PARENTAL DECISION-MAKING REGARDING THEIR CHILD'S PARTICIPATION IN A MIDDLE-SCHOOL TALENT SEARCH

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The present study sought to identify variables that predicted parental decision-making regarding their child's participation in a national gifted and talented identification program for middle school students and subsequent participation in recommended educational options. One hundred sixty-nine parents of students who qualified for either the 2001-2002 or 2002-2003 Duke Talent Identification Program participated in the study. The students were drawn from two large public school districts and six small private schools in a large metropolitan area in the southwestern United States.

Both quantitative and qualitative methods were used to identify the variables predictive of parental decision-making regarding talent search participation. Each parent completed a questionnaire consisting of both multiple-choice and open-ended questions. Selected parents participated in structured follow-up interviews.

The results of the study indicated that parental perception of the helpfulness of school personnel in explaining the purpose and process of the talent search was most predictive of participation in the talent search. The educational level of the father, parent's prior awareness of the purpose and process of talent search, and the number of enrichment activities in which the child had previously participated were also predictive of talent search participation. Qualitative data indicated that parents of both participants and nonparticipants had a limited understanding of the purpose, diagnostic

power, and potential benefits of the talent search. Very few parents chose to seek extracurricular or curricular/instructional options following the talent search testing. Qualitative data indicated that parents did not choose these options due to cost, logistical concerns regarding the special programs, and reservations about the developmental appropriateness of such options for middle school students.

Although talent searches are sponsored and administered by organizations outside the local school, this study suggests that parents mostly rely on their local school for notification of their child's nomination, information on the purpose and benefits of talent search, interpretation of test scores, and guidance in selecting appropriate curricular or extracurricular follow-up.

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CHAPTER I

INTRODUCTION

The definitions of giftedness and talent have been as varied as the course of human history. The exceptional visual or performing artist, the warrior, the engineer, the philosopher, or the orator have been at various times and in various cultures considered the gifted and talented. "There has to be a perfect match between a person's particular talent and the readiness of society to appreciate it" (Tannenbaum, 1988, p. 21). Relative to human history, the valuing of *academic* talent is a recent occurrence.

Fascination with academic precocity grew in the first half of the twentieth century with the advent of instruments capable of measuring an individual's intelligence (Sayler, 1999). Armed with a legitimate means of determining high ability, Terman and his colleagues launched the first longitudinal study of gifted children. The Terman studies are universally recognized as the catalyst for the subsequent years of study focusing on giftedness (Coleman, 1999). Yet, despite the impact of the Terman studies, they were, by nature, descriptive (Clark, 1992); Terman observed high ability in its natural habitat, with no intention of intervening in its expression.

Hollingworth, a contemporary of Terman, was the first to systematically study children of extraordinarily high intelligence (Hollingworth, 1942; Morelock & Feldman, 1997). Although Terman found that children who scored in the highest percentile of an IQ test were more likely to be high achievers in school and beyond than children with scores in the average range, Hollingworth detected substantial differences in

achievement of those scoring within the top decile (Tannenbaum, 1988). Hollingworth examined college records of children with superior IQ scores and found that those with IQ scores greater than 160 achieved to a greater degree than did those with scores of 140, while those with scores of 180 or more achieved to the greatest degree of all.

Like Terman, Hollingworth's studies were exclusively descriptive. She noted three major adjustment problems experienced by children of above 180 IQ (Morelock & Feldman, 1997). First, they failed to develop desirable work habits when placed in a school setting geared to the needs of average children. They spent much of the day idle, and disliked school. Next, Hollingworth noted that these children had difficulty finding satisfactory friendships. Although the IQ-180-or-more children sought out agemates with whom to be friends, their efforts often failed due to lack of common interests. The third problem area noted by Hollingworth was the exceptional child's ability to understand complex ethical and philosophical issues before they were emotionally able to cope with them. To have "the intelligence of an adult and the emotions of a child combined in a childish body" (Hollingworth, 1942, p. 282) was a formula for difficulty.

Terman and Hollingworth's work in identifying, describing, and analyzing talent was groundbreaking, but making predictions regarding the potential of talent not yet developed is less clear and perhaps riskier (Tannenbaum, 1988). Using test scores first to identify high ability and then to develop those aptitudes into talent commenced during the 1940s. The advent of World War II necessitated rapid training of individuals for highly technical skills, such as military pilot. The U.S. Army began to use

experimentally an ability test, the Army General Classification Test (AGCT), to predict talent in a particular area (Ackerman, 1995). The experiment was successful. A high correlation between test scores and job success and final army rank was found. In addition, many high school graduates scored as well as college graduates on the AGCT, so it was not just a test of learned information or skills. Publication of these results lead educational leaders to conclude that a high degree of innate intelligence was present in many individuals, that this intelligence was not being developed, and that testing was a useful tool in determining who would benefit from an expansion of educational opportunities (Ackerman, 1995).

The decade of the 1950s initiated a national drive to identify and develop talent as a means to technological and scientific supremacy (Dow, 1996). Motivated by the launch of the Soviet satellite *Sputnik* and the desire to be first in the world scientifically and technologically, the federal government entered the arena of gifted and talented education. The National Defense Act of 1958 provided assistance to the states in the form of testing, counseling, and guidance of able students, particularly in the areas of science and math (Ross, 1997).

The following two decades, the 1960s and 1970s, were characterized by attention to individual educational needs, including minority populations, the economically disadvantaged, as well as gifted and talented students. The 1972 Marland report by the U.S. Commissioner of Education outlined glaring deficiencies in the education of gifted children in America (Marland, 1972). A central tenet of the report was the lack of specialized programming designed for highly academically able children.

Federal legislation (along with federal funding) supporting the training of educators for the gifted and talented followed the publication of the Marland report. The emerging field of gifted education thus focused primarily on training, with little emphasis on research-based program development (Van Tassel-Baska, 1996).

As a consequence of the lack of focus on program development, education for the gifted evolved essentially modeled on the special education resource room (Callahan, 2001). As with other special education programs, IQ scores and teacher recommendations were the fundamental components of gifted identification. Gifted students were typically served in pull-out programs, often in a separate classroom from their homeroom, usually for less than 100 minutes per week (Van Tassel-Baska, 1996). The curriculum for gifted programming was typically content-free, process oriented, and completely separated from the general curriculum of the school (Callahan, 2001; VanTassle-Baska, 1996).

The Study of Mathematically Precocious Youth

Concurrent with the evolution of process oriented, content-free gifted programming was a divergent branch of thought originating with a chance event on the campus of Johns Hopkins University. Faced with the task of challenging an extremely precocious 13-year-old boy in a summer computer class, Julian Stanley administered the College Board Scholastic Aptitude Test (SAT) in an attempt to determine the ceiling of the boy's abilities (Stanley, 1996). The boy's stellar performance led Stanley to seek out educational options for the boy commensurate with his exceptional abilities. Unlike Terman, Stanley wished to intervene in the education of this precocious child. Stanley's

experience with this and one other highly precocious boy prompted him to seek other youths who reasoned exceptionally well mathematically (Stanley, 1996). With a grant from the Spencer Foundation, Stanley found more boys and girls who reasoned exceptionally well mathematically by using the SAT, and initiated programs on the Johns Hopkins campus to further develop their talents. Thus began the Study of Mathematically Precocious Youth (SMPY). The SMPY model diverged from the prevalent model of general gifted identification and programming geared to general enrichment to a model of identification and programming focused on specific aptitudes and aptitude-directed, content-rich programming.

The SMPY model was conceptualized as a "talent search" (Olszewski-Kubilius, 1998a). The concept spread to other universities, which began their own talent searches to identify pools of mathematically and verbally exceptional middle school students using college entrance exams. University-based talent searches support the SMPY goal of intervention by offering counseling, networking, and special programming to students identified as exceptionally talented in specific content areas. Today, there are four major regional and several state or university-based talent searches in the United States and more than 200,000 students are assessed annually (Rotigel & Lupkowski-Shoplik, 1999).

Calls for Reform in Gifted Education

Although talent searches have grown and expanded tremendously, they are not within the domain of the local school system. As such, talent searches are an auxiliary means of identifying and developing academic talent for many schools. The

predominant model of gifted programming is still the pull-out program based on global IQ (Bernal, 2003; Gallagher, 2000; Shore, Cornell, Robinson, & Ward, 1991).

Pull-out programs, with a few exceptions (Renzulli, Reis, & Smith, 1980), necessitate identifying students as "in or out." This all-or-nothing, you-have-it-or-you-don't approach to identification has contributed to accusations of elitism, an anathema to egalitarian American society (Gottfredson, 2001). Pull-out programs that were estranged from the regular curriculum and focused on processes were often seen as insubstantial (Van Tassel-Baska, 1996). In addition, the gifted curriculum (broad-based issues, thematic studies, problem-solving, and higher level thinking skills) taught in these separate classes was arguably appropriate for the general population of students (Callahan, 2001).

Within the ranks of educators of the gifted, debate also arose. The term "gifted" was viewed as tainted, and some sought more appropriate terminology. "Talent" and "talent development" began to be used as synonyms for "gifted." Talent development was touted as the successor to gifted education (Treffinger & Feldhusen, 1996). An entire issue of *Educational Forum* (Feldhusen, 1995a) was devoted to the talent development versus gifted education dilemma. Not all educators sought to drop the term gifted altogether; instead, they opted to clarify and differentiate between gifts and talents and incorporate both into a conception of programming (Gagné, 1995; 1997; Piirto, 1995). Contemporary calls for reform in gifted education include clarification of gifts and talents, and a focus on content-rich, curriculum-related programming (Callahan, 2001; Massé, 2001).

The Talent Search Model

The talent search model, as pioneered by Stanley, is introduced in the present study as a model of identification and development of academic talent. The talent search model incorporates conceptions of giftedness and talent supported in the literature and is consistent with developmental learning theories such as those of Hunt (1961), Vygotsky (1978), and Csikszentmihalyi (1990).

Talent searches focus on identifying high ability in specific aptitudes: mathematical or verbal. The largest talent searches seek exceptional talent through a two-step process. The first step is to find those middle-school students who score in the top 3-5% of on-grade-level achievement tests. Then, using tests designed for much older students, such as the Scholastic Aptitude Test (SAT), differences in ability and performance are found among the students selected in the first step. Thus, exceptional students capable of working several grade levels ahead are identified from a pool of high on-level performers. The talent search model emphasizes appropriate educational opportunities based on aptitude, not chronological age (Olszewski-Kubilius, 1998a).

Currently, four universities in the United States conduct annual regional talent searches based on the SMPY talent search model. Local schools provide lists of students who qualify for talent search, but that is where their involvement ends. Students are invited directly by the regional talent search university to test for the talent search. Parents must evaluate the option, determine the benefits for their child, and decide whether or not to have their child participate. Once the testing is completed, parents

decide whether or not they will seek educational opportunities or interventions for their child based on the results of talent search testing and recommendations.

Purpose of the Study

This study proposes to look at parental decision-making regarding one regional talent search, the Duke University Talent Identification Program (TIP). Participation is voluntary, consequently some qualified students received the more rigorous assessment and others did not. It is likely that some of the students who did not participate in the Duke TIP would have earned higher scores on the SAT or ACT than did participating students. Even after parents make the choice to have their child tested, they face additional decisions based on the information received from TIP:

1) Parents accept and follow the educational training options proposed by the talent search. For the purposes of this study, educational options are defined as either extra-curricular (outside of the regular school setting) or curricular/instructional (within the school setting). Research indicates that not all options are appropriate for all TIP participants, but a range of options, based on a participant's specific level of SAT or ACT scores, are recommended to children and their parents.
2) Parents choose not to employ/seek out curricular or extra-curricular educational options.

Similar to the consequences of the decision to participate in the testing, participants whose parents did not pursue educational options following participation in the TIP may have had scores equal to or higher than students whose parents did select

to pursue educational options. Therefore, the purpose of this study is to identify factors that influence parental decision-making concerning participation in talent searches such as the TIP program and to identify factors that influence parental decisions to seek out extra-curricular options and/or curricular/instructional options following participation in testing.

Definition of Terms

The present study examines parental decision-making regarding student participation in talent search, a model of identification and academic talent development for gifted students. Parents may or may not seek out educational options for their child following participation in talent search. For the purposes of the present study, educational options are defined as either extra-curricular (outside of the regular school setting) or curricular/instructional (within the school setting).

Gifted

Giftedness is defined in the present study according to Gagné's (2000) conception of natural abilities in at least one ability domain to a degree that places the individual in the upper 14 % of age peers (1 standard deviation above the mean).

Talented

Talented is defined in the present study according to Gagné's (2000) conception of systematically developed abilities or knowledge in at least one field that places the individual in the upper 14 % of age peers (1 standard deviation above the mean).

Subject Acceleration

A curricular/instructional option in which a student is placed with students at a more advanced grade level for one or more subjects, without being officially assigned to the higher grade level (Southern & Jones, 1991). For example, a seventh grader is placed in an algebra I or geometry class.

Grade Acceleration

Also known as grade-skipping, grade acceleration is a curricular/instructional option that moves a student ahead of an age-determined grade placement (Southern & Jones, 1991). For example, at the end of seventh grade, a student skips eighth grade and goes directly into ninth grade.

Curriculum Compacting

Curriculum compacting is an instructional option in which students are pretested or preassessed for prior mastery of learning objectives. The materials mastered are not taught further thereby eliminating needless instruction and practice, and the time saved is used for enrichment or acceleration (Reis, Burns, & Renzulli, 1992).

Advanced Placement (AP) Course

A curricular/instructional option from the College Board in which college courses are taken in high school that prepare a student for an examination. Universities give credit for performance on these examinations if the student scores sufficiently high. (Southern & Jones, 1991).

Early College Entry

Although early college entry is an option exercised outside of the regular secondary school setting, it is considered a curricular/instructional option because it takes the place of the regular school. Students enter college at least one year before the typical age of college entry (Southern & Jones, 1991). This may be accomplished in several ways: leaving high school early without a diploma (Benbow & Stanley, 1983); graduating from high school early due to grade and/or subject acceleration (Benbow & Stanley, 1983); entering a transitional program on a college campus (Benbow & Stanley, 1983; Olszewski-Kubilius, 1998c; Noble & Drummond, 1992); or, entering a college program that simultaneously grants a high school diploma and college credit (Sayler, 1993).

Fast Paced Classes

Fast paced classes are typically extracurricular and are offered through special programs often in the summer or on weekends on university campuses (Southern & Jones, 1991). Students master a full year of high school subject matter in approximately three weeks (Stanley, 1996). Fast paced classes generally use Stanley's (Benbow & Lubinski, 1997) diagnostic testing-prescriptive instruction model to individualize instruction.

Enrichment

Although enrichment is the common method of curricular adjustment in schools, most of the enrichment options recommended in the talent search model are exercised outside of the regular school setting and are therefore considered extracurricular (i.e.,

competitions, summer classes, on-line courses, and mentorships). Enrichment may be in the form of strategies or programming and it implies a deeper, broader, and more varied approach than is typical in the regular curricular offerings (Schiever & Maker, 1997).

Variables

This study looked at to look at several variables that may predict parental decision-making regarding participation in the TIP, participation in educational options, and type of educational options chosen. For all parents, regardless of whether or not their child actually tested for TIP, the following variables were investigated:

1. Private versus public school attendance. It is widely assumed that parents who choose private schooling are more likely to be intricately involved in their child's education (Furst, 1993; Skandera & Sousa, 2001). Although this may be true, does it follow that parents of private school students will voluntarily opt for out-of-level testing and appropriate follow-up? Might the claims made by most private schools of selective admissions and a rigorous curriculum persuade parents that the needs of the academically exceptional are being addressed? Might parents of public school students be more attuned to and comfortable with the routine grouping or special classes for students based on needs (language, disabilities, giftedness)? Since routine assumptions may or may not hold true, this variable warranted investigation.
2. Identification as "gifted and talented." Is the child currently identified as gifted and talented, or has he/she ever been identified? Knowledge of this

variable may give insight into the impact of the gifted label on parental decision-making. Might parents of identified children be more likely to encourage TIP participation and educational options? Might they be satisfied with the status quo? Might parents of bright, yet never identified children view the invitation to participate in TIP as a fluke, or as validation of their child's abilities?

3. Degree of participation in ability-grouped classes. Has the child attended a school with homogeneous ability grouping? When ability grouping was practiced, how often was the child placed in a high or top group for any subject? In which subjects was the child in a top group? Was the placement recent, or in the earlier years of schooling? Knowledge of this variable may give insight into how grouping practices influence parental decisions.
4. Number of previous grade or subject accelerations. Has the child ever skipped a grade? How many? Has the child ever attended a particular subject in a higher grade level? How often? Knowledge of this variable may give insight into how acceleration affects parental decision-making.
5. Number of previous extra-curricular experiences. How many extra-curricular experiences (nonphysical activity) have the parents provided for the child since kindergarten? This variable includes enrollment in workshops, classes, or camps for art, music, language, foreign language, science, math, reading, library programs, or any nonphysical activity. Knowledge of this variable will

provide insight as to how participation in extra-curricular experiences influences parental decision-making regarding TIP.

6. Degree of awareness of the Duke TIP or other talent searches prior to the child's invitation to participate. Do the parents have knowledge of any other child (their own or someone else's) who have been invited to participate? Were they aware of the talent search program before their child was invited to participate? Knowledge of this variable may give insight into how awareness of TIP influences parental decision-making regarding participation in TIP.
7. Reception of formal or informal encouragement or information about TIP from school personnel in addition to the information provided by talent search rather than reception of search materials only. Knowledge of this variable may give insight into how school encouragement influences parental decision-making regarding testing.
8. Entered kindergarten upon eligibility rather than being held out because of age/maturity (academic red shirting). This variable may be an indicator of parental reluctance to push or hurry a child, a factor associated with hesitance to utilize accelerative approaches, such as out-of-level testing.
9. Student grades. Knowledge of this variable may give insight into the influence of a student's grades on parental decisions regarding TIP.

10. Educational level of the mother and father. Knowledge of this variable will give insight as to the effects of parents' educational level on parental decision-making regarding TIP.

In addition to the preceding variables, the following variables were examined for parents of students who tested for TIP:

1. Level of ability as measured by the SAT or ACT score. Knowledge of the composite seventh grade SAT or ACT score will give insight as to the effects of SAT or ACT scores on parental decision-making regarding follow-up to TIP testing.
2. Award of State or National Recognition for outstanding score. This variable will give insight as to the effects of awards on parental decision-making regarding follow-up to TIP testing.
3. Attendance at award ceremonies. This variable will give insight as to the effects of attendance at an award ceremony on parental decision-making regarding follow-up to TIP testing.

Research Questions

This study addressed the following six research questions concerning parental decision-making related to their child's participation in the Duke Talent Identification Program and subsequent actions taken by parents of participants. The first three questions were addressed quantitatively.

1. What impact do various factors have on parental decision-making regarding participation in the Duke Talent Identification Program? Factors investigated

included: private rather than public school enrollment (PS), past participation in homogeneous ability grouped classes (PAG), recent participation in homogeneous ability grouped classes (RAG), identification as gifted (GT), grade acceleration (GA), subject acceleration (SA), previous enrichment experiences (XC), middle school grades (GR), school-provided information about TIP (IN), prior awareness of TIP (AW), perceived helpfulness of school personnel regarding TIP (PR), age at kindergarten entry (KE), and the educational levels of father (FE) and mother (ME)

2. What impact do the factors in the first question plus SAT/ACT composite score (CS), state recognition (SR), national recognition (NR), school-initiated contact (IC), and attendance at a recognition ceremony (AT) have on parental decision-making regarding participation in extracurricular options recommended by TIP?
3. What impact do the factors in the first two questions have on parental request for curricular/instructional options within the school setting?

The final three questions were answered qualitatively:

4. How do parents choose or not choose to have their child participate in a talent search?
5. What are the perceptions of parents regarding out-of-level testing?
6. Why do parents of talent search testing participants choose or not choose to seek recommended or suggested educational options?

Limitations

This study was limited because the subjects represent a convenience sample. Administrators in each cooperating school agreed to give access to parents. Agreement by school officials to participate in the study may indicate a more positive attitude toward the Duke TIP on those campuses.

Although multiple campuses were involved, the study was limited in geographic location to the North Texas area. Additionally, the study only considered talent search participants from the Duke Talent Identification Program. Generalization to other talent search programs is therefore limited.

Delimitations

Because Duke TIP participants are typically seventh graders, their power in choosing to or not to participate in the talent search is somewhat limited. The commitments of money, time, and transportation needed for TIP participation require more autonomy than is expected from middle school students. Therefore, this study limited the focus of decision-making to parents of the participants. Variables associated with parental decision-making were explored.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter reviews the relevant literature related to the talent search model, a model for identification and development of academic talent. The origin of the talent search model and the initiation of the talent searches are presented. One talent search center, the Duke Talent Identification Program (TIP) is discussed. The goals of the talent search model are explored, with extensive attention to the model's role in identification and programming. A rationale for the model is built on the learning theories of Hunt (1961), Vygotsky (1978), and Csikszentmihalyi (1990), and Gagné's (2000) conception of giftedness. A review of the implications of the talent search model for curriculum and instruction follows. Next, limitations and criticisms of the talent search model are examined. Finally, factors that influence participation by gifted students in alternative and auxiliary educational options are discussed.

Origin of the Talent Search Model

The talent search model was conceived through the work of Julian Stanley of Johns Hopkins University in the early 1970s (Keating, 1974; Stanley, 1991; Stanley & Benbow, 1983). In an attempt to ascertain the ability ceiling of an apparently mathematically talented 13-year-old boy, Stanley administered the College Board's Scholastic Aptitude Test (SAT), a test intended for college-bound high-school seniors. When Stanley found that the boy scored higher on the math portion of the SAT than most Johns Hopkins University freshmen, he was prompted to search systematically for more students of similarly high mathematical ability. With a grant from the Spencer

Foundation of Chicago, Stanley created the Study of Mathematically and Scientifically Precocious Youth (SMSPY)(Stanley, 1996). "Scientifically" was dropped in September of 1971 and SMSPY became SMPY. Through SMPY, Stanley and his colleagues initiated an annual talent search: students under age 13 who had scored in the top 5% on the math portion of a grade-level achievement test given by their local schools were invited to take the SAT on the university campus.

Shortly thereafter, SMPY began to offer fast-paced mathematics courses (algebra, geometry, trigonometry, and analytic geometry) to students under age 13 who scored as well or better than the average college-bound high school senior (500 or more on a scale of 200 to 800). In the first decade of its existence, SMPY experimented with various means of delivering accelerated math to seventh graders (Stanley, 1999, 2001). These methods included 3-week summer classes, weekend classes, and even the admitted "cute stunt" of teaching an entire school year of algebra in one day. Fast-paced classes in content areas other than math followed.

Verbally talented students were not initially identified or served by SMPY. Eventually, a separate group was formed, the Study of Verbally Precocious Youth (SVPY)(Stanley, 1996). The verbal group lasted from 1972 until the grant which funded it was not renewed in 1977. Later, an expansion arm of SMPY, the Center for the Advancement of Academically Talented Youth (CTY), took control of the talent search and permanently included both the verbally and mathematically talented and SMPY retained the research functions of the original project (Stanley, 1996; 1999).

Longitudinal research on SMPY talent search participants, begun in 1972 and continuing into the present, is the largest study of its kind in existence, exceeding even Terman's Genetic Studies of Genius (Benbow et al., 1996; Stanley, 1996). Most of the empirical data on talent search and much of what we know about the practice of acceleration comes from the SMPY longitudinal research program (Stanley, 1996).

Expansion of the Talent Search Model

Ten years after the initial talent search conducted at Johns Hopkins University, the talent search concept spread as other universities initiated their own searches (Assouline & Lupkowski-Shoplik, 1997). There are presently four university-based regional talent searches that employ the SMPY model: the Talent Identification Program (TIP) at Duke University, the Center for Talent Development at Northwestern University, the Rocky Mountain Talent Search at the University of Denver, and the Center for Talented Youth, as the Johns Hopkins program is currently known. There are also several university-based local talent searches and one state-based (Illinois) talent search. Several universities also offer talent searches for elementary students.

