifted children could be at risk for establishing a pattern of underachievement or negative behavior patterns" (pp. 280 – 281). Once again, teacher expectancy plays a role in student achievement.

In an analysis of preservice teachers, regular education teachers and gifted education teachers, Schack & Starko (1990) found that the three groups differed regarding criteria for identification of gifted students. Gifted education teachers preferred such characteristics as creativity, wide knowledge, achievement tests, multiple interests, vocabulary and IQ scores. Regular classroom teachers and preservice teachers preferred motivation, class performance, and grades. According to Schack and Starko (1990), these differences may "highlight different perceptions of giftedness, with preservice and classroom teachers more interested in lesson-learning giftedness and teachers of the gifted more concerned with creative productive giftedness, that which involves independent investigations and creation of new knowledge and/or products" (p. 358). If the teacher expectancy of regular education teachers is that gifted students should be teacher pleasers and successful students, then serious implications result for identification of gifted students who do not meet these expectations.

Corroborating the evidence that students need to be teacher pleasers and academically successful for identification for gifted programs, Ribich, Barone, and Agostino (1998) found that while preservice teachers held positive views about gifted students, upon watching a videotape of an underachieving gifted student, their views dropped precipitously. Those students who watched the video of an achieving gifted student scores did not drop and remained constant with their pre-video attitudes. Ribich et al. (1998) note that the significant drop in

student attitudes after watching a brief video indicated that the preservice teachers believed the underachieving students were "not worthy of the label gifted" (p. 311). The expectation of the preservice teachers that gifted students would be teacher pleasers and academically successful was not met. Therefore, these preservice teachers dealt with the disconfirming evidence by blaming the student for his or her behavior.

In a National Research Center on the Gifted and Talented study designed to understand the ways in which preservice teachers develop an awareness of the needs of exceptional learners (both special education and gifted education students), Tomlinson, et al. (1994) interviewed and observed 10 preservice teachers. These preservice teachers believed that all students' needs should be met in the classroom, but meeting those needs is virtually impossible. Preservice teachers believed that compliant behavior equaled academic readiness. Gifted students were believed to be those who turned their work in on time, listened, and answered questions voluntarily whereas special education students were believed to be apathetic, unable to sit still, and disorganized. Twice exceptional students, such as those who are both gifted and learning disabled, were identified as neither. Although the preservice teachers believed in curriculum differentiation their skills were minimal. For example, a student who completed a worksheet early was provided an extra "enrichment sheet" while students struggling in math were graded more leniently on math quizzes. In addition, the

preservice teachers believed the teacher was the dispenser of knowledge rather than the facilitator of knowledge. Note Tomlinson et al. (1994)

> The "generalist" skills which the preservice teachers hone in the classroom maintain a status quo of schooling which is dubious in its value even for the typical learner for whom schools are designed. The liability for academic outliers is that despite proclamations of the existence of individual differences and the responsibility of the teacher to meet them, basic practices may close off avenues of "specialization" necessary for addressing the needs of gifted, remedial, and special education students.... These preservice teachers sense that differentiating instruction is a low priority ... [thus] they gain tacit permission to dispense learning as though all students need the same prescription or treatment (p. 113).

While preservice teachers may believe in theory that all students' needs should be met in the classroom, in practice their implicit theories about gifted students as teacher pleasers and academically successful, as well as their beliefs about special education students as non-compliant and unsuccessful, dominate.

In an attempt to determine the effect of training in differentiation strategies on preservice teachers' attitudes toward academically diverse students, Moon, Callahan, and Tomlinson (1999) found that at the onset of their final internship experience, the preservice teachers held positive attitudes toward curriculum differentiation for academically diverse learners. The preservice teachers were

assigned to one of three interventions, (1) no intervention, (2) a workshop on differentiation, and (3) a workshop on differentiation and a curriculum coach. At the end of their internship, all groups of preservice teachers expressed a decrease in attitudes toward differentiation, however, the workshop and coach group showed the least decline. Moon et al. (1999) posit that since the workshop and coach group showed the least decline, the intervention was effective for increasing preservice teachers' skills in curriculum differentiation for academically diverse learners.

Chapter Summary

This chapter examined the literature on teacher expectancy, conceptions of intelligence and conceptions of giftedness. Teacher expectancy research posits that the beliefs (or expectations) a teacher has about a student will impact that teacher's behavior toward the student. This in turn will impact the student's achievement and self-esteem. Although most research does show a small impact on student achievement (5% - 20%), it is significant to note that the relationship between beliefs and behavior does exist.

Research on conceptions of intelligence show that individuals do carry around implicit theories about what intelligence is. These implicit theories are not only different between the general public and inservice and preservice teachers, but also between inservice and preservice teachers. Additionally, an individual's conceptualizations of intelligence impacts her or his views of another's intelligence.

Explicit theories about giftedness have changed over time. Implicit theories have not changed as dramatically. The research reviewed discussed inservice and preservice teachers' beliefs that students were more likely to be gifted if they demonstrated teacher pleasing behavior and were academically successful. Although preservice teachers believed it was important to meet students' needs in the classroom, recent research showed that these preservice teachers were not prepared to differentiate instruction for gifted students.

The research on preservice teachers' conceptions of intelligence and giftedness indicate that while preservice teachers view both constructs as similar to the views of the general public, there are differences. In addition, research has indicated differences among preservice teachers' conceptions. Further research is warranted given the current findings. Although research does exist that examines preservice teachers' conceptions of intelligence and giftedness, this research did not include an examination of the demographic variables of the preservice teachers such as gender, ethnicity, and academic major, and their correlation to the preservice teachers' conceptions.

Chapter Three

Method

The purpose of this study was to examine preservice teachers' conceptions of intelligence and giftedness. A descriptive, exploratory design was used to determine preservice teachers' conceptions. Noting the importance of descriptive research, Gall, Borg, and Gall (1996) state "... unless researchers first generate an accurate description of an educational phenomenon as it exists, they lack a firm basis for explaining or changing it" (p. 374). Based upon the seminal research indicating a connection between teachers' beliefs and behavior in the classroom (Rosenthal & Jacobson, 1968), it is important to understand preservice teachers' beliefs since they will soon be in charge of their own classroom. In addition, based upon the findings that indicate how one conceptualizes intelligence impacts how one sees another's intelligence (Sternberg et al., 1981) and that how teachers' view intelligence impacts their preference for certain educational goals (Lynott & Woolfolk, 1994), it is important for teacher educators to understand preservice teachers' conceptions of intelligence and giftedness.

The following research questions were addressed in this study:

1) What are the conceptions of intelligence among preservice teachers?

1a) Are there differences in preservice teachers' conceptions of intelligence based upon major, sex, and race?

2) What are the conceptions of giftedness among preservice teachers?

2a) Are there differences in preservice teachers' conceptions of intelligence based upon major, sex, and race?

3) What correlation exists between preservice teachers' conceptions of intelligence and their conceptions of giftedness?

4) What correlations exist between preservice teachers' conceptions of intelligence and certain educational goals?

5) What correlations exist between preservice teachers' conceptions of giftedness and certain educational goals?

This chapter describes the research design, selection of participants, instruments used, procedures, and methods of data analysis.

Research Design

Because this study was an exploratory examination of preservice teachers' conceptions of intelligence and giftedness, a descriptive research design was used. According to Gall et al. (1996), descriptive studies are concerned with determining "what is". This study examined the characteristics and beliefs of a sample of preservice teachers in relation to intelligence and giftedness at one point in time. Data were collected through the use of a questionnaire and through face-to-face interviews.

Participants

This study's sample was drawn from the population of preservice teachers either attending classes or in their final internship during the Spring 2001 semester at the University of South Florida's College of Education. The University of South Florida produces the most teacher candidates in the Southeast. It is located in a large metropolitan area and draws students primarily from an 11 county catchment area that includes both urban and rural localities. During the Fall 1999 semester, 2006 students were enrolled in preservice teacher education courses across the four campuses (Office of Policy (Analysis, 2000). Males comprised 397 enrollees (20%) with females comprising 1609 enrollees (80%). African-American preservice teachers totaled 166 (8%), those of Hispanic origin 162 (8%), other minorities 28 (1%), and white, not of Hispanic origin, 1650 (82%). Median age for undergraduates in the College of Education was reported as 26.

Sudman (as cited in Gall et al., 1996) has suggested that when conducting survey research a minimum of 100 participants per major subgroup and 20 to 50 participants for each minor subgroup should be included. Within the College of Education, the secondary education and special education programs are considerably smaller than the elementary education program with approximately 250, 275, and 800 students, respectively (College of Education, 2000). So that statistical comparisons could be conducted, both secondary education and special education students were oversampled.

In order to analyze the proposed research questions using a one-way analysis of variance, Gall et al. (1996) suggest a sample size of approximately 500 participants. In order to obtain a large enough cross-section of elementary, secondary and special education students, an email was sent to instructors of numerous courses soliciting permission to administer the questionnaire to the students in their course. In order to obtain a cross-section of students that includes those who are beginning their programs, those in the middle of their programs, as well as those completing their programs, courses were selected based upon sequence within elementary education, secondary education, and special education.

Instrumentation

A questionnaire was developed based upon the research of Busse, Dahme, Wagner, and Wieczerkowski (1986) and Lynott and Woolfolk (1994). The questionnaire consisted of five sections which included the following: (1) conceptions of giftedness, (2) conceptions of intelligence, (3) belief statements about the nature of intelligence, (4) belief statements about educational goals, and (5) demographic information (see Appendix A).

Conceptions of Giftedness and Conceptions of Intelligence Sections

The conceptions of giftedness and conceptions of intelligence sections were adapted from Busse et al. (1986). Their questionnaire provided a list of 80 characteristics teachers were to use to rank whether or not the characteristic described a gifted student well, fairly well, not especially, a little, or not at all.

According to Busse et al (1986), "these characteristics were derived from previous studies of gifted children by Cox (1977), Dahme (1981), Frierson (1965), Gowan (1975), Kincaid (1969), Renzulli, Hartman, and Callahan (1975), Terman et al. (1925), Walberg (1971), Walberg, Rasher, and Parkerson (1979) and Witty (1940)" (p. 906). In addition, approximately one-third of the statements were chosen to reflect undesirable characteristics in order to lessen the possibility of a response set. The questionnaire was administered to 446 American teachers and 434 German teachers. In order to reduce the large number of characteristics to a more manageable size, a factor analysis was done individually for both the American sample and the German sample. The analysis yielded five factors for the American sample and seven factors for the German sample. The five factors for the American sample (e.g., intelligent, self-centered/neurotic, dynamic popular, creative and achievement oriented) are similar to the factors identified by both Sternberg et al (1981), Lynott (1988) and Lynott and Woolfolk (1994).

Unfortunately, the researchers provided no reliability coefficient for their questionnaire. In attempting to contact Busse, the only American researcher involved with the research, it was discovered that he had died quite some time ago (see Appendix B). Although this presents a validation problem, because Busse and his colleagues compiled the list of characteristics from numerous previous studies on gifted children and because his findings mirror those of

others examining conceptions of intelligence and giftedness, the list of characteristics was selected for this study.

Busse and colleagues' questionnaire was modified by altering the prompt and the Likert scale to produce this study's questionnaire. Rather than asking participants to rate each characteristic regarding how well it fit a highly gifted student, the present questionnaire mirrors the format used by other researchers (Lynott, 1988; Lynott & Woolfolk, 1994; Sternberg, 1981) by asking participants to indicate how characteristic each statement is of an ideally gifted or ideally intelligent individual. For example, within the conceptions of giftedness section, participants are asked to do the following:

> Based upon your own personal view, rate the following descriptions below indicating how characteristic each one is of an ideally gifted person.

Within the conceptions of intelligence section, participants were provided the same prompt, but asked to base their answers upon an ideally intelligent person. So that results could be compared with the queestionnaires of Sternberg et al. (1981) and Lynott and Woolfolk (1994), both of which used nine-item Likert scales, a nine-item Likert scale was incorporated. The questionnaire asked each participant to rate each characteristic on a scale of 1 (least characteristic) to 9 (most characteristic) of an ideally gifted or intelligent person.

Nature of Intelligence Statements Section

The third section of the questionnaire was designed to differentiate between preservice teachers who hold an entity view of intelligence from those

who hold an incremental view of intelligence. According to Dweck and Bempechat (1983), teachers with an entity perspective see intelligence as a stable trait with goals as performance focused. Teachers with an incremental perspective see intelligence as modifiable with goals as effort focused.

Lynott and Woolfolk (1994) developed a series of 11 paired statements designed to measure the degree an individual has an incremental as opposed to an entity view of intelligence (see Appendix C). Participants were asked to make a forced choice for each of the 11 statements. Each pair of statements represented two extreme positions. Items were scored as a 0 for each incremental response or a 1 for each entity response. The mean of the11 item scores was calculated for a total score ranging between 0 and 1. The higher the score the more the individual is believed to hold an incremental view of intelligence. Lynott and Woolfolk (1994) reported a Cronbach's coefficient alpha of .59 for the 11-item scale. After examining the item correlations, they opted to drop two of the items (items 8 and 10) due to low corrected item correlations. Cronbach's alpha was recalculated with the nine item scale and yielded a reliability score of .66. Lynott and Woolfolk(1994) opted to conduct all further correlation procedures using the nine-item scale. The third section of this study's questionnaire incorporated their nine-item scale to differentiate between preservice teachers with an incremental or entity view of intelligence.

Educational Goals

The fourth section of this study's questionnaire incorporated Lynott and Woolfolk's (1994) 12 educational goal statements. The 12 statements are designed to determine how important the participant views each of the academic goals. Lynott and Woolfolk (1994) divided the goal statements into three separate categories identified as practical/academic, conceptual and social goals (see Appendix D). Participants were asked to rate each goal using a nine-item Likert scale from 1 (least important) to 9 (most important). Subscale scores were calculated based upon the mean rating of the appropriate four items. Lynott and Woolfolk(1994) reported Cronbach's alpha for the social goals scale as .75, for the conceptual scale as .73, and for the practical/academic scale as .73.

Demographic Information

The fifth and final section of this study's questionnaire asked students for a variety of demographic information. Within this section, participants were asked to identify their major, when they anticipated enrolling in their final internship, the types of school related services they received as a PK-12 student, their gender, age, and ethnicity, as well as their primary female guardian's and primary male guardian's educational attainment.

Interview

A semistructured interview was developed to garner a more indepth understanding of preservice teachers' conceptions of intelligence and giftedness. Bogdan and Biklen (1982) note that interviewing may be considered along a

continuum from very structured to unstructured. According to Synder (1992), a semistructured interview is one in which all respondents are asked a few general questions, but it also allows room for individual probes.

Pilot Study

A pilot study was conducted in July of 2000 to pretest the questionnaire as well as to practice administration and scoring of the questionnaire. Dr. Anita Woolfolk, Dr. Donna-Jean Lynott and Dr. Thomas Busse were all contacted for permission to use their respective instruments. Dr. Woolfolk granted permission for both herself and Dr. Lynott (see Appendix B). The researcher was informed by Dr. Margaret Wang's secretary, Victoria Murphy, that Dr. Busse had passed away. With permissions secured a questionnaire was developed incorporating both Busse's characteristics and Lynott and Woolfolk's statements.

The questionnaire was examined by two reviewers for content validity. According to Litwin (1995), "content validity is a subjective measure of how appropriate the items seem to a set of reviewers who have some knowledge of the subject matter" (p. 35). Although content validity is not a statistical tool for measuring validity, it can provide a good foundation "on which to build a methodologically rigorous assessment of a survey instrument's validity" (Litwin, 1995, p. 35). The two reviewers were Dr. Hilda Rosselli, Associate Dean, USF College of Education and Director, Master's Degree program in Gifted Education, and Dr. Daphne Thomas, Associate Professor, USF Department of Special Education. Dr. Rosselli was selected for her expertise in gifted education and Dr.

Thomas was selected for her expertise in special education. Both reviewers were selected for their expertise in understanding conceptions of intelligence and for their expertise in preservice teacher education. The reviewers were asked to assess the instruments' validity in terms of characteristics of giftedness and intelligence as well as accessibility of the language to preservice teachers. Both Dr. Rosselli and Dr. Thomas provided a few changes to the wording of the demographic questions. Overall, the reviewers believed that the instrument was valid for assessing conceptions of intelligence and giftedness.

Three instructors were contacted for permission to pretest the questionnaire in their classes, two of which granted permission. The questionnaire was pretested in Integrating Exceptional Students (EEX 4070), a class comprised of preservice secondary education students, and Psychoeducational Assessment (EEX 6222), a class comprised of inservice teachers enrolled in an alternative master's degree program in special education. Fifty-three individuals completed the questionnaire, 23 secondary education undergraduate students and 30 special education graduate students. Females comprised 80 percent of the sample (n = 42) and males made up 20 percent (n = 11), matching the gender distribution in the College of Education exactly. Median age for the sample was 26 which matched the median age for the College of Education. Compared to the ethnic distribution within the College of Education, African-Americans, (13%, n = 7), those of Hispanic origin (11%, n = 6), and other minorities (4%, n = 2) were represented in larger percentages.

Two forms of the questionnaire were developed to determine if the sequence of whether the gifted characteristics came first or if the intelligence characteristics came first made a significant difference. Questionnaires were administered by the researcher to both classes. Prior to being distributed the two forms of the questionnaires were mixed in an alternating fashion so that receipt of either form by the respondents would be random. After explaining the purpose of the study and the format of the questionnaire, the researcher asked participants to complete the survey and to indicate any questions or problems they had with any of the items next to the item in the questionnaire. Administration of the survey took approximately 30 minutes in both classes.

A review of participants written comments within the questionnaires yielded two significant problems. First, the characteristic of "hides his/her light under a bushel" was identified by 27% (n = 14) of the respondents as archaic and difficult to interpret. Based upon this feedback and that the survey includes another item (e.g., prefers to be inconspicuous) similar to the intent of this item, the characteristic was dropped from the study's questionnaire. Second, the two demographic questions that asked for educational background of primary guardians did not list an option for less than "some high school". Six percent (n = 3) of the respondents indicated that their parents did not attend high school. Based upon this feedback, the option of "8th grade or less" was added to the guardians' educational attainment question.

Frequency distributions were examined for data-entry errors and outliers. None were found. Stem-and-leaf displays indicated no violation of normality. In addition, normal probability plots were calculated to determine if observed values differed substantially from expected values. The plots indicated that the data were approximately normally distributed. Skewness coefficients also indicated that the data were approximately equally distributed.

Before proceeding to determine the questionnaires' reliability, independent sample t-tests were run to determine if there were significant differences between the responses of those answering Form 1 from those answering Form 2. Three variables indicated significant mean differences ($p \leq .05$) within the conceptions of giftedness section. "Is undisciplined", "poor memory" and "is shy" yielded mean differences of 1.16, 1.0, and 1.13, respectively. For each of the three variables, those participants responding on Form 1 rated the variable as more characteristic of an ideally gifted individual than those participants responding on Form 2. For the conceptions of intelligence section, three different variables indicated significant mean differences ($p \leq .05$). "Achievement in math", "achievement in language arts" and "achievement in foreign language" yielded mean differences of 1.42, 1.71 and 1.36, respectively. Again, those participants responding on Form 1 rated each of the variables as more characteristic of an ideally intelligent person than those responding on Form 2. Based upon these sample findings, it does appear that if an individual is asked to think about the characteristics of an ideally gifted person first, they are slightly more likely to rank

certain negative factors and certain achievement factors as more characteristic of that individual than those who are asked to think about the characteristics of an ideally intelligent person first. It will be important to see if this finding holds up with a larger sample size.

Due to the small sample size, a factor analysis of the responses for conceptions of giftedness and intelligence could not be conducted. However, four scales were developed by the researcher based upon the behavioral characteristics scale developed by Joseph Renzulli and Robert Hartman (Renzulli & Hartman, 1971). The Renzulli/Hartman Scale for Rating Behavioral characteristics of Superior Students (SRBCSS) was selected for three reasons. First, it is considered to be the pre-eminent behavioral checklist for gifted education and the one from which other checklists are derived (Piirto, 1999). Secondly, the SRBCSS checklist has been adopted widely by public schools for use in identification of gifted students (Piirto, 1999). Third, identification criteria within Florida requires that students meet a "majority of characteristics on a behavioral checklist" (Florida State Board of Education Rule 6A-G.03019). An analysis previously conducted by the researcher indicated that a majority of Florida school districts either used the SRBCSS or a checklist derived from it (Taylor, 1996). For these reasons, the SRBCSS was deemed to be an appropriate instrument upon which to base this study's scale formation.

The SRBCSS is made up of four dimensions which are as follows: (1) learning, (2) motivation, (3) creativity, and (4) leadership. According to the researchers, the scales

> Were derived from a comprehensive review of the literature dealing with characteristics or traits of superior students. Research studies relating to each of the four dimensions of the instrument were searched and categorized in an effort to isolate observable behavioral characteristics which were supported by common agreement among well known contributors to the literature. For a scale item to be included in the instrument, it was necessary that at least three separate studies had called attention to the importance of a given characteristic (Renzulli, 1971, pp. 211 – 212).

Although the scales were originally developed in the early 1970's, they have remained unchanged by the original researchers throughout the 1990's (Rimm & Davis, 1996).

Reliability can be simply defined as how reproducible a survey instrument's data are (Litwin, 1995). Since the pretest questionnaire was administered only once, a measure of internal consistency was needed in order to calculate the instrument's reliability. Cronbach's alpha for each scale was calculated because it is the most widely used measure of internal consistency and because it is a conservative estimate of an instrument's reliability (Carmines & Zeller, 1979).

Conceptions of Giftedness

The Cronbach's alpha for the 14-item learning dimensions scale was .80 with corrected item-total correlations ranging between .22 and .57. For the 15-item motivation dimension scale, Cronbach's alpha was .84 with item to scale correlations ranging between .26 and .64. Cronbach's alpha for the 23-item creativity dimension scale was .85 with corrected item-total correlations ranging from .15 to .63. For the 25-item leadership dimension scale, Cronbach's alpha was .91 with item to scale correlations between .24 and .64.

Conceptions of Intelligence

The Cronbach's alpha for the 14-item learning dimensions scale was .84 with corrected item-total correlations ranging between .21 and .70. For the 15-item motivation dimension scale, Cronbach's alpha was .87 with item to scale correlations ranging between .32 and .63. Cronbach's alpha for the 23-item creativity dimension scale was .86 with corrected item-total correlations ranging from .22 to .66. For the 25-item leadership dimension scale, Cronbach's alpha was .94 with item to scale correlations between .27 and .77.

Nature of Intelligence

The reliability coefficient for this nine-item scale was .67 with item to scale correlations ranging from -.05 to .70.

Educational Goals

Cronbach's alpha was calculated for each of the three goals. The three-item conceptual goals scale indicated an internal consistency coefficient of .72

with item to scale correlations between .44 and .69. Cronbach's alpha for the four-item social adaptiveness goals scale was .77 with corrected item-total correlations ranging from .43 to .68. The five-item practical/academic scale indicated a Cronbach's alpha of .50 with item to scale correlations between .11 and .43.

Procedures

Administration of the questionnaire was conducted by the researcher during the first month of the Spring semester of 2001. Upon obtaining permission from the instructors of the various College of Education courses, questionnaires were distributed to the preservice teachers during class time. The researcher guided participants through the first page of the questionnaire which explained the purpose of the study and each of the five sections of the questionnaire. Although the questionnaire falls under the University of South Florida Institutional Review Board Exempt Category 2 requiring no consent form, a letter explaining the study was distributed to participants (see Appendix E). After the introduction to the study, participants were asked to complete the questionnaire and to turn it in to the researcher upon completion. Administration of the questionnaire took approximately 30 minutes.

During administration of the questionnaire, students were asked to volunteer if they were willing to schedule an interview with the researcher. It was explained that the interview could be scheduled at a time convenient for them and would entail a more indepth discussion about their conceptions of

intelligence and giftedness. Students who volunteered were contacted by phone to schedule an interview. All interviews took place in the researcher's office at the University of South Florida. All interviews were tape recorded and transcribed by the researcher. Each interview took approximately 30 - 45 minutes. Respondents were asked to complete a permission letter requested by the University of South Florida Institutional Review Board (Appendix E).

Although every effort was made to administer the questionnaire to courses with little student overlap, two courses did have some student overlap. Participants who had already completed the questionnaire in a previous class were asked to leave the room while their colleagues were administered the questionnaire.

Data Analysis

Before conducting any statistical analysis to address the research questions, a preliminary analysis of the data was conducted to determine the distributional properties of the variables. Frequency distributions and descriptive statistics were examined to determine the existence of outliers and data-entry errors. Since outliers can distort results, it was important to identify any anomalies within the data. Because several of the proposed statistical procedures within this study require a normal data distribution and homogeneity of variances, normal probability plots, skewness coefficients, and Levene's test for homogeneity of variance were calculated and examined.

What Are the Conceptions of Intelligence Among Preservice Teachers?

Two quantitative measures and one qualitative measure were used to address this question. According to Kim and Mueller (1978), exploratory factor analysis may be used "... as an expedient way of ascertaining the minimum number of hypothetical factors that can account for observed covariation" (p. 9). Factor analysis is a statistical technique designed to reduce the number of variables into a smaller number of factors by combining variables that are at least moderately correlated (Gall et al., 1996). A factor analysis of the 79 intelligence characteristics was conducted to identify possible factors. Individual variables were examined for violations of normality using the skewness and kurtosis coefficients. A correlation matrix was examined to make sure that at least some of the variables were correlated with one another. Both the Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were calculated. Both the Kaiser and scree rules were used to determine the appropriate number of factors. A varimax rotation was conducted for the factor analysis.

In order to address whether preservice teachers held an entity or incremental view of inteligence, the nine nature of intelligence variables were scored as zero or one using Lynott and Woolfolk's (1994) scoring schema. The mean of the nine variables was calculated to determine an entity view (mean closer to zero) or an incremental view (mean closer to one).

The interview data in which students were asked to identify someone they thought was intelligent and then to provide examples of why they thought that individual was intelligent were examined for themes or patterned regularities in the data (Wolcott, 1994). These themes were then analyzed to determine congruence with the factors developed through the factor analysis technique.

Are There Differences in Preservice Teachers' Conceptions of Intelligence Based upon Major, Sex and Race? A three-way analysis of variance (3 X 2 X 3) was conducted to address this question. In order to determine whether the assumption of normality was violated, normal probability plots and statistics were calculated and examined. To test the assumption of homogeneity of variances, Levene's test of homogeneity was calculated. Interaction effects and main effects for the three independent variables were examined. Tukey's HSD ("honestly significant difference") was used to determine which means are significantly different from each other. According to Diekhoff (1996), the Tukey HSD is a conservative test "that adjusts itself to counteract increases in Type I errors that would otherwise accompany increases in the number of pairwise comparisons" (p. 251).

The Nature of Intelligence scale was also examined to determine the impact of major, sex, and race. Normal probability plots and statistics were calculated to determine any violations of normality or homogeneity of variances. A three-way ANOVA (3 X 2 X 3) was conducted for the Nature of Intelligence scale. Interaction and main effects were examined.

What are the Conceptions of Giftedness Among Preservice Teachers?

A factor analysis of the 79 giftedness characteristics was conducted to address this question. Individual variables were examined for violations of normality using the skewness and kurtosis coefficients. A correlation matrix was examined to make sure that at least some of the variables were correlated with one another. Both the Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were calculated. Both the Kaiser and Scree rules were used to determine the appropriate number of factors. A varimax rotation was conducted for the factor analysis.

The interview data in which students were asked to identify someone they thought was gifted and then to provide examples of why they thought that individual was gifted were examined for themes or patterned regularities in the data (Wolcott, 1994). These themes were then analyzed to determine congruence with the factors developed through the factor analysis technique.

Are There Differences in Preservice Teachers' Conceptions of Giftedness Based upon Major, Sex and Race? A three-way analysis of variance (3 X 2 X 3) was conducted to address this question. In order to determine whether the assumption of normality was violated, normal probability plots and statistics were calculated and examined. To test the assumption of homogeneity of variances, Levene's test of homogeneity was calculated. Interaction effects and main effects for the three independent variables were examined. Tukey's HSD

("honestly significant difference") was used to determine which means are significantly different from each other.

What Correlation Exists Between Preservice Teachers Conceptions of Intelligence and Giftedness?

A correlation analysis was used to address this question. Scatterplot data were examined to determine linearity and homoscedasticity. The Pearson product moment correlation was calculated and examined to determine relationships between the variables.

What Correlations Exist Between Preservice Teachers' Conceptions of Intelligence and Certain Educational Goals? And Between Their Conceptions of Giftedness and Certain Educational Goals?

The twelve educational goals variables were examined for violations of the normality assumption through the use of skewness and kurtosis coefficients. A principal axis factor analysis with varimax rotation was conducted to determine whether a factor analysis would yield the same dimensions as Lynott and Woolfolk's (1994) original study. Although the factor analysis did not match Lynott and Woolfolk's (1994) study, their dimensions were selected for analysis. In order to address the question, a correlation analysis was examined to determine relationships between the variables. A multiple linear regression was conducted using the intelligence factors (and giftedness factors) as independent variables and the educational goals as dependent factors. Histograms of the standardized residuals for each of the dependent variables by each of the

independent variables were examined to determine whether the assumption of normality or equality of variances was violated. Stepwise regression analysis was conducted for each of the educational goal factors. Norusis (1994) notes that stepwise regression is the most commonly used regression model.

Limitations

The most significant limitation for this study is the use of a convenience sample. It is generally preferred that some form of a random sampling procedure be utilized in order to generalize the sample results to the larger population. According to Henry (1990), convenience samples add uncertainty to the generalizability of the sample results and can be influenced by confounding variables; therefore, the "credibility of the findings is also at risk" (p. 24). Gall et al. (1996) also caution the use of convenience samples. They do note, however, that inferential statistics can be used if the sample is "carefully conceptualized to represent a particular population" (p. 229). Although the courses in which the questionnaire was administered covered a cross-section of the three subgroups, the results of the study must be interpreted with caution. Unintentional bias may result from the willingness of each instructor to allow administration of the questionnaire or not.

Another limitation is the study's heavy reliance upon gathering data through a questionnaire. While quantitative measures provide a picture of the phenomena being studied, it is but one method for collecting information about the phenomena. In addition, quantitative measures may not provide as rich an

understanding as other less quantitative measures such as interviews or focus groups. Although this study included a small sample of face-to-face interviews with preservice teachers, additional interviews could have provided a more detailed and fuller understanding of preservice teachers conceptions of intelligence and giftedness.

Chapter Summary

This chapter has explained the proposed research design, selection of participants, instrumentation, procedures and data analysis for this study. Using a descriptive, exploratory design this study assessed preservice teachers' conceptions of intelligence and giftedness. Although research exists that indicates how one conceptualizes intelligence impacts how one sees another's intelligence (Sternberg et al, 1981) and that how a teacher views intelligence impacts his or her preference for certain educational goals (Lynott & Woolfolk, 1994), little research in this area has focused on preservice teachers. The researcher believes that this study makes a contribution to the field by illuminating how preservice teachers' conceptualize intelligence and giftedness and how various demographic characteristics relate to preservice teachers' conceptualizations.

Chapter Four

Results

The purpose of this study was three-fold: (1) to examine preservice teachers' conceptions of intelligence and giftedness in relation to demographic factors; (2) to examine the relationship between preservice teachers' conceptions of intelligence and giftedness; and, (3) to examine how conceptions of intelligence or giftedness correlated with certain educational goals. This chapter begins with a description of the sample and then presents the results of the data analysis used to address each research question.

Sample Demographics

Instructors of twenty undergraduate courses in the College of Education were contacted by email asking for permission to administer the research questionnaire in their course. The courses included a broad spectrum of classes offered to preservice teachers in elementary education, secondary education and special education. Sixteen instructors responded with 12 providing access, three denying access and one indicating the course had been cancelled. The questionnaire was administered in the 12 classes in which the instructor granted access to the course. These courses included the following (1) both sections of the internship orientation provided to all education interns; (2) an elementary

section of Integrating Exceptional Students in Regular Education; (3) a secondary section of Integrating Exceptional Students in Regular Education; (4) one section of Clinical Teaching in Special Education; (5) one section of Behavior Management in Special Education; (6) the only section of Introduction to Mental Retardation; (7) two sections of Foundations of Special Education, one offered to special education majors and one offered to elementary education majors; (8) the only section of Adolescent Literature for Secondary Education; and, (9) one combined elementary education section of Literature for the Intermediate Grades and Teaching Methods in Elementary Education. Courses were selected to minimize overlap of students. Before administering the questionnaire, students were asked if they had been in another class in which the questionnaire was administered. If they answered affirmatively, the students were asked to leave the room and return when the administration was complete for their class. The only class in which overlap did occur was for both sections of Integrating Exceptional Students in the Regular Classroom. Several students were simultaneously enrolled in their final internship and this course. These students had completed the questionnaire during the internship orientation.

Five hundred seventy-five questionnaires were distributed to students in the 11 classes. Five hundred sixty-seven (99%) were returned completed. Early childhood majors made up 8.6% (n=49) of the sample, elementary education majors 41.3% (n=234), physical education majors 4.1% (n=23), special education majors 24.2% (n=135) and secondary education majors 20.6% (n=117). These

percentages roughly equal the overall proportion of students in the College of Education. Females comprised 83.6% of the sample (n=474) and males made up 15.3% (n=87). One percent of the respondents did not answer this question (n=6). Based on the College of Education's overall demographics, males were slightly underrepresented in the sample (15.3% vs. 20%) and females were slightly over-represented (83.6% vs. 80%). Median age for the sample was 23 with a range between 19 and 59. The sample's median age was slightly younger than the median age of 26 for the College of Education. European-Americans constituted 75.9% (n=434) of the sample, while African-Americans made up 11.5% (n=65), those of Hispanic origin comprised 6.9% (n=39), and other minorities 1.5% (n= 9). Eleven individuals (1.9%) indicated they were of a mixed race descent and 13 respondents (2.3%) provided no racial origin information. These percentages roughly equal the overall racial profile reported by the College of Education with African-Americans slightly over-represented (11.5% sample vs. 8% college) and those of Hispanic origin slightly underrepresented (6.9% sample vs. 8% college). Because this study was originally designed to look at three majors (i.e., elementary, secondary and special education) early childhood and elementary education majors were combined while physical education majors were eliminated. In addition, because the study was designed to examine three races (i.e., African-American, European-American, and Hispanic-American), individuals who indicated they were of mixed racial origin, and individuals who fell into the other racial category were eliminated from the

analysis. Approximately 10% of the sample was excluded from analysis resulting in a final sample size of 513.

Frequency distributions and boxplots for all individual variables were examined for data-entry errors. Seven errors were identified. The questionnaires associated with the data-entry errors were examined and corrections were made. Subsequent frequency distributions and boxplots yielded no additional errors.

During administration of the questionnaire, the researcher asked for volunteers to participate in face-to-face interviews about intelligence and giftedness. Seven preservice teachers volunteered to be interviewed, however, two later opted not be interviewed. Five preservice teachers, four females and one male, were interviewed by the researcher. Their ages ranged from 21 to 31; two were European-American, one was Hispanic and two were African-American. An emergent interview protocol was used which provided some standard interview questions (Appendix F), but allowed the researcher to probe responses in an appropriate contextual manner.

Data Analysis

What Are the Conceptions of Intelligence Among Preservice Teachers?

To address this question an exploratory factor analysis was conducted. Before conducting the analysis, the 79 separate intelligence variables were examined for violations of normality. Diekhoff (1996) advises that variables with skewness coefficients more extreme than -0.5 and +0.5 should be interpreted

cautiously when conducting statistical analysis requiring an assumption of normality. Skewness and kurtosis coefficients were examined for the 79 intelligence variables. Thirty-five (44%) of the intelligence variables had a skewness coefficient more extreme than -0.5 and + 0.5. Four variables (5%) had skewness coefficients more extreme than -1.0 or +1.0. The four variables were "can think logically" (Sk = -1.22), "is intellectually curious" (Sk = -1.09), "is verbally unskilled" (Sk = 1.07), and "enjoys learning" (Sk = -1.03). Twenty-eight (35%) of the intelligence variables had kurtosis coefficients more extreme than -0.5 or +0.5. Two variables (3%), "can think logically" and "is intellectually curious," had coefficients of -1.22 and -1.24 respectively indicating a platykurtic distribution.

Two variables were recoded to more accurately reflect characteristics associated with intelligence. These two variables were "verbally unskilled" and "poor memory". Both variables were recoded so that previously low scores became high scores and vice versa. These two recoded variables will be referred to as "verbally skilled" and "good memory".

In order for a factor analysis to effectively group variables into factors some of the variables must be correlated with each other. An examination of the correlation matrix of the 79 variables relating to conceptions of intelligence showed that all variables were related to at least one other variable with a correlation coefficient of greater than .30. Bartlett's test of sphericity was used to test the hypothesis that the correlation matrix was an identity matrix with all

variables perfectly correlated to themselves and no variable correlated to another variable. This hypothesis was rejected (Bartlett's test of sphericity = 25,902.915, $p < .001$). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was examined to compare the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. The KMO will be small if variables do not share common factors, hence, the larger the KMO the better for a factor analysis. The KMO for the 79 variables related to conceptions of intelligence was 0.95. According to Kaiser (1974) a KMO in the 0.90's is excellent.

Having met the criteria for conducting an exploratory factor analysis, a principal component analysis was used to determine the number of components or factors. Stevens (1996) notes that the most widely used criterion for determining the number of components in a factor analysis is the Kaiser rule which posits that only components with eigenvalues greater than 1 should be used. Thirteen factors met this criterion accounting for 62.9% of the variance in the data. In keeping with the research by Sternberg et al. (1981) and Lynott and Woolfolk (1994) a varimax rotation was conducted for the 13 factors. An examination of the 13 factors yielded little significant information with only three factors having 10 or more items loading at .40 or above.