To qualify for the talent search, seventh-grade students who score at or above the 95th percentile on a nationally normed achievement test, such as the Iowa Test of Basic Skills, are invited to take either the SAT (now the SAT-I) or the American College Testing Program (ACT) and report their scores to a talent search. More than 200,000 students per year participate in talent searches (Rotigel & Lupkowski-Shoplik, 1999). Following the SMPY model, participants scoring at or above cut-off scores set by each

talent search on subtests of the SAT or ACT are invited to enroll in special classes or programs sponsored by the university or in other universities with similar programs.

Duke Talent Identification Program

Pertinent to the present study is the Talent Identification Program (TIP) regional talent search sponsored by Duke University. Using the SMPY model, the Duke TIP was founded in 1980 by Robert Sawyer through a grant from the Duke Endowment (Goldstein et al., 1992). Participants are drawn from public, private, and home schools in a 16-state region: Alabama, Arkansas, Florida, Georgia, Iowa, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Nebraska, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas. The first TIP talent search in 1981 drew about 8,700 participants, increasing to over 81,600 participants by 2001 (Duke TIP, 2002a). Students must be in the seventh grade or have skipped the seventh grade during the current school year and have scored in the 95th percentile on a nationally normed, standardized test of achievement, aptitude, or mental ability (Duke University TIP, 2002c). Acceptable tests include the California Achievement Test (CAT), the Cognitive Abilities Test (COGAT), the Iowa Test of Basic Skills (ITBS), the Stanford Achievement Test (SAT-9), and the Texas TAAS. A complete listing of tests and acceptable subtests can be found in the 7th Grade Talent Search Coordinator's Guide (2002c). It is important to note, however, that any student can test for the Duke TIP by taking the SAT I or ACT independent of the normal TIP-local school process (Goldstein et al., 1999).

Information regarding the Duke TIP is sent to schools in September to be distributed to qualified seventh-grade students. 2003 registration costs are $48 for the

SAT ($22 Duke TIP fee plus $26 SAT test fee) and $47 for the ACT ($22 Duke TIP fee plus $25 ACT test fee), but both the Duke TIP fee and the test fees may be waived if financial need can be documented (Duke University Talent Identification Program, 2003b).

Participants in the Duke TIP receive a score report directly from SAT or ACT in addition to an analysis of the results prepared by Duke. The Duke TIP also sends the results of the search, along with interpretive materials, to the principal or counselor at each participant's school. Participants with qualifying scores are also invited to state and/or national recognition ceremonies (Duke University TIP, 2002c).

Duke University offers an array of summer classes and weekend classes for students with qualifying scores, ranging in costs from $2,000 to $3,000 (Duke University TIP, 2003b). These options range from enrichment and exploration-style courses to fast-paced pre-college coursework, depending on the student's SAT I or ACT scores. On-line and CD-ROM courses which can be purchased regardless of score are offered at a cost ranging from $30 to $60 (Duke University TIP, 2002a). A newsletter published for parents of gifted students, the Duke Gifted Letter, is available for $24 for a one-year subscription (Duke University TIP, 2002c).

Goals of Talent Search

In the early 1920s, long before the term "talent search" was coined, Lewis Terman began a groundbreaking longitudinal study of children he termed "geniuses" (Terman, Baldwin, & Bronson, 1925; Stanley, 1974). In his search for talented children, Terman and his colleagues administered the newly developed Standford-Binet

Intelligence Test to students nominated by their teachers as the "brightest" in the class (Terman et al., 1925). Terman identified more than 1,500 students with IQs of 140 or more. He collected massive amounts of personal and educational data on the subjects, spanning three decades (Stanley, 1974; Clark, 1992). After Terman's death, his former students and then their students continued the study (Subotnik & Arnold, 1994). Terman's work focused on the study of exceptional individuals within their "natural habitat," never seeking to intervene or influence development (Stanley, 1999).

In a significant departure from the philosophy of Terman, Stanley and his SMPY colleagues not only wished to identify exceptional talent, they also determined to intervene and enhance the educational experience of talented students (Stanley, 1999). As a model of identification and development of academic talent, talent search seeks to accomplish three goals: identify talented students, intervene when appropriate in their educational placement, and nurture exceptional abilities through talent development (Olszewski-Kubilius, 1998a).

Goal: Identification

Identification of giftedness or talent has many connotations. Traditionally, schools employ methods of identification that focus on general intelligence, i.e., measurements of the classic IQ construct and on-level achievement or performance. Although an IQ may be an excellent indicator of general learning rate, it is a global indicator. High scores on an IQ instrument may be the result of aptitudes including memory, analytical ability, or verbal expressiveness. For example, the Wechsler Intelligence Scale for Children-Revised (WISC-R) (Wechsler, 1974) yields a full scale IQ

based on 10 subtests, each of which measures a different ability (Sattler, 1992). All subtests are used, however, to calculate the full scale IQ. A full scale IQ does not indicate in which area or areas an individual excels. Therefore, a group of high IQ students would not necessarily be homogeneous in ability, nor does it give specific information about kinds of ability. For these reasons, the talent search model chose not to use IQ tests to identify exceptional students in the talent searches (Stanley & Benbow, 1988; Van Tassel-Baska, 1996). Any educational programming based solely on IQ with no regard to specific aptitude is "illogical and inefficient" (Stanley & Benbow, 1988, p. 364). Because the goals of talent search go beyond mere identification to intervention and curriculum, the model employs a much finer focus in identifying exceptional aptitude. Instead of attempting to identify generalized "giftedness," the talent search model seeks to identify exceptional verbal and/or mathematical reasoning ability.

Identification of exceptional talent begins with seeking a broad a pool of potentially talented nominees (any student who scores at or above the 95th percentile on a grade-level standardized test). Additionally, any student not in the 95th or above percentile may test for a talent search on an independent basis (Goldstein et al., 1999). The major regional middle school talent searches rely on college entrance exams, either the SAT I or the ACT, to identify students who are exceptionally talented from the original pool of talented students.

Talent searches require college entrance exams even though the vast majority of participants have readily available scores from on-level standardized tests previously

administered by their schools. The rationale for this practice lies in determining what a grade-level test can and cannot reveal. Standardized grade-level tests reflect predominant curricular expectations for each particular grade level. As a result, grade-level tests are narrow in their range of expectations in both content and thinking skills (Callahan, 1992). Although items on a grade-level test may vary in level of difficulty, there are usually too few difficult items to provide a finely focused assessment of exceptional students (Olszewski-Kubilius, 1998a). When bright students quickly reach maximum scores on grade level tests, their true level of ability is unknown. This phenomenon, known as the "ceiling effect," limits the utility of grade level tests in determining the actual limits of ability in highly able students (Callahan, 1992).

Use of College Entrance Exams with Seventh Graders

Stanley and his SMPY colleagues needed an identification instrument that was difficult enough for the "average" talent search participant to score midway between a chance score and a perfect score. Stanley also wanted to focus on precocious development that was less indicative of chronological age and life experiences and more indicative of "manifest intellectual talent" (Stanley, 1977, p. 77). This criterion led to the choice of exceptional mathematical reasoning ability as SMPY's initial focus (Stanley, 1984,1999; Stanley & Benbow, 1983). Therefore, any instrument used for identification purposes had to be heavily weighted toward mathematical reasoning abilities, yet less dependent on specific content knowledge. A reasoning test, it was believed, would be a valid predictor of future success in related subject areas (Stanley, 1977). These considerations led to the choice of the SAT-M. Stanley and his colleagues reasoned that

although students may have never been taught the specific content of algebra and post-algebra mathematics, students with extraordinary analytical abilities would be able to score well on the test. For example, a student who knows the formula for the area of a right triangle and correctly calculates it is not functioning at as high a level as the student who does not know the formula, but deduces it and correctly answers the question (Keating, 1974). After testing several large groups of seventh graders, Stanley and his SMPY colleagues concluded that the SAT-M functioned more at an analytic level for Talent Search participants than it does for its intended target population, high-school juniors and seniors (Stanley & Benbow, 1988).

The SAT-M met the criterion of a reasoning test, along with other criteria of standardization, security, reliability, level of difficulty, and established interpretation (Stanley, 1977). The rationale behind the choice of the SAT-M was extended to the SAT-Verbal (SAT-V) and students with extraordinary verbal abilities (Benbow, 1991b). The ACT was piloted as a talent search instrument in 1987 and was found likewise to identify students with exceptional reasoning ability (Assouline & Lupkowski-Shoplik, 1997; Sawyer & Brounstein, 1988). Today, students participating in most talent searches may choose to take either exam.

Out-of-Level Testing

In order to extend the continuum of potential scores on a test, the talent search model employs "out-of-level" testing. The term out-of-level testing is most commonly found in literature relating to students with disabilities. In the context of students with disabilities, out-of-level testing refers to the administration of a test at a student's

perceived functioning level, usually below grade level (Thurlow, Elliot, & Ysseldyke, 1999). The measurement issues that make out-of-level tests work apply for students who get more on-level test items wrong or get them mostly right. In the context of highly able students, out-of-level testing refers to the administration of a test at the student's perceived functioning level, substantially above a student's chronologically determined grade level. Proponents of out-of-level testing for students with disabilities cite benefits of "improving the accuracy of measurement" and "better matching the student's current educational goals and instructional level" (Thurlow et al., 1999, p. 2). The talent search model uses "above level" out-of-level testing (SAT I or ACT) toward the same goals (Callahan, 1992; Assouline & Lupkowski-Shoplik, 1997; Olszewski-Kubilius, 1998a; Rotigel & Lukowski-Shoplik, 1999).

Out-of-level testing allows discrimination between talented students and exceptionally talented students (Olszewski-Kubilius, 1998a). Consider two students who score at the 99th percentile on a grade level math achievement test. On the basis of a grade level test, both students appear to be talented math students. It would seem reasonable to serve both students with identical curricular and instructional plans. However, out-of-level testing often reveals extraordinary differences between the two students. For example, 2916 seventh graders who scored at the 99th percentile in mathematics on on-level tests took the SAT and 630 scored between 300-400, 1204 between 400-500, 858 between 500-600, 191 between 600-700, and 33 between 700-800 (Van Tassel-Baska, 1986). The curricular implications for those scoring between 700-800 on the SAT are very different than for those scoring near 300, yet all of these

students looked alike on the on-level tests. Although a child who, at age 12, scores a 350 on the SAT-M is an advanced student relative to others in his grade and is in need of some special consideration, the child who scores a 600 or more is reasoning at a level above most college-bound twelfth graders. Out-of-level tests reveal truly exceptional students and allow full demonstration of their capabilities (Goldstein et al., 1992).

Out-of-level tests are able to illuminate differences between talented students because of the increased numbers of difficult test items. On a grade level test, the scores of talented students will generally cluster at the 95th percentile or above on a normal distribution (Assouline & Lupkowski-Shoplik, 1997). A higher quantity of difficult test items means that out-of-level tests spread out the scores at the upper end of a normal distribution, creating a new bell-shaped normal distribution within the 95th to 99th percentiles (Assouline & Lupkowski-Shoplik, 1997; Olszewski-Kubilius, 1998a, Wendler, Ninnemen, & Feigenbaum, 2000). Thus, two students, each scoring at the 99th percentile on a grade level test, may be at opposite ends of the distribution on the SAT I.

Appropriateness of Grade-Level Test Cutoff Scores

Stanley recommended taking a closer look at students who scored in the top 3-5% in comparison to grade-level peers (Lupkowski-Shoplik & Swiatek, 1999). Therefore, the major regional talent searches use a cutoff score for nomination at either the 95th or 97th percentiles on selected subtests of standardized grade-level tests.

Empirical evidence has demonstrated the appropriateness of the cutoff scores in their ability to discriminate between talent search qualifiers and nonqualifiers. Ebmeier and Schmulbach (1989) addressed this issue in a statewide SAT-based middle school talent search. Students who qualified at the 95th percentile on the grade-level test but failed to make a 400 or above on either the SAT-M or SAT-V were considered "false positives." Those who scored 400 or more on either the SAT-M or the SAT-V but scored below the 95th percentile on the grade-level test were considered "false negatives." Although more than 58% of those who qualified at the 95th percentile failed to score well (≥400) on the SAT-M (a false positive), Ebmeier and Schmulbach found that only a few students who scored well (≥400) on the SAT-M failed to score above the 95th percentile on the grade-level test (a false negative). The same inverse correlation between false positives and false negatives holds true for the SAT-V. When cutoff scores are set at the 99th percentile, the decrease in false positives is minimal compared to the increase in false negatives. Ideally, both false positives and false negatives should be minimal, but a 95th percentile cutoff appears to reduce the risk of incorrectly excluding students without unduly frustrating students for whom a college-level test would be too difficult.

Another way to judge the appropriateness of cutoff scores is to consider evidence from the scores obtained by talent search participants. As cut-off scores increase, scores on the SAT increase, although it is not a perfect correlation. A study of the Duke Talent Identification Program (TIP) found a noteworthy difference in subsequent SAT scores of qualifiers at the 99th percentile and qualifiers at lower

percentiles (Goldstein et al., 1999). Of those students qualifying at the 97th and percentile in math, 13.4% scored 480 or higher on the SAT-M, and 1.9% scored 550 or higher. Of those students qualifying at the 99th percentile in math, 32.8% scored 480 or higher on the SAT-M and 9.8% scored 550 or higher. More than 8% of students qualifying at the 97th percentile on verbal achievement scored 430 or better on the SAT-V, and 0.8% scored more than 500. Of the students qualifying at the 99th percentile on verbal achievement tests, 26.6% scored 430 or more on the SAT-V, and 5.2% scored 500 or more (Goldstein et al., 1999).

Psychometric Properties of the SAT with Middle-School Students

Of the almost three million students who took the SAT I in 1998-1999, more than 130,000 were middle-school students (Wendler, Ninneman, & Feigenbaum, 2000). When a test is used with a population for whom it is not intended (such as a college entrance exam with middle-school students), it is important to examine the psychometric justification for using the test (in this case, the SAT) with the unintended population (Benbow, 1992).

In general, the scores of middle-school students cover the entire distribution of the 200-800 point scale for both the SAT-M and SAT-V (Wendler, et al., 2000). The distribution of scores for the middle-school students approximates that of the high-school students (Benbow, 1988). The scores of middle-school students tend to maintain their ordinal ranking over time, increasing approximately 50 points per year between junior high and the senior year of high school (Olszewski-Kubilius, 1990).

Wendler et al. (2000) extracted middle-school student data from all students taking the SAT I for the years 1997-1998 and 1998-1999 and compared their performance to the college-bound students. As would be expected, the mean scores for the college-bound cohorts were higher than the means for the middle-school students for both years. However, Wendler and colleagues found that although the college-bound cohorts on average outscored the middle-school students, many middle-school students scored as well, or better, than many college-bound high-school students. The performance of the middle-school students was, in summary, "amazing" (Wendler et al., 2000, p. 8).

Although the scores of the middle-school students covered the entire distribution of the 200-800 point scale for both the SAT-M and SAT-V, the majority of scores were found within a narrow range. On the SAT-V, 76% (1997-1998) and 77% (1998-1999) of the scores fell between 350 and 540, while 78% (1997-1998) and 76% (1998-1999) of the SAT-M scores fell between 350 and 540. The scores of the college bound cohorts were less narrowly distributed, with approximately 57% falling within the 350-540 range on the SAT-V and 55% falling within the 350-540 range on the SAT-M (Wendler et al., 2000).

SAT scores of gifted middle school students yield predictive information as well. Benbow (1992) found definitive differences in subsequent science and math achievement among middle school students whose SAT-M scores placed them in the top 1% of grade-level ability. Students who scored in the upper quarter of the top 1%

in middle school on the SAT were clearly higher on 34 measures of science and mathematical achievement in high school, college, and graduate school.

Evidence also indicates that verbal achievement can be predicted by the scores on the SAT-V in middle school. Students who were below the required SAT cut-off score (SAT-V ≥ 430 and SAT-M ≥ 500) were admitted to a special summer program in literary analysis along with students meeting the requirements (Olszewski-Kubilius, Kulieke, Willis, & Krasney, 1989). There was a statistically significant difference favoring the students scoring above the cut-off on posttest measures of achievement.

Evidence indicates that the SAT scores of middle-school students exhibit the same distribution as is found for the test's intended population. The consistency of the ordinal ranking of the scores over the years and the predictive accuracy of academic achievement further support the validity of the SAT with gifted middle-school students. Although some may fear that the use of such a rigorous test as the SAT with young students is useless or even harmful (Keating, 1974), the clustering of scores in the mid range and the ability of many gifted middle-school students to score as well or better than high- school seniors support the appropriateness of the test.

Goal: Placement and Guidance

The goals of educational placement/guidance and talent development distinguish the talent search model from the work of Terman, whose work was limited to identification and description of gifted individuals (Stanley, 1999). Using the data from out-of-level testing in the identification process, the talent search model seeks educational modifications when appropriate, as well as academic guidance (Assouline &

Lupkowski-Shoplik, 1997; Brody & Blackburn, 1996; Keating, 1974; Olszewski-Kubilius, 1998a; Stanley, 1984; Van Tassel-Baska, 1996). The recommendations for placement and guidance apply to the student's regular schooling. In other words, the modifications recommended take place in school or take the place of school. Recommendations for modifications and guidance fall across a continuum, dependent on a student's SAT or ACT score. Several authors have synthesized recommendations from the literature and suggested cutoff scores for determining the appropriateness of the modifications (e. g., Assouline & Lupkowski-Shoplik, 1997; Olszewski-Kubilius, 1998a; Rotigel & Lupkowski-Shoplik, 1999; Van Tassel-Baska, 1996). For the purposes of the present study, these recommendations will be classified as low, moderate, and radical modifications.

Low Level Modifications

Modifications at this level require only modest intervention in the educational placement of a student. Students for whom low-level modifications are appropriate are generally considered to be those who score below the 50th percentile (for middle school students) on the SAT or ACT (e.g., 200-490 on SAT M or V) (Assouline & Lupkowski-Shoplik, 1997). These recommendations include advanced or honors courses in the areas of strength. Academic guidance to plan coursework through high school is universally recommended (Assouline & Lupkowski-Shoplik, 1997; Olszewski-Kubilius, 1998a; Rotigel & Lupkowski-Shoplik, 1999; Van Tassel-Baska, 1996).

Early course entry. Early entrance into courses is recommended, especially in algebra (Assouline & Lupkowski-Shoplik, 1997; Rotigel & Lupkowski-Shoplik, 1999), as a low level modification. Historically a ninth grade course, algebra I is not consistently

offered as an option to middle-school students (First in the World Consortium, 1999; Stanley & Benbow, 1982). This is especially relevant in light of a recent U.S. government report identifying grades 5 through 8 as a "weak link" in American mathematics education (United States Department of Education, 1997, p. 20). Although algebra I is considered the "gateway" to advanced science and mathematics in high school, only one-fourth of U.S. middle-school students enroll in algebra. Low income and minority students are even less likely to take algebra by eighth grade. (United States Department of Education, 1997, p. 5). Students who take algebra in middle school are at a distinct advantage: approximately 60% of students who take calculus in high school took algebra in the eighth grade (United States Department of Education, 1997, p. 16). When mathematical talent is detected in a talent search, the appropriate middle-school math placement can be made and an appropriate academic plan can be set.

Advanced placement: Advanced Placement (AP) coursework is another modification requiring only modest intervention. Advanced Placement exams are offered by the College Board in 35 subjects (College Board, 2003). Students take college-level courses on their high school campus, and may sit for an AP exam at the completion of the course. A successful score on an AP exam usually results in either credit from a university or exemption from the first semester of a course (Brody & Stanley, 1991). For the advanced student, AP coursework offers the opportunity for rigorous study in the area or areas of strength (Van Tassel-Baska, 2001).

Additionally, AP coursework apparently plays a key role in college achievement for high-ability students. In a study of highly-able college students, the factor most predictive of college success (defined as GPA, Dean's list, graduation and departmental honors) was number of AP credits accumulated in high school (Brody et al., 1990). AP credits were more predictive of college success than SAT scores, age at college entry, or number of college credits during high school. For talented students needing low level educational modifications, enrollment in AP courses, even before twelfth grade, is an appropriate choice (Assouline & Lupkowski-Shoplik, 1997; Rotigel & Lupkowski-Shoplik, 1999).

Moderate Level Modifications

Students for whom moderate-level modifications are appropriate are generally considered to be those who score above the 50th percentile (for middle school students) on the SAT or ACT (Assouline & Lupkowski-Shoplik, 1997). Modifications at that level are more complex because they move away from traditional educational practices. More involvement is required on the part of school counselors and administrators. At that level, interventions focus on altering the pace and/or sequence of the curriculum and may be accomplished either inside the school system or outside of it, through fast-paced courses, curriculum compacting, or grade and/or subject acceleration (Assouline & Lupkowski-Shoplik, 1997; Rotigel & Lupkowski-Shoplik, 1999; Van Tassel-Baska, 1996).

Fast paced courses: math. Altering the pace of the curriculum implies offering the traditional curriculum, but not in the traditional nine-month-school-year timeframe.

One method of altering the pace is replacing a course normally taught during the school year with the same course taught in a fast-paced summer program not associated with the school. Fast-paced courses have been a hallmark of the SMPY model of talent search, specifically in math and science. From its conception, SMPY has studied various configurations of the pacing of high- school math and science courses. From the admitted "cute stunt" (Stanley, 2001) of teaching algebra I in a single day to 3-week courses, Stanley and colleagues have experimented with fast-paced math and science (Stanley, 1999). In June of 1972, SMPY began offering fast-paced pre-calculus courses (algebra I and II, geometry, trigonometry, and analytic geometry) to highly capable students, identified through talent search, who had just completed the sixth grade. After 20 hours of instruction in the summer and Saturday mornings during the school year, eight students completed all five pre-calculus courses in about 120 hours of instruction (Stanley, 1991). Although all in the class were highly capable in math, not all could keep up with the extremely fast pace. Those who fell behind were either dropped or assigned to another class that moved more slowly.

Stanley developed the diagnostic testing followed by prescribed instruction model (DP-PI) in order to devise a more individually paced method of teaching. DT-PI begins with diagnostic testing. Students in fast-paced courses are given a standardized test for the subject that follows the last pre-calculus course taken by the student in school (Bartkovich & Mezynski, 1981). Students continue to take tests in succeeding courses until they can no longer score better than the 75th percentile in a course test. This course becomes the initial course in the student's instructional program. The instructor

of the fast-paced course analyzes the missed items on the standardized tests to determine which concepts have not been mastered. Instruction includes only the concepts that have not been mastered. Review of the previously mastered concepts is done through homework. Using the DP-PI model, all topics can be covered in a fast-paced course because time is not spent on needless repetition of previously learned material. At the end of the fast-paced course, students are given a course standardized test, comparable to the one used in pre-testing.

The DI-PI model has been recommended for use in the regular classroom as well (Sayler, 1995). A student ready for acceleration can be pretested using a chapter test from the next grade's text. Students complete the pretest, marking questions of which they are unsure. The teacher or mentor then identifies and analyzes questions that were missed or marked as "unsure." Using the diagnostic data, the teacher or mentor prescribes the concepts to be learned, either independently or by direct instruction. Finally, the student is again tested with an alternate form of the pretest. When the student scores at least 90%, the student moves to the next chapter, and the DI-PI procedure begins again.

Many more fast-paced math classes were offered by SMPY following the success of the original class. In 1978, a highly selective group of 33 talent search seventh graders was invited to participate in an 8-week program of pre-calculus mathematics: algebra I, II, and III; plane geometry; trigonometry; and analytic geometry (Bartkovich & Mezynski, 1981). On the basis of DP-PI testing, the students were divided into five groups for instruction. Students received 40 hours of instructional time. Each of the

students completed at least one course during the 8-week program. Six of the 33, having already completed algebra I in school, completed the remaining five courses in the 8-week class. The following year (1979) a similar class was offered. The 92 participants were divided into three groups based on amount of pre-calculus knowledge they possessed, determined by diagnostic testing. Group 1, the "high" group, completed an average of 1.97 courses in the 8-week class, while groups 2 and 3 ("middle" and "low") earned averages of 1.71 and 1.90 courses, respectively.