According to Stevens, (1996), with an $N > 250$ and a mean communality $\geq$ .60, either the Kaiser or scree rules can apply for determination of the number of factors. The results of the scree test showed that three to five factors could be

considered to explain the data. Three factors could explain approximately 45% of the variance whereas four could explain approximately 48% and five approximately 51%. Both of the criteria for using a Scree test were met (M = .64 N = 498) and it was decided to use the Scree test to determine the number of factors.

A varimax rotation was conducted for the three factor, four factor and five factor models. Although the three factor model provided the most compact analysis, the three factors were difficult to interpret. Variables such as "has a high drive level", "has precise ideas about the future", "is headstrong", and "shows extraordinary achievement in foreign language" were grouped together. The four factor model separated these variables out, but combined factors that could be associated with leadership, such as "is popular with classmates", with factors that could be associated with creativity, such as "is creative". The five factor model provided the most interpretable results. The five factors can be interpreted as social adaptiveness, learning/motivation, leadership, academic, and creativity (Table 1). The social adaptiveness factor included such variables as "is irritable", "has few social contacts", "is egotistical", and "likes to work alone". The learning/motivation factor included "pursues goals persistently", "enjoys learning", "is ambitious" and "is intellectually curious". Variables that loaded on the leadership factor included " is popular", "is flexible", "helps classmates", and "is honest". The academic factor included all variables that began with "shows extraordinary achievement in" some academic subject such

Table 1

Factor loadings for intelligence variables from varimax rotation

	ISocAdap	ILrnMotv	ILeader	IAcad	ICreate
Is irritable	0.78				
Is immature	0.75				
Is humorless	0.74				
Is unmanageable	0.72				
Has few social contacts	0.72				
Is a tattletale	0.72				
Shows behavior disorders	0.71				
No interest social activities	0.70				
Is often sick	0.68				
Is intolerant	0.68				
Is egotistical	0.68				
Is a poor loser	0.67				
Disturbs teachers lessons	0.65				
Is boastful	0.64				
Is neurotic	0.63				
Is shy	0.62				
Prefers to work alone	0.61				
Tries too hard to conform	0.61				
Is younger	0.58				
Is distractible	0.58				
Is undisciplined	0.57				
Is aggressive	0.57				
Prefers to be inconspicuous	0.56				
Verbally skilled*	-0.54				
Is precocious	0.54				
Good memory*	-0.54				
Is dominant	0.51				
More mature mentally	0.50				
Difficult to influence	0.38				
High drive level		0.77			
Pursues goals persistently		0.75			
Is confident		0.72			

(Continued on next page)

Table 1 (Continued)

	lSocAdap	lLrnMotv	lLeader	lAcad	lCreate
Is a perfectionist		0.71			
Highly motivated		0.69			
Enjoys learning		0.69			
Is ambitious		0.67			
Intellectually curious		0.64			
Likes intellectual games		0.62			
Is self-assured		0.61			
Works easily under pressure		0.61			
Argues effectively		0.60			
Precise ideas about the future		0.59			
Likes to read		0.56			
Undertakes tasks willingly		0.55			
Is competitive		0.54			
Is independent		0.53			
Asks many questions		0.51			
Prefers discussions w/adults		0.51			
Quick intellectual grasp		0.51			
Is self-critical		0.49			
Is headstrong		0.49			
Agrees with adults		0.48			
Can withstand stress		0.47			
Choosy about friends		0.46			
Thinks logically		0.45			
Finds unusual ways to solve problems		0.45			
Is playful			0.75		
Is vivacious			0.71		
Is popular			0.69		
Is spontaneous			0.65		
Is flexible			0.65		
Excels in sports			0.63		
Helps classmates			0.55		
Pursues a hobby intensely			0.49		
Sets the tone			0.49		
Is sensitive			0.48		
Thinks s/he something special			0.44		

(Continued on next page)

Table 1 (Continued)

	lSocAdap	lLrnMotv	lLeader	lAcad	lCreate
Prefers unstructured tasks			0.43		
Is honest			0.42		
Extraordinary achievement in music				0.75	
Extraordinary achievement in foreign language				0.72	
Extraordinary achievement in art				0.71	
Extraordinary achievement in language arts				0.65	
Extraordinary achievement in in math				0.61	
Is gifted*				0.43	
Is creative					0.70
Has great imagination					0.65
Shows originality					0.63
Is full of ideas					0.57

Note. lSocAdap = social adaptiveness factor; lLrnMotv = learning/motivation factor; lLeader = leadership factor; lAcad = academic factor; lCreate = creativity factor; *variables were moved to learning/motivation factor.

as foreign language or math. The creativity factor included the following variables, "is creative", "has great imagination", "show originality" and "is full of ideas".

Three variables loaded on to the social adaptiveness factor that did not theoretically fit. These variables included "verbally skilled", "precocious", and "good memory". All three seem more characteristic of the learning/motivation factor in that all three refer to some aspect of learning. In addition, one variable "is gifted" loaded on to the academics factor. An examination of this factor indicated that with the exception of "is gifted" all variables were related to "shows extraordinary achievement" in some subject matter such as math or foreign language. The variable "is gifted" also seems more characteristic of the learning/motivation factor. All four variables were moved to load on the learning/motivation factor for further analysis. Table 1 provides the factor loadings for the five factor model.

An examination of the means of the five factors indicates that the creativity factor is ranked the most characteristic of intelligence by preservice teachers (Table 2). This is followed by the learning/motivation factor, the academics factor, the leadership factor and the social adaptiveness factor. The mean of the variables associated with each factor was calculated in order to create the factor variables. In order for a score to be computed for that factor, at least 50% of the individual variables needed to have data present. For example, the mean score

Table 2

Descriptive statistics for intelligence factors

	N	M	SD	Min	Max	Range	Skew	Kurt
Creativity	512	6.40	1.44	1.20	9.00	7.80	-0.44	-0.13
Learning/ motiv.	512	6.24	1.13	2.20	9.00	6.80	-0.52	0.42
Academics	512	5.52	1.61	1.00	9.00	8.00	-0.25	0.40
Leadership	511	5.07	1.34	1.00	9.00	8.00	-0.54	0.35
Social adapt.	510	3.76	1.34	1.00	9.00	8.00	-0.03	-0.13

Note. Scores range between 1 as least characteristic to 9 as most characteristic. Kurt = Kurtosis.

of the six variables that comprised the academics factor would only be calculated if at least three (≥ 50%) of the six contained data.

Nature of intelligence. In order to assess whether preservice teachers had an entity or incremental view of intelligence, the nine nature of intelligence variables were scored as either zero (entity view) or one (incremental view). Since the instrumentation for this section followed Lynott and Woolfolk's (1994) instrumentation, their classification schema was used to classify the variables as either entity or incremental (see Appendix C). The closer to one the score, the more incremental the view of intelligence. The data were negatively skewed (Sk = -1.22) and leptokurtic (kurtosis = 1.15). Cronbach's alpha for this scale was

.56. Overall, preservice teachers were more supportive of the incremental view of intelligence than the entity view ($M = 0.84$, $SD = 0.17$).

Interview responses for conceptions of intelligence. During the interviews with the preservice teachers, leadership ability came across as one of the most prominent factors for their conceptualizations of intelligence. When the students were asked to think about someone they considered to be intelligent and then provide examples of why they thought that person was intelligent, three of the five mentioned some aspect of leadership ability. For example, one of the students described President Clinton as having leadership ability in being able to "do things as President that other Presidents, in my lifetime, weren't able to do". The other leadership examples included a high-school ROTC instructor and the mother of one of the interviewees who was an accomplished business executive.

The factor that came across next was social adaptiveness. Two of the preservice teachers noted examples that included some element of social adaptability. For example, one student stated that "I've never seen him in a position where he didn't know what to do or how to react or was at a loss for words.... He just has a natural ability to be able to deal with situations". Only one other student echoed this student's emphasis on natural ability and intelligence by noting that "she has the natural ability to communicate with people, with others well". The other two examples of intelligence included an eight-year-old niece who was doing well in school and a father who was a mechanic.

The preservice teachers were also asked to describe the physical characteristics of the examples they noted. Two students identified European-American males in their 50's, one student identified an African-American female who was a child, one identified a Hispanic male in his 50's, and one identified an European-American female in her 40's. With the exception of one African-American preservice teacher, students identified an example of an intelligent individual who reflected their own ethnicity. Two of the female students identified females and two identified males. The one male student identified a male as well.

Instrument reliability for intelligence variables. Reliability coefficients were examined for two sets of factors, those that were created through the factor analysis procedure and those that were user developed using the Renzulli/Hartmann Scale for Rating Behavioral Characteristics of Superior Students (SRBCSS). The five factors created through the factor analysis procedure are social adaptiveness, learning/motivation, leadership, academics and creativity. The four factors created using the SRBCSS are learning, motivation, creativity and leadership. Cronbach's alpha for each scale was calculated as a measure of internal consistency.

The Cronbach's alpha for the 26-item social adaptiveness factor was .95 with corrected item-total correlations ranging between .43 to .78. For the 31-item learning/motivation factor (including the four variables assigned to this factor) the Cronbach's alpha was .94 with corrected item-total correlations ranging between

.09 and .75. The 13-item leadership factor had a Cronbach's alpha of .90 with corrected item-total correlations ranging between .51 and .72. The five-item academic factor's Cronbach's alpha was .87 with corrected item-total correlations between .60 to .74. The Cronbach's alpha for the five-item creativity factor was .87 with corrected item-total correlations ranging between .53 to .83. In addition, the Cronbach's alpha was calculated for the learning/motivation scale without the four assigned variables. The difference was negligible with the Cronbach's alpha including the assigned variables .94 and the Cronbach's alpha without the assigned variables .95 (Table 3).

In keeping with the terminology used by Renzulli and Hartman (1971), the factors will be referred to as dimensions. An examination of the dimensions created using the Renzulli/Hartmann scale yielded the following: (1) Cronbach's alpha for the 14-item learning dimension, developed using the Renzulli/Hartmann scale, was .85 with corrected item-total correlations between .33 to .61; (2) the 16-item motivation dimension's Cronbach's alpha was .89 with corrected item-total correlations between .34 to .66; (3) the Cronbach's alpha for the 23-item creativity dimension was .87 with corrected item-total correlations between .31 to .54; (4) the 25-item leadership dimension's Cronbach's alpha was .92 with corrected item-total correlations between .17 to .68. These reliability coefficients are roughly equivalent to those developed through the pilot study. Cronbach's alpha for the pilot study was .84 for the learning dimension, .87 for the motivation dimension, .86 for the creativity dimension and .94 for the leadership dimension.

Table 3

Reliability analysis for intelligence factors

Procedure	Factor	Cronbach's alpha	# of items	Range of item to total correlations
Factor analysis procedure				
	Social adaptiveness	.95	27	.43 to .78
	Learning/motivation	.94	30	.09 to .75
	Leadership	.90	13	.51 to .72
	Academic	.87	5	.60 to .74
	Creativity	.87	5	.53 to .83
User developed factors using SRBCSS				
	Learning dimension	.85	14	.33 to .61
	Motivation dimension	.89	16	.34 to .66
	Creativity dimension	.87	23	.31 to .54
	Leadership dimension	.92	25	.17 to .68
Pilot information				
	Learning dimension	.84	14	.21 to .70
	Motivation dimension	.87	16	.32 to .63
	Creativity dimension	.86	23	.22 to .66
	Leadership dimension	.94	25	.27 to .77

Note: SRBCSS = Scale for rating the behavioral characteristics of superior students. Sample size for factor analysis and user developed procedures was 498. Sample size for the pilot was 53.

Comparison of the two models showed the creation of one entirely new factor through the factor analysis procedure. The social adaptiveness factor was not a separate factor in the model developed using the Renzulli/Hartmann scale. However, the variables hang together so well that it appears to be a theoretically sound factor which incorporates a variety of social adaptability measures. Some overlap between the other factors does occur. Fifty-two percent of the items on the learning/motivation factor are items associated with the learning dimension

on the Renzulli/Hartmann scale. Fifty-four percent of the items on the leadership factor are items associated with the leadership dimension. All of the items on the creativity factor are items associated with the creativity dimension on the Renzulli/Hartmann scale.

Are There Differences in Preservice Teachers' Conceptions of Intelligence Based upon Major, Sex and Race?

In order to address this question, a three-way (3 X 2 X 3) ANOVA was conducted. Before conducting an ANOVA, three assumptions must be met: (1) the samples should come from populations that are normally distributed; (2) the samples being compared should have approximately equal variances; and (3) the observations are independent. These assumptions were examined for each factor by each independent variable.

Major. An examination of normal probability plots and statistics for the five intelligence factors yielded some minor violations of normality for all five factors. Lilliefors (K-S) test indicated statistically significant ($p < .05$), although small, violations of normality for the elementary education majors in the social adaptiveness factor (K-S = 0.06), learning/motivation (K-S = 0.06), leadership (K-S = 0.07), creativity (K-S = 0.06) and the academic factor (K-S = 0.06). Violations of normality were noted for special education majors in the leadership factor (K-S = 0.09). No violations of normality were found for secondary education majors.

To test the assumption of homogeneity of variances, Levene's test of homogeneity was calculated. With the exception of the social adaptiveness factor (Levene's test = 3.11, $p < .05$), none of the factors yielded significantly different variances. Although ANOVA is robust to violations of normality and homogeneity of variances, findings should still be interpreted with caution.

Sex. Normal probability plots and statistics were calculated to determine any violation of the assumption of normality. Several violations of normality were detected. Lilliiefors (K-S) test indicated statistically significant ($p < .05$), although weak, violations for female students for the academic factor (K-S = 0.06), creativity factor (K-S = 0.05), leadership factor (K-S - 0.06), learning/motivation factor (K-S = 0.06) and the social adaptiveness scale (K-S = 0.06). Statistically significant ($p < .05$) violations of the normality assumption for male students were not found. Levene's test of homogeneity of variances indicated a statistically significant difference of variances for the academic factor (Levene's = 4.14, $p < .05$). Although ANOVA is robust to violations of normality and homogeneity of variances, findings should still be interpreted with caution.

Race. The normality assumption for the five intelligence factors indicated several weak, although significant ($p < .05$) violations. Lilliefore's (K-S) test indicated violations for European-Americans for the academic factor (K-S = .06), leadership factor (K-S = .07), and the learning/motivation factor (K-S = .05). There were no significant violations for Hispanics or African-Americans for any of the five factors. Levene's test of homogeneity of variances yielded no significant

results, therefore, the assumption of homogeneity of variances was not violated. Again, although ANOVA is robust to violations of normality, findings should still be interpreted with caution.

ANOVA analysis. A three-way ANOVA (3 X 2 X 3) was conducted to determine the interaction effects of the three independent variables (i.e., major, sex, race) on each of the five dependent variables (i.e., social adaptiveness, learning/motivation, leadership, creativity, academic) separately (see Table 4). It is important to examine interaction effects since their existence may hide main effects. Of the 18 cells, one was emtpy. No male elementary majors of Hispanic descent were included in the sample (Table 4).

The three-way ANOVA did not yield any statistically significant two or three-way interaction effects for the social adaptiveness factor. Since no significant interaction was noted, the main effects for each of the independent variables could be tested individually (see Table 5). Main effects were present for race $F(3, 2) = 3.08$, $p < .05$ and sex F $(3, 1) = 4.60$, $p < .05$. Tukey's HSD ("honestly significant difference") indicated that the differences in means between European-Americans and African-Americans were statistically significant at the .05 level. European-Americans ranked this factor significantly lower than African-Americans ($M = 3.71$, $SD = 1.33$; $M = 4.19$, $SD = 1.44$, respectively). Male preservice teachers rated the social adaptiveness factor higher than their female peers ($M = 4.11$, $SD = 1.43$; $M = 3.70$. $SD = 1.32$, respectively). There was no statistically significant main effect for major.

Table 4

Intelligence factors by major, race and sex.

Major	Race	Sex	N	M	SD	Skew	Kurtosis
Academics factor							
Elementary	African-American	Male	1	6.20	0	0	0
		Female	32	5.77	1.70	-.38	.20
	European-American	Male	7	5.00	1.24	-1.80	4.45
		Female	213	5.52	1.70	-.18	.26
	Hispanic	Male	0				
		Female	20	5.44	1.42	-1.64	4.11
Secondary	African-American	Male	4	6.60	1.10	-1.70	2.92
		Female	5	5.64	1.20	1.28	2.31
	European-American	Male	28	5.87	1.57	-1.22	2.24
		Female	64	5.41	1.93	-.20	-.30
	Hispanic	Male	1	2.40	0	0	0
		Female	10	6.04	1.10	.71	-.81
Special Ed.	African-American	Male	9	5.19	1.29	-1.09	.23
		Female	12	5.38	1.42	1.61	3.35
	European-American	Male	10	5.90	1.07	-.15	.03
		Female	88	5.31	1.34	-.18	.90
	Hispanic	Male	3	6.27	1.33	1.69	0
		Female	4	5.75	1.48	1.17	1.21
Leadership factor							
Elementary	African-American	Male	1	6.23	0	0	0
		Female	32	5.44	4.18	-.12	.10
	European-American	Male	7	4.95	.57	.54	.09
		Female	212	5.10	1.40	-.62	.58
	Hispanic	Male	0				
		Female	20	4.90	1.39	-.16	-1.08

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Table 4 (Continued)

Major	Race	Sex	N	M	SD	Skew	Kurtosis
Secondary	African-American	Male	5	5.35	1.39	-.84	-.24
		Female	4	5.45	.37	.34	-1.07
	European-American	Male	28	4.70	1.39	-.56	-.23
		Female	64	4.88	1.39	-.45	-.52
	Hispanic	Male	1	4.85	0	0	0
		Female	10	5.46	1.29	-.50	-.70
Special Ed.	African-American	Male	9	5.43	1.25	-2.06	5.11
		Female	12	4.76	1.71	-.90	.55
	European-American	Male	10	5.35	1.16	.42	-.74
		Female	88	5.05	1.27	-.27	.49
	Hispanic	Male	3	5.08	.23	0	0
		Female	4	5.17	.78	.49	-2.07
Learning motivation factor							
Elementary	African-American	Male	1	6.90	0	0	0
		Female	32	6.45	1.01	-.02	-1.10
	European-American	Male	7	6.07	.77	-.35	-1.42
		Female	213	6.24	1.22	-.61	.40
	Hispanic	Male	0	0	0	0	0
		Female	20	6.18	1.18	.15	-1.00
Secondary	African-American	Male	4	6.59	.93	-1.67	3.02
		Female	5	7.07	1.47	-.55	.23
	European-American	Male	28	6.12	.93	-.31	.41
		Female	64	6.21	1.03	-.48	1.50
	Hispanic	Male	1	6.20	0	0	0
		Female	10	6.53	.99	-.55	.04
Special Ed.	African-American	Male	9	6.27	1.06	-.29	-1.19
		Female	12	6.00	1.71	-.63	-.16
	European-American	Male	10	6.12	.98	-.42	1.72

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Table 4 (Continued)

Major	Race	Sex	N	M	SD	Skew	Kurtosis
		Female	88	6.17	1.12	-.57	.12
	Hispanic	Male	3	6.28	.51	-.77	0
		Female	4	6.53	1.05	-.95	-.01
Creativity factor							
Elementary	African-American	Male	1	8.00	0	0	0
		Female	32	6.31	1.20	-.60	.60
	European-American	Male	7	6.20	1.03	-.28	-2.33
		Female	213	6.26	1.52	-.37	-.14
	Hispanic	Male	0				
		Female	20	6.44	1.48	.02	-1.03
Secondary	African-American	Male	4	7.00	1.05	0	-5.64
		Female	5	6.20	2.38	-.63	-1.97
	European-American	Male	28	6.90	1.16	-.41	-.39
		Female	64	6.71	1.41	-.62	.67
	Hispanic	Male	1	4.60			
		Female	10	7.22	.80	-.29	-.59
Special Ed.	African-American	Male	9	6.38	1.09	-.52	-.17
		Female	12	6.02	1.43	.38	-1.33
	European-American	Male	10	6.23	1.41	-1.34	1.12
		Female	88	6.32	1.45	-.42	-.50
	Hispanic	Male	3	6.20	.35	1.73	0
		Female	4	6.50	1.67	-1.03	2.10
Social adaptiveness factor							
Elementary	African-American	Male	1	2.59	0	0	0
		Female	32	4.07	1.45	.32	.84
	European-American	Male	7	4.45	.73	-.16	.31
		Female	213	3.68	1.35	.09	.01
	Hispanic	Male	0				

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Table 4 (Continued)

Major	Race	Sex	N	M	SD	Skew	Kurtosis
		Female	20	3.49	1.40	-.19	-1.37
Secondary	African-American	Male	4	5.58	1.17	.91	-.05
		Female	5	4.30	1.46	.40	-1.14
	European-American	Male	28	3.67	1.43	-.47	-.91
		Female	64	3.51	1.24	-.41	-.66
	Hispanic	Male	1	4.22	0	0	0
		Female	10	3.20	1.25	.03	-1.27
Special Ed.	African-American	Male	9	4.56	1.20	-.07	1.18
		Female	12	3.92	1.57	-.53	-.48
	European-American	Male	10	3.90	1.36	.09	-.95
		Female	88	3.75	1.24	.11	-.04
	Hispanic	Male	3	5.24	.22	1.51	0
		Female	4	4.69	.31	.04	-5.65

Table 5

Analysis of variance for intelligence factors

Source	df	*F*	
		Social Adaptiveness	Creativity
Major (M)	2	1.28	4.09*
Race (R)	2	3.08*	0.27
Sex (S)	1	4.60*	0.14
M x R	4	1.50	0.44
M x S	2	0.09	0.06
R x S	2	0.31	1.54
M x R x S	3	1.36	0.83

Note.: * $p < .05$, n = 511.