Fast paced courses: science. The question arose as to whether the success of SMPY's formula for fast-paced mathematics classes could be applied to the sciences (Lynch, 1992). Although mathematics is dependent on mastery of specific processes that progress sequentially, science is more content laden and requires mastery of unfamiliar vocabulary. In addition, laboratory work necessary in the sciences cannot easily be accelerated. SMPY researchers, through CTY, offered 3-week residential courses in high school biology and chemistry in the summer of 1982. Students ranged from 11 to 15 years of age. Pretesting of the biology students revealed that although they lacked specific technical knowledge, they scored well in areas requiring reasoning (Stanley & Stanley, 1986). Classes consisted of three hours each day for lecture and discussion, followed by two-and-one-half hours of laboratory (Lynch, 1992). At the end of the course, the students were tested with the College Board Multiple Assessment Programs and Services (MAPS) Biology Achievement Test, a retired, but equivalent form of the College Board Achievement Tests. The exam was administered by the researchers, and had not been seen by the course instructor (Stanley & Stanley, 1986).

The mean score was equivalent to the 94th percentile, with two students earning perfect scores. Seventy percent of the biology students eventually took the College Board's Advanced Placement (AP) Program exam in biology. All scored 3 or better, with an average score of 4.42.

In a follow-up study, Lynch (1992) looked at the achievements of the fast-paced biology class over a six-year period. In that period, student pretest scores remained stable. The average age of the participants was 13.6 years ($N = 353$). The mean score for all six years (covering nine sites) on the MAPS Biology test was equivalent to the 74th percentile.

The chemistry class was organized similar to the biology class, with the exception of no pretesting (Stanley & Stanley, 1986). The 3-week class consisted of 82.5 hours of instruction. After completion of the class, the students took the MAPS Chemistry Achievement Test. The original 13 chemistry class members earned a mean score equivalent to the 93rd percentile, with two perfect scores.

Lynch (1992) also looked at the chemistry class over the same six-year period. In the five years following the initial fast-paced chemistry class, the participants were pretested with the College Board Achievement Test in Chemistry (CEEB). The mean score on the pretest was equivalent to the 8th percentile, reflecting the tendency of elementary and middle school science to heavily emphasize life science. The average age in the chemistry classes was 14.2 ($N = 352$). At the end of the three-week class, the mean score on the MAPS Chemistry Achievement Test was equivalent to the 69th percentile. In one year of the study (1985) the students also took the American

Chemical Society (ACS) examination as a posttest. The ACS test was normed on high-school honors chemistry students who had completed one year of chemistry. The 1985 chemistry students ($N = 45$) earned a mean score equivalent to the 75th percentile on the ACS exam.

CTY expanded the fast-paced science program to physics following the success of the biology and chemistry classes. The average age of the physics students in the five-year period studied by Lynch (1992) was 14.8. Although similar in structure and technique to the biology and chemistry classes, the physics class had a notable difference. Two courses were offered: one for students who had completed calculus ($n = 38$) and one for students who had completed algebra II ($n = 175$). Not surprisingly, the calculus group scored higher on the pretest. Following the 3-week class, the mean score earned by all students (regardless of math experience) on the MAPS Physics Achievement Test was equivalent to the 70th percentile for high school juniors and seniors.

Expansion of fast-paced concept. After experimenting with various formats, SMPY eventually was instrumental in creating the Johns Hopkins Center for the Advancement of the Academically Talented Youth (CTY). CTY offers 3-week intensive residential summer programs (Stanley, 1991; Stanley & Stanley, 1986). Other talent search programs, including the Duke TIP, followed suit (Harbin, 1992; Sawyer & DeLong, 1986). The Duke TIP publishes a catalogue of summer program offerings, including fast paced classes, and sends it to eligible students as soon as test score

information is available. Students continue to receive the catalogue prior to each summer session (Duke University Talent Identification Program, 2003b).

Quality of fast-paced instruction. Questions inevitably arise as to the quality of content and quantity of retention associated with faced-paced instruction. It is hard to argue that the students in fast-paced classes did not learn the content well in light of the scores received on the end of course achievement tests. Diagnostic testing as recommended by Stanley (2001) ensures that only what is not already known is covered in class. Fears of "gaps" in knowledge can be erased if instruction is prescriptive. Critics may also charge that fast-paced science does not allow for the development of inquiry skills, or that gifted students would be better off engaged in inquiry-based research. In a study of eight different fast-paced physics courses, Hsu (2003) found that the effectiveness of a fast-paced physics class was lower than that of a full length honors physics course taught using interactive methods. Yet, the fast-paced students were substantially higher in their conceptual understanding of basic concepts than were students in a regular, full-length class taught using traditional methods. Stanley and Stanley (1986) argued that fast-paced science gives gifted students the necessary rudimentary knowledge needed to pursue independent research. Fast-paced science, therefore, is not an either/or situation with regards to research. Instead, fast-paced science facilitates the gifted student's movement toward independent research.

The research on fast paced classes has established the consistent ability of academically-gifted middle-school students to learn high-school mathematics and

sciences rapidly, and learn them very well. Overall, the age at which the subjects were studied had no bearing on success in the class. Students in the fast-paced science classes usually ranged in age from 12 to 16, with a few younger students occasionally admitted. With the exception of fast-paced biology, there was no statistically significant correlation found between age and posttest scores (Lynch, 1992).

Curriculum Compacting

Another recommended means of modifying pace for students needing moderate level interventions is curriculum compacting (Assouline & Lupkowski-Shoplik, 1997; Rotigel & Lupkowski-Shoplik, 1999). Curriculum compacting is a strategy used to "streamline" the regular curriculum for students who are capable of mastering it a faster pace (Reis, Burns, & Renzulli, 1992, p. 5). Students may need compacting, particularly in subjects where they are likely to have learned the material in a previous grade or outside class, such as math, geography, language arts, spelling, and reading. Talented students who are capable of learning at a very rapid pace may also benefit from compacting in subject areas where the content is likely to be new, such as science, social studies, and literature (Troxclair, 2000; Winebrenner, 1992). Unlike fast-paced summer classes, curriculum compacting is designed to be implemented in the regular school.

Curriculum compacting begins with identifying the learning objectives in a given subject area (Reis et al., 1992). At this point, the teacher must differentiate between an objective (the desired outcome) and an activity (the means to an outcome, such as a worksheet, reading assignment, or lecture). Talented students may not need to

complete all activities in order to master a content area (Troxclair, 2000). Braggett (1984) found that teachers are not always comfortable with this practice. He reported that teachers are often hesitant to allow an advanced reader to miss a phonics lesson in order to work on a more complex project. Teachers also believed that children must experience the total educational program at each grade level (field trips, etc.) in order to benefit. Reis et al. (1992) found that teachers who equate participation in learning activities with mastery of content have a difficult time compacting the curriculum for gifted learners.

Once the objectives for a content area are determined, students are pretested over the objectives in order to determine their level of mastery. Pretesting may encompass a single chapter, a unit of study, or an entire course, and may take several forms: formal tests, observation of the student, assessing student thought processes, or posing open-ended questions (Reis et al., 1992). Instructional time and activities are then eliminated for students who demonstrate mastery or the ability to master concepts and skills rapidly. Time that is saved from the regular curriculum due to compacting may be used for a variety of options: independent study, mentoring, or other forms of self-directed learning (Reis et al., 1992; Winebrenner, 1992). Saved time should not be used for remediation in areas of weakness (Winebrenner, 1992).

As with fast paced classes, some critics are concerned that compacting will result in knowledge "gaps." Research, however, does not support this fear. Reis, Westberg, Kulikowich, and Purcell (1998) found that the achievement scores of gifted students whose curriculum had been compacted as much as 40-50% were not statistically

significantly different from the scores of students who had not been compacted. Compacting, therefore, allows talented students to modify the pace of coursework without compromising content.

Grade and/or Subject Acceleration

From the inception of the talent search concept, acceleration has been a key element in the goal of guidance and placement of talented students. Programs emanating from the original talent search through SMPY have for decades operated from the presumption that competence rather than age is the chief determinant in deciding who gets access to what curricula and opportunities and when (Benbow et al., 1996; Goldstein et al., 1999; Stanley, 1999). Yet, within schools, it is typically age or grade that determines the placement of students in the curricular sequence (Olszewski-Kubilius, 1998a). Subject matter acceleration, the placement of a student for part of the day in one or more subjects above grade level (Rogers, 1991; Southern, Jones, & Stanley, 1993) and grade acceleration, moving a student ahead of the typical grade placement for age, are options for students needing moderate levels of intervention (Assouline & Lupkowski-Shoplik, 1997; Rotigel & Lupkowski-Shoplik, 1999; Van Tassel-Baska, 1996).

Shore, Cornell, Robinson, and Ward (1991) undertook the daunting task of codifying recommended practices in gifted education and assembling the empirical and theoretical support underlying each of the practices. They identified 101 recommended practices from 100 textbooks in the field, then ranked each according to the degree of support found. Acceleration was one of seven practices to receive the highest ranking

of "strongly supported." In fact, the authors noted "No single recommendation has been stated more often in one form or another…." (p. 78). Acceleration is recognized both domestically and internationally as an important option in the education of talented students (Eales & dePaoli, 1991; Gross, 2000). Davis and Rimm (1998) presented acceleration not only as a strategy that accommodates the high abilities and needs of the gifted, but also as a required component of any well-rounded program. Subject matter acceleration and grade skipping topped the list of recommendations made for students who reason exceptionally well mathematically and verbally (Brody & Blackburn, 1996). Pyryt, Masharov, and Feng (1993) identified practices from multinational sources (China, Russia, Israel, and the United States) judged to be effective in nurturing gifts and talents and found four accelerative options among the recommended practices.

Grade acceleration, sometimes called "grade skipping," often receives bad press due to the popularity of books such as The Hurried Child (Elkind, 1982). Elkind warned of the danger in pushing children to early achievement in sports, academics, and social interaction. Elkind (1988) later clarified the distinction between accelerating gifted students and trying to accelerate students of average ability. Acceleration of gifted students, Elkind wrote, is more accurately characterized as academic "tailoring" because it improves the fit between the child's level of intellectual development and the curriculum (Elkind, 1988).

Research supports beneficial academic outcomes for the accelerant as well as emotional well-being when grade acceleration is used appropriately. Students who

accelerate one or more grades apparently do as well as or better on measures of high school achievement than do like-ability peers who do not accelerate. Brody and Benbow (1987) questioned former talent search participants upon graduation from high school. The respondents were divided into four groups according to the degree to which they had been accelerated in school: group 1, most accelerated (grade skips); group 2 (AP tests or college courses); group 3 (subject acceleration); group 4, no acceleration. Groups 1 and 2 had statistically significantly higher high school GPAs than the other groups. No statistically significant differences were found between groups for National Honor Society, National Merit Scholar Finalist, or class rank.

After high school, grade accelerants continue to achieve at levels equal to or above their like-ability peers. Talent search participants who entered college at an age younger than is typical were found to be virtually identical to participants who entered college at the traditional age on measures of college achievement (Swiatek & Benbow, 1991). Only two statistically significant differences were found between the groups. First, the accelerants were found to have obtained a higher level of educational attainment than the nonaccelerants. Second, the accelerants who attended graduate school began their studies at a younger age than did the nonaccelerants who attended graduate school. These findings moderate fears that acceleration leads to gaps in knowledge or early burn out.

Likewise, highly-able students who remain in their grade level but accelerate in one or more subjects experience success. Vialle, Ashton, Carlon, and Rankin, (2001) surveyed accelerated students in years 8, 9, 10 in an academically selective high school

in New South Wales, Australia. The students were accelerated in one or more subject areas within this selective high school. Within 6 to 10 weeks of the placement, the accelerants were performing at the top of the class into which they had been accelerated. The researchers found that students often became dissatisfied with the pace of the class, however, if the group into which they were placed contained the less capable students of that grade.

Pyryt and Moroz (1992) investigated a mathematics program in a junior-high school in Calgary, Alberta, Canada that allows acceleration of a cohort through four years of secondary math in three years. Three cohorts, composed of approximately 30 students each, were examined. Cohort members were judged to be successful if they completed each year of the program with an average of 70% or better. All three cohorts posted impressive percentages of success for the three years of the program, especially with the Math 9 course; 100% of the three cohorts were successful at this level. The researchers found no statistically significant difference between the accelerated cohorts and the older regular students on the common midterm examinations.

Benefits of Altering Curricular Sequence and Pace

There is evidence that subject acceleration is appropriate for highly-able students because it provides a more direct route to advanced courses. In school, time is a limited resource. For students capable of completing many advanced courses in science and math, introductory prerequisites (biology I, chemistry I, physics I, algebra, and geometry) are time-consuming hindrances. Kolich and Brody (1992) contacted first-year

college students who had scored between 700 and 800 on the SAT-M before the age of 13. The study looked at the degree to which the students had accelerated their mathematics education. The degree of acceleration in math was determined by the grade level at which the first calculus course was completed (calculus generally being a senior level course). The mean grade level for first year calculus was 9.49, two and a half years before the typical college-bound student. The researchers assessed the number and type of postcalculus courses taken by the students while still in high school. Of the 42 accelerants, 11 did not complete a postcalculus course in high school, 7 completed one course, 6 completed two courses, and 18 students completed three or more postcalculus courses in high school. A total of 106 postcalculus courses were completed by 31 students (see Kolich & Brody, 1992, for titles and frequencies of postcalculus courses). As would be expected, the greater the degree of acceleration, the more postcalculus courses were completed in high school.

Students who grade or subject accelerate have increased options for higher-level coursework, internships, and additional academic explorations (Benbow, 1991a; Olszewski-Kubilus, 1998c; Southern & Jones, 1991). One accelerated student completed a senior year with a concentration in science and math, then completed a second senior year with concentrations in the humanities (Gross, 1994). Because gifted children often prefer to work with their mental peers (Kulik & Kulik, 1984; Rogers, Schatz, & Dykstra, 2001), acceleration creates the possibility of a peer group with like intellectual and academic interests (Southern & Jones, 1991).

Rimm and Lovance (1992) recommended acceleration as a means to prevent or reverse underachievement. They interviewed the parents of 14 highly gifted students who had been referred for counseling due to a variety of nonacademic problems: behavior difficulties at home and school, refusal to do work, unfinished work, organizational problems, peer adjustment problems, and boredom. Following counseling, the students were either grade-skipped or subject-skipped. After brief periods of adjustment, all parents believed that their child was functioning well academically and socially. Many highly able students in grade-level classrooms experience emotional distress to the point of physical symptoms. Multiple case studies of young gifted children (Gross, 1992; Vialle et al., 2001) relate episodes of physical illness, rashes, crying, and even muteness while in regular school placements. After acceleration, the children in the studies were reported to be happier, socially and emotionally. The most common regret was that acceleration was not done earlier. Various efforts were made to maintain contact between the accelerants and their age peers, but most accelerants reported successfully associating with older students.

Academic outcomes for accelerants are, for the most part, very similar to the outcomes for their older classmates or like-ability nonaccelerated peers. When there are differences in academic outcomes, the differences favor the accelerants. The evidence does not support fears of damage to academic achievement or "gaps" in learning. On the contrary, many students benefit academically and emotionally. As a moderate level intervention, grade or subject acceleration is a viable option for academically talented students.

Radical Modifications

All of the options recommended at the low and moderate level are appropriate for students scoring at the highest percentiles on the SAT or ACT (Assouline & Lupkowski-Shoplik, 1997; Olszewski-Kubilius, 1998a; Rotigel & Lupkowski-Shoplik, 1999; Van Tassel-Baska, 1996). However, students functioning at this level may be candidates for an additional, more radical option: early college entry.

Early College Entry

Most of the research on early college entrants comes from programs that admit students as a cohort. The Transition School of the University of Washington's Early Entrance Program (EEP) is an example of an early entrance cohort. The University of Washington takes students as early as seventh or eighth grade into its Transition School (Brody, 1998). Transition School was initiated in 1981 in order to enhance the academic and personal growth of the early entrants in the EEP and to provide them with a peer group (Janos et al., 1989). Transition School is a self-contained year on the UW campus in which the accelerants take fast paced English, math, history, and physics as a cohort (Noble, Robinson, & Gunderson, 1993). Transition School is designed to fill in the gaps resulting from skipping high school and ready the accelerants to begin UW as full-time students. Academic counseling is available, as well as emotional and psychological consultations (Janos et al., 1989).

The Texas Academy of Mathematics and Science (TAMS) is a residential early entry program on the campus of the University of North Texas (Brody, 1998). Students typically enter after their tenth grade year and take regular university courses in math,

science, and humanities, although the focus of the program is math and science. After two years, students receive a high school diploma and have, in addition, accumulated a minimum of 60 college credit hours (Sayler,1993).

Success of Early Entrants

Research is generally favorable regarding early college entry as an option for highly motivated students with exceptional SAT or ACT scores. Janos, Sanfilippo, & Robinson (1986) noted that it is difficult to find incidences in the literature of accelerants who were not successful in college. There is little written about the unsuccessful accelerants because (a) there are so few of them, and (b) they usually return to high school. Early entrants tend to do as well as, and often do better than like-ability students who entered college after four years of high school. Brody et al. (1990) retrospectively looked at 65 early entrants at a highly selective private university from 1980 to 1984. The early entrants graduated in four or less years at a similar rate (83%) to the "regular" college students (78%). Eleven percent of the accelerants earned concurrent bachelor's and master's degrees, compared to 1% of the regular students. The accelerants earned statistically significantly more grade point and departmental awards at graduation. More than twice the percentage of accelerants compared to regular students (26% versus 12%) was elected to honor societies.

More evidence of the success of early entrants is found in Janos and Robinson (1985) who studied accelerants in the Early Entrance Program (EEP) at the University of Washington (a select, top-ranked university). The EEPs were compared with regular UW students (REG) who had been matched for pre-entry achievement scores and with a

group of UW National Merit Scholars (NAT) on several academic variables. There was no statistically significant difference between the groups on number of credit hours earned. Both the EEP group and the National Merit Scholars earned cumulative grade point averages (GPA) that were statistically significantly higher than the regular UW students. The mean GPA for the EEP group was almost identical to the mean GPA of the National Merit Scholars. Janos et al. (1989) later compared a group of EEP students to students who had qualified for EEP but chose not to attend (QUALs), regular students (REGs) at the University of Washington, and UW students who had been National Merit Finalists (NATs) on academic variables (verbal ability and college readiness). The EEP, QUAL, and NAT groups scored higher than did the regular UW students, but the National Merit Scholars outscored the EEP group and the qualifying students. However, college GPAs of the NATs and EEPs were comparable.

In a similar study, Noble, Robinson, and Gunderson (1993) compared a second group of EEP students with students who had qualified for the EEP and National Merit Scholars. The vast majority of the EEP students and National Merit Scholars finished their degrees within the expected timeframe. A notable difference between the three groups was found in educational aspirations. Ninety-seven percent of the EEPs and 80% of the students who had qualified for EEP had already earned or were planning to earn a graduate degree, but only 45% of the National Merit Scholars had earned a graduate degree or expected to do so.

Goal: Support of Talent Development

The third goal of the talent search model is to nurture exceptional abilities (Olszewski-Kubilius, 1998a). Talent searches work in three ways to accomplish this goal: reveal undiscovered exceptional abilities, create a network of support, and provide opportunities for academic exploration.

Uncovering Exceptional Abilities

Talent search offers the opportunity to uncover exceptional abilities that may have gone unnoticed. Given that grade level achievement tests are unable to discriminate adequately among students scoring in the top third to fifth percentiles, exceptional talent is obscured (Olszewski-Kubilius, 1998a). Additionally, exceptional students may underachieve in the classroom and appear to be average or below average (Rimm & Lovance, 1992). After participation in a talent search, exceptional students and their parents may be surprised at the level of performance on the SAT or ACT (Olszewski-Kubilius, 1998b). Students who have generally been high achievers in school may learn about specific academic aptitudes (Assouline & Lupkowski-Shoplik, 1997).

Exposing previously hidden exceptional aptitudes is especially important in light of the study by Benbow and Arjmand (1990) who found precollege experiences were strong predictors of college achievement among former talent search participants. Even though all participants in the study were academically talented, they did not achieve equally in college. The types and quantity of courses and special examinations taken in high school were most predictive of high college achievement (defined as full-time

graduate school, publications, special projects, awards, honors, and competitions). This study highlights the need for educational intervention in the case of academically talented students. Exposing exceptional talent is an essential precursor to needed educational planning and guidance.

Network of Support

Once a student is registered with one of the major regional talent searches, students and parents have access to a variety of support networks. After the results of the testing are in, students and parents are provided with information that assists them in interpretation of the scores (Brody, 1999). The Duke TIP, for example, provides an extensive summary of each year's talent search results (Duke University TIP, 2002d). The summary includes the number of students taking the ACT and the SAT for the year, highest reported scores for each subtest, percentage ranks of all reported scores, and cut-off scores for state and national recognition, as well as interpretive guidelines. Talent searches provide certificates of recognition and invitations to award ceremonies for high scoring participants (Brody, 1999; Duke TIP, 2002c; Johns Hopkins University CTY, 2002; Northwestern University CTD, 1999; University of Denver, 2002).

Talent searches make available a variety of publications helpful to students and parents. These publications include newsletters, college guides, resource handbooks, internet links, and catalogues of enrichment programs (Brody, 1999; Duke Talent Identification Program Coordinator's Guide, 2002c; Johns Hopkins University CTY, 2002; Northwestern University CTD, 1999; University of Denver, 2002). Talent searches also provide opportunities for academic and career counseling, as well as specific counseling

for students scoring at extremely high levels (≥ 700 on SAT-M or SAT-V) before age 13 (Brody, 1999).

Opportunities for Academic Exploration

Talent search university summer programs. Although the options recommended in the second goal of the talent search model (placement and guidance) focus on interventions in schooling, the third goal, talent development, may be realized in or out of school (Brody, 1998). Central to Stanley's concept of talent search is the "smorgasbord" of special opportunities (Stanley & Benbow, 1982). In addition to options that modify the pace and/or sequence of schooling (discussed in a previous section), talent searches encourage academic exploration through mentoring, internships, independent study, contests and competitions, part time college attendance, and summer programs, both academic and enrichment oriented (Assouline & Lupkowski-Shoplik, 1997; Brody, 1999; Brody & Stanley, 1991; Olszewski-Kubilius, 1998; Van Tassel-Baska, 1996). Universities sponsoring the major regional talent searches offer a variety of options specifically for their talent search participants. These options include summer institutes, online courses, CD-ROM courses, international field studies, and weekend courses (Duke University, 2003b; Duke TIP, 2002c; Johns Hopkins University CTY, 2002; Northwestern University CTD, 1999; University of Denver, 2002).

Common to all four regional talent searches are summer programs designed for talent search participants: Duke University's Summer Studies Programs; Johns Hopkins University's Center for Talented Youth (CTY); Northwestern University's Apogee,

Spectrum, and Equinox; and the University of Denver's RMTS Summer Institute (Duke TIP, 2002c; Johns Hopkins University CTY, 2002; Northwestern University CTD, 1999; University of Denver, 2002). These universities offer a spectrum of courses in mathematics, economics, science, social science, the humanities, and the arts. Talent search participants must meet or surpass SAT or ACT subtest cutoff scores in order to qualify for the university sponsored summer programs. Within the course offerings, there are additional scoring criteria for eligibility.

Relevant to the present study is Duke University's Summer Studies Program. Approximately 6% of Duke TIP participants qualify for the Summer Studies Program based on SAT or ACT scores (Schiel, 1998). The Summer Studies Program consists of the Academy for Summer Studies and the Center for Summer Studies (Duke University, 2003b). Students qualifying for the Academy must meet one of the following criteria by grade seven: ≥ 500 on the SAT-M; ≥ 500 SAT-V; ≥ 18 on ACT M; ≥ 25 on ACT E; ≥ 20 on ACT SR; or ≥ 20 on ACT R. Students qualifying for the Center must meet one the following criteria by grade seven: ≥ 570 on the SAT-M; ≥ 570 SAT-V; SAT-M ≥ 520 and SAT-V ≥ 520; ≥ 20 on ACT M; ≥ 27 on ACT E; ≥ 24 on ACT SR;
≥ 25 on ACT R; M ≥ 19 and E ≥ 25; or M ≥ 19 and R ≥ 24. Courses are fast-paced and above grade level, and many courses are taught at an undergraduate college level. Courses are taught on six different campuses: five in North Carolina and one in Kansas. Not all courses or levels are offered at each campus. Costs vary by campus, and range from $2,150 to $2,550 for one 3-week course (Duke University, 2003b).

Effects of participation in summer programs. Evidence indicates that participation in summer programs may produce auxiliary effects that go beyond the ostensible objectives of the specific educational opportunity, and are both cognitive and affective. Each of the following studies assessed former talent search participants who had either qualified for or attended a university-based summer program.

Fox, Brody, and Tobin (1985) assessed the math and science course-taking behavior and mathematics attitudes of high ability junior high girls following three different types of special programs. The programs included a summer accelerated math class for girls. Girls who had participated in the summer math program continued to be accelerated in math through the 11th grade compared to control group boys and girls. Although this advantage was lost by the 11th grade, the summer program girls achieved as well as high ability boys who had received no treatment and better than high ability girls who had received no treatment. Participation in a special program appears to have helped the talented girls keep pace with the talented boys, long after the class was completed.

Barnett and Durden (1993) compared talent search students who participated in special summer courses (search/program) through the sponsoring talent search university to students who qualified, but did not participate (search only), on measures of high school and college achievement. The students were matched on gender and SAT scores. Students in both groups were academically successful and active in extracurricular activities in high school. However, search/program students selected more rigorous high- school courses, and selected them earlier, than did search only

students. Search/program students also took AP exams earlier and attended more selective universities than did search only students. The data indicate that from middle school on, the search/program students continued to seek out academic challenges.

In a similar study, Schiel (1998) first statistically controlled for seventh grade ACT composite score, then compared summer program participants to nonparticipants on measures of high school academic achievement. Students who had attended the talent search university's summer program had a greater probability of obtaining a higher ACT composite score in high school. Additionally, program participants had a greater probability of taking trigonometry, having a cumulative math GPA of "A", earning college credit prior to high school graduation, and winning an award for science achievement.

Olszewski-Kubilius and Grant (1996) noted that the beneficial effects of summer programs may be dependent on the format of the class. Former talent search students who had qualified for and participated in special summer programs through the talent search university were assessed in high school, college, graduate school, or beyond. All were similar in aptitude, having met or exceeded the SAT cutoff scores for participation in the special program through the talent search university. The students were divided into two groups: those who had taken a math class in the program and those who took other "nonmath" classes. Although taking a nonmath class was not associated with general positive outcomes (measured by years in high school, National Merit Commendation or better, aspirations to a doctoral degree, and number of AP classes), taking a math class was associated with the positive, non-math associated outcomes.

There was a major difference in the format of the math and nonmath classes: the math classes were self-paced, while the nonmath classes were teacher-paced. Evidence suggests that the self-confidence, motivation, and analytic skills gained in a self-paced summer class were not only beneficial in the subject area (math), but the positive effects were generalized to other areas of academic endeavor as well.

Noncognitive benefits of special summer programming have also been recognized. Thomas (1989; 1993) conducted follow-up interviews on talent search students who had participated in a summer program sponsored by the talent search university. In both follow-up studies, the participants were typically high achievers: impressive high school GPAs, many extra-curricular activities, college credit in high school, acceptance at selective universities, and aspirations for graduate degrees. Affectively, participants reported that the summer program had increased their confidence, motivation, self-concept, desire for a collegiate environment, aspirations for the future, and independence.

There is a deficiency in the literature regarding participation by talent search students in special programs that are not affiliated with a talent search university. Schiel (1998) recognized this limitation in his analysis of summer program research. Although evidence indicates that special summer programs have long-range benefits, the evidence is only drawn from participants in talent search university sponsored summer programs. As Van Tassel-Baska (1998) pointed out, most qualifying participants do not attend the talent search university sponsored summer program. What is not known are the benefits resulting from programs other than talent search

programs, independent reading, or projects undertaken by students after participation in the identification phase of a talent search.

Rationale for the Talent Search Model

Exploration of the talent search model has important implications for furthering knowledge in the field of gifted education. Theoretically, the talent search model applies the developmental learning theories of Hunt (1961), Vygotsky (1978), and Csikszentmihalyi (1990). Conceptually, the model is consistent with Gagné's developmental model of giftedness and talent and allies conflicting views of giftedness and talent development.

Theoretical Rationale

The talent search model applies established theories of developmental psychology shaped during the past century. Robinson (1983) summarized the "bedrock" principles that underlie educational adaptations for intellectually gifted children: (a) Learning is a sequential, developmental process, (b) there are substantial differences in the rates at which children proceed though developmental processes, and (c) effective teaching involves the presentation of problems that slightly exceed those already mastered.

Hunt and the Optimal Match

Using the foundation of Piaget's developmental stages theory, Hunt (1961) delved into the problem of matching educational practice to the "natural phases of the child's interaction with the environment…" (pp. 267-268). Hunt is credited with coining the phrases "optimal match" and the "problem of the match" in reference to an

appropriate educational plan for a child (Whalen, 2001). Hunt believed that Piaget fell short by not suggesting accommodative modifications when there is not an appropriate match between "the circumstances a child encounters and the schemata he has already assimilated into his repertoire" (1961, p. 268). In other words, schools should take into account what a child brings into the classroom, regardless of his chronological stage of development.

As an example of this concept, Hunt related the experience of children who entered kindergarten with two years of nursery school, already knowing the kindergarten curriculum. These kindergarteners found kindergarten boring, and were ready to start reading and arithmetic. Hunt surmised that the educational environment "…must supply encounters for the child which permit him to use the repertoire of schemata that he has already developed and which force him to accommodate them if the rate of development and motivational interest are to be maintained" (p. 278). To those who feared that this approach would unnecessarily "push" children, Hunt responded that the proper "match" results in positive motivation and pleasure. Elkind (1988) would later support this position when he promoted academic acceleration of gifted children as a positive means of providing developmentally appropriate curricula. Furthermore, Hunt believed that lack of motivation and withdrawal in school resulted as much from boredom and lack of challenge as it did from exposure to material beyond a child's ability.

Although Hunt accepted the realization of the optimal match was challenging (Whalen, 2001), he gave two general guidelines for matching "circumstances" with

"schemata" (Hunt, 1961, p. 273). First, pertinent information needed for the optimal match comes from the child: observing the child's behavior within the particular schemata, listening to the child talk about relevant issues, and gathering knowledge about the child's past experience. Second, the size of the discrepancy between the educational circumstances and the child's ability must be determined. Hunt believed that the size of the discrepancy was a measure of potential for intellectual development. Therefore, the readiness of a child to "catch on" to new circumstances was indicative of potential for advanced learning. This second guideline was echoed in the research of Jackson and Butterfield (1988), who concluded that the potential for success in a program requiring sophisticated problem-solving is best predicted by a child's ability to learn the strategies, rather than assessment of a child's current strategic repertoire.

The talent search model is consistent with Hunt's call for crediting students with the knowledge and skills they bring into the classroom. The model recognizes that highly able students acquire much of what they know before they are expected to know it. As Hunt advocated, the talent search model employs educational modifications when necessary to better the "match." The talent search model also embodies Hunt's approach to identification of intellectual talent. Instead of using a measure of current achievement, talent search uses a measure of reasoning ability (Hunt's readiness to "catch on") in order to detect intellectual talent.

Vygotsky and the Zone of Proximal Development

L. S. Vygotsky (1978) also explored the relationship between development and learning. As did Hunt, Vygotsky believed that any learning a child encounters in school

has a previous history. Vygotsky agreed that learning should be matched to a child's developmental level, but differentiated between the actual developmental level and the level of potential development. The actual developmental level refers to established mental functions, existing due to already completed developmental cycles, and measurable by what a child can accomplish independently. Potential development refers to the capability of a child to learn under the guidance of a teacher or more capable peers. Vygotsky called the gap between the actual developmental level (independent problem solving) and the level of potential development (problem solving with guidance) the zone of proximal development (Vygotsky, 1978). The zone of proximal development defines abilities that are not yet mature, but are in an embryonic state, and are in the process of maturing. Vygotsky (1978) called these embryonic abilities the "buds" or "flowers" of development, as opposed to the "fruits" of development. Vygotsky held that attention to the zone of proximal development allows us to define not only what has been achieved, but what achievements are in the course of maturing as well.

Vygotsky (1978) established the importance of determining the zone of proximal development in conceptualizing mental development. By identifying the zone of proximal development in a child, predictions can be made as to how the child will develop, given that the same developmental conditions are maintained. Vygotsky called this predictive ability "a powerful concept….one that can markedly enhance the effectiveness and utility of the application of diagnostics of mental development to educational problems" (p. 87).

Talent searches apply Vygotsky's approach of optimizing the educational experience by providing content just outside the reach of what a student can do alone. Acceleration, fast-paced learning, and mentoring are hallmarks of the talent search model. Vygotsky, as well as Hunt, believed that identifying potential talent was key to its development. In the spirit of Vygotsky, talent search seeks to realize potential by stretching the individual beyond what is expected.

Csikszentmihalyi and Flow

Csikszentmihalyi's theories of optimal experience and flow further explain the connection between the active individual and the facilitative environment (Csikszentmihalyi, 1990; Whalen, 2001). Csikszentmihalyi described optimal experience as the "deep sense of enjoyment" that comes from the feeling of being "in control of our actions, masters of our own fate" (p. 3). Optimal experience does not always occur in ideal situations; to the contrary, it may occur under duress or in times of challenge. Csikszentmihalyi holds that the best times of life are those when "a person's body or mind is stretched to its limits in a voluntary effort to accomplish something difficult and worthwhile" (p. 3). In the context of education, optimal experience theory proposes that the efficacy of an educational challenge should be judged by the quality of the experience of the individual learner (Whalen, 2001).

From Csikszentmihalyi's analysis of the optimal experiences of creative people in a multitude of fields comes the concept of flow. Creative individuals consistently reported a state of immersed concentration, with centered attention, minimal distractions, and an enjoyable repartee while engaged in a creative activity.

Czikszentmihalyi termed this state the flow experience (Czikszentmihalyi, 1990; Whalen, 2001). The flow experience was ubiquitous; it crossed lines of economics, culture, and geography. Individuals reported being so engrossed in an activity that nothing else mattered. Activities which resulted in a flow experience shared commonalities: high challenge, clear goals and rules, and the opportunity for choice, control, and self-expression.

Czikszentmihalyi's research indicates that there is a correspondence between the flow experience and moderately mismatched challenges and skills (Whalen, 2001). When both the perceived challenges and skills are above an individual's normal level, the most positive outcomes and high levels of concentration occur. In other words, challenge is necessary in order to realize the full manifestation of talent. This, in turn, fuels motivation. According to Whalen, "The flow experience in itself motivates people to seek new challenges" (p. 325).

Kanevsky's (1994) research further illustrates this principle. High IQ and normal IQ children were asked to learn, transfer, and generalize a strategy for solving a puzzle. When it became apparent that the puzzle lacked sufficient difficulty to challenge the high IQ children, many of them began to challenge the rules of the puzzle, attempt illegal moves, and make mistakes out of boredom. As a result of their uncooperativeness and inattentiveness, the performance of some of the high IQ children was inferior and inaccurate. Without a sufficient challenge, there was no motivation to succeed in the activity. Instead, many opted to create their own challenge by bending and breaking the rules.

The talent search model is consistent with the optimal experience and flow theories of Csikszentmihalyi. Talent search seeks to provide the level of challenge that keeps an exceptional student engaged in the pursuit of academic goals, a flow experience. In addition, the talent search model recognizes that the facilitative environment greatly impacts the development of flow within an individual. Therefore, the model employs educational interventions and guidance when necessary.

Conceptual Rationale

The construct of giftedness has been conceptualized as a strict, IQ-based interpretation (e.g., Terman, 1925) to broad, inclusive concepts such as the three-ring conception of giftedness (Renzulli, 1986) and multiple intelligences theory (Gardner, 1983). Within these conceptual frameworks, terms such as gifted and talented have been defined and debated. Various models of identification and programming have been created to fit particular conceptions of giftedness (e.g., Gardner, 1993; Renzulli, 1977). The talent search model fits within the conceptual framework of Gagné's differentiated model of giftedness and talent (Gagné, 1995; 2000) and lends interpretive precision to the terms gifted and talented.

Differentiated Model of Giftedness and Talent

Conceptually, the talent search model is in harmony with Gagné's model of the gifted construct, the differentiated model of giftedness and talent (Gagné, 1995; 2000). The notable feature of Gagné's DMGT is the distinction made between giftedness and talent. In the DMGT, giftedness is characterized as "untrained and spontaneously expressed superior natural abilities (called "aptitudes" or gifts") in at least one ability

domain, to a degree that places an individual at least among the top 10% of his or her age peers" (p. 1). The DMGT recognizes four domains of giftedness: intellectual, creative, socioaffective, and sensorimotor. A high degree of natural ability is best observed in young children whose exposure to environmental influences and systematic learning is limited. However, high natural ability, or giftedness, can be apparent in older children and adults in the speed and facility with which they learn or acquire new skills.

In the DMGT, talent is characterized by the "superior mastery of systematically developed abilities (or skills) and knowledge in at least one field of human activity to a degree that places an individual within at least the upper 10% of age peers …" (Gagné, 2000, p. 1). In the DMGT, talents emerge from the transformation of high natural abilities (giftedness) into well-trained and systematically developed skills particular to a field of activity. In other words, giftedness is the raw material; talent is the end point, or goal. A given natural ability (giftedness) such as intellect can be expressed in a variety of talents, e.g.: reasoning, analysis, or strategic planning (Gagné, 1995).

Because in the DMGT talent is the end product resulting from preexisting exceptional natural ability, a talented individual is by default a gifted individual. However, the reverse does not hold true. Giftedness that is not developed does not translate into talent, hence the existence of gifted underachievers (Gagné, 1995; 2000). Development of gifts into talents can be helped or hindered by physical, psychological, and environmental factors (Gagné, 2000). Genetic endowment, motivation, temperament, behavioral style, traits, disorders, family demographics, socioeconomic

status, and significant life events all interact with the process of turning giftedness into talent.

Gagné sets the threshold for both giftedness and talent at the 90th percentile (Gagné, 2000). However, the DMGT recognizes five degrees of giftedness and talent within the top 10%. These degrees are "mildly" (top 10%), "moderately" (top 1%), "highly" (1:1,000), exceptionally (1:10,000), and "extremely" (1:100,000).

Unlike many other conceptions of giftedness, DMGT does not focus on global intellect, as measured by an IQ. Instead, the focus is on measurement of specific aptitudes (natural abilities) and how they can be brought to expression in talent (Gagné, 1995). Stanley (1984), in the development of the talent search model, likewise focused on aptitudes and eschewed a reliance on general mental ability. Talent search is consistent with the DMGT by insisting on identification based on areas of reasoning strength in a student, as opposed to a generalized labeling as gifted.

In the DMGT, the development of talent (Gagné's end product) takes precedent over the development of natural abilities. Gagné (1995) is opposed to programming that emphasizes "pure" training of natural abilities and does not have a direct application to a practical field. Generic "gifted" programming, designed to develop natural abilities, is often accused of being "busy work" and "academically irrelevant" (p. 360). The talent search model aligns with the DMTG in its recommendations for exceptional students. Recommendations are consistently content-oriented: subject and grade acceleration, college coursework, AP classes, and a host of summer offerings in subjects from comparative literature to economics. "If I am hungry, give me food. If I

am thirsty, give me water. A steak will not save the person dying of thirst, nor will water save the one in the last throes of starvation" (Stanley, 1984, p. 178).

According to the DMGT, levels of giftedness and talent exist within the population of very able students, each with differing educational needs. The talent search model's use of out-of-level testing is consistent with this conception of giftedness. Out-of-level testing uses college entrance exams to redistribute students who crowd the top percentiles on grade-level tests along a normal curve (Assouline & Lupkowski-Shoplik, 1997; Olszewski-Kubilius, 1998a, Wendler, Ninnemen, & Feigenbaum, 2000). The focus of assessment is therefore refined so that differences among students in the top percentiles of grade level achievement become apparent (Benbow, 1992). Talent search programs further recognize differences by offering varying levels of programming, depending on the participant's performance on the SAT or ACT.

The DMGT explains the phenomenon of the gifted underachiever. One can be gifted (natural ability), but not talented (end product) if the natural abilities are never fashioned into superior skills or knowledge. Gagné (1995) holds that intrapersonal and environmental factors acting on natural abilities are catalysts in the talent development process. Therefore, interventions are necessary. Talent search research confirms this conception. Students with equally high reasoning ability, as confirmed by seventh grade SAT scores, do not achieve in college and beyond to equal degrees. Talent search research reveals that as students differ in high school curricula, achievement differs (Benbow & Arjmand, 1990; Brody et al., 1990). Special examinations and a course load

heavy in AP classes appear to be a critical factor in achievement in college and beyond. In other words, intervention is supported. Students who were counseled and guided to choose demanding, college-level high school classes achieved to higher degrees than equal ability peers who chose a less rigorous route. An understanding of the DMGT highlights the judiciousness of talent search's commitment to academic placement and guidance prior to high school.

Terminology Debates: Gifted Versus Talented

During the last two decades, the term gifted has increasingly come under fire. The term gifted has been deemed an educational albatross (Feldhusen, 1994), counterproductive (Renzulli & Reis, 1991), stigmatizing (Feldhusen, 1992) and potentially harmful (Shore et al., 1991). As a consequence, the terms talented or talent development, considered by some to be less offensive, began to be used synonymously with gifted (Gagné, 1995). The result was a muddying of the conceptual basis of all three terms.

The semantic debates were fueled by challenges to the construct of giftedness itself. Opposition arose to the dichotomous nature of giftedness: you either have it, or you don't (Treffinger & Feldhusen, 1996). Although the field of gifted education was moving away from reliance on a cut-off IQ score as the sole determinant of giftedness or not-giftedness, identification practices still relied on formulas designed to find "general, all-purpose gifted children" (Feldhusen, 1995b, p. 348). Matrices were created that added and averaged scores on various identification instruments, resulting in an overall index of giftedness (Feldhusen, 1995b, p.348). To qualify as gifted, therefore,

students needed to score highly on most of the measures used (Massé, 2001). This restrictive selection process resulted in students with an exceptional aptitude in one area being judged as not gifted (Gagné, 1995). Reaction to global giftedness resulted in a revamped gifted construct characterized by the notion that almost everyone is gifted, in one way or another: Gardner (1983) described multiple intelligences, Renzulli's (1986) definition was a trio of above-average abilities, and Feldhusen (1992) asserted that all or most children have areas of talent strength or aptitude.

Eventually, the terms talent and talent development began to be used synonymously or in place of gifted and gifted education (Treffinger & Feldhusen, 1996). Treffinger and Feldhusen characterized talent development as the successor to gifted education. Proponents of the shift to talent terminology argued that it was not merely a cosmetic or politically correct change, but a fundamental change in the conception of the construct (Treffinger, 1995; Treffinger & Feldhusen, 1996). According to Treffinger and Feldhusen (1996), "Talent is potential for the development of competence or expertise across a broad range of human endeavors…" and it redirects efforts to "address specific talent areas rather than some presumed generic 'giftedness'" (p. 183). Gagné (1995) operationally defended the use of the gifted term, and called for terminological consensus by defining gifts as natural abilities and talents as the developed end products of giftedness.

The term gifted has also fallen out of favor because of its negative connotations of elitism. Winner (1997) theorized that ambivalence toward extreme intellectual talent arises from an anti-intellectual mind-set in American culture. According to Winner,

deep-rooted American fear of hierarchies leads to rejection of anything that could be interpreted as elitism. De Tocqueville (1840) observed Americans will endure poverty, servitude, barbarism, but Americans do not endure aristocracy. Giftedness offends the sense of egalitarianism of many as it implies the existence of differential aptitudes (though affected by environment), and this is perceived as an injustice (Gagné, 1995).

Gross (1999) has long documented the aversion of those in egalitarian societies toward the academic precocity of children. Her studies with highly gifted children in Australia reveal the tendency of society to "cut down to size" children who "develop at a faster pace or attain higher levels of achievement than their age-peers" (p. 207). Australians recognize this practice as "cutting down the tall poppies." Massé (2001) proposed that replacing gifted with the terms talent development or talent education would be more palatable in an egalitarian society.

The talent search model has the potential to quiet the semantic wars over the terms gifted, talented, gifted education and talent development. Unlike other gifted programming, the talent search model does not require a diagnostic label for participation. Criteria for participation in talent search is a 95^{th} percentile or above score on one of several grade-level achievement subtests. Additionally, students may self-nominate for talent search by taking the SAT or ACT on an independent basis. Students scoring at or above cut-off levels on the SAT or ACT may take advantage of special programming through talent search and, regardless of whether a student qualifies for special programming, participants have access to recommendations for educational planning. The all or nothing aspect of a global gifted label is diminished because

aptitudes are recognized as falling along a continuum, as well as falling into different domains.

The talent search model quiets the furor because the purpose of special identification is long-term planning, not selection to a special class. The talent search model excludes any components of an overall elite class of the gifted. Instead, talent search doggedly pursues exceptional verbal or mathematical reasoning, wherever it may be found, in order to bring it to full potential.

Curricular and Instructional Implications

Talent search has important implications for curriculum and instruction. Talent search challenges deep-rooted educational practices and conventional wisdom in the areas of curricular access, curriculum content, and instructional pace.

Curriculum Access

The primary challenge talent search presents is to conventional conceptions of who gets access to what curriculum, and when. In traditional schooling, chronological age is by far the chief determinant of academic placement (Robinson, 1983). This is particularly true in the years preceding high school (Stanley, 1989). The debates over kindergarten entry age and the propensity to red shirt children clearly illustrate the fixation on chronological age as the determinant of school readiness (Graue & DiPerna, 2000). From its inception, talent search has insisted that competence rather than age be used in determining who gets access to what curricula and opportunities, and at what time (Benbow et al., 1996). Research emanating from SMPY has repeatedly shown that chronological age is not a reliable factor in determining readiness for a

particular content area (Bartkovich & Mezynski, 1981; Lynch, 1992; Stanley, 1991,1999; Stanley & Stanley, 1986). These studies indicate that students often have the mastery of prerequisite knowledge and skills, maturity, and motivation needed to succeed in courses well above their grade level (Olszewski-Kubilius, 1998).

Talent search also calls into question the traditional sequence of curriculum. SMPY research indicates that some students do not need to take every course in a subject area's sequence. Skipping subjects or even grades may be beneficial for some (Brody & Benbow,1987; Pyryt & Moroz, 1992;Vialle et al., 2001). For example, skipping fundamental courses in math or science frees up time to take more advanced courses in these subjects and at no significant loss of learning as students intuit or learn the basic skills while learning the more advanced ones (Kolich & Brody, 1992).

Talent search's challenge to conventional curriculum access and sequence creates a particular dilemma in educational policy. Students who seek early access to curriculum or alterations in curricular sequence face policy barriers which may be official or unofficial. Reis and Westburg (1994) surveyed 28 urban, suburban, and rural school districts of varying geographical locales and socioeconomic status regarding written and unwritten acceleration policies. Eighty-five percent of the schools had no formal, written policies concerning grade acceleration for secondary students, while 73% reported formal written policies concerning subject skipping. Some of the written policies allowed grade or subject acceleration, others forbade it. Most of the districts acknowledged the existence of informal, unwritten acceleration policies, the majority of which were in opposition to grade or subject skipping. Attention to these policies is critical in light of

the finding that none of the districts had policies prohibiting low achieving students access to appropriate curriculum, even if it was below grade level. Reis and Westburg called this paradox into question: Is equity achieved when one group has access to appropriate curriculum while another is denied?

Students who complete courses outside the school system, whether in talent search summer programs or college courses, also face policy barriers when seeking to be credited for their work. Awarding the appropriate credit for outside work is an issue for high schools grappling with rigid standards for graduation (Lynch, 1990). For example, state and local policies requiring a certain number of science or math courses in high school may pose a barrier to students bringing these credits into high school. Research indicates a sporadic, inconsistent pattern of awarding credit to students completing courses outside the school system.

Van Tassel-Baska (1998) reported that only a few talent search students were able to receive credit or advanced standing in their local schools after completing summer courses. For example, Northwestern University applied for and received accreditation for awarding high-school credit for its summer courses, yet only 62% of those completing the program received credit from their school. Similarly, Thomas (1989) found that only 44% of students completing a fast paced summer course at the Academic Talent Search Summer School at California State University-Sacramento were granted credit and a grade by their school. Many were required to take an examination before receiving credit.