The three-way ANOVA did not yield any statistically significant interaction effects for the creativity factor. A statistically significant main effect was noted for major F (3, 2) = 4.09, $p < .05$. The Tukey-HSD indicated significant differences in means between secondary education majors and special education majors as well as between secondary majors and elementary education majors. Secondary education majors (M = 6.77, SD = 1.38) ranked the creativity factor significantly higher than either their elementary (M = 6.32, SD = 1.47) or special education (M

= 6.26, *SD* = 1.45) peers. Main effects for race and sex were not statistically significant.

The three-way ANOVA did not yield any statistically significant interaction or main effects for the learning/motivation factor, the leadership factor, or the academic factor.

Nature of intelligence ANOVA analysis

Normal probability plots and statistical tests were conducted to determine any violations of the assumptions of normality and homogeneity of variances. Major indicated a weak, but statistically significant ($p < .001$) violation of the normality assumption for elementary (K-S = .20), secondary (K-S = .20), and special education (K-S = 15). Levene's test of homogeneity did not yield a statistically significant finding. Violations of the normality assumption were indicated for African-Americans (K-S = 0.16, $p < .001$), European-Americans (K-S = 0.18, $p < .001$), and for Hispanics (K-S = 0.20, $p < .001$). Levene's test of homogeneity was statistically significant (Levene's = 3.14, $p < .05$), therefore, the assumption of homogeneity of variances was violated. There were no violations of either normality or homogeneity of variances for sex. Although ANOVA is robust to violations of normality and homogeneity of variances, findings should still be interpreted with caution.

A three-way (3 X 2 X 3) ANOVA was conducted for the Nature of Intelligence scale. No statistically significant interaction effects were indicated. The main effect for sex was statistically significant F (3, 1) = 10.92, $p < .001$.

Female students (M = .86, SD = .16) were significantly more likely to favor an incremental view of intelligence than their male counterparts (M = .76, SD = .20).

What Are the Conceptions of Giftedness Among Preservice Teachers?

In order to address this question, an exploratory factor analysis was conducted. In order to assess violations of normality, the 79 giftedness variables were examined. Twenty-six (33%) of the gifted variables had skewness coefficients more extreme than -0.5 or +0.5. Four variables (5%) had values more extreme than ± 1.0. These four variables were "can think logically" (Sk = -1.08), "is intellectually curious" (Sk = -1.28), "has a poor memory" (Sk = 1.04), and "is intelligent" (Sk = -1.31). Thirty-four (43%) of the gifted variables had kurtosis coefficients more extreme than ± 0.50. Two variables (3%), "is intellectually curious" and "is intelligent", had coefficients of 1.63 and 1.62, respectively indicating a leptokurtic distribution. Because of the violation of the assumption of normality for these variables additional statistical procedures must be interpreted with caution. Two variables were recoded to more accurately reflect characteristics associated with giftedness. These two variables were "verbally unskilled" and "poor memory". Both variables were recoded so that previously low scores became high scores and previously high scores became low scores. These two recoded variables will be referred to as "verbally skilled" and "good memory" in subsequent analysis.

In order to determine if at least some of the variables were correlated with each other, the correlation matrix for the 79 gifted variables was examined. Each

of the variables was related to at least one other variable with a correlation coefficient more extreme than ± 0.30. Bartlett's test of sphericity was large (Bartlett's = 24,422.30, $p < .001$) so the null hypothesis that the correlation matrix was an identity matrix could be rejected. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was examined to compare the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. The KMO will be small when variables do not share common factors, therefore, the larger the KMO the better for a factor analysis. The KMO for the 79 gifted variables was 0.95. According to Kaiser, (1974) a KMO in the 0.90's is excellent.

Having met the criteria for conducting a factor analysis, a principal components analysis was used to determine the number of factors. According to Stevens (1996), the most widely used criterion for determining the number of factors is the Kaiser rule which posits that only factors with eigenvalues greater than one should be used. Thirteen factors met this criterion accounting for 64% of the variance in the data. In keeping with the research by Sterberg et al. (1981) and Lynott and Woolfolk (1994) a varixmax rotation was conducted for the 13 factors. An examination of the 13 factors yielded little significant information with only three factors having 10 or more items loading at .40 or above.

Stevens notes that with an $N > 250$ and a mean communality $\geq .60$, either the Kaiser or scree rules can be used for determining the number of factors. The results of the Scree test indicated that four factors explained approximately 49%

of variability in the data. Since both of the criteria for using a Scree test were met ($M = 0.64$ $N = 479$), a four factor model was calculated.

A varimax rotation was conducted for the four factor model. An examination of the pattern of factor loadings for the variables showed the emergence of four distinct factors: social adaptiveness, learning/motivation, leadership, and academics. As can be seen in Table 6, the social adaptiveness factor included variables such as "is irritable", "is dominant", and "no interest in social activities". However, this factor also included two variables "verbally skilled" and "good memory" that resulted in negative factor loadings. Both of these variables are more theoretically aligned with learning and were reclassified into the learning/motivation factor for further analysis. The learning/motivation factor included such variables as "high drive level", "enjoys learning", and "quick intellectual grasp". The leadership factor included such variables as "is playful", "is vivacious", and "is popular". The academics factor included all the variables in which "extraordinary achievement in (some academic subject)" was rated.

An examination of the means of the four factors indicated that the learning/motivation factor was ranked the most characteristic of intelligence by preservice teachers (Table 7). This is followed by the academics factor, the leadership factor, and the social adaptiveness factor. The mean of the variables associated with each factor was calculated in order to create the factor variables. In order for a summary score to be computed for the factor, at least 50% of the individual variables needed to have data present. For example, the mean score

Table 6

Factor loadings for gifted variables

	GsocAdap	GlrnMotv	Gleader	GAcad
Is irritable	0.83			
Is a poor loser	0.77			
Is egotistical	0.75			
Is boastful	0.74			
Has few social contacts	0.70			
Is unmanageable	0.70			
Is a tattletale	0.69			
Is physically immature	0.68			
Is humorless	0.68			
Is dominant	0.67			
Is intolerant	0.67			
Displays behavior disorders	0.67			
Is often sick	0.64			
Is distractible	0.63			
Is shy	0.62			
Tries too hard to conform	0.61			
No interest in social life	0.61			
Disturbs teacher's lessons	0.60			
Is aggressive	0.60			
Prefers to work alone	0.59			
Prefers to be inconspicuous	0.58			
Is neurotic	0.57			
Is younger	0.53			
Is undisciplined	0.52			
Is precocious	0.51			
Agrees mostly with adults	0.51			
Prefers adult discussions	0.49			
Choosy about friends	0.48			
More mature mentally	0.46			
Verbally skilled*	-0.45			
Good memory*	-0.45			
Is headstrong	0.43			

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Table 6 (Continued)

	GsocAdap	GlrnMotv	Gleader	GAcad
Is self-critical	0.43			
Difficult to influence	0.39			
Has high drive level		0.77		
Is ambitious		0.75		
Pursues goals w/ persistence		0.73		
Enjoys learning		0.71		
High achievement motivation		0.70		
Is confident		0.68		
Is a perfectionist		0.67		
Is self-assured		0.66		
Undertakes tasks willingly		0.65		
Works easily under pressure		0.57		
Withstands stress		0.56		
Is competitive		0.56		
Has precise ideas about future		0.54		
Is independent		0.53		
Enjoys intellectual games		0.51		
Helps classmates		0.49		
Thinks s/he is something special		0.48		
Likes to read		0.48		
Is honest		0.47		
Argues effectively		0.47		
Is intelligent		0.46		
Intellectually curious		0.46		
Thinks logically		0.46		
Quick intellectual grasp		0.45		
Sets the tone		0.45		
Asks many questions		0.45		
Is creative			0.67	
Shows originality			0.66	
Is playful			0.64	
Has great imagination			0.64	
Full of ideas			0.61	
Is vivacious			0.61	
Is flexible			0.60	

(Continued on next page)

Table 6 (Continued)

	GsocAdap	GlrnMotv	Gleader	GAcad
Is spontaneous			0.60	
Is sensitive			0.48	
Prefers unstructured tasks			0.45	
Excels in sports			0.43	
Is popular			0.42	
Finds unusual ways to solve problems			0.41	
Pursues a hobby intensely			0.37	
Extraordinary achievement in foreign language				0.75
Extraordinary achievement in music				0.70
Extraordinary achievement in music				0.66
Extraordinary achievement in language arts				0.64
Extraordinary achievement in math				0.51

Note. GSocAdap = social adaptiveness factor, LlrnMotv = learning motivation factor, GLeader = leadership factor, GAcad = academics factor; *variables moved to learning/motivation factor.

Table 7

Descriptive statistics for giftedness factors

	N	M	SD	Min	Max	Range	Skew	Kurt
Learning/ motiv.	512	6.40	1.44	1.20	9.00	7.80	-0.44	-0.13
Academics	511	5.51	1.62	1.00	9.00	8.00	-0.24	0.07
Leadership	512	6.23	1.13	2.14	8.86	6.71	-0.61	0.68
Social adapt.	511	4.06	1.30	1.00	9.00	8.00	-0.18	-0.23

Note. Kurt = Kurtosis. Scores range between 1 as least characteristic to 9 as most characteristic.

of the five variables that comprised the academics factor would only be calculated if an individual answered at least three (≥ 50%) of the five items in this group.

Interview responses for conceptions of giftedness. All of the preservice teachers who were interviewed noted that giftedness was something that was above and beyond what others could do. Consistently, words such as "the ability to do something extraordinary", "transcends what is commonplace", and "understanding things that other people cannot" were used to either describe a gifted individual or to provide a personal definition of giftedness. Interestingly, however, only one of the students described giftedness as an innate ability, by stating "it's a gift, it's not something you learn, it's something that you are given".

Four of the students described an aspect of giftedness as academically related. For example, one of the students described an adolescent relative as "he's good in math, he's good in writing, and he's good in sports. I would think that would be a gifted person with all those abilities." Another student stated that "I think of past products such as Einstein or people who defy the status quo". Yet another noted that "she's very book smart". In addition, three of the students cited an aspect of social adaptiveness that focused more on the negative aspects of giftedness. For example, one of the preservice teachers noted that "too smart people, they're kind of above everything, they don't really understand easy stuff. Every once in a while, that's what I think about her." Another noted "he's really smart. He uses [his ability] at manipulating her."

One of the students noted that discrepancy between their own personal definition and what they noticed in school settings. The student stated that "when I think of giftedness, I think of ... those who have baffled the imagination with what they have done.... When I look at kids in gifted programs in the public school setting it's quite different. I don't know if they are complacent with the curriculum but they really don't explore the other side of their talents." This student went on to note that gifted students seemed more obsessed with grades than with learning.

When asked to describe the physical characteristics of the individuals they described as examples of a gifted individual, one European-American male, one European male, two European-American females and one African-American male were identified. Both the European-American and Hispanic preservice teacher identified European-American examples. One of the African-American preservice teachers identified an African-American and one identified a European. Two of the female students identified females and two identified males. The one male student identified a male as well.

Instrument reliability for giftedness variables. Reliability coefficients were examined for both the factors created through the factor analysis procedure as well as the factors created using the Renzulli/Hartmann Scale for Rating Behavioral Characterisitcs of Superior Students (SRBCSS). Both models created four factors with the factor analysis model yielding the factors of social adaptiveness, learning/motivation, leadership, and academics. The model

developed using the dimensions of the Renzulli/Hartmann scale included the factors of learning, motivation, creativity, and leadership. In keeping with the terminology used by Renzulli and Hartman (1971), these factors will be referred to as dimensions.

Cronbach's alpha was calculated for the four factors developed through the factor analysis procedure (Table 8) The Cronbach's alpha for the 34-item social adaptiveness factor was .95 with corrected item-total correlations ranging between .46 to .77. Cronbach's alpha for the 28-item learning/motivation factor was .93 with corrected item-total correlations between .05 to .74. The 14-item leadership factor's Cronbach's alpha was .89 with corrected item-total correlations ranging between .45 to .66. The Cronbach's alpha for the five-item acadmics factor was .85 with corrected item-total correlations between .53 to .70.

Cronbach's alpha was calculated for the four dimensions developed using the Renzulli/Hartmann scale. The Cronbach's alpha for the 14-item learning dimensions was 0.83 with corrected item-total correlations between .19 to .55. Cronbach's alpha for the 16-item motivation dimension was .88 with corrected item-total correlations ranging between .37 to .65. The 23-item creativity dimension's Cronbach's alpha was .87 with corrected item-total correlations between .32 to 0.56. Cronbach's alpha for the 25-item creativity dimension was .92 with corrected item-total correlations ranging between 0.19 to .67. These reliability coefficients are roughly equivalent to those developed through the pilot study. Cronbach's alpha for the pilot study was .80 for the learning dimensions,

Table 8

Reliability analysis for giftedness factors

Procedure	Factor	Cronbach's alpha	# of items	Range of item to total correlations
Factor analysis procedure				
	Social adaptiveness	.95	34	.46 to .77
	Learning/motivation	.93	28	.05 to .74
	Leadership	.89	14	.45 to .66
	Academic	.85	5	.53 to .70
User developed factors using SRBCSS				
	Learning dimension	.83	14	.19 to .55
	Motivation dimension	.88	16	.37 to .65
	Creativity dimension	.87	23	.32 to .56
	Leadership dimension	.92	25	.19 to .67
Pilot information				
	Learning dimension	.80	14	.22 to .57
	Motivation dimension	.84	16	.26 to .64
	Creativity dimension	.85	23	.15 to .63
	Leadership dimension	.91	25	.24 to .64

Note. SRBCSS = Scale for rating the behavioral characteristics of superior students. Sample size for factor analysis and user developed procedures was 498. Sample size for the pilot was 53.

.84 for the motivation dimension, .85 for the creativity dimension, and .91 for the leadership dimension.

Comparison of the two models indicated some overlap between the variables. For the learning/motivation factor, 46% of the variables were the same as those variables on the learning dimension and motivation dimension developed using the Renzulli/Hartmann scale. The leadership factor was comprised of variables from the creativity dimension (57%) and the leadership

dimension (29%). The academics factor was made up of the learning dimension (60%) and the creativity dimension (40%) from the Renzulli/Hartmann scale. Although the social adaptiveness factor did not appear in the factors developed using the Renzulli/Hartmann scale, it does appear to be a theoretically sound factor which connects several variables addressing social adaptability. The social adaptiveness scale consists of variables from the learning (16%), motivation (22%), creativity (34%) and leadership (34%) dimensions.

Are There Differences in Preservice Teachers' Conceptions of Giftedness Based upon Major, Sex and Race?

A three-way (3 X 2 X 3) ANOVA was conducted to address this question. However, before conducting the ANOVA, three assumptions needed to be met: (1) the samples needed to come from populations that were normally distributed; (2) the samples being compared needed to have approximately equal variances; and (3) the observations are independent. These assumptions were examined for each independent variable. In addition, the four giftedness factors were created as variables based upon the factor analysis in order to test differences in means across the independent variables. The mean of the variables associated with each factor was calculated in order to create the factor variables. In order for a score to be computed for the factor, at least 50% of the individual variables needed to have data present. For example, the mean score of the five variables that comprised the academics factor would only be calculated if an individual answered at least three ($\geq$ 50%) of the five in the group.

Major. An examination of normal probability plots and statistics for the four giftedness factors yielded some minor violations of the normality assumption for only the social adaptiveness factor. Lilliefor's (K-S) test indicated statistically significant ($p < .05$), although small, violations of normality for secondary education majors for the social adaptiveness factor (K-S = 0.08). No violations of normality were found for elementary or special education preservice teachers. Although ANOVA is robust to violations of normality, findings should still be interpreted with caution.

Levene's test of homogeneity was calculated to test the homogeneity of variances assumption. None of the factors yielded statistically significant differences in variances.

Sex. Normal probability plots and statistics were examined to determine any violation of the two assumptions. Two violations were detected. Lilliefor's (K-S) test indicated statistically significant ($p < .05$) violations for female students for the social adaptiveness factor (K-S = 0.06) and the academics factor (K-S = 0.04). No other violations of the normality assumption were significant for either males or females. Levene's test of homogeneity indicated a significant difference in variances for the social adaptiveness factor (Levene's = 10.78, $p < .001$). No other statistically significant difference in variances was noted. Because of the violation of normality and homogeneity of variances, results must be interpreted with caution.