More optimistic findings were reported by Lynch (1990). Lynch questioned former participants in the Johns Hopkins University Center for the Advancement of Academically Talented Youth (CTY) fast paced summer math and science classes regarding their success in receiving credit or placement. Students who had taken precalculus mathematics had the highest rate (81%) of requesting and receiving credit or placement. That finding is consistent with Olszewski-Kubilius' (1989) finding that schools were more likely to grant credit for more "organized" subjects such as math, foreign language, biology, and chemistry than for less "organized" subjects such as writing or literature. Only about half (52 %) of those who had taken fast paced science classes requested credit or placement. Of those who requested credit or placement, 78% were successful. Although most schools agreed to honor the coursework, most preferred to grant advanced standing as opposed to actual credit for the course. Schools who granted credit or placement often required an exam in the subject or a grade assigned to the fast paced class before credit or placement was given.

Kolitch and Brody (1992) also reported a somewhat optimistic picture. The 69 students in their study found schools to be "fairly cooperative" in granting credit for work done outside school. Three students reported a great deal of difficulty - one of them termed it a "huge battle." Ten other students reported minor complaints that were resolved with parental intervention. All in all, the researchers determined that some students accelerated with the help of the school, others in spite of it.

Content of the Curriculum

The content of programming for gifted students has traditionally been outside the regular curriculum. Programs were typically "pull-out" classes designed not to interfere with the regular curriculum (Treffinger & Feldhusen, 1996). Because it provides powerful diagnostic data, talent search has the potential to come inside the arena of the regular curriculum and impact the content. The concept of educational diagnosis and prescription pervades the entire scope of talent search. From aptitude-specific identification to special programs, the focus remains on a systematic matching of talent to a curricular offering (Van Tassel-Baska, 1996).

Responsive curriculum planning gives a student with a talent in math, for example, a broad choice of courses in advanced mathematics, science, or economics. An example of building a curriculum responsive to strengths is Van Tassel-Baska's (1996) idea of creating a rigorous English course for the verbally talented that emphasizes critical reading, deductive reasoning, vocabulary development, and analogies as found in the SAT-V. Responsive curriculum planning also recognizes that not all highly able students in a content area have the same curricular needs. Benbow (1992) demonstrated that even within the top 1% of ability in a content area, achievement differences exist.

Schools and school districts have joined together to incorporate components of the talent search model into the curriculum (Rotigel & Lupkowski-Shoklik, 1999; Van Tassel-Baska & Prentice, 1985). The Academically Talented Youth Programs (ATYP) model, created by school districts in the Kalamazoo, Michigan area, is a notable

example of assimilating the talent search model into the curriculum (McCarthy, 1998). A region of approximately 50 school districts collaborates with a nearby university and selective college to replicate the format and content of talent search summer courses in the regular curriculum. Seventh through ninth-grade students qualifying for ATYP (based on SAT scores) attend a weekly 2½-hour block class in either high school mathematics or expository writing/literature. At the end of two years (180 hours of instruction), students have completed four years of precalculus math or an English course with high school honors and college freshman objectives. The math students subsequently enroll in AP calculus when available. Approximately half of the English students take the AP English exam, and the majority score 4 or 5. After completion of the ATYP, students may attend the region's math/science magnet school or enroll in university course, where they are consistently among the top performers. Program costs are shared among the schools, and parents pay the fees when a private school does not pay or the student is home-schooled.

Nowhere in the talent search model is it implied that a student should major, so to speak, in his/her area of strength to the exclusion of exploration and enrichment in other areas. Talent search is a model for identifying and addressing aptitudes and developing talents, and does not exclude important development in other aspects of life. Furthermore, the principles of talent search have the capacity to impact the curricular content of education in general, not just for the gifted. Most individuals demonstrate the capacity for developed skills or knowledge in a particular area, but not to the degree of giftedness or talent. Gagné calls this competency (1995). The principle

of constructing content responsive to talents is transferable to construction of content responsive to competencies.

Pace of Instruction

Mastery of a subject has traditionally been defined by both the performance of the student and the time spent on the subject (Olszewski-Kubilius, 1998). Many practitioners equate mastery of objectives with participation in a year's worth of activities, and are hesitant to allow an advanced student to miss any instruction (Braggett, 1984). As was addressed in the previous discussion on curriculum compacting, teachers who do not distinguish between an objective and an activity have a difficult time eliminating unnecessary instruction (Reis et al., 1992). Although most schools adhere to a policy of 120 hours of instruction per subject, talent search research has found that highly able students were capable of mastery in far fewer hours (Bartkovich & Mezynski, 1981; Lynch, 1992; McCarthy, 1998; Olszewski-Kubilius et al., 1989).

A U.S. government report called time "learning's warden" (National Education Commission on Time and Learning [NECTL], 1994). When highly able students are forced to spend more time than they need on a curriculum designed for the general population of learners, they can become bored, frustrated, unmotivated, and in essence, "prisoners of time" (NECTL, 1994, p. 11). Talent search therefore challenges the belief that all learners need the same amount of instructional time in order to truly master a subject (Olszewski-Kubilius, 1998).

Limitations and Criticisms of Talent Search

Talent searches have been in existence for more than three decades. A strong rationale for the talent search model can be built theoretically and conceptually, and the empirical evidence for the success of talent searches is strong. Yet, it has been suggested that the impact of talent search has been limited in both the identification and developmental phases of the model (Olszewski-Kubilius, 1998a; Van Tassel-Baska, 1998). The following sections examine several limiting factors that have been identified in the literature.

Limited Numbers

Talent search is limited in the number of students it is designed to serve (Stanley, 1996; Van Tassel-Baska, 1998). In order to qualify for talent search testing, a student must first be in the top 5% of seventh grade ability. However, in order to qualify for university-based programs, students must score as well or better than college-bound high school seniors, thus narrowing the percentage to the top 1% nationally.

Van Tassel-Baska (1998) reported that 160,000 students are tested each year through talent searches. Of that number, 40,000 qualify for university-based talent search programs, but only 8,000 actually participate. The highly disparate screening to service ratio of talent searches led Van Tassel-Baska to remark, "If a local program screened and identified students in such a manner and then denied service to such a large number of them, it would cease to exist" (p. 140). Even the 160,000 who are

tested is a limited figure in view of Olszewski-Kubilius' (1998a) finding that only a small percentage of schools who could recommend students for the talents actually do so.

Cost

Participation in a talent search requires monetary resources, the amount of which depends on the degree of participation. First of all, there is a fee to take the SAT or ACT, plus a fee paid to the talent search university, a total of approximately $50 (Olszewski-Kubilius, 1998a). Three-week summer programs sponsored by talent search universities can be quite expensive, costing as much as private school tuition or a year at a state university (Van Tassel-Baska, 1998). Students who attend university-sponsored programs also must pay the expenses of travel and other miscellaneous costs. Financial aid is available, but on a very limited basis (Olszewski-Kubilious; 1998a; Van Tassel-Baska, 1998).

Logistics

Talent search university programs may be located far from home. For example, the Duke University TIP summer studies courses are offered on five campuses in North Carolina and on one campus in Kansas. However, the Duke TIP serves a 16 state area, as far north as Nebraska and Iowa, as far west as Texas, and as far south as Florida (Duke University Talent Identification Program, 2003b). The logistics necessary to send a seventh grader by air or the time off from work to drive may be daunting for many families. In addition, the three week commitment of the summer programs leaves little flexibility in summer schedules (Van Tassel-Baska, 1998).

Perceptions of Talent Search

The regional talent searches are conducted by universities, not the local school or even the school system. Talent search involves the local schools, but indirectly. As Stanley (1996) put it, talent search "burrows under" the particular school in a "benignly insidious manner" (p. 233). Although a close collaborative relationship would be ideal, the sheer size of the regions served by the talent search universities hinders a close connection with each local school (Van Tassel-Baska, 1998). The local school is responsible for submitting the names of students who qualify for the search, but the responsibility of the local school ends there (Olszewski-Kubilius, 1994; 1998a). Parents and students decide whether or not they will participate in the talent search and make the necessary arrangements (Olszewski-Kubilius, 1994). Scores are sent directly to the student (Stanley, 1996). Talent searches are thus perceived by the local school as "independent, fee-based organizations tailored to provide quality coursework within circumscribed time frames *outside the realm of school*" [italics added] (Van Tassel-Baska, 1998, p. 140). In other words, there is tendency for schools to view the talent searches as just one of many outside contests or enrichment opportunities.

Perceptions of Out-Of-Level Testing

Talent search is limited because local schools do not fully appreciate the implications of out-of-level testing (Van Tassel-Baska, 1998). Knowing that you have a group of students at the top of grade-level achievement is one thing; knowing that you have a group functioning as well or better than college students is another. Many middle school practitioners mistakenly assume that seventh graders take a junior high

version of the SAT or ACT (McCarthy, 1998). Schools may fail to recognize the implications of a seventh grader scoring at college-entry level, and thus the value of the talent search data in developing an academic plan is lost (McCarthy, 1998; Van Tassel-Baska, 1998). Likewise, the implications of the talent search data may escape the high school staff if it is assumed is that all entering freshmen only have middle school experiences and abilities (McCarthy, 1998).

Data generated from out-of-level testing may be viewed as an intellectual curiosity, and nothing more. Gregory Anrig, former president of the Educational Testing Service (which administers the SAT), supported the use of the SAT with middle school students as a research project, but strongly opposed using the information gained for any other purpose (Feinberg, 1984).

Educator Opposition

Talent search is limited by educator opposition to one of the hallmarks of the model: acceleration. Although the talent search model most heavily emphasizes subject acceleration, curricular flexibility is always a central tenet (Stanley, 1996). Despite decades of empirical support for acceleration (Shore et al., 1991), attitudes of educators toward acceleration range from ambivalence to opposition.

Southern, Jones, and Fiscus (1989) extensively examined the opinions of educators regarding acceleration and the source of their opinions. Elementary teachers, elementary principals, gifted program coordinators, and school psychologists ($N = 554$) responded to survey questions indicating the degree to which they agreed with presumed effects of acceleration. Four dimensions were covered: academic adjustment,

social development, emotional adjustment, and inhibition in the development of leadership. With the exception of the coordinators, the respondents overwhelmingly opposed acceleration on the grounds of social and emotional adjustment concerns and deprivation of childhood experiences. In follow up interviews, the educators were asked to rank the importance of the sources of their opinions on acceleration. Research reports and district policies were among the sources considered least important.

Practitioner opposition to acceleration is not confined to American teachers. In a New Zealand study, Townsend and Patrick (1993) surveyed experienced teachers and teacher trainees regarding their opinions of acceleration. Both the teachers and the trainees acknowledged the academic rationale for acceleration, but had strong reservations concerning the social and emotional impact.

Southern et al. (1989) noted that the educators did not distinguish between types of acceleration, but grouped all manifestations of acceleration under one umbrella. This finding is not surprising given the lack of research knowledge evidenced by the respondents. The failure to distinguish between types of acceleration can be a prescription for trouble when applying research to practice. For example, it would not be valid to apply the early school admission research to the practice of subject acceleration in math.

Accessibility to Students with Dual Exceptionalities

The talent search identification process starts with students who are at the top of the grade level according to achievement tests. However, many gifted students may not be found in this manner (Olszewski-Kubilious, 1998a). Special populations are difficult

to find in most models of identification, talent search included. Students with two exceptionalities, gifted plus limited English proficiency, socio-economically disadvantaged, or learning differences, may underachieve and never "look" gifted in the classroom or on achievement tests (Baum & Owen, 1988; Borland & Wright, 1994; Ray, 1997; Reis, Neu, & McGuire, 1995; Tomlinson, Callahan, & Lelli, 1997). The second exceptionality often masks the giftedness and achievement test scores do not reflect the student's true abilities. Without an achievement score in the top 3-5%, twice exceptional students will not be tapped to participate in talent search.

Participation in Alternative or Auxiliary Academic Opportunities

The present study identified factors that are predictive of parental decision-making regarding talent search. Since talent search occurs outside the auspices of the regular school, and because talent search programming recommendations often call for alternative or auxiliary educational opportunities, a deliberate decision to participate must be made by the parents. Because middle school students do not routinely complete the demographic information that other SAT or ACT test takers complete, there is limited information on the demographic characteristics of talent search participants (Wendler et al., 2000). In order to inform the selection of predictive variables for the present study, the following section reviews the empirical evidence and recommended practices found in the literature regarding factors that influence the participation of high ability students in alternative or auxiliary academic opportunities. The majority of the factors identified in this section are either directly or indirectly dependent on the parents of the gifted student. As middle school students, potential

talent search participants are likely to be dependent upon parents to guide and finance talent search participation.

Parental Perception of Abilities

Solow (2001) observed, "How parents view their children's abilities and potential influences the way they guide them" (p. 14). Several studies have examined the effects of the gifted label on the parental perceptions of the child. Cornell (1983) compared 22 families with one or more children in a gifted program to a control group of 20 families in which all the children were in a regular classroom. Parents were questioned as to their perception of giftedness and how it applied to their child. Interestingly, some of the parents of children in gifted programs did not perceive their child to be gifted. Very few parents of students in a regular classroom considered their child gifted.

In a subsequent study, Cornell (1989) questioned parents of students who had participated in a summer enrichment program for high ability students. Approximately 86% of the students in the study were in a gifted program during the previous school year. Mothers and fathers answered separate questionnaires regarding their use of the term gifted to describe their child and whether or not they thought of their child as gifted. The percentage of mothers who used the term gifted was slightly larger than the percentage of fathers who used the term (approximately 74% and 69%, respectively). More children of mothers who used the term gifted were in school gifted programs compared to nonusers, but there was no difference in proportion of children in gifted programs among the user and nonuser fathers. Most parents agreed in thinking that that their child was gifted.

Raymond and Benbow (1989) considered the effects of parental encouragement on academic talent. The study looked at a group of talent search participants, including a subgroup of extremely precocious students with SAT-M scores of 700 or more or SAT-V scores of 630 or more. Parents of the extremely precocious students were found to give the most support in the students' area of strength, while the parents of the moderately gifted students provided general support or none at all.

Parental Perception of Academic Needs

When academic needs challenge conventional wisdom regarding developmental needs, conflict may arise over the appropriateness of academic opportunities. In their study of extremely precocious youth, Lupkowski-Shoplik and Assouline (1994) determined that parents are the primary advocates for their children in securing alternative and auxiliary educational opportunities. The parents in their study battled the education establishment in order to provide radical acceleration, flexible scheduling, and subject acceleration for their children. Gross (1994) has followed the development of precocious youth in Australia for many years. Gross likewise chronicled the battles parents faced in obtaining educational opportunities for their child that were not considered developmentally appropriate for the child's age.

Durden and Tangherlini (1993) presented case studies of nine gifted students and their encounters with rigid educational systems. They noted that almost all of the students received much of their education outside of school (p. 156). Recognizing the role played by the parents, Durden and Tangherlini recommended Individual Educational Plans (IEP) for every student. In their opinion, IEPs force the bureaucracy

to come face to face with the parent, the child, and the school (pp. 280-281). The researchers concluded "The ease with which modifications were made in the regular educational program to meet an individual's needs was strongly related to the ability of the parents to serve as advocates or diplomats" (p.281).

Conversely, parents may value developmental maturity over academic readiness. This is especially apparent in the practice of delayed kindergarten entry, also known as academic red shirting (Graue & DiPerna, 2000). Children, especially those with birthdays at or near the age cut-off for kindergarten entry, are held out and enter kindergarten almost a full year older than the traditional age. Graue and Diperna (2000) found that parents who choose red shirting are concerned with maturational development, as opposed to academic readiness. Being smart enough was not the issue with parents; rather, parents were concerned with attention span, gaining an edge over other students, and not pushing the child (p. 510). Noel and Newman (1998) looked at two groups of parents who chose red shirting: those who made the decision at or before the birth of the child and those who made the decision closer to kindergarten entry. Parents who decided to red shirt at birth based their decision on their own experiences and philosophies. Parents who decided to red shirt closer to ages three or four based their decision on a characteristic or experience of their child that was problematic. Neither parent group cited any school-associated variables in making the decision to red shirt.

Pressure to avoid the hurried-child syndrome may influence parental perceptions of a child's academic needs. The hurried child is a term attributed to Elkind (1982) as a

descriptor of the overscheduled, parentally pushed child. Although Elkind later clarified that the academic acceleration of gifted children was not considered pushing and was quite often warranted (Elkind, 1988), the hurried child fear still influences parents. For example, the middle school principal of Sidwell Friends, a prestigious private school in Washington, D.C. openly discouraged parents from letting their children take the SAT for talent search purposes. "There's the hurried child syndrome, and we're concerned about that. We feel our children are subject to enough academic pressure without increasing it" (Feinburg, 1984, p. A1).

Useem (1992) found that children of parents who valued challenge, even if challenge meant making lower grades and experiencing frustration, were more likely to be found in high ability math classes. The same study found, however, that some children were placed in nonaccelerated math classes due to the low stress philosophy of the parents, regardless of the children's actual academic ability.

Academic Choices

Olszewski-Kubilius and Yasumoto (1994) investigated variables that influenced gifted students' selection of a math course versus a verbal course or a verbal course versus a science course in a summer academic program. The variables investigated included ability, prior experience, student interest, and parental attitudes regarding the importance of the subject. In both cases, the variable with the most explanatory power was parental attitude about the importance of the subject. Students whose parents rated math and science as very important to their child's future were most likely to select a math or science course in the summer program.

Similar findings were found by Useem (1992) regarding parental influence in choice of academic courses. Parents who had taken rigorous math courses themselves reported pushing their children to likewise take difficult math courses. Parents with college degrees were more likely to strongly encourage difficult courses, even when their children were intimidated by the descriptions and reputations of the courses.

Academic choices may also be influenced by a student's perception of the course. Rogers and Schatz (1998) and Rogers, Schatz, and Dykstra (2001) examined the effects of course content and student learning styles on gifted students' attitudes toward an academic summer program. The study, which spanned three summers, found that students were most satisfied with courses that featured in-depth, novel, and sophisticated content. Analysis of learning styles revealed a consistent student profile: independent, persistent, and fluent. Overall, students ranked "finding others like myself" the most satisfactory element of the summer program.

Private Versus Public School

The type of school a student attends (public versus private) may be a factor in participation in academic opportunities. Without the constraints of policies and standards imposed by a large school district or state, private schools seem to have more flexibility in making educational modifications (Witham, 1997). Witham (1994; 1997) compared public and private schools in their use of grade and subject acceleration for gifted students. Although the frequency of grade acceleration for both public and private schools was low, private schools reported a greater percentage of students using texts and other materials two years beyond the grade level. However,

some private school educators reported that acceleration was unnecessary due to the broad, in-depth quality of their private school curriculum.

In his "Ten Suggestions for Guiding Students," Stanley (1989) counseled parents of talented students to avoid relying on private schools for appropriate educational solutions. Despite the small class size, Stanley believes that most private schools are too small to provide the scheduling flexibility needed for accelerated students. According to Stanley, the IQ range (120-140) in most private schools is limited. Private schools therefore tend to focus on and cater to this IQ range. Stanley advised parents of talented students to save the money spent on private schools for special educational options outside school. Private schools may also have a more homogenous curricular track than do public schools. Hoffer, Greeley, and Coleman, (1985) found that private schools place more students in college-bound academic tracks, require more semesters of coursework, and assign more homework than public schools. When all students are on the same academic track, glaring curricular mismatches may not be apparent.

Muller (1993) looked at home-based measures taken by private school parents and public school parents to expand their child's educational options. One of the factors considered was enrolling the child in an out-of-school music class. This factor was considered to be indicative of the parents' willingness to invest time and money outside of school. Muller found no difference between private school parents and public school parents on home-based measures, including the music classes.

Parental Educational Level

A widely held belief is that almost all academic outcomes of students are intrinsically related to the socioeconomic status of their parents (White, 1982). However, studies indicate that high socioeconomic status has little relationship to school involvement (Sui-Chu & Willms, 1996) and that the advantages of rigorous coursework narrow the gap between socioeconomic status and achievement (Gamoran, 1987). Parental educational level has been shown to be highly predictive of parental intervention in a child's schooling. Useem (1992) found that among students in accelerated math groups, the majority had parents holding advanced degrees. In fact, of families where both parents held advanced degrees, only one child was not in an accelerated math class. Parents with advanced degrees and those with college degrees were much more likely to demonstrate knowledge of how students were placed in math groups than were parents with some college or less. Parents who were not college graduates were especially unclear as to the long-term implications of choosing a particular course of study, and were often more concerned with the grade in a class than with the level of the class.

Particularly relevant to the present study was Useem's (1992) finding that highly educated parents were more likely to question the school's decisions regarding their child, more likely to request interventions, and were more likely to be successful in obtaining educational interventions. Parents with less formal schooling tended to trust school personnel to make all educational decisions regarding their child. Lareau (1987) found that parental attitudes toward education were a critical factor in the degree of

parental school involvement. Parents who believed themselves to be partners with the school were more likely to be involved in the education of their child than were parents who viewed education as the job of the school (Lareau, 1987).

Honors and Awards

Honors and awards have been cited as a motivation for students to participate in educational opportunities. Rotigel and Lupkowski-Shoplik (1999) rank honors and awards among the top six benefits of participating in a talent search. It has been recommended that recognition of academic talent should be a priority as it is with athletic and musical talent (Van Tassel-Baska & Prentice, 1985).

Summary and Need for the Present Study

The talent search model, as a model for identification and development of academic talent, is supported by developmental learning theory and is consistent with the DMGT conception of giftedness and talent. University sponsored talent searches, based on the SMPY model, have created defensible programs for talent development. Although talent search has vital implications for schools, curriculum, and instruction, talent searches are limited because they are outside the jurisdiction of the school and must rely on parent initiative. The literature indicates that parents are the major source of influence on how students participate in educational opportunities outside the norm of regular schooling. At present, there are no known studies identifying factors that are predictive of parental decision-making regarding talent search participation. There are no known studies identifying factors that influence parental decisions to seek out extra-

curricular options or curricular and instructional options following participation in a talent search. The present study sought to address these deficiencies.

CHAPTER III

METHODOLOGY

This chapter outlines the methodology that was used in the present study. Because diverse types of data provide the best understanding of a research problem (Creswell, 2003; Tashakkori & Teddlie, 2003), both quantitative and qualitative data were collected in a mixed methods research design. Mixed method designs allow the researcher to illuminate data collected in one method with data collected in the second method.

This chapter includes a description of the participants, descriptions of the schools from which the participants were drawn, descriptions of the research instruments, and an outline of the procedures followed in carrying out the research. The chapter ends with a description of the data analysis procedures used.

Design

In the present study, a sequential explanatory strategy was employed, with components of concurrent triangulation strategy (Creswell, 2003). Sequential explanatory strategy is characterized by the collection and analysis of quantitative data followed by the collection and analysis of qualitative data. Following collection of quantitative data using a questionnaire, selected respondents were interviewed to gather qualitative data. A sequential explanatory strategy allowed use of the qualitative data to explain and interpret the dominant quantitative data. Concurrent triangulation strategy is characterized by concurrent confirmation and collaboration of data using two different methods (Creswell, 2003). In the present study, respondents were asked to

respond to open-ended questions related to the closed-ended items on the questionnaire.

Participants

Participants consisted of parents of students who were invited to participate in either the 2001-2002 or 2002-2003 Duke Talent Identification Program. The students represented in the present study were in the seventh grade or were eligible for seventh grade at the time of their nomination for the Duke TIP. The students qualified to participate by scoring in the top five percentile on one or more subtests of a standardized achievement test administered by their local school or school district. Students represented in the present study qualified on one of the following achievement tests: Texas Assessment of Academic Skills (TAAS), Iowa Test of Basic Skills (ITBS), or Stanford Achievement Test.

The participants represent a sample used for its convenience. Names of students who qualified for the 2001-2002 or 2002-2003 Duke TIP were obtained from the cooperating schools. Parents of each qualified student received a mailed introductory letter and questionnaire (see Appendices A and B) and were asked to participate in the present study. A total of 387 questionnaires were sent out. One hundred sixty-nine (44%) questionnaires were returned with agreements to participate. An informed consent document (see Appendix C) was included with the questionnaire. Parents who chose to participate signed the consent document and returned it along with the completed questionnaire.

Schools Represented in the Study

Names of students qualifying for the 2001-2002 or 2002-2003 Duke TIP were obtained from two public school districts in a large metropolitan area of the Southwest as well as from six private schools in and surrounding the same metropolitan area.

Public School District "A"

In the 2003 – 2004 academic year, Public School District "A" enrolled 5,383 students on six middle school campuses. The district has an ethnically diverse student population, with 35% Anglo, 41% Hispanic, 12% African American, 12% Asian.

Public School District "A" is unique in that it has a two-tiered system of gifted programming. Students in the first tier are served on their home campuses. Elementary students are clustered and placed with a teacher trained in gifted education. Within the regular classroom, students in the first tier work together and with other students. Teachers augment the curriculum with differentiated curricular and instructional strategies. Middle and high school students in the first tier are also served on their home campuses, with access to special seminars, honors classes, and AP classes.

Students in the second tier of gifted programming are those identified as working many grade levels above their chronological age. This program serves approximately 1% of the district's population. There are multiple admission requirements for the second tier program, but two IQ scores of 140 or more are required. These students, considered highly gifted, are clustered together in a "school within a school" arrangement. Elementary students are clustered together on one campus, middle school students are clustered together on another. In these "schools within a school,"

the highly gifted students are given individualized as well as multi-grade instruction. Second tier high school students attend their home campuses, with access to honors, gifted, and AP classes.

Public School District "B"

In the 2003 – 2004 academic year Public School District "B" enrolled 13,133 students on 13 middle school campuses. The district has an ethnically diverse student population, with 40% Anglo, 35% Hispanic, 18% African American, 7% Asian.

Public School District "B" serves gifted middle school students in a magnet school. The magnet school offers advanced coursework in English, math, reading, social studies, and science called "enriched honors." A program of fine arts is also offered. Students must meet district requirements for academic giftedness for admission to the magnet school. Students entering from elementary gifted academies are granted automatic admission. Musically or artistically gifted students are admitted based on an audition. All applications are scored, and vacancies in the magnet school are filled with the highest ranking applicants.

Private Schools

Five of the six private schools were church-related schools with enrollments ranging from 37 to 162 in middle school. The preponderance of church-related schools was an inadvertent result of purposely choosing small private schools. The nonreligious-affiliated private schools providing a general education in the geographic area chosen by the researcher were substantially larger than the private schools asked to participate in the present study. Small private schools were preferred in order to

obtain a more direct route to school decision-makers, thus facilitating the acquisition of research sites. The ethnicity of the students in the private schools was predominantly Anglo, with 5% to 27% African American, Hispanic, and Asian.

None of the private schools specifically identified students as gifted or talented. Each of the private schools reported offering advanced or pre-AP curriculum to all students. Algebra I was the only above-grade-level course offered by the private schools. One school noted that it utilized academic competitions and an advanced vocabulary program in preparing students to take the exam for the Duke program.

Instrumentation

A five page questionnaire (see appendix B) consisting of 24 questions was developed to collect the data on the predictor variables during the quantitative phase of the study. Twenty-two questions were multiple-choice. Thirteen of the multiple-choice questions provided space for the respondent to elaborate to varying degrees. Two questions were open-ended. In order to assess content validity, the questionnaire was reviewed by two experts in the field of gifted education. In addition, the questionnaire was piloted with 10 parents of students who had previously qualified for the Duke TIP in order to assess the clarity of the questions, directions, and format.

Interviews

In the qualitative phase of the study, 34 selected parents were interviewed in order to illuminate, clarify, and follow-up responses given on the questionnaire. The interviews served as a means to qualitatively answer research questions 4, 5, and 6 regarding parental decision-making and to clarify responses on the short answer and

open-ended questions of the questionnaire. Interviews were conducted by email. Appendix D contains the guiding questions for the interviews, but the questions were free to vary in order to allow for a rich description of parental perceptions and decision-making.

Outcome (Dependent) Variables

Outcome variables (see Table 3.1) in each of the first three research questions were dichotomous in nature:

1. Student participates in TIP or student does not participate in TIP (TIP). This variable was operationalized as taking either the SAT or ACT as part of the Duke Talent Identification Program. TIP was measured by item #13 on the questionnaire.
2. Student participates in extra-curricular options or student does not participate in extra-curricular options (EXC). This variable was operationalized as participation in extracurricular options recommended by TIP following taking the SAT or ACT for the Duke TIP. EXO was measured by item #21 on the questionnaire.
3. Parent requests curricular/instructional options or parent does not request curricular/instructional options (CIO). This variable was operationalized as parent request for curricular or instructional options in the school setting as recommended by TIP. CIO was measured by item #22 on the questionnaire.

Predictor (Independent) Variables

Predictor variables in the quantitative phase of the study were either dichotomous or continuous in nature:

1. Public versus private school attendance (PS). This variable was operationalized as the number of years spent in public school between grades 4 to 7. PS was measured by item #1 on the questionnaire and scored continuously on a scale of 0 to 4.
2. Past ability grouping (PAG). This variable was operationalized as participation in at least one homogeneous-ability grouped class at any time during grades 1 to 6. PAG was measured by item #4 on the questionnaire and scored dichotomously (no = 0, yes = 1).
3. Recent ability grouping (RAG). This variable was operationalized as participation in at least one homogeneous-ability grouped class during the seventh grade year. RAG was measured by item #5 on the questionnaire and scored dichotomously (no = 0, yes = 1).
4. Identification as gifted or talented (IGT). This variable was operationalized as having been identified for a gifted/talented program at any time. IGT was measured by item #6 on the questionnaire and was scored dichotomously (no = 0, yes = 1).
5. Grade accelerated (GA). This variable was operationalized as having skipped any grade at any time. GA was measured by item #7 on the questionnaire and was scored dichotomously (no = 0, yes = 1).

6. Subject accelerated (SA). This variable was operationalized as having been accelerated at least one grade in at least one subject at any time. SA was measured by item #8 on the questionnaire and was scored dichotomously (no = 0, yes = 1).
7. Extracurricular activities (XC). This variable was operationalized as the number of non-sports-related enrichment activities during the past three years. XC was measured by item #9 on the questionnaire and was scored continuously on a scale beginning with 0.
8. Grades (GR). This variable was operationalized as report card grades for grades 6 and 7. GR was measured by item #3 on the questionnaire and was scored continuously on a scale of 1 to 6, with a score of "6" being "all A's."
9. Received information regarding TIP from school (IN). This variable was operationalized as any special informational efforts or training program for parents or students prior to the testing date. IN was measured by item #10 on the questionnaire and was scored dichotomously (no = 0, yes = 1).
10. Awareness of TIP prior to child's invitation to participate (AW). This variable was operationalized as reported level of parental awareness of Duke Talent Identification Program. AW was measured by item #12 on the questionnaire and was scored continuously on a scale of 1 to 4, with "4" being "very aware."
11. Helpfulness of school personnel (PR). This variable was operationalized as the perceived level of helpfulness of school personnel in providing information,

answering questions, or explaining the program prior to the testing date. PR was measured by item #11 on the questionnaire and was scored continuously on a scale of 1 to 4, with "4" being "very helpful."

12. Age of kindergarten entry (KE). This variable was operationalized as the child's age in September of the kindergarten year. KE was measured by item #2 on the questionnaire and was scored continuously on a scale of 1 to 4, with "1" being "age 4 or less" and "4" being "age 7 or more."
13. Father's educational level (FE). This variable was operationalized as the highest level of education obtained by the father or male guardian. FE was measured by item #17 on the questionnaire and was scored continuously on a scale of 1 to 7, with "7" being the highest level given.
14. Mother's educational level (ME). This variable was operationalized as the highest level of education obtained by the mother or female guardian. ME was measured by item #16 on the questionnaire and was scored continuously on a scale of 1 to 7, with "7" being the highest level given.
15. Received state recognition (SR). This variable was operationalized as having obtained a score on either the SAT or ACT that qualified the student for state recognition. SR was measured by item #19 and was scored dichotomously (no = 0, yes = 1).
16. Received national recognition (NR). This variable was operationalized as having obtained a score on either the SAT or ACT that qualified the student

for national recognition. NR was measured by item #20 and was scored dichotomously (no = 0, yes = 1).

17. Attended a recognition ceremony (AT). This variable was operationalized as attendance by the child at a state and/or a national recognition ceremony. AT was measured by items #19 and #20 and was scored dichotomously (no = 0, yes = 1).
18. Composite score on the SAT or ACT (CS). This variable was operationalized as the composite score on either the SAT or ACT obtained in the seventh grade as part of the Duke TIP. CS was measured by item #18 on the questionnaire and was scored continuously based on the percentile ranking of the score. Percentile rankings of SAT and ACT scores of Duke TIP participants are published by the Duke TIP each year (Duke University TIP, 2002d).
19. School initiated contact following TIP (IC). This variable was operationalized as any suggestion or counsel given by the school regarding courses, grade level, or any other type of accommodation for the child in the upcoming school year. IC was measured by item #22 on the questionnaire and was scored dichotomously (no = 0, yes = 1).

Table 3.1

Outcome (Dependent) and Predictor (Independent) Variables

Outcome Variable	Predictor Variables	Questionnaire Items
TIP: Participation in Duke TIP	PS, PAG, RAG, IGT, GA, SA, XC, GR, IN, AW, PR, KE, FE, ME	1, 4, 5, 6, 7, 8, 9, 3, 10, 12, 11, 2, 17, 16
EXC: Extracurricular options	all of the above plus CS, SR, NR, IC, AT	all of the above plus 18, 19, 20, 23
CIO: Curricular/instructional options	all of the above	all of the above

Procedure

Parents of students who qualified and were invited to participate in the 2001-2002 and/or 2002-2003 Duke Talent Identification Program were mailed an introductory letter explaining the proposed study and requesting cooperation (Appendix A), the questionnaire (Appendix B), and an adult consent form (Appendix C). The introductory letter and consent form were piloted along with the questionnaire in order to ensure clarity of wording and format. All documents were mailed in envelopes with preprinted addresses. A stamped, return envelope addressed to the researcher with a preprinted return address (parents) was included. Approximately 2 weeks after the initial mailing,

nonrespondents were mailed a second questionnaire and consent form with an additional request for cooperation.

Respondents were purposefully selected from two categories for qualitative follow-up: (a) student qualified, but did not take the exam, and (b) student took the exam and a score greater than or equal to the 50th percentile was reported. The 34 selected participants were asked to respond to a brief follow-up interview by email.

Respondents were contacted by email. Several contacts were sometimes necessary in order to obtain all follow-up responses.

Data Analysis

Quantitative Data

Descriptive statistics and frequencies were determined for each of the predictor (independent) and outcome (dependent) variables. Some of the multiple-choice items on the questionnaire requested a short-answer elaboration. For example, the multiple-choice question regarding grade skipping asked the respondent to identify the actual grade, if any, that was skipped. Data from short answers on items #4 through #8 and item #21 were compiled and descriptive statistics were generated.

In the present study, the outcome variables for the first three research questions were discrete, or dichotomous. When a dependent variable is dichotomous, one possible means of analysis is logistic regression (Brooks, 2001; Miles & Shevlin, 2001; Pampel, 2000). Logistic regression was used to determine which predictor variables in research questions 1 through 3 best explained parental choices following an invitation to participate in the Duke TIP. Logistic regression can be understood as an "odds ratio."

In the present study, logistic regression tells us the *probability* of the outcome variable given a change in a predictor variable. The *I* index, analogous to an effect size in regression analysis, was examined in order to indicate improvement over chance in the given relationaship.

In regular regression analysis, two or more predictor (independent) variables may be correlated (multicollinearity), masking important relationships between variables. This problem is addressed by examining the structure coefficients in order to judge the individual contributions of each predictor (independent) variable. In other words, examination of structure coefficients allows the appropriate interpretation to be assigned to each variable. Logistic regression analysis is limited in that no useful structure coefficients have been developed. This can be problematic in the event of multicollinearity among the variables.

To help overcome this difficulty, a second quantitative analysis, descriptive discriminant analysis, was used in order to yield standardized weights and structure coefficients. Descriptive discriminant analysis is appropriate with dichotomous variables when knowledge of the relationships between the predictor (independent) variables is required. The dependent variable was treated as a grouping independent variable and the predictor variables as the dependent variables. However, because all analyses in the general linear model are by nature correlational, these designations are irrelevant. The descriptive discriminant analysis parceled out the observed variation, determining the amount of "credit" each predictor (independent) variable should receive.

Qualitative Data

The qualitative data were analyzed using the pattern analysis method (Miles & Huberman, 1994). First, qualitative data that were integrated into the quantitative questionnaire (open-ended responses) were sorted and transcribed. Next, the follow-up interviews were transcribed. A general reading of the qualitative data followed. Patterns, themes, and recurrent topics were noted. Descriptive wording was chosen for emergent patterns and 23 categories were created. Finally, the qualitative data were reevaluated and coded into the categories with the use of *QSR N4Classic™* software (QSR International, 2000). Findings were used to analyze research questions 4, 5, and 6.

CHAPTER IV

RESULTS

Parents of high-ability middle-school children were surveyed about their decision-making process relative to advanced testing and educational choices for their children. Questionnaires were sent to 387 families. Forty-four percent of the questionnaires were returned (n = 169). The response rate, although not ideal, is within typical margins for this type of study (Kerlinger, 1986). However, the possibility remains that the data collected are not representative of the nonrespondents or of the population in general of adolescents invited to participate in a talent search.

A case can be made for the representativeness of the data if the nonrespondents can be shown to be similar to the respondents (Miller & Smith, 1983). The selection criteria for the Talent Search ensure that both respondents and nonrespondents were parents of students who had scored in the top 5% in one or more areas of a grade-level achievement exam. Seventy percent of the total number of questionnaires were sent to parents of children who were enrolled in a public school at the time of talent search nomination, 30% were sent to parents of children who were enrolled in a private school. The percentages of public school and private school parents who returned the questionnaire mirrored percentages of parents in each category who received the questionnaire: public, 62%, private, 38%. Further comparisons between responders and nonresponders can be made using extrapolation methods, as suggested by Armstrong and Overton (1977) and as illustrated in studies by Baggott, Beale, Dodd, and Kato (2004) and Siemiatycki and Campbell (1984). Armstrong and Overton (1977)

found that subjects who respond less readily ("late responders") are more like nonresponders. The first 10% of responders ("early responders") in the present study were compared to the final 10% of responders ("late responders") on mean scores of five variables: years in public school (PS), report card grades (GR), participation in talent search (TIP), mother's education (ME), and father's education (FE) (see Table 4.1). No statistically significant difference ($p < .05$) was found between mean scores on the five variables between early responders and late responders. It can be reasonably concluded that the nonrespondents were similar to respondents in level of education, child's school achievement, type of school child attended, and participation in talent search.

Table 4.1

Early Versus Late Responders

	Early Responders	Late Responders		
Variable	*M* (*SD*)	*M* (*SD*)	*p*	*d*
PS	1.88 (1.96)	2.41 (1.97)	.44	-.28
GR	5.24 (.75)	4.94 (.56)	.20	.46
TIP	0.71 (.47)	0.53 (.51)	.30	.37
ME	4.35 (1.27)	3.94 (1.56)	.41	.30
FE	4.71 (1.10)	4.81 (1.52)	.82	-.08

Note. ▯ = .05.

Not all students who are invited to participate in a talent search do so. Sixty-eight percent of the responding parents in this study (n = 115) reported that their child participated in the Duke Talent Identification Program (TIP). The ratio of Duke TIP participants to nonparticipants in the present study was approximately two-thirds to one third. However, this ratio is probably not representative of the actual ratio of participants to nonparticipants. Parents who chose to have their child participate in the Duke TIP may have been more predisposed to responding to a questionnaire concerning the Duke TIP. No official records concerning number of students nominated versus number of actual participants are kept by the Duke TIP (J. Baldwin, personal communication, October 21, 2003). Individual school counselors determine nominees and distribute invitations, and do not report the participation rate to Duke TIP.

Descriptive Analysis of Variables

An analysis of the frequencies and descriptive statistics associated with the variables provide an overview of the sample. Comparisons of means are for the purpose of presenting a general overview only, without statistical implications. Frequencies for outcome (dependent) variables and predictor (independent) variables are found in Appendices E and F. Table 4.2 summarizes the descriptive statistics for the predictor (independent) variables for both the Duke TIP participants (TIP = 1) and nonparticipants (TIP = 0).

Table 4.2

Descriptive Statistics For Predictor (Independent) Variables

	TIP Participants (*n* = 115)				Nonparticipants (*n* = 54)			
Variable	Min.	Max.	*M*	*SD*	Min.	Max.	*M*	*SD*
Years in public school (PS)	.00	4.00	2.58	1.84	.00	4.00	2.59	1.83
Kindergarten entry age (KE)	1.00	3.00	2.06	.43	1.00	3.00	2.04	.33
Report card grades (GR)	1.00	6.00	5.04	1.03	1.00	6.00	4.96	.91
Past ability grouping (PAG)	.00	1.00	.71	.45	.00	1.00	.76	.43
Recent ability grouping (RAG)	.00	1.00	.86	.35	.00	1.00	.90	.29
Identified gifted/talented (IGT)	.00	1.00	.74	.44	.00	1.00	.70	.46
Subject accelerated (SA)	.00	1.00	.31	.47	.00	1.00	.33	.48
Extracurricular activities (XC)	.00	20.00	1.53	2.56	.00	5.00	.85	1.20
Information provided (IN)	.00	1.00	.51	.50	.00	1.00	.42	.50
Helpfulness of personnel (PR)	1.00	4.00	2.42	1.06	1.00	4.00	1.76	.89
Awareness (AW)	1.00	4.00	2.02	1.07	1.00	4.00	1.65	.98
Mother's education (ME)	1.00	7.00	4.52	1.45	1.00	6.00	4.17	1.35
Father's education (FE)	1.00	7.00	5.04	1.38	1.00	7.00	4.40	1.48
Composite score (CS)	1.00	99.00	62.45	31.44				
Attend recognition ceremony (AT)	.00	1.00	.19	.39				

Note. The values represent mean scores on questionnaire items corresponding to each variable. See Chapter III for a complete explanation of item scaling.

Parent Variables

The information supplied by the parents included the years in public school (PS), kindergarten entry age (KE), mother's educational level (ME), father's educational level (FE), number of extracurricular activities (XC), and prior awareness of the Duke TIP (AW). There was virtually no difference in the mean scores of Duke TIP participants and nonparticipants on years in public school (PS), kindergarten entry age (KE), or mother's education level (ME).

More than 60% of the respondents' children spent the three grades immediately preceding the talent search (grades 4 through 7) in a public school. Most of the respondents' children (84%) entered kindergarten at the traditional age of 5. Eleven percent entered kindergarten at age six or more, with 5% entering before age 5. The majority of respondents (65%) reported the mother's education level to be a bachelor's degree or more.

There were differences in the mean scores of Duke TIP participants and nonparticipants on number of extracurricular activities, prior awareness of Duke TIP, and father's education level. Almost half (45%) of the respondents reported that their child had not participated in any non-sports-related extracurricular activities in the previous three years, while 40% reported one or two non-sports-related extracurricular activities in the previous three years. Duke TIP participants participated in more non-sports-related extracurricular activities ($M = 1.53$) than did nonparticipants ($M = .85$).

Approximately half of the respondents reported no awareness of the purpose and process of the Duke TIP prior to their child's nomination for the program. Duke TIP

participants were more aware of the Duke TIP (M = 2.02) than were nonparticipants (M = 1.65).

More than 70% of respondents reported the father's education level to be a bachelor's degree or more. On a scale of one to seven with seven being a doctoral degree, Duke TIP participants reported a higher level of father's education (M = 5.04) than did nonparticipants (M = 4.40).

Educational Options Variables

The number of parents choosing extracurricular options following Duke TIP participation (EXC) and the parents choosing curricular or instructional modifications following Duke TIP participation (CIO) were extremely low (< 4% and < 2%, respectively). Likewise, the frequency of schools initiating contact with parents (IC) following Duke testing was extremely low (< 2%).

School Status Variables

Students' school ranking or status variables included report card grades (GR), past ability grouping (PAG), recent ability grouping (RAG), gifted/talented identification (IGT), subject acceleration (SA), and grade acceleration (GA). There was virtually no difference in mean scores of Duke TIP participants and nonparticipants on questionnaire items measuring any of the variables related to school status. More than 80% of the respondents reported that their child received grades of either all A's and B's, or all A's.

Most of the children had participated in ability-grouped classes both in the past (grades 4 through 6, 73%) and in the year of the Duke nomination (grade 7, 88%).

The most commonly reported subjects in which past ability-grouping occurred were math (65%), language arts (reading and/or English, 53%), and science (32%). The most commonly reported subjects in which recent ability-grouping occurred were also math (70%), language arts (reading and/or English, 58%), and science (39%).

Seventy-three percent of the respondents reported that their child had been previously identified for a gifted and talented program. Approximately half (49%) of those reported that identification occurred in either kindergarten, first, or second grade.

One-third of the respondents reported that their child had experienced subject acceleration. Math was the most commonly reported subject in which a child was accelerated (76% of accelerants). This probably reflects the choice of many children to take algebra I (typically a ninth grade course) in eighth grade. Children were accelerated in English and science, but to a lesser degree (24% and 22%, respectively). Less than 2% of the respondents reported grade acceleration.

School Personnel Variables

School effectiveness in explaining and promoting participation in the talent search was measured by whether the school provided information about Duke TIP (IN) and by parental perception of the helpfulness of school personnel (PR). Approximately one half of the respondents (n = 81) reported receiving information or training on the talent search tests prior to sitting for the actual testing. There were differences in the mean scores of Duke TIP participants and nonparticipants on questionnaire items relating to the information provided by the schools and the perceived helpfulness of school personnel. Duke TIP participants reported receiving information/training more

often (*M* = .51) than did nonparticipants (*M* = .42). More than 30% of respondents did not find school personnel to be helpful in explaining the Duke program. On a scale of one to four with one being "not helpful" and four being "very helpful", Duke TIP participants found school personnel to be more helpful (*M* = 2.42) than did nonparticipants (*M* = 1.76).

Composite Talent Search Scores

Participants in the sample took one of two tests, the Scholastic Aptitude Test (SAT) or the American College Test (ACT). The individual subscale scores of each test measure different things so only the composite, total test, scores from the SAT and ACT were used for analysis. Since understanding of each child's performance relative to others was necessary, the percentile rank of composite scores for the SAT and ACT were used for analysis instead of actual scores on the two scales.

The mean percentile rank of composite score was 62.5. More than 65% of respondents' children had composite SAT or ACT scores at the 50th percentile or higher. The scores of the sample were higher overall than the scores of TIP participants as reported in both the 2001 – 2002 and 2002 – 2003 talents searches (see Table 4.3) (Duke University Talent Identification Program, 2002d, 2003a).

Table 4.3

Duke TIP Average Composite SAT/ACT scores

	SAT	ACT	Percentile Rank
2001 – 2002 (*N* = 76,456)	856	17.3	50
2002 – 2003 (*N* = 80,428)	851	16.9	50
Study Sample (SAT)	922		70
Study Sample (ACT)		20.7	83

State level recognition is given at the 87th percentile (verbal subtest) or 85th percentile (math subtest) of the SAT, and at the 75th percentile (English subtest), 96th percentile (math subtest), 80th percentile (reading subtest), or 88th percentile (science subtest) on the ACT. National recognition is given at the 99th percentile on either subtest of the SAT or at the 99th percentile on any of the ACT subtests. In the 2002 – 2003 Duke talent search, 20,100 (25%) participants achieved state recognition and 1,056 (1%) achieved national recognition (Western Kentucky University, 2003). In the present study, 36% reported that their child received state recognition. About 3% reported receiving national recognition. Of respondents reporting state or national recognition (*n* = 42), less than 19% reported actually attending one of the recognition ceremonies.

Research Questions

Due to extremely low frequencies of the outcome (dependent) variables in research questions 2 and 3 (extracurricular options and curricular/instructional options, respectively), there was not enough variability to warrant predictive analysis. Results for each of the remaining questions are presented both in narrative and tabular form within the following sections, with qualitative data relevant to each question included.