Race. Normal probability plots and statistics were calculated for each of the factors based upon race. Lilliefor's (K-S) test indicated three violations of the assumption of normality. This assumption was violated for European-Americans for the social adaptiveness factor (K-S = 0.05), the learning/motivation factor (K-S = 0.05), and the academic factor (K-S = 0.04). No other violations of normality were noted. Levene's test of homogeneity of variances yielded no significant differences. Again, the violation of the normality assumption requires caution in interpreting the results.

ANOVA analysis. A three-way ANOVA (3 X 2 X 3) was conducted to determine the interaction effects of the three independent variables (i.e., major, sex and race) on each of the four dependent variables (i.e., social adaptiveness, learning/motivation, leadership, and academics). Interaction effects were examined since they may mask significant main effects. Of the 18 cells, one was empty. There were no male elementary students of Hispanic origin included in the sample (Table 9).

The three-way ANOVA did not yield any significant interaction effects for the social adaptiveness scale. Since no interaction effects were present, the main effects for each of the independent variables were examined (Table 10). Main effects were present for sex F (3, 1) = 4.60, $p < .05$ and race F (3, 2) = 3.08, $p < .05$. The Tukey-HSD indicated that the differences in means between African-Americans and European-Americans were significant at the .05 level.

Table 9

Giftedness factors by major, race and sex

Major	Race	Sex	N	M	SD	Skew	Kurtosis
Academics factor							
Elementary	African-American	Male	1	6.80	0	0	0
		Female	32	5.78	1.42	-.71	.26
	European-American	Male	7	5.00	1.24	-1.76	4.30
		Female	213	5.47	1.70	-.30	.02
	Hispanic	Male	0				
		Female	20	5.24	1.60	-.24	.29
Secondary	African-American	Male	4	6.70	1.67	-1.16	.97
		Female	5	5.36	1.07	-1.38	2.37
	European-American	Male	27	5.42	1.73	-.15	1.01
		Female	64	5.59	1.89	-.21	-.15
	Hispanic	Male	1	4.20	0	0	0
		Female	10	5.80	1.43	-.55	.04
Special Ed.	African-American	Male	9	5.93	1.20	-.51	-.56
		Female	12	5.18	1.38	.87	-.04
	European-American	Male	10	5.80	1.44	-.09	-1.08
		Female	88	5.43	1.48	.06	.04
	Hispanic	Male	3	5.80	.07	0	-.06
		Female	4	6.40	1.00	0	0
Leadership factor							
Elementary	African-American	Male	1	6.64	0	0	0
		Female	32	5.65	1.04	-.23	-.07
	European-American	Male	7	5.25	.46	-1.99	4.08
		Female	213	5.31	1.27	-.44	.68
	Hispanic	Male	0				
		Female	20	5.09	1.18	-.08	-.46

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Table 9 (Continued)

Major	Race	Sex	N	M	SD	Skew	Kurtosis
Secondary	African-American	Male	4	5.86	.10	-1.41	1.50
		Female	5	4.89	1.47	-.58	-.76
	European-American	Male	27	5.53	1.21	-.47	-.09
		Female	64	5.52	1.29	-.10	-.31
	Hispanic	Male	1	4.93	0	0	0
		Female	10	5.45	1.48	-.48	-.68
Special Ed.	African-American	Male	9	5.43	.85	.50	-1.71
		Female	12	5.17	1.43	-.30	-.55
	European-American	Male	10	5.88	1.00	.18	-1.23
		Female	88	5.29	1.25	-.24	.43
	Hispanic	Male	3	6.14	.61	.52	0
		Female	4	5.93	.92	.58	-2.69
Learning motivation factor							
Elementary	African-American	Male	1	7.50	0	0	0
		Female	32	6.53	1.02	.01	-.79
	European-American	Male	7	6.23	.82	.89	.70
		Female	213	6.34	1.18	-.81	1.05
	Hispanic	Male	0				
		Female	20	6.30	1.04	.11	-.63
Secondary	African-American	Male	4	6.26	.37	.68	1.76
		Female	5	5.60	1.80	-.86	-1.18
	European-American	Male	28	6.12	.86	.24	-.38
		Female	64	6.06	1.14	-.33	.28
	Hispanic	Male	1	6.14	0	0	0
		Female	10	6.21	1.20	-.72	-.11
Special Ed.	African-American	Male	9	6.23	.71	.16	-1.13
		Female	13	5.59	1.14	-.13	.35

(Continued on next page)

Table 9 (Continued)

Major	Race	Sex	N	M	SD	Skew	Kurtosis
	European-American	Male	10	6.29	.78	-.66	-.32
		Female	88	6.17	1.18	-.68	.69
	Hispanic	Male	3	6.51	.61	.35	0
		Female	4	5.30	1.27	-.54	1.54
Social adaptiveness factor							
Elementary	African-American	Male	1	3.09	0	0	0
		Female	32	4.26	.98	.03	.15
	European-American	Male	7	4.22	1.08	-.66	.07
		Female	213	3.91	1.35	.03	.20
	Hispanic	Male	0				
		Female	20	3.91	1.38	-.08	-1.25
Secondary	African-American	Male	4	4.64	1.57	1.23	.83
		Female	5	4.49	1.49	-1.91	3.78
	European-American	Male	27	4.05	1.22	-.82	-.34
		Female	64	3.94	1.23	-.29	-1.08
	Hispanic	Male	1	5.50	0	0	0
		Female	10	3.63	1.14	.20	-1.04
Special Ed.	African-American	Male	9	5.08	.90	-.17	-1.18
		Female	12	3.96	1.65	-.26	-.40
	European-American	Male	10	4.60	1.33	.17	-.24
		Female	88	4.19	1.30	-.37	-.38
	Hispanic	Male	3	5.70	.65	-1.29	0
		Female	4	5.38	.56	.24	-3.29

Table 10

Analysis of variance for giftedness factors

Source	df	*F*	
		Social adaptiveness	Learning/ motivation
Major (M)	2	3.09	3.80*
Race (R)	2	1.30*	0.32
Sex (S)	1	3.97*	0.80
M x R	4	1.00	1.67
M x S	2	0.39	0.07
R x S	2	0.22	1.08
M x R x S	3	1.12	0.28

NOTE: * = $p < .05$, n = 510.

African-Americans ranked this factor significant higher than their European-American peers ($M = 4.19$, $SD = 1.17$; $M = 3.71$, $SD = 1.27$, respectively). Males rated this factor significantly higher than their female colleagues ($M = 4.36$, SD =;1.25; $M = 4.00$, $SD = 1.27$, respectively) at the $p < .05$ level. There was no statistically significant effect for major.

No significant interaction effects were noted for the learning/motivation factor. A statistically significant main effect was noted for major F (3, 2) = 3.80, $p < .05$. Tukey-HSD indicated significant differences between elementary and

secondary majors as well as between elementary and special education majors. Elementary preservice teachers ($M = 6.35$, $SD = 1.25$) ranked this factor significantly higher than either their secondary ($M = 6.04$, $SD = 1.20$) or special education ($M = 6.06$, $SD = 1.22$) peers. Main effects for race and sex were not significant. No statistically significant interaction or main effects were found for either the leadership factor or the academics factor.

What Correlation Exists Between Preservice Teachers' Conceptions of Intelligence and Their Conceptions of Giftedness?

In order to address this question, a correlation analysis was conducted to examine the correlation coefficients for each of the intelligence factors with each of the giftedness factors. Before conducting such as analysis one must confirm that the relationship between the variables is linear, that the degree of strength of the relationship is approximately equal across the full range of both variables, and whether or not outliers exist.

An examination of scatterplot data indicated that linear relationships existed between all the variables although some were quite weak. Heteroscedasticity was noted in the correlation between the giftedness social adaptiveness factor and both the intelligence learning/motivation factor and the intelligence creativity factor; as scores on the factors increased, the strength of the relationship decreased. Scores on all factors ranged between one and nine. No outliers were noted. Due to the weak linear nature and the heteroscedasticity noted, further findings must be interpreted with caution.

The correlations between the factors is noted in Table 11. The strongest correlations existed between the following variables: (1) giftedness academics factor and the intelligence academics factor ($r = .63$, $p \leq .001$); (2) giftedness leadership factor and the intelligence leadership factor ($r = .63$, $p \leq .001$); (3) giftedness learning/motivation factor and the intelligence learning/motivation factor ($r = .65$, $p \leq .001$); and (4) the giftedness social adaptiveness factor and the intelligence social adaptiveness factor ($r = .78$, $p \leq .001$). Like factors correlated the most strongly with one another.

The strong correlation is also reflected through the preservice teacher interviews. For the most part, students had difficulty in separating intelligence and giftedness. Students seemed to fall into one of two groups, those who viewed intelligence and giftedness as indistinguishable, or those who viewed them as similar, but saw giftedness as innate. For example, one student stated several times during the interview that intelligence and giftedness were "undefinable", "intangible", and "can't be defined". Referring specifically to intelligence this student noted that "I don't think there is a plausible definition of intelligence. I think that we need to construct our meaning of intelligence to behoove us, but there are so many variables involved with intelligence that I don't think you can define it". Another student grappled with defining giftedness. Eventually, this student noted that the example she thought of for someone who is gifted "graduated with honors from college, she has a master's degree, she's intelligent". Yet another student noted "he's really smart" when

Table 11

Correlations between intelligence factors and giftedness factors

	GAcad	GLrnMotv	GLeader	GSocAdap
IAcad	.63**	.43**	.40**	.31**
ILrnMotv	.46**	.65**	.51**	.42**
ILeader	.45**	.61**	.63**	.59**
ICreate	.32**	.44**	.45**	.17**
ISocAdap	.33**	.30**	.44**	.78**

Note. GAcad = giftedness academics; GLrnMotv = giftedness learning/motivation; GLeader = giftedness leadership; GSocAdap = giftedness social adaptiveness; IAcad = intelligence academics; ILrnMotv = intelligence learning/motivation; ILeader = intelligence leadership; ICreate = intelligence creativity; ISocAdap = intellignece social adaptiveness.

**$p \leq .001$

describing an example of someone who is gifted.

The other group of students also saw similarities between intelligence and giftedness. Two students opted to use the same person as an example for both intelligence and giftedness. The only difference for these students was that they saw giftedness as a gift. For example, one student stated that "my personal definition of giftedness is just that, it's a gift, it's not something you learn, it's just

something that you are given." Another student echoed this sentiment by noting that "everyone is given gifts".

What Correlations Exist Between Preservice Teachers' Conceptions of Intelligence and Certain Educational Goals?

The twelve variables associated with the educational goals were examined for violations of the normality assumption. All of the 12 variables except one had skewness coefficients greater than ± 0.50. Six (55%) had values more extreme than ± 1.0 with the highest skewness coefficient associated with the educational goal of "developing critical thinking and understanding" (Sk = -1.66). Eleven of the educational goals variables (92%) had kurtosis coefficients greater than ± 1.0. Seven variables (64%) exceeded a kurtosis value of ± 1.0. The largest kurtosis coefficient was 4.20 which was also associated with the educational goal of "developing critical thinking and understanding".

Lynott and Woolfolk (1994) divide these 12 educational goals variables into three factors: practical/academic, conceptual, and social. A principal components with varimax rotation factor analysis was conducted to determine agreement with Lynott and Woolfolk's (1994) three factors. In order to effectively identify factors some of the variables must be correlated to one another. Bartlett's test of sphericity was calculated and the null hypothesis that the variables were unrelated to one another was rejected (Bartlett's = 2224.40, $p <$ .001). The Kaiser-Meyer-Olkin (KMO) was also calculated. The KMO for the 12

educational goals variables was 0.88. According to Kaiser (1974), a KMO in the 0.80's is good.

The factor analysis yielded two factors rather than the expected three. The two factors accounted for 50.3% of the variance in the data. Four of the five practical/academic variables loaded on one factor. These included "developing technical knowledge", "fostering competitiveness", "teaching students to be hard-working", and "fostering autonomy". One of the practical/academic variables, "developing academic mastery in basic skills", loaded on the second factor which also included all of the conceptual thinking and social variables.

A reliability analysis was conducted for both models, the two factor model developed through the factor analysis procedure, and the three factor model developed by Lynott and Woolfolk (1994). Cronbach's alpha for the eight-item first factor of the two factor model was .85 with corrected item-total correlations ranging between .47 to .66. For the four-item second factor, Cronbach's alpha was .61 with corrected item-total correlations between .37 to .42. Cronbach's alpha for the five-item practical/academic factor in Lynott and Woolfolk's model was .66 with corrected item-total correlations between .37 to .47. The three-item conceptual thinking factor's Cronbach's alpha was .79 with corrected item-total correlations between .57 to .75. Cronbach's alpha for the four-item social factor was .78 with corrected item-total correlations ranging between .54 to .62.

Although the reliability coefficients were reasonable for each of the factors, Lynott and Woolfolk's (1994) three factor model made the most conceptual

sense. In addition, use of the three factor model would allow comparison with the Lynott and Woolfolk (1994) study. The three Lynott and Woolfolk (1994) factors of practical/academic goals, conceptual goals, and social goals were created (see Table 12). The mean of the variables associated with each factor was calculated in order to create the factor variables. In order for a score to be computed for the factor, at least 50% of the individual variables needed to have data. In addition, a correlation matrix was computed to determine relationships between each of the factors (see Table 13).

What correlation exists between the three educational goals factors and the five intelligence factors? Several steps were done to address this question. First, correlation coefficients were examined individually for each of the educational goals (i.e., social, practical/academic, and conceptual) by each of the intelligence factors (i.e., social adaptiveness, learning/motivation, leadership, creativity and academics). Several statistically significant correlations were noted (Table 14). Although all correlations are fairly weak, the learning/motivation intelligence factor was the most strongly correlated with all three educational goals factors. In addition, the leadership intelligence factor was also one of the most strongly correlated with the practical/academic educational goal factor. Interestingly, the social adaptiveness intelligence factor did not significantly correlate with the social educational goal factor.

Table 12

Descriptive statistics for educational goals factors

	N	M	SD	Min	Max	Range	Skew	Kurt
Practical/ academic	506	6.56	1.05	1.00	9.00	8.00	-0.34	1.05
Conceptual	506	7.69	1.06	1.00	9.00	8.00	-1.18	3.02
Social	506	7.60	1.13	1.00	9.00	8.00	-1.27	3.25

Note. Scores range between 1 as least characteristic to 9 as most characteristic. Kurt = Kurtosis.

Table 13

Correlations between educational goals factors

	Conceptual thinking	Practical/ Academic	Social adaptiveness
Conceptual thinking	1.00	0.54	0.58
Practical/academic	0.54	1.00	0.55
Social adaptiveness	0.58	0.55	1.00

Note. For all coefficients $p < .001$, n = 506.

Table 14

Correlations between educational goals factors and intelligence factors

Intelligence factors	Conceptual thinking	Practical/ Academic	Social adaptiveness
Academics	.15**	.22***	.12**
Creativity	.19***	.15***	.16***
Leadership	.10*	.25***	.20***
Learning/motivation	.24***	.29***	.28***
Social adaptiveness	.03	.20***	.06

Note. *$p < .05$; **$p < .01$; ***$p < .001$. Sample sizes varied between 498 to 506.

A multiple linear regression analysis was conducted using the five intelligence factors as independent variables and the three educational goals factors as dependent variables. Assignment of the intelligence factors as independent variables was based upon the vast research that documents teachers' beliefs impacting behavior in the classroom. In essence, how a teacher conceptualizes intelligence may impact the educational goals he or she favors.

Multiple linear regression has the following assumptions: (1) normality and equality of variance; (2) the independent variables should be independent of one another; and (3) the relationship between the independent variables and the dependent variables should be linear. In order to test these assumptions, each dependent variable was looked at separately in conjunction with the five independent variables. A histogram of the standardized residuals for the conceptual goal was examined to determine normality of the data. The histogram indicated a distribution that was slightly leptokurtic and negatively skewed. The historgram of observed residuals to predicted residuals for the practical/academic educational goal showed no violation of the normality assumption. For the social educational goal factor, the histogram of observed to predicted residuals showed a negatively skewed distribution. The scatterplots of predicted residuals to observed residuals also did not show a pattern for any of the three educational goals. It appears that the assumption of normality was violated for the conceptual thinking and the social educational goals factors. The assumption of linearity and equality of variances did not appear to be violated for

any of the factors. In addition, the independence assumption was not violated for any of the factors.

A separate stepwise regression analysis was conducted for each of the educational goals factors (Table 15). For the conceptual goals factor, only the learning/motivation intelligence factor was entered into the equation through the stepwise analysis. The learning/motivation factor accounted for approximately six percent of the variation in conceptual thinking ($r = .06$, $p < .001$). When the other four intelligence variables were forced into the regression analysis, together they accounted for an additional two percent of the variation in conceptual thinking ($r = .08$, $p < .001$). For the practical/academic educational goal factor both the learning/motivation intelligence factor and the leadership intelligence factor were entered into the regression equation. These variables accounted for approximately 10% of the variation in the practical/academic educational goal factor. Forcing the remaining three intelligence factors into the equation for the practical/academic educational goal factor contributed no additional explanatory information. In a stepwise regression analysis for the social educational goal factor only the learning/motivation intelligence factor was entered into the equation. The learning/motivation intelligence factor accounted for 8% of the variation in the social educational goal factor ($r = .08$, $p < .001$). Forcing the remaining four intelligence factors into the equation accounted for an additional 1% of the variation in the social educational goal factor.

Table 15

Summary of regression analysis intelligence factors predicting educational goals

Variable	B	SE B	Beta
Conceptual goals factor			
Learning/motivation factor	.24	.04	.24*
Practical/academic goals factor			
Learning/motivation factor	.20	.05	.22*
Leadership factor	.10	.04	.12*
Social goals factor			
Learning motivation factor	.28	.04	.28*

Note. $R^2 = .06$ for conceptual goals; $R^2 = .09$, change in $R^2 = .01$ for Step 2 for practical/academic goals; $R^2 = .08$, change in $R^2 = .01$ for social goals.

*$p < .001$.

What Correlations Exist Between Preservice Teachers' Conceptions of Giftedness and Certain Educational Goals?

Correlation coefficients were examined for each of the three educational goals (i.e., conceptual, practical/academic, and social) individually by each of the four giftedness factors (i.e., academics, leadership, learning/motivation, and social adaptiveness). Several significant correlations were noted (Table 16). The learning/motivation intelligence factor was the most strongly correlated with each of the educational goals. In addition, the academics factor also displayed one of the strongest correlations with the practical/academic educational goal factors. Interestingly, the social adaptiveness giftedness factor did not significantly correlate with the social educational goal factor.