Question 1

What effect do various factors have on parental decision-making regarding participation in the Duke Talent Identification Program? Factors investigated include: private versus public school enrollment (PS), past participation in homogeneous ability grouped classes (PAG), recent participation in homogeneous ability grouped classes (RAG), identification as gifted (IGT), grade acceleration (GA), subject acceleration (SA), previous enrichment experiences (XC), middle school grades (GR), school-provided information about the Duke TIP (IN), prior awareness of Duke TIP (AW), perceived helpfulness of school personnel regarding Duke TIP (PR), age at kindergarten entry (KE), and the educational levels of father (FE) and mother (ME). The level of reported grade acceleration (GA) was very low and there was not enough variability for grade acceleration to be useful as a predictor. Grade acceleration was therefore dropped from further analyses.

Logistic Regression Analysis

In addition to the descriptive statistics, logistic regression analysis was conducted. Logistic regression can determine which of the variables were most predictive of talent search participation.

The ratio of Duke TIP participants to nonparticipants in the present study was approximately two-thirds to one third. It cannot be known, however, if this ratio is representative of the actual ratio of participants to nonparticipants in the general population because no official records concerning number of students nominated versus number of actual participants are kept by the Duke Talent Identification Program (J. Baldwin, personal communication, October 21, 2003). Therefore, an equal probability of participants to nonparticipants was assumed and a default cut rate of .50 was used for the logistic regression analysis. Alpha was set to .05.

The logistic regression analysis (see Table 4.4) indicated that the model was statistically different from a model without any predictors (p = .03).

Table 4.4

Logistic Regression Results

Chi-square	*p*	–2 Log likelihood
24.14	.03	161.24

Although the large –2 Log likelihood value indicated limited predictive power, the overall hit rate (cases classified correctly) for the model was 73.2% (see Table 4.5).

Table 4.5

Cases Classified Correctly (Hit Rate)

TIP nonparticipation	28.9%
TIP participation	91.7%
Total	73.2%

Note. $N = 153$.

Logistic regression analysis (see Table 4.6) of the 13 predictor (independent) variables found one of the variables, perceived helpfulness of school personnel (PR), statistically significant ($p = .01$). The *B* weights and *Exp(B)* values for both PR and father's education (FE) ($p = .058$) indicated some limited predictive strength.

Table 4.6

Logistic Regression Analysis for Variables Predicting Participation in TIP

Variable	*B*	*SE*	Wald	*df*	*p*	*Exp(B)*
Years in public school (PS)	.075	.156	.233	1	.629	1.078
Kindergarten entry age (KE)	.106	.500	.045	1	.832	1.112
Report card grades (GR)	-.077	.210	.133	1	.715	.926
Past ability grouping (PAG)	-.522	.573	.830	1	.362	.593
Recent ability grouping (RAG)	.065	.724	.008	1	.928	1.067
Identified gifted/talented (IGT)	.264	.488	.291	1	.589	1.302
Subject accelerated (SA)	-.293	.471	.389	1	.533	.746
Extracurricular activities (XC)	.234	.160	2.153	1	.142	1.264
Information received (IN)	-.322	.557	.334	1	.563	.725
Helpfulness of personnel (PR)	.641	.255	6.330	1	.012	1.899
Prior awareness (AW)	.241	.215	1.257	1	.262	1.272
Mother's educational level (ME)	.042	.180	.053	1	.817	1.042
Father's educational level (FE)	.313	.165	3.593	1	.058	1.368

Effect Size

Another measure of the usefulness of factors is effect size (Huberty & Lowman, 2000; Wilkinson & APA TFSI, 1999). The appropriate effect size statistic is the *I*-index because it indicates how much better than chance is a given hit rate (Huberty, 1994). The *I*-index is calculated $I = H_o - H_e / 1 - H_e$, where H_o is the observed hit rate and H_e is

the expected hit rate (determined by the default cut-rate). The *I*-index in the present study was .464, indicating that the model represented a substantial improvement over chance in correctly classifying cases as Duke TIP participants or nonparticipants.

Summary of Logistic Regression Analysis

The logistic regression analysis was somewhat predictive given the *p* values of the perceived helpfulness of school personnel (PR) and the *I*-index of .464. However, in the logistic regression analysis, some of the variance contributed by the other predictors may have been subsumed by PR. Important relationships may be masked when multicolinearity exists. This was true of the relationship between mothers' and fathers' educational levels where the Spearman's rho was .508 ($p = < .01$).

In regression analysis, the same problem may exist; two or more predictor (independent) variables may be correlated (multicolinearity) thereby masking important relationships between variables. This problem is addressed in regular regression analysis by examining structure coefficients in order to judge the individual contributions of each predictor (independent) variable. In other words, examination of structure coefficients allows the appropriate "credit" to be assigned to each variable. Because logistic regression is a logit model, not linear, no useful structure coefficients have been developed. Therefore, it could not be determined by logistic regression analysis if variables other than PR were contributing to the predictive value of the model. Consequently, a descriptive discriminate analysis was done to better understand the effect of individual factors.

Descriptive Discriminant Analysis

In order to provide a more complete picture of the effect of each variable, a second quantitative analysis, descriptive discriminant analysis (DDA), was used. DDA yields standardized weights and structure coefficients, useful in judging the unique contribution of each variable. The rationale for use of DDA with dichotomous variables was discussed in the Data Analysis section of Chapter III. Box's M test indicated that the assumption of homogeneity of variance needed for DDA was met (p = .259).

The variables were statistically screened for predictive value prior to conducting the DDA. As recommended by Huberty (1994), this screening eliminates those variables that would not contribute to separation of categories (Duke TIP participants and nonparticipants). Screening was done via a univariate ANOVA F test (see Table 4.7). Huberty did not recommend automatically dropping a variable that was not statistically significant; however, he recommended that any variable contributing nothing but "noise" in a univariate sense (F value < 1.0) be dropped prior to conducting DDA. Using these criteria, information received from school (IN), previous extracurricular enrichment experiences (XC), perceived helpfulness of school personnel regarding Duke TIP (PR), prior awareness of Duke TIP (AW), mother's education (ME), and father's education (FE) were kept for analysis.

Table 4.7

Analysis of Variance for Predictor Variables

Variable	*F*	*p*	R^2
Years in public school (PS)	.001	.974	.0000
Kindergarten entry age (KE)	.136	.712	.0008
Report card grades (GR)	.242	.624	.0014
Past ability grouping (PAG)	.392	.532	.0023
Recent ability grouping (RAG)	.726	.395	.0043
Identified gifted/talented (IGT)	.230	.632	.0013
Subject accelerated (SA)	.069	.793	.0004
Number of extracurricular activities (XC)	3.370	.070	.0201
Information received from school (IN)	1.389	.240	.0082
Helpfulness of school personnel (PR)	14.590	.000	.0830
Prior awareness of talent search (AW)	4.641	.033	.0270
Mother's educational level (ME)	2.163	.143	.0129
Father's educational level (FE)	7.221	.008	.0429

The descriptive discriminate analysis (see Table 4.8) was conducted with participation in TIP treated as the independent variable and IGT, XC, PR, AW, ME, and FE treated as the dependent variables. The analysis produced a squared canonical correlation (analogous to R^2) of .1274. This is a medium-sized effect according to Cohen's guidelines (1988). Effect sizes should be judged in the context of the

phenomenon being studied (Kirk, 2001). Wilks's Lambda was statistically significant at p = .002, indicating some explanatory power via the outcome variables.

Table 4.8

Summary Statistics for the Descriptive Discriminant Analysis

Canonical Correlation	.357
Squared Canonical Correlation	.1274
Wilks's Lambda	.872
X^2	20.718
df	6
p	.002

Contributions of Variables

After examining the results of the logistic regression analysis and the descriptive discriminant analysis, there appeared to be a small effect worth exploring. The next step was to determine which of the variables were accounting for the effect observed. Examination of the standardized weights of the six variables (see Table 4.9) revealed that variables perceived helpfulness of personnel (PR) and father's educational level (FE) were accounting for most of the effect observed, as was suggested in the logistic regression analysis. However, the variables of extracurricular activities (XC) and prior awareness of talent search (AW) appeared to be more important than was indicated by the logistic regression analysis, and they were sufficiently large enough to warrant further investigation.

Table 4.9

Standardized Weights and Structure Coefficients for Dependent Variables in Descriptive Discriminant Analysis

Variable	Standardized Weight	Structure Coefficient
Helpfulness of personnel (PR)	.733	.681
Father's education (FE)	.513	.560
Prior awareness of talent search (AW)	.257	.442
Extracurricular activities (XC)	.300	.363
Mother's education (ME)	.044	.311
Information received from school (IN)	.131	.175

Table 4.9 also reports the structure coefficients for the six variables, in order of their contribution to the effect observed. Structure coefficients are important because they indicate the "structure", or makeup of the effect observed. Because structure coefficients do not take into account collinearity between variables, they are able to indicate the relative importance of individual variables. Helpfulness of personnel (PR) was the most important variable, but the variables of father's education (FE), prior awareness of talent search (AW), and extracurricular activities (XC) each received notable amounts of the credit for the effect.

In order to ascertain the unique contributions of the two variables receiving the most credit, descriptive discriminant analysis was conducted two more times (see Table

4.10): first, without father's educational level (variable FE), and second, without perceived helpfulness of school personnel (variable PR). In the analysis without FE, there was no change in the rank order of the structure coefficients. These results suggest that very little of what FE explained was shared by the other variables.

Table 4.10

Descriptive Discriminant Analysis Structure Coefficients With Six Variables, Removing FE and PR

Variable	With All	Without PR	Without FE
PR	.681		.770
FE	.560	.731	
AW	.442	.495	.478
XC	.363	.434	.395
ME	.311	.460	.278
IN	.175	.217	.175

In the analysis which dropped perceived helpfulness of school personnel (PR), there was one change in the rank order of the structure coefficients because the amount of credit assigned to mother's educational level increased slightly. Father's educational level increased a small amount, and there were negligible changes in the other variables. These results suggest that only a small amount of what PR explained was shared by other variables.

Summary of Descriptive Discriminant Analysis

The DDA revealed a medium effect for the model. Helpfulness of school personnel (PR) accounted for most of the variability explained. Father's education level (FE), awareness of the purpose and process of the Duke TIP prior to nomination (AW), and number of extracurricular activities (XC) also contributed a small amount to the variability explained. The DDA and the logistic regression analysis pointed in the same direction: both identified perceived helpfulness of school personnel (PR) as the most important factor in explaining talent search participation.

Qualitative Data

Qualitative data gathered from interviews and the questionnaires provided further insight into the first research question. This was particularly helpful for the effect of information provided by the school (IN) and parents' prior awareness of the Talent Search (AW).

Information Provided to Parents

Neither the logistic regression analysis nor the descriptive discriminant analysis identified information provided to parents by the school as an important factor in parental decision-making. Consequently, closer analysis of the qualitative data provided a descriptive picture of the format and type of information parents received prior to Duke TIP testing. In addition, a pattern emerged regarding parental perceptions of the ways they received information on the talent search process and purpose.

Description of information. The most common source of information reported by parents in this study was the initial contact letter sent home with their child describing

the talent search and its processes. Some parents, but not all, also received additional information at a school-organized parent meeting. Some of these meetings also included a student test preparation session. These meetings and preparation sessions were usually held before or after school or on weekends. Parents generally described the preparation sessions as "tutoring" or "work from an SAT workbook." Following are a few typical descriptions of information provided:

> "A letter was sent home from our principal asking us to call if we had any questions."
>
> "They sent information home with him."
>
> "Orientation at school, practice/prep class most of one Saturday."
>
> "Informational meeting for students and parents, kids could go to tutoring."

Delivery of information. Many parents were critical of their school's practice of sending the Duke TIP information home via their child. Others expressed frustration at their inability to obtain follow-up information after getting the initial information letter. The following statements illustrate this pattern:

> "One must understand that most correspondence that is supposed to find its way to the parents can be lost or delayed (in the 'Friday brown envelope system'). If the Duke TIP wants more participation, it should be contacting parents in a more direct method."
>
> "He discarded the info at school as he did not want to take it. I was not aware until too late."

"I would like for the information letter that told me my child qualified to include the benefits and details. They assumed the public school would do that, I think, and my daughter goes to private school."

"I called the school and asked for someone to call me back to answer some questions. No one did, so we didn't continue with it."

"I misunderstood the form and returned it to the school counselor. When I asked her about it several weeks later she told that me I was supposed to have mailed the form, instead of returning it to school… the deadline passed, and he was unable to sign up for it."

"When we heard about it from some students participating and inquired about it at school, the middle school principal said he wasn't aware of any such group of students. Therefore, my daughter never participated in testing."

Parental Awareness

Quantitatively, parental awareness of the purpose and process of the talent search was found to contribute a small amount to the overall effect. Although no question asked directly about the purpose and processes of the talent search, the qualitative data revealed four patterns of parental perceptions specific to the purpose and process of the talent search. The patterns noted emerged from comments made regarding all aspects of Duke TIP.

Talent search testing is a practice test. There was a strong perception that having a child take the talent search test was beneficial solely as a "practice" run for

future college admission testing. This perception is illustrated by the following comments:

> "Experience in taking the test early will make taking it in high school less stressful."
>
> "I believe her taking the SAT test was beneficial in making the student aware of exactly what preparation needs to be done later to get into college."
>
> "In the end, it boiled down to the opportunity to take the SAT as a practice for her, no real pressure and as a learning exercise…"
>
> "I see it as preparation for the SAT and practice and a first look at a test he may end up taking several times before he leaves high school."
>
> "Since scholarships are so closely tied to this test, we decided that we would take advantage of every opportunity available to him."

Benefits of talent search are ill-defined. The second strong pattern was the perception that the benefits of participating in the talent search were vague and ill-defined. Uncertainty about the advantages of participation was a common theme found in parental responses. The following comments illustrate this pattern:

> "I am not sure where it is supposed to lead us except more info on G/T students."
>
> "I think they (talent searches) are great for identifying kids that are smart but not know it or believe it. The follow-up if you aren't exceptional is poor making me ask, "'what's the point?'"

"We knew from his brother's experience that there was really no benefit, other than knowing what to expect on the SAT."

"Hard to know how it should affect us or my child's education."

"There doesn't seem to be a major advantage in participation."

"(The) school's promotion of it would have been important in our understanding the program and its benefits; especially info on availability of scholarships and other academic benefits."

"What is the future purpose, once students are identified?"

The ACT/SAT are inappropriate for middle-school students. A third strong pattern identified in the qualitative data was the perception that the tests used in the talent search, the SAT and ACT, were inappropriate for middle-school students. This perception led many parents to believe that the talent search, in general, was inappropriate. The following comments illustrate this pattern:

"I wonder at the amount of stress these students are exposed to taking a test so far beyond them."

"She felt like she was stupid when she came out of the test because it was so hard…we tried to tell her it was WAY over her head but she was very negative about it."

"My older daughter did participate. After her taking the ACT with a bunch of seniors and her coming home telling me she didn't know the information, I decided it was silly for (my daughter) to participate."

"We chose not to pressure him with the exam."

"I was appalled as I was chatting with other parents of middle-schoolers taking the SAT's to find out they had paid for SAT prep classes or sample tests. Often these kids were totally stressed out about this test."

"Did not feel it was to his advantage, being compared to 16-year-olds."

Questions about financial motivation of talent search. A fourth pattern, not as strong as the previous three, but worth noting, was the perception of a financial motivation underlying talent searches in general. Universities and programs that administer the talent search tests were perceived as being the true beneficiaries of talent search testing. Following are a few typical comments:

"Felt the SAT was the winner financially."

"I know research of these students is Duke's primary interest but it feels like early college recruiting."

"We feel the SAT and ACT are targeting a younger population to raise money. We plan to take the tests our junior year in high school."

"I think it is a marketing (for profit) advantage to getting parents and students to feel the urgency of thinking ahead to college."

"Didn't see the point of a 7th grader taking the SAT; not sure if it was a disguised private solicitation."

Summary of Qualitative Data for Research Question 1

Although most parents reported receiving information about Duke TIP prior to the testing date, many were critical of the means by which information was disseminated. They were not critical of the content or format of the information, but

were sometimes critical of the availability of follow-up information and the chance to ask questions. Many parents perceived the purpose of the talent search solely as an opportunity to practice for college entrance exams. However, some parents expressed uncertainty as to the practical benefit of taking these difficult tests. Other parents perceived the talent search to be inappropriate for middle-school students because they believe the SAT/ACT to be inappropriate for middle- school students. Some parents perceived an underlying financial motivation in talent searches on the part of universities and test administrators.

Research Question 4

How do parents choose or not choose to have their child participate in a talent search?

In interviews and on the questionnaire, parents were asked to elaborate on their decision regarding their child's participation in the talent search. They were asked about the rationale behind the decision, and asked to elaborate on the decision-making process. Parents were asked in the interviews to describe factors that might have led to a different decision.

The patterns noted among parents of participants are presented first, followed by patterns noted among parents of nonparticipants.

Decision to Participate

A pattern of influence by others emerged with parents of participants. Parents of participants often discussed the testing with their child in order to assess the child's

willingness to participate. Other parents sought out individuals with specific knowledge regarding Duke TIP for advice.

Influence of child. The first pattern noted was the influence of the child's willingness to participate. Many parents reported discussing the decision with the child. When the decision was discussed with the child, the decision was generally favorable toward participation. At times, the decision was left entirely up to the child.

"I did discuss it with my child and ultimately it was her decision."

"(She) wanted to participate. She actually knew more about the program than her father and I did."

"I did discuss it with my daughter as well. She has aspirations to attend an Ivy League university one day, so this fit in well with her goals."

"We did discuss it with her, but do not feel she understood much about it."

"Definitely discussed it with our son, and he was willing to give it a try."

Influence of knowledgeable others. The influential individual was often an older child who had previously been nominated, the parent of a child who had previously been nominated, or educational personnel. Sometimes the connection was a personal or professional one.

"My husband and I discussed it with (our son) after we talked to some other people whose kids had taken the test."

"I had a nephew who had participated four years earlier, so I talked to my sister about it briefly and she said it was a good thing, so we decided to participate."

"We were very familiar with the program being we had another child participate

in the program four years earlier."

"The second time I signed her up because a mom was saying it was good, that they were then eligible for some programs."

"My sister and brother-in-law were professors at UNC-Chapel Hill at the time, and I emailed her to ask her about it."

"I was very familiar with Duke TIP through my prior training and experience as a middle school counselor."

"Both myself and my child's other parent are Duke alums, so the association with Duke was a cincher."

Decision Not to Participate

Three strong patterns emerged among parents who chose not to have their child participate: lack of perceived value for talent search on the part of the parent or child, financial concerns, and logistical concerns.

Lack of perceived value in participating. Many parents simply stated that neither they nor their child saw the value of talent search, without elaborating on the reason for the disinterest. If a reason for the disinterest was given, it was often resistance on the part of the parent or child to be labeled as exceptional.

"I registered her for the test, but she was adamant about not taking it. She either wasn't interested or not wanting to be known as a 'brain' or both."

"She is incredibly reluctant to sign up for anything that would label her as exceptional, much to my chagrin."

"Because of their intelligence, they are already singled out enough."

"Didn't want our son to consider himself 'better than the rest'."

Financial considerations. When the consideration was financial, cost of the testing was usually the concern. Several parents mentioned a lack of financial aid.

"My son was so disappointed that he couldn't take the test. As a mom I was totally hurt and disappointed that we couldn't afford the test and to my knowledge there were no other options. It's sad that a child can't be tested unless he/she has money!"

"At the time we could not afford the fee. If there were scholarships available we may have considered it."

"The cost did not seem worth the return."

"My older two were offered but we had no money and I didn't know you could get fee wavers or scholarships for them."

"Why charge money? We are not rich."

Inconvenience. The third strong pattern to emerge among parents who chose not to have their child participate was the inconvenience of the testing. Many parents simply stated that family schedules were in conflict with the testing dates. Other inconveniences took the form of logistics (transportation, distance) and time constraints.

"Schedule conflicts, the location was too far away, no ride."

"Chose not to based on amount of extra study time involved."

"We discussed what would be involved in this and my son decided that after all the months he put into his school robotics program, he needed to focus on other classes in order to stay in the gifted program."

"We decided to forego the SAT as it entailed tutorials and his honors classes and sports activities already filled his schedule."

"I believe the timing was the main problem as we had conflicts. I didn't think it was 'a big enough of a deal' to work around the test."

Summary of How Parents Make Decisions Regarding the Duke TIP

Parents who chose to have their child participate in the talent search were influenced by discussions with their child. Discussions with the child often focused on the child's perceptions of the benefits of the program. Discussions with others who were in some way connected to the talent search also influenced participation. Information gained from knowledgeable others ranged from anecdotal experiences of parents of previous participants to adults with direct connections to Duke University or to the talent search program. Parents who chose not to have their child participate in the talent search based the decision on a perceived lack of value of or interest in the talent search, financial considerations, and inconvenience of the testing.

Research Question 5

What are the perceptions of parents regarding out-of-level testing?

The concept of out-of-level testing is integral to a talent search. As one parent commented, "I'm not sure why they would want middle-school students to take a test like this. Our school does the ITBS every year, why wouldn't they just look at those

results?" Understanding of the concept of out-of-level testing or a lack of such understanding is a critical factor in a parent's evaluation of a talent search program. Parents were asked to speculate as to the purpose of having middle-school students take an out-of-level test like the SAT or ACT.

Perceived Purpose of Out-Of-Level Testing

Two patterns emerged regarding parental perceptions of the purpose of out-of-level testing.

Difficult test. The strongest pattern to emerge was the belief that talent searches wished to utilize a difficult test. Interestingly, some of the responses accurately paralleled the theoretical rationale: providing a higher testing ceiling for those with advanced abilities. One respondent quoted a talent search publication regarding the purpose of out-of-level testing. Most responses were less theoretically accurate, but still focused on the use of a more difficult test than is normally used with the students. The following comments illustrate this pattern:

> "Often the standardized grade-level tests are so easy such as TAAS and TAKS and ITBS that gifted students achieve near perfect scores. Therefore it is difficult to see the student's true aptitude."
>
> "The SAT allows a student to test at a much higher potential level- there are no maximum (well, there is at a 1600), but it's usually hard to achieve. The TAAS and the TAKS on the other hand are easy and the max is you thoroughly achieved what is expected at grade level, no measure of ability above that."
>
> "The ACT and SAT test at a much higher level than other standardized tests."

"The SAT and ACT are more of a challenge to highly talented students."

"I think it is in preparation for testing to come and to measure higher level thinking ability."

"SAT and ACT are different from the standardized tests at school because they most likely have more advanced questions and they have a different objective."

Informing curricular/instructional decisions. A second pattern, not as strong as the previous pattern, was the perception of out-of-level testing as a means of informing curricular and instructional decisions. The following comments were typical of this perception:

"It is a way to judge where our schools stand in teaching gifted, or high ability students."

"Perhaps it is to identify high achievers and recruit them for specific programs."

"I think they are attempting to identify the high ability children so their parents and teachers can seek programs that best meet the needs of those children."

Value of Out-Of-Level Testing

The respondents whose children participated in the testing were asked to comment on the value of the information revealed by the testing. Two patterns emerged as to the perceived value of the information gained from the testing.

Confirmation of abilities. The test scores obtained through the out-of-level testing offered in a talent search confirmed and refined the parents' beliefs about the high aptitude of their children. Typical comments were:

"We knew he was very strong in math and his score reflected that."

"I did not really learn anything new about my child through the Duke. I learned that my kid is incredibly bright. No, actually, I already knew that, so this was additional confirmation."

"We were fortunate enough to already know that she is gifted."

"I appreciate having the information from the testing, even though it was not new information, but confirmed what I already knew about her."

Specific content area. Testing also revealed to parents information about relative strengths and weaknesses in specific content areas. These comments were typical:

"He had exactly the same score on both sections, and I had always thought his strengths lay primarily in the math and science areas."

"It did show us that her math skills were not as strong as we were led to believe."

"It shows her love of reading is positively impacting her test-taking ability."

Summary of Parental Perceptions Regarding Out-Of-Level Testing

Parents primarily regarded out-of-level testing as a means of administering a more difficult test than is usually encountered by students. Out-of-level testing was also regarded as a means of informing curriculum for advanced students. Parents generally found the results of testing to be confirmation of previously known abilities. Some parents reported gaining new information regarding a specific subject area.

Research Question 6

Why do parents of talent search participants choose or not choose to seek recommended or suggested educational options?