A multiple linear regression analysis was conducted using the four giftedness factors as independent variables and the three educational goals factors as dependent variables. Assignment of the giftedness factors as independent variables was based upon the vast research that documents teachers' beliefs impacting behavior in the classroom. In essence, how a teacher conceptualizes giftedness may impact the educational goals he or she favors. In order to test the three multiple linear regression assumptions, each dependent variable was looked at separately in conjunction with the four independent variables. A histogram of the standardized residuals for the conceptual goal was examined to determine normality of the data. The histogram indicated a

Table 16

Correlations for educational goals by giftedness factors

Giftedness factors	Conceptual thinking	Practical/ Academic	Social adaptiveness
Academics	.15***	.25***	.13**
Leadership	.15***	.20***	.16***
Learning/motivation	.20***	.28***	.20***
Social adaptiveness	.07	.19***	.06

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Sample sizes ranged from 498 to 506.

distribution that was slightly leptokurtic and negatively skewed. The historgram of observed residuals to predicted residuals for the practical/academic educational goal showed no violation of the normality assumption. For the social educational goal factor, the histogram of observed to predicted residuals showed a negatively skewed and leptokurtic distribution. The scatterplots of predicted residuals to observed residuals also did not show a pattern for any of the three educational goals. It appears that the assumption of normality was violated for the conceptual thinking and the social educational goals factors. The assumption of linearity and equality of variances did not appear to be violated for any of the factors. In addition, the independence assumption was not violated for any of the factors.

A separate stepwise regression analysis was conducted for each of the educational goals factors (Table 17). For the conceptual goals factor, only the learning/motivation giftedness factor was entered into the equation through the stepwise analysis. The learning/motivation factor accounted for approximately four percent of the variation in conceptual thinking ($r = .04$, $p < .001$). When the other three giftedness variables were forced into the regression analysis, together they accounted for no additional variation in conceptual thinking. For the practical/academic educational goal factor both the learning/motivation giftedness factor and the academic giftedness factor were entered into the regression equation ($r = .09$, $p < .001$). These variables accounted for approximately 9% of the variation in the practical/academic educational goal factor. Forcing the remaining two giftedness factors into the equation for the practical/academic educational goal factor contributed an additional 1% of explanatory information. In a stepwise regression analysis for the social educational factor only the learning/motivation giftedness factor was entered into the equation. The learning/motivation giftedness factor accounted for 4% of the variation in the social educational goal factor.($r = .04$, $p < .001$). Forcing the remaining three giftedness factors into the equation accounted for no addtional variation in the social educational goal factor.

Chapter Summary

The results presented in this chapter indicate that preservice teachers have multifaceted conceptions of intelligence and giftedness. Five factors were

Table 17

Summary of regression analysis giftedness factors predicting educational goals factors

Variable	B	SE B	Beta
Conceptual thinking factor			
Learning/motivation factor	.19	.04	.20*
Practical/academic factor			
Learning/motivation factor	.20	.05	.21*
Academics factor	.09	.03	.13*
Social adaptiveness			
Learning motivation factor	.20	.04	.20*

Note. $R^2 = .04$ for conceptual thinking; $R^2 = .08$, change in $R^2 = .01$ for Step 2 for practical/academic; $R^2 = .04$ for social goals.

*$p < .001$.

found to describe preservice teachers' conceptions of giftedness and four factors for preservice teachers' conceptions of giftedness. Independent variables such as major, sex and race were found to explain some of the variation in intelligence factors and giftedness factors. Overall, preservice teachers hold a more incremental view of intelligence than an entity view. While there is some correlation between all the intelligence factors and all the giftedness factors, the strongest correlation exists between like factors such as the gifted academics factor and the intelligence academics factor. In addition, intelligence factors and

giftedness factors are able to explain very little of the variation in preservice teachers beliefs about educational goals. A more detailed discussion of each of these findings is presented in the next chapter.

Chapter Five

Discussion

This descriptive study examined the conceptions of intelligence and giftedness of 567 preservice teachers. This chapter begins with a brief review of the study, followed by a discussion of the findings, and concludes with the limitations of the study and recommendations for future research.

Review of Study

The research on teacher expectancy posits that the beliefs a teacher holds about a student impacts both the expectations the teacher holds for that student, as well as the behavior the teacher displays toward the student (Brophy, 1983; Darley & Fazio, 1980; Harris & Rosenthal, 1985; Kagan, 1992; Rosenthal, 1987, 1997; Rosenthal & Jacobson, 1968). Preservice teachers enter their professional development with well-established beliefs about teaching developed through at least 18 years of experiences as students (Calderhead & Robson, 1991; Nespor, 1987; Nisbett & Ross, 1980; Pajaren, 1992; Weinstein, 1988; Wilson, 1990). Preservice teachers' experiences as students shape the lens through which they interpret content knowledge and pedagogy as well as their expectations for their students (Goodman, 1988; Wilson & Martinussen, 1999).

Conceptions of intelligence and giftedness are a component of the beliefs, or interpretive lens, through which preservice teachers view students. Sternberg,

et al. (1981) found that laypersons identified certain factors as characteristic of intelligence. In addition, the researchers noted that knowledge of an individual's beliefs about intelligence could be used to accurately predict their rating of another individual's intelligence. Lynott and Woolfolk (1994) found that preservice and inservice teachers' beliefs about intelligence differed from those held by the general public. While the seminal research of Pegnato and Birch (1959) indicating that teachers are not effective identifiers of gifted children has come under debate, much research has documented that inservice and preservice teachers express beliefs that gifted students are those who are teacher pleasers and academically successful (Crammond & Martin, 1987; Jacobs, 1972; Powell & Siegle, 2000; Rohrer, 1995; Schack & Starko, 1990; Tomlinson, et al., 1994). Understanding preservice teachers' conceptions of intelligence and giftedness is important since beliefs do impact behavior. As future teachers who will soon be in charge of their own classrooms, it is important for teacher educators to understand preservice teachers' conceptions of intelligence and giftedness. Once we understand these conceptions, then we may be able to determine whether intervention is necessary to broaden these beliefs.

The purpose of this study was to (a) examine preservice teachers' conceptions of intelligence and giftedness; (b) examine the relationship between preservice teachers' conceptions of intelligence and giftedness; and, (c) examine

how conceptions of intelligence or giftedness correlated with certain educational goals. Specifically, the research questions that were addressed are as follows:

1. What are the conceptions of intelligence among preservice teachers?
   1a. Are there differences in preservice teachers' conceptions of intelligence based upon major, sex and race?
2. What are the conceptions of giftedness among preservice teachers?
   2a. Are there differences in preservice teachers' conceptions of giftedness based upon major, sex and race?
3. What correlation exists between preservice teachers' conceptions of intelligence and their conceptions of giftedness?
4. What correlations exist between preservice teachers' conceptions of intelligence and certain educational goals?
5. What correlations exist between preservice teachers' conceptions of giftedness and certain educational goals?

The 567 respondents completed a questionnaire administered in 12 undergraduate College of Education classes. The classes represented a broad range of elementary education, secondary education and special education courses. The sample demographics approximated the demographics of the College of Education. The questionnaire consisted of five parts which included rating 79 characteristics associated with intelligence, rating 79 characteristics associated with giftedness, selecting nine forced-choice statements about the nature of intelligence, rating 12 educational goals, and completing demographic

information. The questionnaire was administered during the first month of the Spring 2001 semester. Additionally, five preservice teachers were interviewed using a semi-structured format designed to elicit fuller descriptions about intelligence and giftedness than were available through the questionnaire. The interviews were conducted during the second month of the Spring 2001 semester.

Descriptive statistics were calculated for all variables. The 79 characteristics of intelligence were analyzed using an exploratory factor analysis (varimax rotation) that yielded five factors. The 79 characteristics of giftedness were analyzed using an exploratory factor analysis (varimax rotation) that yielded four factors. A series of 3 (major) by 2 (sex) by 3 (race) analyses of variance were conducted to determine the impact of major, sex and race on the intelligence factors and on the giftedness factors. Pearson product moment correlations were calculated to determine the relationship between the five intelligence factors and the four giftedness factors. Finally, multiple linear regressions were conducted to determine the predictive ability of the five intelligence factors for the educational goals and the predictive ability of the four giftedness factors for the educational goals. Results of the study need to be interpreted with caution since violations of normality and homogeneity of variances were observed.

Analysis and Discussion

Overall, the findings of the study indicate that preservice teachers' conceptions of intelligence and giftedness are similar to, but not identical to, laypersons' and inservice teachers' conceptions of these concepts. Major, sex and race are related to preservice teachers' conceptions of intelligence and giftedness. In addition, preservice teachers see intelligence and giftedness as somewhat indistinguishable from each other. While conceptions of intelligence and giftedness are related to preservice teachers support for certain educational goals only slightly, this relationship is equivalent to the relationship of teacher expectations on student achievement.

Conceptions of Intelligence

In their seminal study of individual's conceptions of intelligence, Sternberg et al. (1981) observed that people did have organized conceptions of intelligence, but that different people had different organizational schema. Whereas both experts and laypersons identified problem solving and verbal ability as characteristic of intelligence, experts identified practical intelligence as a third factor and laypersons identified social competence. Dweck and Bempechat (1983) posited that conceptions of intelligence ran a continuum from entity oriented to incrementally oriented. Those with an entity orientation see intelligence as fixed whereas those with an incremental orientation see intelligence as malleable. Lynott and Woolfolk (1994) compared inservice and preservice teachers conceptions of intelligence with both the findings of

Sternberg et al. (1981) and Dweck and Bempechat (1983). Lynott and Woolfolk (1994) found that preservice teachers' conceptions of intelligence were comprised of three factors, practical/academic intelligence, conceptual thinking, and social adaptiveness. This differs with laypersons' conceptions in that preservice teachers did not express a verbal factor as characteristic of intelligence. In addition, inservice teachers' conceptions of intelligence was comprised of only two factors, practical knowledge and conceptual thinking.

The results of this study yielded five factors of preservice teachers' conceptions of intelligence: academics, creativity, leadership, learning/motivation and social adaptiveness. While the academics and leadership factors could be seen as a component of Lynott and Woolfolk's (1994) practical/academic factor, and the learning/motivation and creativity factors could be a part of their conceptual thinking factor, it is interesting to note that in both studies social adaptiveness comprises its own factor. An examination of the variables that make up the social adaptiveness factor indicate that many of the itmes are negative characteristics of intelligence. Given Goodman's (1985) contention that preservice teachers enter their professional preparation programs with an already formed interpretive lens, then the possibility that this interpretive lens focuses more on social adaptiveness than learning/motivation, academics or leadership may be cause for concern. Fortunately, the social adaptiveness factor was ranked the least characteristic of intelligence while the creativity and learning/motivation factors were ranked the most characteristic. However, it is

interesting to note that in the interviews only one of the students mentioned an aspect of creativity when asked to provide examples of why they thought an individual they identified as intelligent was intelligent. This student identified a male mechanic as creative since he was able "to build things without blueprints", certainly an aspect demonstrating originality and imagination. Only one other student identified a learning/motivation factor when describing a student by noting "she's constantly trying to improve on how she can do better". However, three of the students identified some element of social adaptiveness as characteristic of intelligence. Therefore, while social adaptiveness may be ranked least characteristic of intelligence overall, the fact that aspects of it emerged in discussions with preservice teachers indicates that it remains a gnawing undercurrent in their thinking about intelligence.

Significant main effects were noted for the social adaptiveness factor. African-Americans ranked the social adaptiveness factor higher than their European-American peers. This finding is especially interesting given Frasier's (1997) contention that minority students are not identified for gifted education services because teachers do not recognize intelligence in these students due to the effects of cultural, economic and language differences. If characteristics of intelligence related to social adaptiveness weigh heavier with African-American preservice teachers than European-American preservice teachers, then we can begin to see how this interpretive lens impacts these future teachers' expectations about students. For example, if I, as a European-American teacher,

believe that social adaptiveness factors such as aggressiveness, irritability, and boastfulness are not representative of intelligence then it is less likely that I will develop expectations that a student with these characteristics will be intelligent. If we also take into account Shade's (1992) finding that African-Americans and European-Americans differ in their perceptual processes, then the impact upon the interpretive lens through which these future teachers rate students is compounded. This difference in ranking of social adaptiveness between African-Americans and European-Americans may be a small component in explaining the underrepresentation of African-American students in gifted education programs.

Another significant main effect for the social adaptiveness factor was noted for sex. Male preservice teachers ranked this factor significantly higher than their female colleagues. This finding is not surprising when one takes into account that students with a more masculine role orientation are expected to perform at a higher level and are evaluated more highly than students with a feminine role orientation (Bernard, 1979; Dusek & Joseph; 1983; Sadker & Sadker, 1995). Social adaptiveness characteristics such as aggressiveness, egotistical behavior, and dominance are more likely to be seen as masculine characteristics than feminine ones. Women, with a more connected way of knowing, are less likely to associate these characteristics with intelligence than men who tend to have a more separated and hierarchical way of knowing (Belenky & Goldberger, 1986; Gilligan, 1982).

A significant main effect was also noted for the creativity factor. Secondary education majors rated this factor significantly higher than their elementary education or special education peers. Given Brophy's (1985) contention that teacher expectations can be generated by whether teachers believe their job is content focused or caring focused, and given that high schools tend to be more content focused and elementary schools tend to be more caring focused, then this finding begins to make sense. With the heavy emphasis on content at the secondary level, those students who display creativity within the confines of a content focused curriculum are more likely to stand out and more likely to be considered intellectually above average than those students who do not incorporate creativity. Secondary education preservice teachers incorporate this view into their interpretive lens when ranking characteristics of intelligence.

This study's findings are consistent with Lynott and Woolfolk's (1994) finding that preservice teachers hold a more incremental view of intelligence than an entity view. Female students were significantly more likely to hold an incremental view than their male colleagues. Again, given women's more connected way of knowing (Belenky & Goldberger, 1986; Gilligan, 1982), it is not surprising that they would find educational goals such as "all students are potentially intelligent", "the more students learn, the more intelligent they become", and "all students can make significant academic progress" more in line with their beliefs about educational goals.

Conceptions of giftedness

Research on preservice and inservice teachers' conceptions of giftedness indicate that they believe students are more likely to be gifted if they demonstrate teacher pleasing behavior and are academically successful (Crammond & Martin, 1987; Jacobs; 1972; Rohrer, 1995; Tannenbaum, 1962). Preservice teachers, elementary education teachers and gifted education teachers differed in criteria for identifying gifted students (Schack & Starko, 1990). While preservice and elementary education teachers emphasized motivation and class performance, gifted education teachers emphasized creativity and wide knowledge. Although preservice teachers express the importance of meeting all students' needs in the classroom, they are often ill-prepared to do so and are especially unable to meet the needs of gifted students (Moon et al., 1999; Tomlinson, et al., 1994).

Renzulli, Hartmann and Callahan (1975) proposed four dimensions of giftedness that were developed from research on characteristics of giftedness. The four dimensions they purported were learning, motivation, leadership and creativity. In a factor analysis of 80 characteristics of giftedness, Busse et al. (1986) identified five factors which included intelligence, self-centered/neurotic, dynamic/popular, creative and achievement oriented. Using the same list of characteristics as Busse et al. (1986), this study identified four factors of giftedness through a factor analysis. The four factors are academics, leadership, learning/motivation, and social adaptiveness. There is overlap with both previous study's results. This study's learning/motivation factor included similar variables

to Renzull's et al. (1975) learning dimension and motivation dimension. Likewise, the learning/motivation factor was similar to Busse et al's (1986) intelligence and achievement oriented factors. This study's leadership factor was similar to Renzulli's et al. (1975) leadership dimension and creativity dimension, and to Busse et al's. (1986) dynamic/popular factor. The academics factor from this study resembled Renzulli's et al. (1975) learning dimension and Busse et al's. (1986) intelligence factor. Although the social adaptiveness factor does not exist in Renzulli's et al. (1975) dimensions, it's characteristics can be found in each dimension. The soical adaptiveness factor is most similar to Busse et al's. (1986) self-centered/neurotic factor.

Aithough the social adaptiveness factor was ranked the least characteristic of giftedness, its mean within the conceptions of giftedness section was higher than its mean within the conceptions of intelligence section. Given that items such as "is irritable", "has few social contacts", "is intolerant", "is a tattletale" and "is aggressive" are reminiscent of the stereotypes Terman (1926; Terman & Oden, 1947) dispelled with his longitudinal study of gifted students in California, this finding also corroborates the conceptions of intelligence finding that these types of characteristics still provide an undercurrent to beliefs about gifted students.

Similar to the findings for conceptions of intelligence, African-Americans ranked the social adaptiveness factor higher than their European-American peers. It is important to reiterate that this may be especially troublesome given

the under-representation of African-American students in many gifted education programs. If as Frasier (1997) posits, that European-American teachers do not identify African-American students for gifted services because of cultural, economic and language differences, then the difference in rankings of the social adaptiveness factor may begin to explain such a discrepancy.

As with conceptions of intelligence, a significant main effect was noted for the social adaptiveness factor regarding sex. Once again, males ranked this factor significantly higher than their female colleagues. Given the research that students with a more masculine role orientation are expected to perform at a higher level and are evaluated more highly than students with a feminine role orientation (Bernard, 1979; Dusek & Joseph; 1983; Sadker & Sadker, 1995), and given women's emphasis on connected knowing (Belenky & Goldberger, 1986; Gilligan, 1982) it is not surprising that women would rank this factor lower.

A significant main effect was noted for the learning/motivation factor regarding major. Elementary education majors ranked this factor significantly higher than their secondary or special education peers. Such findings are congruent with Schack and Starko's (1990) finding that preservice and elementary education teachers emphasized motivation and class performance for identifying gifted students. However, given Ribich, Barone and Agostino's (1998) finding that gifted students who did not display these traits were not considered worthy of the gifted label, and given that most identification of gifted students begins in the elementary education classroom, this finding is worrisome

for those students who do not display characteristics association with learning and motivation. Although no significant main effect was noted for race, the under-representation of minority students in gifted education programs, may be compounded by the heavy emphasis on characteristics of the learning/motivation factor, and the difference in rankings between African-Americans and European-Americans for the social adaptiveness factor.

Correlation Between Intelligence Factors and Giftedness Factors

Preservice teachers seem to view intelligence and giftedness as similar. This study's findings that a fairly strong correlation exists between like factors, such as between the intelligence academics factor and the giftedness academics factor, along with the interview responses indicate that preservice teachers view intelligence and giftedness as closely related to each other. This came across most clearly in the interviews with preservice teachers. These individuals seemed to fall into one of two groups, those that viewed intelligence and giftedness as indistinguishable, or those that viewed them as similar, but saw giftedness as innate.

The preservice teachers' dilemma in differentiating between intelligence and giftedness may be due to their limited exposure to these concepts (Dixon, Dixon, Wark, & Carlson, 2000). In most professional development programs elementary and secondary education students are exposed to conceptions of intelligence only within a semester long course that focuses on including special education students in general education classrooms. Often, these courses are

structured so that approximately three hour segments are devoted to students with learning disabilities, emotional handicaps, and physical impairments. If students with gifts and talents are included, and not all courses mention giftedness, then this subject too is afforded a three hour segment. Although the theory of multiple intelligences may be introduced, the primary emphasis of this type of course is to provide preservice teachers with cursory knowledge about behavior management and instructional differentiation for students with disabilities.

Although special education majors spend much more time addressing the cognitive and emotional needs of students with disabilities, few professional development programs require a course in meeting the needs of students with gifts and talents. Special education majors primary exposure to gifted education, if it is addressed, is through a three hour segment delivered during an introductory special education course. This lack of exposure to the construct of giftedness may be one of the reasons a special education major stated "all students are gifted". Although all students may have "gifts", such a broad statement as "all students are gifted" shows the lack of understanding about the educational and psychometric use of the term "gifted". Positing that "all students are gifted" is like stating that "all students are mentally retarded". The fallacy of the statement is apparent.

The lack of exposure to multiple theories about intelligence and to the field of gifted education in general may be a reason why preservice teachers see

intelligence and giftedness as indistinguishable. This may also be why research has documented that while preservice teachers posit that all students needs should be met in the classroom, few are willing to differentiate for high ability students, and even fewer are prepared to do so (Tomlinson, et al., 1994). Given Sternberg and Davidson's (1986) contention that "giftedness is something we invent.... If the definition is not useful, valuable talents will be wasted, and less valuable ones fostered and encouraged" (p. 4) then it may behoove teacher educators to examine the professional development program and determine if the curriculum fosters a "valuable" definition of intelligence and giftedness.

Educational Goals

Numerous studies have purported the connection between teacher expectations and student achievement (Brophy, 1983; Darley & Fazio, 1980; Harris & Rosenthal, 1985; Kagan, 1992; Rosenthal, 1987, 1997; Rosenthal & Jacobson, 1968). Swann and Synder's (1980) experiment with teacher expectations, teaching philosophy or educational beliefs, and student achievement indicated that expectations and beliefs can combine to impact teacher behavior toward students, and thus, student achievement. Brophy (1983) noted that predicting the effects of teacher expectancy is difficult since the expectations interact with beliefs about learning and instruction to determine teacher behavior. In addition, he posited that teacher expectancy effects impact student achievement either up, for high expectations, or down, for low expectations by about 5% to 10%.

Lynott and Woolfolk (1994) examined the correlation between inservice teachers' conceptions of intelligence and certain educational goals. They found significant correlations between the intelligence factors and the educational goals. The researchers noted that the strongest correlations were between each factor of intelligence and its complimentary category of educational goal. For example, conceptual thinking was most strongly related to the conceptual goal.

This study also found significant correlations between the intelligence factors and the educational goals as well as between the giftedness factors and the educational goals. All of the intelligence factors and all of the giftedness factors were correlated with at least one educational goal factor. Based upon the teacher expectancy research, this study examined the explanatory ability of the intelligence factors in relation to the educational goals and the ability of the giftedness factors in relation to the educational goals. The regression analysis for the intelligence factors indicated that the learning/motivation intelligence factor provided the greatest explanatory ability with each of the educational goals. Interestingly, the intelligence factors were able to explain between 6% to 10% of the variation in the conceptual goals. Similarly, the learning/motivation factor for the giftedness factors provided the greatest explanatory power with each of the educational goals. The giftedness factors were able to explain between 4% to 8% of the variation in the conceptual goals. Both of these findings are similar to Brophy's (1983) finding that teacher expectancy and beliefs explain student achievement between 5% and 10%. Although impact on student

achievement was beyond the scope of this research, given the strong connection between teacher expectancy and student achievement noted in previous research, an argument can be made that teachers' conceptions of intelligence and conceptions of giftedness can impact teachers' behavior toward students and, thus, impact student achievement.

Implications

This study has several implications for preservice teacher education and for research on preservice teachers' conceptions of intelligence and giftedness. This study helps to illuminate preservice teachers' conceptions of intelligence and giftedness. As Gall et al. (1996) note, it is important to understand a phenomenon before attempting to explain or change that phenomenon. This study has described five factors that characterize preservice teachers' conceptions of intelligence and four factors that characterize their conceptions of giftedness. These factors are similar to, but not identical to, previous research outlining both laypersons' and teachers' conceptions of intelligence (Lynott & Woolfolk, 1994; Sternberg, et al., 1981) and teachers' conceptions of giftedness (Busse et al., 1986a; Busse, Dahme, Wagner, & Wieczerkowski, 1986b). This study has extended previous research by examining the impact of demographic variables such as major, sex and race. In particular, the finding that race is related to preservice teachers conceptions of intelligence and giftedness may help to explain the underrepresentation of minority students in gifted education.

The finding that preservice teachers have trouble distinguishing between conceptions of intelligence and conceptions of giftedness has direct bearing upon teacher education. The limited exposure that preservice teachers receive about gifted education may bear directly upon their behavior toward students identified as gifted. VanTassel-Baska (1998) found that teachers without special training in the education of gifted learners are often uninterested and even hostile to the needs of this group of students. This study's findings that preservice teachers' conceptions of intelligence and giftedness can explain between 4% to 10% of the variability in preservice teachers' support for certain educational goals, indicates that these future teachers' expectations could have direct impact upon their future students' achievement. Without proper understanding of the variability of students within gifted education, gifted students deemed to be underachieving and non-conformist by preservice teachers, may be considered to be unworthy of being gifted (Ribich et al., 1998). According to Brophy (1983), teachers with a negative expectation about certain students could negatively impact those students' achievement by 5% to 10%.

Given that teacher expectations do impact behavior toward students, and given this study's finding that conceptions of intelligence and giftedness are related to preservice teachers' support for certain educational goals, then it is important for teacher educators to address preservice teachers' conceptions of intelligence and giftedness. This could most easily be addressed by requiring preservice teachers to take an introductory course in gifted education. However,

given the already full teacher education curriculum and state legislation mandating a limited number of hours for undergraduate degree programs, this alternative may not be feasible. Another strategy may be to restructure existing courses such as those designed to address including students with disabilities in general education classrooms. Rather than focusing upon the disability, these courses could more broadly emphasize the continuum of learning abilities by exploring the multiple theories about intelligence and learning. Providing preservice teachers with an increased exposure and understanding about intelligence may help to expand their interpretive lens about all exceptionalities including gifted education. A similar restructuring could occur for introductory special education courses, thus increasing special education preservice teachers' ability to meet the needs of twice exceptional students such as those who are gifted *and* learning disabled.

Limitations

The most significant limitation for this study is the use of a convenience sample. It is generally preferred that some form of a random sampling procedure be utilized in order to generalize the sample results to the larger population. According to Henry (1990), convenience samples add uncertainty to the generalizability of the sample results and can be influenced by confounding variables; therefore, the "credibility of the findings is also at risk" (p. 24). Gall et al. (1996) also caution the use of convenience samples. They do note, however, that inferential statistics can be used if the sample is "carefully conceptualized to

represent a particular population" (p. 229). Although the courses to which the questionnaire was administered covered a cross-section of the three subgroups, the results of the study must still be interpreted with caution. Unintentional bias may have resulted from the willingness of each instructor to allow administration of the questionnaire or not.

Another limitation is the study's heavy reliance upon gathering data through a questionnaire. While quantitative measures provide a picture of the phenomena being studied, it is but one method for collecting information about the phenomena. In addition, quantitative measures may not provide as rich an understanding as other less quantitative measures such as interviews or focus groups. Although this study included a small sample of face-to-face interviews with preservice teachers, additional interviews could have provided a more detailed and fuller understanding of preservice teachers conceptions of intelligence and giftedness.

Recommendations

The findings of this study support addressing preservice teachers conceptions of intelligence and giftedness in teacher preparation programs. If this study were replicated, the following recommendations are made:

1. Rather than attempting to measure conceptions of intelligence and conceptions of giftedness in one questionnaire, these sections should be divided into two questionnaires that could be administered on different days. Two benefits may result from doing this. First, access may be provided to additional

courses since the questionnaire would take less time to administer (e.g., 15 minutes rather than 30 minutes). Secondly, by splitting the two sections, greater differences between conceptions of intelligence and conceptions of giftedness may emerge. Since these two sections included the same characteristics but with different prompts, respondents may have answered them similarly without really contemplating their answers.

2. Sternberg et al's, (1981) protocol for developing the list of characteristics for intelligence should be used rather than a pre-existing questionnaire. Sternberg et al's. (1981) protocol was implemented in two stages. First, prospective respondents were asked to list characteristics that they associated with intelligence. These lists were collected and developed into a questionnaire that was then administered to a similar group of respondents. By using this type of protocol, the questionnaire incorporates the language used by respondents rather than the language used by the researcher. By examining the lists developed for conceptions of intelligence and conceptions of giftedness, the researcher could begin to determine if the concepts are viewed as similar or not.

3. Since the Renzulli/Hartmann Scale for Rating the Behavioral Characteristics of Superior Students (SRBCSS) is the most widely used behavioral checklist for identifying gifted students, a questionnaire developed from this scale could then be used to determine if preservice teachers' view these characteristics as representative of gifted students.

4. An alternative research design could be to match preservice teachers' questionnaire responses to their responses in a face-to-face interview. This would provide a much fuller description of why individuals saw certain factors of intelligence and giftedness as more characteristic than other factors.

5. This study's finding that preservice teachers' conceptions of intelligence and giftedness are related to their belief in certain educational goals needs to be examined further. Given the research on the impact of teacher expectancy on student achievement, additional research should extend the focus from beliefs to teacher behavior in the classroom. In addition, a longitudinal study would help determine how fixed preservice teachers' conceptions of intellligence and giftedness are. Do these views change as the teacher moves from preservice through their first year and on into their teaching careers?

Chapter Summary

Preservice teachers conceptions of intelligence and giftedness are similar to, but not identical to, laypersons' and inservice teachers' conceptions of these concepts. Demographic characteristics such as major, sex and race have some relation to preservice teachers' conceptions of intelligence and giftedness. The relationship of race may have the greatest bearing upon the underrepresentation of minority students in gifted education. Preservice teachers view intelligence and giftedness as somewhat indistinguishable from one another. This may have serious consequences for those students who are seen as nonconforming to preservice teachers expectations that gifted students are teacher pleasers and

productive students. Additionally, preservice teachers' conceptions of intelligence and giftedness are related to their beliefs about certain educational goals. Given the research documenting the relationship of teacher expectancy on student achievement, this finding bears further investigation documenting the link between expectations, behavior, and student achievement.

Based upon the results of this study, preservice teacher education programs should consider expanding preservice teachers' exposure to research on intelligence and giftedness. Although the limitations of this study require that the results be interpreted with caution, the results may still help teacher educators target the need for exposing preservice teachers' to broader information about these concepts.

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Appendices

Appendix A: Questionnaire

Preservice Teacher Questionnaire: Part 1

There are many different definitions of intelligence. Based on your own personal view, rate the following descriptions below indicating HOW CHARACTERISTIC each is on an ***ideally gifted*** person. Use the following scale for your ratings:

Least characteristic of giftedness 1 2 3 4 5 6 7 8 9 Most characteristic of giftedness

For each description, select a number from 1 (least characteristic of intelligence) to 9 (most characteristic of intelligence) and circle the number in the column beside the description.

	Description	Least								Most
G01	Can think logically	1	2	3	4	5	6	7	8	9
G02	Has a quick intellectual grasp	1	2	3	4	5	6	7	8	9
G03	Is independent	1	2	3	4	5	6	7	8	9
G04	Is intellectually curious	1	2	3	4	5	6	7	8	9
G05	Shows extraordinary achievement in math	1	2	3	4	5	6	7	8	9
G06	Is undisciplined	1	2	3	4	5	6	7	8	9
G07	Has great imagination	1	2	3	4	5	6	7	8	9
G08	Is sensitive	1	2	3	4	5	6	7	8	9
G09	Has precise ideas about the future	1	2	3	4	5	6	7	8	9
G10	Is neurotic	1	2	3	4	5	6	7	8	9
G11	Likes to read	1	2	3	4	5	6	7	8	9
G12	Disturbs teachers' lessons	1	2	3	4	5	6	7	8	9

Appendix A: (Continued)

Preservice Teacher Questionnaire: Part 2

There are many different definitions of giftedness. Based on your own personal view, rate the following descriptions below indicating HOW CHARACTERISTIC each is on an *ideally intelligent* person. Use the following scale for your ratings:

Least characteristic of intelligence 1 2 3 4 5 6 7 8 9 Most characteristic of intelligence

For each description, select a number from 1 (least characteristic of intelligence) to 9 (most characteristic of intelligence) and circle the number in the column beside the description.

	Description	*Least*								*Most*
I01	Can think logically	1	2	3	4	5	6	7	8	9
I02	Has a quick intellectual grasp	1	2	3	4	5	6	7	8	9
I03	Is independent	1	2	3	4	5	6	7	8	9
I04	Is intellectually curious	1	2	3	4	5	6	7	8	9
I05	Shows extraordinary achievement in math	1	2	3	4	5	6	7	8	9
I06	Is undisciplined	1	2	3	4	5	6	7	8	9
I07	Has great imagination	1	2	3	4	5	6	7	8	9
I08	Is sensitive	1	2	3	4	5	6	7	8	9
I09	Has precise ideas about the future	1	2	3	4	5	6	7	8	9
I10	Is neurotic	1	2	3	4	5	6	7	8	9
I11	Likes to read	1	2	3	4	5	6	7	8	9
I12	Disturbs teachers' lessons	1	2	3	4	5	6	7	8	9

Appendix A: (Continued)

	Description	*Least*								*Most*
I13	Is headstrong	1	2	3	4	5	6	7	8	9
I14	Is a tattle tale	1	2	3	4	5	6	7	8	9
I15	Shows behavioral disorders	1	2	3	4	5	6	7	8	9
I16	Shows originality	1	2	3	4	5	6	7	8	9
I17	Pursues goals with persistence	1	2	3	4	5	6	7	8	9
I18	Has no interest in social activities	1	2	3	4	5	6	7	8	9
I19	Prefers to work alone	1	2	3	4	5	6	7	8	9
I20	Is ambitious	1	2	3	4	5	6	7	8	9
I21	Is verbally unskilled	1	2	3	4	5	6	7	8	9
I22	Finds unusual ways to solve problems	1	2	3	4	5	6	7	8	9
I23	Enjoys competition with others	1	2	3	4	5	6	7	8	9
I24	Enjoys learning	1	2	3	4	5	6	7	8	9
I25	Works easily under achievement pressure	1	2	3	4	5	6	7	8	9
I26	Has a poor memory	1	2	3	4	5	6	7	8	9
I27	Undertakes tasks willingly	1	2	3	4	5	6	7	8	9
I28	Is difficult to influence	1	2	3	4	5	6	7	8	9
I29	Very popular with classmates	1	2	3	4	5	6	7	8	9
I30	Is flexible	1	2	3	4	5	6	7	8	9

Appendix A: (Continued)

	Description	*Least*								*Most*
I31	Can withstand stress	1	2	3	4	5	6	7	8	9
I32	Is shy	1	2	3	4	5	6	7	8	9
I33	Show extraordinary achievement in language arts	1	2	3	4	5	6	7	8	9
I34	Is confident that he/she can achieve self-chosen goals	1	2	3	4	5	6	7	8	9
I35	Is creative	1	2	3	4	5	6	7	8	9
I36	Is full of ideas	1	2	3	4	5	6	7	8	9
I37	Is physically immature	1	2	3	4	5	6	7	8	9
I38	Is often sick	1	2	3	4	5	6	7	8	9
I39	Has few social contacts	1	2	3	4	5	6	7	8	9
I40	Shows extraordinary achievement in art	1	2	3	4	5	6	7	8	9
I41	Has high achievement motivation	1	2	3	4	5	6	7	8	9
I42	Agrees mostly with opinions of adults	1	2	3	4	5	6	7	8	9
I43	Shows high drive level	1	2	3	4	5	6	7	8	9
I44	Is egotistical	1	2	3	4	5	6	7	8	9
I45	Is boastful	1	2	3	4	5	6	7	8	9
I46	Is dominant	1	2	3	4	5	6	7	8	9
I47	Pursues a hobby very intensely (outside of school)	1	2	3	4	5	6	7	8	9

Appendix A: (Continued)

	Description	*Least*								*Most*
I48	Is playful	1	2	3	4	5	6	7	8	9
I49	Tries his/her best to do a task as perfectly as possible	1	2	3	4	5	6	7	8	9
I50	Is a poor loser	1	2	3	4	5	6	7	8	9
I51	Is irritable	1	2	3	4	5	6	7	8	9
I52	Prefers to be inconspicuous	1	2	3	4	5	6	7	8	9
I53	Is spontaneous	1	2	3	4	5	6	7	8	9
I54	Is aggressive	1	2	3	4	5	6	7	8	9
I55	Is humorless	1	2	3	4	5	6	7	8	9
I56	Show extraordinary achievement in a foreign language	1	2	3	4	5	6	7	8	9
I57	Likes intellectual games	1	2	3	4	5	6	7	8	9
I58	Is distractible	1	2	3	4	5	6	7	8	9
I59	Can argue effectively	1	2	3	4	5	6	7	8	9
I60	Is self-assured	1	2	3	4	5	6	7	8	9
I61	Is intolerant	1	2	3	4	5	6	7	8	9
I62	Is lively and vivacious	1	2	3	4	5	6	7	8	9
I63	Thinks he/she is something special	1	2	3	4	5	6	7	8	9
I64	Sets the tone in his/her class	1	2	3	4	5	6	7	8	9

	Description	*Least*								*Most*
I65	Show extraordinary achievement in sport	1	2	3	4	5	6	7	8	9
I66	Is more mature mentally than physically	1	2	3	4	5	6	7	8	9
I66	Likes to work on unstructured tasks	1	2	3	4	5	6	7	8	9
I68	Helps classmates	1	2	3	4	5	6	7	8	9
I69	Is younger than most students in the class	1	2	3	4	5	6	7	8	9
I70	Prefers discussions with adults	1	2	3	4	5	6	7	8	9
I71	Tries too hard to conform	1	2	3	4	5	6	7	8	9
I72	Asks many questions	1	2	3	4	5	6	7	8	9
I73	Is very choosy about the friends he/she makes	1	2	3	4	5	6	7	8	9
I74	Is precocious	1	2	3	4	5	6	7	8	9
I75	Is self-critical	1	2	3	4	5	6	7	8	9
I76	Is honest	1	2	3	4	5	6	7	8	9
I77	Is unmanageable	1	2	3	4	5	6	7	8	9
I78	Shows extraordinary achievement in music	1	2	3	4	5	6	7	8	9
I79	Is gifted	1	2	3	4	5	6	7	8	9

Appendix A: (Continued)

Preservice Teacher Questionnaire: Part 3

Below are statements representing different views. Even though you may agree or disagree with both views in a set, select one from each pair with which you can most agree. Circle the number of the statement with which you can most agree.

A) 1. Some students will always be more intelligent than others.
2. All students are potentially intelligent.

B) 1. The most intelligent students may do poorly on tests, but learn from experience.
2. The most intelligent students make few mistakes and generally do well on tests.

C) 1. Intellectual challenges increase intelligence.
2. Intellectual challenges prove who is really intelligent.

D) 1. Information may increase, but the amount of intelligence stays the same.
2. The more students learn, the more intelligent they become.

E) 1. Intelligence is primarily an inherited trait.
2. Intelligence is the result of experiences.

F) 1. Some students cannot be expected to make significant academic progress.
2. All students can make significant academic progress.

G) 1. There is no limit to how much any student can learn.
2. Some students have limited ability.

H) 1. Frequently, low achievers have the ability, but lack effort and self-direction.
2. Frequently, low achievers do not have the ability to achieve.

I) 1. The more a student is taught to think, the more intelligent a student becomes.
2. The more intelligence a student has, the more thinking a student does.

Preservice Teacher Questionnaire: Part 4

Based upon your belief about academic goals in education, indicate the importance of each of the following goals. For each goal circle the number which corresponds to your rating (1 = least important, 9 = most important).

	Goals	*Least*								*Most*
1)	Developing academic mastery in basic skills	1	2	3	4	5	6	7	8	9
2)	Fostering cooperation	1	2	3	4	5	6	7	8	9
3)	Teaching children to be rational problem-solvers	1	2	3	4	5	6	7	8	9
4)	Developing technical knowledge	1	2	3	4	5	6	7	8	9
5)	Developing personal growth	1	2	3	4	5	6	7	8	9
6)	Fostering competitiveness	1	2	3	4	5	6	7	8	9
7)	Teaching students to be hard-working	1	2	3	4	5	6	7	8	9
8)	Developing social adaptiveness	1	2	3	4	5	6	7	8	9
9)	Developing abstract reasoning	1	2	3	4	5	6	7	8	9
10)	Developing critical thinking and understanding	1	2	3	4	5	6	7	8	9
11)	Teaching students to be good citizens	1	2	3	4	5	6	7	8	9
12)	Fostering autonomy	1	2	3	4	5	6	7	8	9

Appendix A: (Continued)

Preservice Teacher Questionnaire: Part 5

1) What is your major? (circle one)
   a) Early childhood education
   b) Elementary education
   c) Physical education
   d) Secondary education: _____(specify area)
   e) Special education: _____ (specify area)
   f) Other (please specify: _____)

2) Where are you in your program? (circle one)
   a) Intern in Fall 2000
   b) Intern in Spring 2001
   c) Intern in Fall 2001
   d) Intern in Spring 2002
   e) Intern in Fall 2002
   f) Intern in Spring 2003

3) Are you currently a parent?
   a) No
   b) Yes
   How old are your children?_____

4) As a student did you receive any of the following services (circle all that apply):
   a) Gifted education services
   b) Special education services for a learning disability
   c) Special education services for a behavioral disorder or emotional handicap
   d) Speech and/or communication therapy
   e) Services for a physical disability
   f) None of the above

5) What is your highest educational attainment?
   a) High school degree or equivalent
   b) Two year college degree (AA, AS, etc.)
   c) Four year college degree (BA, BS, etc.)
   d) Some graduate school
   e) Graduate school degree (MA, MS, JD, Ph.D., etc.)

6) What is your sex? (circle one)
   a) Female
   b) Male

7) What is your age? _____

8) With which racial/ethnic group do you most identify (circle one):
   a) Black (not of Hispanic origin)
   b) Asian
   c) Caucasian (not of Hispanic origin)
   d) Hispanic
   e) Native American/Pacific Islander
   f) Mixed race
   g) Other: _____ (please specify)

9) What is your mother's/primary female guardian's highest educational achievement?
   a) 8th grade or less
   b) Some high school
   c) High school degree or equivalent
   d) Some college
   e) Two-year college degree (AA, AS, etc.)
   f) Four year college degree (BA, BS, etc.)
   g) Some graduate level work
   h) Master's degree (MA, MS, MSW, etc.)
   i) Doctoral degree (Ph.D., Ed.D., Ed.S., M.D., J.D. (lawyer))
   j) No primary female guardian

10) What is your father's/primary male guardian's highest educational achievement?
   a) 8th grade or less
   b) Some high school
   c) High school degree or equivalent
   d) Some college
   e) Two-year college degree (AA, AS, etc.)
   f) Four year college degree (BA, BS, etc.)
   g) Some graduate level work
   h) Master's degree (MA, MS, MSW, etc.)
   i) Doctoral degree (Ph.D., Ed.D., Ed.S., M.D., J.D. (lawyer))
   j) No primary male guardian

Thank you for completing this questionnaire.

Appendix B: Permissions

Taylor, Ella

From: AWOOLFOLK@aol.com
Sent: Sunday, June 4, 2000 8:46 AM
To: ETaylor@tempest.coedu.usf.edu
Subject: Re: Dimensions of Intelligence instrument

In a message dated 6/1/00 1:42:45 PM, ETaylor@tempest.coedu.usf.edu writes:

<< I recently read your article entitled "Teachers' implicit theories of intelligence and their educational goals" published in the Journal of Research and Development in Education with Donna Lynott. I am interested in conducting similar research entirely with preservice teachers for my dissertation. I would like permission to use all 3 of the instruments: Dimensions of Intelligence, Nature of Intelligence and the Educational Goals questionnaire. >>

You have my permission to use anything you need for your dissertation. I will try to locate Lynott's address, but you probably do not need it.

Anita Woolfolk Hoy
Professor
The Ohio State University
159 Ramseyer Hall
29 West Woodruff Ave.
Columbus, OH 43210

office: 614-292-3774
home: 614-488-5064
fax: 614-488-5075

Wed, Jun 28

From: Victoria Murphy <vmurphy@astro.ocis.temple.edu>
To: <eltaylor@tampabay.rr.com>
Date: Wednesday, June 28, 2000 11:40 AM
Subject: Professor Thomas V. Bussey

Ms. Taylor: I am writing in response to your e-mail to Dr. Margaret Wang, Director of the Temple University Center for Research in Human Development and Education. Unfortunately, Dr. Thomas Bussey passed away some years ago. Dr. Wang suggests that you contact Dr. Joseph P. DuCette, Asociate Dean of the College of Education. His office is in Ritter Hall, Room 243. His telephone number is 215-204-7962. If I can be of further assistance, please contact me. Sincerely, Victoria K. Murphy, Secretary-to-the Director

Appendix C: Lynott & Woolfolk's Nature of Intelligence Dimension Questions

Entity

Some students will always be more intelligent than others.

The most intelligent students make few mistakes and generally do well on tests.

Intellectual challenges prove who is really intelligent.

Information may increase, but the amount of intelligence stays the same.

Intelligence is primarily an inherited trait.

Some students cannot be expected to make significant academic progress.

Some students have limited ability.

Frequently, low achievers do not have the ability to achieve.

The more intelligence a student has, the more thinking a student does.

Incremental

All students are potentially intelligent.

The most intelligent students may do poorly on tests, but learn from the experience.

Intellectual challenges increase intelligence.

The more students learn, the more intelligent they become.

Intelligence is the result of experiences.

All students can make significant academic progress.

There is no limit to how much any student can learn.

Frequently, low achievers have the ability, but lack effort and self-direction.

The more as student is taught to think, the more intelligent a student becomes.

Appendix D: Lynott & Woolfolk's Educational Goal Statements

Conceptual goals

Teaching children to be rational problem solvers

Developing abstract reasoning

Critical thinking and understanding

Practical/Academic Goals

Academic mastery in basic skills

Developing technical knowledge

Fostering competitiveness

Teaching students to be hard-working

Fostering autonomy

Social goals

Fostering cooperation

Personal growth

Developing social adaptiveness

Teaching students to be good citizens

July 10, 2000

Ella L. Taylor, M.A./ Daphne Thomas, Ph.D.
Department of Special Education
EDU-162

Dear Ms. Taylor and Dr. Thomas:

Your new protocol (**IRB #99.141**) entitled,

"Preservice Teacher's Conceptions of Intelligence and Giftedness"

has been approved under Exempt Category number two (2). This action will be reported at the next convened IRB-02 meeting on July 21, 2000.

If you have any questions regarding this matter please do not hesitate to call my office at 974-5638.

Sincerely,

Louis Penner, Ph.D.
Chairperson, IRB-02

LP: amr
cc: FAO

Office of Research, Division of Research Compliance
Institutional Review Boards, MPA No. 1284-01/M1284-02XM
University of South Florida • 12901 Bruce B. Downs Blvd., MDC 035 • Tampa, Florida 33612-4799
(813) 974-5638 • FAX (813) 974-5618

February 26, 2001

Ella L. Taylor, M.A./ Daphne Thomas, Ph.D.
Department of Special Education
EDU-162

Dear Ms. Taylor and Dr. Thomas:

Your Change in Procedure [IRB #99.141] for your protocol entitled,
"Preservice Teacher's Conceptions of Intelligence and Giftedness"

Included the following changes:

- Revisions/modifications to the protocol: two items have changed since the initial IRB. First, originally the number of participants was estimated to be 400. The revised estimate of participants is 800. The second change is the addition of a face-to-face interview with selected participants. Individuals who volunteer for this component will be contacted by phone to set up an interview. Therefore, a consent form has been added that subjects will sign that details the study, interview procedure, tape recording of the interviews, etc.

Please note: Due to the above referenced changes, the category in which this study was originally approved has changed from Exempt category number two (2), to Expedited category numbers six and seven (6,7). Therefore, a consent form will be used for both the interview portion as well as the questionnaire portion.

- Approval is for up to a twelve-month period. A Research Progress Report to request renewed approval must be submitted to this office *by the submission deadline in the eleventh month of this approval period.* A final report must be submitted if the study was never initiated, or you or the sponsor closed the study.
- Any changes in the above referenced study may not be initiated without IRB approval except in the event of a life-threatening situation where there has not been sufficient time to obtain IRB approval.
- All changes in the protocol must be reported to the IRB.
- If there are any adverse events, the Chairperson of the IRB must be notified immediately in writing.

The Institutional Review Board under expedited review approved these changes. This action will be reported at the next convened IRB-02 meeting on March 23, 2001. If you have any questions or comments please telephone me at 974-5638.

Sincerely,

Louis Penner, Ph.D.
Chairperson, IRB-02

LP: amr

cc: FAO

APPROVED THRU
JAN 2002
USF-02 INSTITUTIONAL REVIEW BOARD IRB#1284-02XM

Submit your Research Progress Report by the submission deadline *one month prior to the above date.* Failure to meet this deadline will result in closure of this study.

Office of Research, Division of Research Compliance
Institutional Review Boards, HPA No. 1284-01/IRB1284-02XM
University of South Florida • 12901 Bruce B. Downs Blvd., MDC 035 • Tampa, Florida 33612-4799
(813) 974-5638 • FAX (813) 974-5618

Amndexp.doc

Social Sciences/Behavioral Adult Informed Consent (Interview Portion)

University of South Florida

Information for People Who Take Part in Research Studies

The following information is being presented to help you decide whether or not you want to be a part of a minimal risk research study. Please read carefully. If you do not understand anything, ask the Person in Charge of the Study.

Title of Study:	***Preservice teachers conceptions of intelligence and giftedness***
Principal Investigator:	Ella L. Taylor
Study Location(s):	University of South Florida, Tampa, Florida

You are being asked to participate because you are a preservice teacher currently enrolled in a College of Education undergraduate course.

General Information about the Research Study

The purpose of this research study is to determine how preservice teachers think about intelligence and giftedness.

Plan of Study

- You are being asked to participate in an interview designed to examine preservice teachers' conceptions of intelligence and giftedness. The interview will take approximately 45 minutes. The interview will be tape-recorded.

- **Payment for Participation**
  You will not be paid for participation in this study.

Benefits of Being a Part of this Research Study

- You will not directly benefit from participating in this study. However, by taking part in this research study, you may increase our overall knowledge of how preservice teachers think about intelligence and giftedness.

Risks of Being a Part of this Research Study

- There are no known risks or harm based upon participation in this study.

Confidentiality of Your Records

- Your privacy and research records will be kept confidential to the extent of the law. Authorized research personnel, employees of the Department of Health and Human Services and the USF Institutional Review Board may inspect the records from this research project.

The results of this study may be published. However, the data obtained from you will be combined with data from other people in the publication. The published results will not include your name or any other information that would in any way personally identify you.

Safeguards to protect your confidentiality will be taken with the audiotapes. No code names or numbers will be used to identify you. The tape-recorded interviews and the transcribed interviews will be kept in a locked file cabinet in the Principal Investigator's office. Upon completion of the study, the tapes will be destroyed.

Volunteering to Be Part of this Research Study

- Your decision to participate in this research study is completely voluntary. You are free to participate in this research study or to withdraw at any time. If you choose not to participate, or if you withdraw, there will be no penalty or loss of benefits that you are entitled to receive.

Questions and Contacts

- If you have any questions about this research study, contact Ella Taylor (813-974-7007).

- If you have questions about your rights as a person who is taking part in a research study, you may contact a member of the Division of Research Compliance of the University of South Florida at 813-974-5638.

Your Consent—By signing this form I agree that:

- I have fully read or have had read and explained to me this informed consent form describing a research project.
- I have had the opportunity to question one of the persons in charge of this research and have received satisfactory answers.
- I understand that I am being asked to participate in research. I understand the risks and benefits, and I freely give my consent to participate in the research project outlined in this form, under the conditions indicated in it.
- I have been given a signed copy of this informed consent form, which is mine to keep.

Signature of Participant	Printed Name of Participant	Date

Investigator Statement

I have carefully explained to the subject the nature of the above protocol. I hereby certify that to the best of my knowledge the subject signing this consent form understands the nature, demands, risks and benefits involved in participating in this study.

Signature of Investigator Or Authorized research investigators designated by the Principal Investigator	Ella L. Taylor Printed Name of Investigator	Date

Institutional Approval of Study and Informed Consent

This research project/study and informed consent form were reviewed and approved by the University of South Florida Institutional Review Board for the protection of human subjects. This approval is valid until the date provided below. The board may be contacted at (813) 974-5638.

IRB# 99.141

Rev 9/99

APPROVED THRU
JAN 2002
USF-IRB INSTITUTIONAL REVIEW BOARD

Social Sciences/Behavioral Adult Informed Consent (Questionnaire Portion)

University of South Florida

Information for People Who Take Part in Research Studies

The following information is being presented to help you decide whether or not you want to be a part of a minimal risk research study. Please read carefully. If you do not understand anything, ask the Person in Charge of the Study.

Title of Study:	***Preservice teachers conceptions of intelligence and giftedness***
Principal Investigator:	Ella L. Taylor
Study Location(s):	University of South Florida, Tampa, Florida

You are being asked to participate because you are a preservice teacher currently enrolled in a College of Education undergraduate course.

General Information about the Research Study

The purpose of this research study is to determine how preservice teachers think about intelligence and giftedness.

Plan of Study

- If you choose to participate in this study, you will be asked to complete a questionnaire designed to examine preservice teachers conceptions of intelligence and giftedness. Questionnaire completion will take approximately 30 minutes.

- **Payment for Participation**
  You will not be paid for participation in this study.

Benefits of Being a Part of this Research Study

- You will not directly benefit from participating in this study. However, by taking part in this research study, you may increase our overall knowledge of how preservice teachers think about intelligence and giftedness.

Risks of Being a Part of this Research Study

- There are no known risks or harm based upon participation in this study.

Confidentiality of Your Records

- Your privacy and research records will be kept confidential to the extent of the law. Authorized research personnel, employees of the Department of Health and Human Services and the USF Institutional Review Board may inspect the records from this research project.

  The results of this study may be published. However, the data obtained from you will be combined with data from other people in the publication. The published results will not include your name or any other information that would in any way personally identify you.

  Safeguards to protect your confidentiality will be taken with the audiotapes. No code names or numbers will be used to identify you. The tape-recorded interviews and the transcribed interviews will be kept in a locked file cabinet in the Principal Investigator's office. Upon completion of the study, the tapes will be destroyed.

Volunteering to Be Part of this Research Study

- Your decision to participate in this research study is completely voluntary. You are free to participate in this research study or to withdraw at any time. If you choose not to participate, or if you withdraw, there will be no penalty or loss of benefits that you are entitled to receive.

Questions and Contacts

- If you have any questions about this research study, contact Ella Taylor (813-974-7007).

- If you have questions about your rights as a person who is taking part in a research study, you may contact a member of the Division of Research Compliance of the University of South Florida at 813-974-5638.

Your Consent—By signing this form I agree that:

- I have fully read or have had read and explained to me this informed consent form describing a research project.
- I have had the opportunity to question one of the persons in charge of this research and have received satisfactory answers.
- I understand that I am being asked to participate in research. I understand the risks and benefits, and I freely give my consent to participate in the research project outlined in this form, under the conditions indicated in it.
- I have been given a signed copy of this informed consent form, which is mine to keep.

Signature of Participant	Printed Name of Participant	Date

Investigator Statement

I have carefully explained to the subject the nature of the above protocol. I hereby certify that to the best of my knowledge the subject signing this consent form understands the nature, demands, risks and benefits involved in participating in this study.

Signature of Investigator Or Authorized research investigators designated by the Principal Investigator	Ella L. Taylor Printed Name of Investigator	Date

Institutional Approval of Study and Informed Consent

This research project/study and informed consent form were reviewed and approved by the University of South Florida Institutional Review Board for the protection of human subjects. This approval is valid until the date provided below. The board may be contacted at (813) 974-5638.

IRB# 99.141

Rev 9/99

APPROVED THRU
JAN 2002
USF-92.9 INSTITUTIONAL REVIEW BOARD 92-124-92-U

Appendix F: Interview protocol

Interviewer welcomes participant and thanks for participation in interview.

Interviewer: This interview is designed to get at your beliefs about intelligence and giftedness. There are no right and wrong answers. I'm going to start off by asking you some basic questions and then we'll move into talking about intelligence and giftedness.

Interviewer: What is your age?

Interviewer: Do you have children?
If yes, how many?

Interviewer: Do you identify with any particular ethnicity?

Interviewer: When you think back to your own K-12 education, did you receive any gifted education services?

Interviewer: Did you receive any speech or communication therapy?

Interviewer: Did you receive any services for LD or EH?

Interviewer: When are you scheduled to do your final internship?

Interviewer: Now, I'd like to move us into talking about intelligence. I'd like you to think of someone who you think is intelligent. Let me know when you've thought of someone.

Interviewer: Okay, now I'd like you to share examples with me of why you think that person is intelligent? (Probe as needed.)

Interviewer: Can you describe what the person looks like? (Probe for details if not provided.)

Interviewer: When you think about your own definition of intelligence, regardless of anything that you've read, how would you define intelligence? (Probe as needed).

Interviewer: Now, I'd like you to think about someone you believe is gifted. Let me know when you've thought of someone.

Interviewer: Okay, now I'd like you to share examples with me of why you think that person is gifted? (Probe as needed.)

Appendix F (Continued)

Interviewer: Can you describe what the person looks like? (Probe for details if not provided.)

Interviewer: When you think about your own definition of giftedness, regardless of anything that you've read, how would you define giftedness? (Probe as needed).

Interviewer: Is there anything else you'd like to share about either intelligence or giftedness?

Interviewer: Thanks for participating in this research.

About the Author

Ella Taylor received a Bachelor's Degree in Political Science from the University of South in 1983. She started her teaching career while working as a research associate for the Center for the American Woman and Politics at Rutgers University. In 1989, she began teaching as an adjunct in political science and women's studies. After working as a campaign manager, she decided to pursue a Master's Degree in Gifted Education at USF. She received her Master's in 1995 and opted to pursue a doctorate in interdisciplinary education with an emphasis in gifted education and teacher education.

While in the Ph.D. program, Ms. Taylor coordinated the USF online master's degree program in gifted education and was very active in the development of professional development seminars for undergraduate students in special education. Ms. Taylor has presented at numerous state and national conferences. Her research interests are preservice teacher education and gifted education.