Educational options, including instructional or curricular modifications and extra-curricular opportunities outside of school, are suggested by the university-based talent searches. The recommendations made are dependent upon the student's score on the SAT or ACT. Parents of talent search participants in this study were asked to give reasons why they did or did not choose to have their child participate in either curricular/instructional modifications or in extracurricular options suggested. Only two parents mentioned not choosing an educational option due to a nonqualifying score. Parents were asked in interviews to elaborate on factors that might have led them not to follow the educational or curricular recommendations they received.

Four parents named a specific extracurricular option chosen following the Duke TIP recommendation. Six parents reported specific curricular/instructional changes or described educational decisions that were made as a result of Duke TIP participation and recommendation. Most of the options were accelerative or enriching in nature. Two parents chose to seek remediation based on their child's relatively low SAT score. There were not enough qualitative data generated from these respondents from which to draw valid conclusions as to why parents chose to pursue educational options. A complete listing of the options chosen is found in Table 4.11.

Table 4.11

Educational Options Chosen by Parents of TIP Participants

Extracurricular	Curricular/Instructional
PSAT prep class	Algebra II early entry
Computer programming course	Changed to a magnet school
Math camp	Changed to a single-gender private school
	Repeat algebra I in 9th grade
	Asked teachers to work on weaknesses

Extracurricular Options

Four strong patterns and one moderately strong pattern emerged among the parents of Duke TIP participants as to why extracurricular options were not chosen.

Cost prohibitive. There was a strong pattern of belief among parents of Duke TIP participants that the cost of the extracurricular programs offered following participation was prohibitive. Most simply stated that the programs were "too expensive" or "cost prohibitive." Following are typical of comments made by parents who elaborated further:

> "All of the great programs that are offered are expensive… I wish there were scholarships available to help financially."
>
> "They (Duke TIP) caused info regarding expensive programs to come addressed to my child. Then, I had to be the bad guy to say we couldn't afford them."

Location. A second strong pattern of belief among parents of the talent search participants in this study was that extracurricular options were located too far away to be feasible. The majority of parents referenced the programs offered though Duke TIP.

"We did not know of anything in our area and did not want to send her to Duke at that age."

"The programs offered were mostly residential programs away from our home and we did not feel they were appropriate for that age child."

"Too far away. Would have considered one in (our city)."

"Not interested in being that far from home for more than a weekend."

Scheduling concerns. The third strong pattern of belief to emerge was that extracurricular options did not align well to the child and family's schedules. Many parents commented on busy school-year schedules, and expressed reluctance to similarly schedule the summer months.

"I can't really think of anything that would motivate us to pursue summer school type activities. (He) is so busy during the school year with classes and extra-curricular activities, that when summertime rolls around, we all need a break."

"Our schedule is full--- school, piano, sports, but we may do it later."

"He is very active with the athletic programs at our school and time is not available for long-range courses."

Inappropriate for middle-school students. The fourth strong pattern of belief was that the extracurricular options recommended by Duke TIP were inappropriate for middle-school students. There were strong comments suggesting that students should

be allowed to "just be kids" and that the extracurricular programs were a form of inappropriate "pushing."

> "He is, after all still 14 and I feel no need to push him that far academically. I think he gets enough education for his age through the middle school program."
>
> "School days are long and kids need their time to relax when school is over."
>
> "Some of the programs sounded more like work than fun. Summer for middle school students needs to be fun and entertaining."
>
> "While there are many opportunities for (our son) to grow intellectually, we want to make sure that he grows socially. He needs to learn to interact with children/people that might not be as intelligent as he is. If he is involved in special programs for gifted children, he misses those opportunities to deal with people that are not gifted."
>
> "We will focus on extracurricular in high school, not middle school."

Lack of interest. A fifth, moderately strong pattern noted was a lack interest in extracurricular options. Parents responding in this way simply commented that they were "not interested" in the recommended extracurricular options, and did not elaborate further. A few parents commented that they viewed the Duke TIP as "good practice," but they were not personally interested in pursuing any follow-up activities.

Curricular/Instructional Modifications

Three patterns emerged regarding the pursuit of curricular or instructional modifications following Duke TIP participation. Since the majority of respondents did not choose to pursue curricular or instructional modifications following Duke TIP

participation, the patterns described reasons why curricular/instructional options were not chosen.

Current programming is sufficient. The strongest of the three patterns was the belief that curricular/instructional modifications were not needed because the child was enrolled in some type of accelerated/enriched programming: honors classes, pre-AP, or a gifted/talented program. There was an overall perception that honors and/or pre-AP courses provided a sufficient challenge for the academically gifted. Options beyond these classes were often viewed as "too much." There was also a lack of understanding of what additional options might exist beyond the typical honors, gifted, or pre-AP programs currently available in their children's schools.

> "The counselor at her school already had her registered in pre-AP."
>
> "I think that if my child had not already been in honors/advanced courses and she were to have been identified as a high achiever, I would have then sought out additional instruction or to have her placed in advanced classes."
>
> "She is in the top, toughest already."
>
> "He is already in advanced classes for his grade level and to me that is enough. I don't believe it is necessary to be doing college work in high school."
>
> "(My daughter) and her sister had previously been enrolled in the (G/T) program in their school district. As this is the only option available to students who are identified as highly gifted and talented, we had already explored this avenue."

Private school. The second pattern to emerge was the belief that curricular/instructional modifications were not needed because the child was enrolled in

a private school. Private schools were often described as "college preparatory" and as having a "challenging curriculum" that addressed the needs of advanced students.

> "We have always been pleased with the education that (he) has been getting in his private school. I haven't seen a need for changes in the way he has been taught."
>
> "My daughter is attending a small, private, college preparatory school. At this point in her education, her curricular choices are fairly limited (one elective), and instruction is targeted to a higher level already."
>
> "The parochial school already taught advanced classes."

Modifications unavailable. The third pattern to emerge regarding curricular and instructional modifications was the perception that even if such modifications were needed, they were not available in their child's school. Some parents implied that the school chose not to make any new options available.

> "There was no indication that there would be accommodations available."
>
> "There were no changes that could have been made at her school."
>
> "Most of her teachers have a set lesson plan. The school appears to be concerned with test scores from the whole student body, but not an individual."
>
> "The school is very limited in programs and accelerated classes."

Follow-up Materials

The Duke University Talent Identification Program offers a variety of follow-up materials concerning educational options to parents and participants, ranging from newsletters to summer program catalogues and brochures. Respondents were asked to

comment on the helpfulness of the follow-up materials provided. The materials were not seen as very useful, with most of the parents ranking the materials as moderately helpful to not particularly helpful.

> "Once in a while I read the info that comes from Duke TIP but the stuff in it seems rather common sense."
>
> "Having worked with children for more than twenty years, I was not really surprised or helped with any information that was sent to us."

"We find it (the materials) more interesting than helpful."

"We read the fun stuff for kids, and not really any of the other material."

A common shortcoming noted in the follow-up materials was a lack of specific information on obtaining college scholarships. As one parent stated, "We were very honored to have our son identified by Duke. We would like more information on college scholarships."

Summary of Reasons Why Parents Do Not Choose Educational Options Recommended by Duke TIP

Parents did not choose extracurricular options following Duke TIP because of the costs of programs, the distant locations of programs, scheduling conflicts and prior commitments, the belief that such programs are inappropriate for middle-school students, and simple disinterest in extra programming. Parents did not choose to seek curricular or instructional modifications following the Duke TIP because their child is already in accelerated or enriched programming or in a private school. Some parents

believed that modifications were unavailable. Follow-up materials concerning educational options were considered limited in their usefulness.

CHAPTER V

DISCUSSION

Research Question 1

What effect do various factors have on parental decision-making regarding participation in the Duke Talent Identification Program?

Although all students who received an invitation qualified for the talent search, not all accepted the invitation. The factor most influencing parental decision-making was the perceived helpfulness of the school personnel in explaining the talent search process and providing information about the talent search prior to the testing date. The perceived helpfulness of school personnel increased the chances of participation in talent search.

Parents were critical of the format of information and the means by which the school disseminated information about the talent search. A letter sent home via the student was the most commonly reported means used by school personnel to communicate information about participating in the talent search. Some schools held parent and/or student information meetings and test prep sessions. Many parents noted that information sent home via the student often never reached the parent. Other parents noted difficulty in having follow-up questions answered satisfactorily by school personnel. Parental awareness of talent search purposes and process, participation in extracurricular activities, and having a highly educated father also increased the chances of talent search participation.

Talent searches are conducted by universities, not the local school or even the school system. Stanley (1996) commented that talent search "burrows under" the local school in a "benignly insidious manner" (p. 233). However, parents expressed a need for more and clearer information about the process. The present study indicated that parents looked to the local school, not the talent search, for this information. Although parents generally agreed that the school provided information about the talent search, parents wanted more specific, locally oriented, and personal communication from the local school. They wanted school personnel to tell them about testing specifics and benefits of the talent search process. Parents wanted the local school to ensure that the initial contact, usually a letter, was comprehensive and delivered directly to them, not sent through their children. Initial contact letters were often thrown away by the child or disregarded by parents who wanted nothing to do with "more testing."

There was a small positive effect on participation when parents were aware of the purpose and processes of talent search prior to the invitation to participate. Parents will often go to great lengths to provide opportunities for their child if the benefits of participating are made evident. However, the benefits of participation in a talent search were not understood by most parents and even these understandings were often limited and not well aligned with the intended purposes of the talent search.

Parents widely believed that the talent search was nothing more than a trial run for future college admissions testing. This position is not a part of Stanley's talent search model. However, this parental belief is somewhat fostered by both the *2004 – 2005 7th Grade Talent Search Coordinator's Guide* (Duke University, 2004b) and *2004 –*

2005 Student Guide (Duke University, 2004a) that cite "experience in an above-level test" as an important reason to participate in the Duke talent search. The *Coordinator's Guide* also cites previewing "a test that they will take later on for college admission" as a primary benefit. Although test practice may have some beneficial auxiliary effects, it is not one of the primary goals of the talent search model as developed by Stanley - to identify and intervene.

The use of information gained from above-level testing to develop educational plans and to explore educational opportunities (as proposed by Stanley's talent search model) is also an important benefit of participation, according to the same documents. Because parents relied primarily on the school for their information about talent search, it appears that the practice benefit was most stressed by schools in encouraging talent search participation. It is possible that schools were hesitant to emphasize the diagnostic aspect of talent search for fear of being held accountable for addressing the resultant information.

Parents were leery of a "for profit" purpose perceived to be behind the promotion of the talent searches. They believed that either the sponsoring university center or the test administrators had financial motives for promulgating these talent searches. This parental wariness may be due to the large number of recruiting offers for special programs that are mailed to participants following participation. There is also a general consensus among educators that talent searches are one of several independent, fee-based organizations offering outside contests and/or enrichment opportunities (Van Tassel-Baska, 1998). Considering the strong dependence for

information on school personnel who may have mixed motives for the way they promote the searches, it is not surprising that parents also assume there is a for-profit motive underlying them.

Because many parents did not understand the appropriateness of college entrance exams (the ACT and SAT) for middle-school aged children, there was a strong perception that the talent searches were inappropriate. This finding is consistent with the "hurried child" research, especially the research on academic red-shirting. Graue & DiPerna (2000) found that parents who delayed kindergarten entry for their child did not base their decision on academic or intellectual criteria. Instead, the decision to delay kindergarten was based on personal philosophy, anecdotal experiences, and maturational issues. Likewise, none of the parents who perceived the talent search to be inappropriate believed that their child was not "smart." Rather, parents believed that the tests, and thus talent search, was inappropriate due to stress, pressure, and undue competition. Given the common opinion that talent search testing is preparation for college entry exams and a money-maker for its promoters, it is not surprising that some parents may view the testing as unnecessary stressful practice, not a diagnostic tool.

Even if parents chose to have their child participate in talent search, they often questioned the practical and local value of the process. As one parent succinctly stated, "What's the point?" these parents seemed to believe that nothing would change in their home schools regardless of the results of testing.

Many of the misconceptions and issues raised by parents in the study, such as score interpretation and scholarship opportunities, were addressed in the literature of

the sponsoring university. The Duke Talent Identification Program website offers an introduction to the theoretical underpinnings of talent search as well as user-friendly guides to interpreting the results of testing and follow-up programming and curricular suggestions. However, parents who are looking to their local school for information are not likely to seek out a university website unless directed to do so by the local school. Although the *Student Guide* (Duke University, 2004a) that accompanies the invitation to participate briefly outlines the purposes of talent search, the published Duke Talent Identification Program materials were not an important source of information for parents in the present study. In fact, only one parent referenced Duke TIP material as a source of information.

The *Coordinator's Guide* (Duke University, 2004b) provides more in-depth information on the purposes of talent search and its potential as a diagnostic tool, but it is up to the school coordinator to pass along this information to parents. The invitation letter provided by Duke TIP, to be sent out by the school coordinator, provides information only on testing sites and times, not the rationale for the tests. If the intention of talent search is to benignly burrow into the schools as Dr. Stanley suggested, this process has been derailed by the schools. Whether this happens purposefully or by neglect, it is clear (at least in this study) that the schools fall short in disseminating and clarifying information on the testing for the parents of the students involved.

Enrollment in a private school or a public school did not affect talent search participation. This finding is consistent with Muller's (1993) study in which there was no

difference in the willingness of public school parents or private school parents to enroll their children in out-of-school enrichment activities. However, this may be explained by the findings of the present study that found school personnel are the most important factor in a parent's decision to have their child participate. Given this influence of school personnel, it may not matter if the school is public or private. This finding may also indicate a uniform ambivalence to the talent search process by schools in general, whether public or private.

A potential explanation for the strong connection between school personnel, awareness of talent search, and participation in talent search could lie with the school itself. When schools do not see the talent search as part of or influencing their curricular options, they may not expend much energy promoting it, explaining it, or using the diagnostic data generated from it.

It is important to know how local school personnel view talent search. Do school personnel view talent search as important or needed? Do school personnel understand the implications of talent search scores? Do school personnel truly support the diagnostic strength of the talent search process and plan to use the diagnostic data generated, or do they simply offer the talent search option in response to pressure from the gifted and talented coordinator or from parents? The answers to these questions may determine how rigorously local school personnel promote and clarify the talent search process to parents. It is interesting to note that although schools represented in the present study often offered training sessions on how to take the test, parents seldom reported attending orientation meetings designed to promote participation or on

how the test data would be used. It is possible that school personnel are committed to participating in talent search as a matter of parental or district expectations, but stop short of truly believing in the value of it.

There was more participation by children whose fathers had earned a bachelor's degree or higher. Research strongly supports the positive impact of parental education on educational involvement by parents (Lareau, 1987; Useem, 1992). In the present study, the educational level of the mother did not impact the participation of the child. The qualitative data did not provide any additional evidence as to why a higher level of education of the father, but not the mother, would result in more participation. In a related study, Olszewski-Kubilius & Yasumoto (1994) found that gifted children often choose a math/science course over a verbally-oriented course (or vice-versa) based on which area their parents value most. It is possible that fathers of the children in the present sample were more favorable toward talent search. However, it also likely that the small predictive power gained from an educated father was indicative of an educated household in general.

The number of nonsports extracurricular activities by the child also played a role in predicting participation. It appeared that parents who chose to have their child participate in talent search had a history of selecting intellectual or creative pursuits for their children. Cornell (1989) found that the majority of children in an extracurricular enrichment program had been identified as gifted/talented. Although identification as gifted/talented did not predict talent search participation in the present study, most of those who chose to participate had been so identified.

Other factors related to school status such as kindergarten entry age, ability grouping, subject acceleration, and report card grades did not have an effect on talent search participation. Both participants and nonparticipants were fairly uniform regarding these school status factors. The majority of the children in the present study, both talent search participants and nonparticipants, made high grades, had a history of enrollment in advanced and/or accelerated classes, and had been identified as gifted/talented. The fact that most of the children in the present study made high grades and were in advanced classes highlights a limitation of the talent search process; that is its inability to find all gifted and talented children in a school. The talent search was probably not designed to find, nor does it find, those bright students with learning differences, limited English proficiency, social-economic disadvantages, or who are not performing well at the current time (Baum & Owen, 1988; Borland & Wright, 1994; Ray, 1997; Reis, Neu, & McGuire, 1995; Tomlinson, Callahan, & Lelli, 1997). A more valid judgment could be made regarding the effect of these school status factors if the pool of talent search nominees included underachieving students of high intellect.

Implications for Practice

These findings highlight the importance of the initial contact that introduces the talent search to the parents. The initial contact is generally the invitation issued by the talent search and a letter sent home from the local school with the child. However, the present study indicates that this is not enough. Parents depend on the local school to explain to them what the talent search is all about and to guide them through the talent search process. Therefore, the initial contact should be sent directly to parents (by

letter or email) prior to the university's invitation, alerting parents to the forthcoming invitation to participate. The initial contact should include names and phone numbers of local school personnel. The initial contact should explain in basic terms the testing process, how the diagnostic data will be used and why, as well as explain the availability of financial aid for the test and for the summer options that may follow a strong performance on the test.

The parental perceptions of talent search found in the present study underscore the need to explain the specific purpose and value for their child of talent search in layman's language in the initial contact document. Parents need to understand that talent search testing is not just practice for future college testing or a measure of what their child already knows, but functions as a measurement of readiness for advanced work (Assouline & Lupkowski-Shoplik, 1997; Callahan, 1992; Olszewski-Kubilius, 1998a). Parents need to understand what new and more accurate information they will gain from the testing and how they and their child's school will appropriately use what they learn.

An effective initial contact and explanation of the practical uses of the test data by the local school should increase interest in the official talent search invitation, as well as subsequent school-based parent orientation meetings and test preparation sessions. Schools that do not currently offer parent orientations, regardless of practice sessions for students, should provide a knowledgeable resource person for consultations with parents. The result should be better-informed decisions by parents regarding their child's participation in talent search.

Schools should have plans in place for addressing the needs presented by the various levels of scores on the tests. *The No Child Left Behind* (United States Department of Education, n.d.) legislation focused national attention on the acquisition of basic skills by all children. It is important for schools not to neglect the needs of students who are capable of working well above grade-level proficiency. Schools need to use what they know about tailoring programming to accommodate the individual differences of students working below grade-level to plan programming for students working substantially above grade-level. The contributors to the recent report *A Nation Deceived: How Schools Hold Back America's Brightest Students* (Colangelo, Assouline, & Gross, 2004) argued that it is a "violation of equal opportunity" when "educators confuse equity with sameness" and insist on all students having "the same curriculum at the same time (p. 9)." The report recommended as economical and practical the various forms of acceleration, especially expansion of AP programming, for students identified by talent searches as needing advanced academic challenge.

Research Question 4

How do parents choose or not choose to have their child participate in a talent search?

Parents who chose to have their child participate in talent search sought input from others, including their own child, during the decision-making process. Parents who chose not to have their child participate seemed to base their decision on several practical aspects of participating – time, cost, and travel – and one philosophical issue – the potential for elitism.

There was a marked difference in the decision-making process described by parents who chose to have their child participate in the talent search and those who chose not to have their child participate. Parents who chose to have their child participate made the decision following personal conversions with their child, individuals with specific knowledge of talent search, or both. These conversations, rather than fact-gathering research regarding talent search, drove the decision-making process. Parents wanted to determine the feelings of their child about the talent search. It is interesting to note that although talent search is an academic endeavor, parents were primarily guided by the feelings of their child, rather than their intellectual needs. Parents also sought out anecdotal experiences of other participants. Parents valued the experiences, primarily the feelings about the experience, related to them by previous participants and parents of previous participants. Often the previous participant was an older sibling of the nominee. When favorable experiences were reported, parents chose to participate in talent search. Occasionally, parents sought the opinions of adults, who, because of professional ties, had specific knowledge of the program or the sponsoring university.

Parents who chose not to have their child participate described the decision-making process quite differently. The decision not to participate was often made based on personal beliefs about gifted children or was made in light of practical considerations of time, cost, travel, or lack of benefit.

Several parents made the decision not to participate after concluding that the talent search process was a form of elitism. Parents did not want their child held in a

higher regard than his or her peers based on intellect. In one case, the child himself did not want to be held in higher regard. Gross (1999) has long documented the anti-academic precocity mind-set of many in egalitarian societies. Parents who resist the gifted label or who are unconvinced of their child's exceptional abilities will, as Solow (2001) found, guide their academic paths accordingly. Other parents stated that their child was averse to being singled out for academic ability. Among middle-school aged children, this may not be a reaction against elitism but an aversion to being different from peers in any manner (Cross, Coleman, & Stewart, 1993).

Practical concerns over finances and logistics guided the decision of many parents who chose not to have their child participate. Some parents felt that the cost of taking the SAT or ACT was beyond their resources. Others, however, believed that there were simply not enough benefits for the cost and inconvenience of the test to justify the expenditure.

Several parents in the present study stated that they would have chosen to participate had they known about testing fee waivers for qualifying students. Information about fee waivers and scholarships can be found on the Duke TIP website, but the present study indicates that parents seldom, if ever, consult the sponsoring university for information. Those who needed financial aid depended on the school to inform them about possible help. Again, beyond offering the test and training on how to take the test, schools do not seem to be putting forth much effort to promote participation. If schools believe that talent search is not their responsibility and they do

not intend to use the diagnostic data generated, they unlikely promote ways of funding it.

Implications for Practice

Parents will support educational programs if they perceive the program to be valuable to the future of their child (Olszewski-Kubilius & Yasumoto, 1994). Information is key in making informed decisions regarding talent search. Parents want to know why participation is valuable and how it will impact their child. More effort needs to be made by the local school to inform parents about the usefulness of talent search testing and to answer the questions, "What can talent search tell me about my child?" and "How will the school use the information generated by this above-level test?"

Because parents care about the feelings of their children regarding talent search participation, children who are nominated also need laymen's explanations of the purpose of talent search. As their parents, children may conclude that talent search is just "one more test" for which they see no benefit. Children also need to know about the mechanics of the testing process *before* the nomination letter arrives. This might be accomplished by exposing potential talent search nominees to practice questions similar to those found on the SAT or ACT. Success on a few of the easier questions may instill in children a sense of accomplishment and desire for a further challenge. Exposure to the test format and sample questions may reduce anxiety about a "college test." If children, and subsequently their parents, are intimidated by the invitation to test, they will likely never attend a training session for more information.

Specific information regarding financial aid should be clarified in the initial contact letter. Time constraints and scheduling conflicts might be alleviated if parents took advantage of alternative testing dates. Duke TIP offers two testing dates for talent search students, which does not leave much flexibility for family schedules. Students may test after the two dates, but they cannot attend a recognition ceremony if they qualify. Students testing after the two dates are still eligible for programming and certificates of recognition if they qualify. Initial contact information should clarify the dates of the test and the option for alternative testing dates.

School personnel may need to reconsider the amount of time required for test preparation sessions. Some parents indicated that they might have chosen to have their child participate if time-consuming preparation sessions were not required. Basic instruction in the mechanics of the test – types of questions and so forth – might be more appropriate for students taking the ACT or SAT for talent search purposes.

Research Question 5

What are the perceptions of parents regarding out-of-level testing?

Although parents generally viewed the purpose of out-of-level testing as a means of administering a test to students that was harder than typical achievement tests, they did not appear to understand *why* such testing is important. In the context of current socio-political demands for stringent testing and accountability (Romberg, 1998), it is not surprising that parents would view a harder test as better suited for bright children. Parents believed that out-of-level testing could be used to inform curricular decisions, but it usually is not. Parents often found the test results to be a confirmation of what

they already knew or suspected about their child's abilities, but occasionally gained knowledge regarding a specific academic area.

Although parents generally had an accurate understanding of the concept of out-of-level testing, this understanding was more fully articulated by the parents of the students who actually participated in the talent search. There was a general perception that the achievement testing normally done by students was insufficient for measuring the true abilities of exceptional students. Parents commented on the perfect or near-perfect scores earned by their children on regular achievement tests. However, it is important to note that understanding *why* a test is used does not imply understanding about *how* test results can be used. Parents accustomed to seeing "99th percentiles" on grade-level standardized testing may not realize the full implications of a child scoring at the 50th percentile on tests designed for individuals entering college. The present study indicated that parents rely on the local school for information on talent search, but schools often fail to recognize or acknowledge the implications of a seventh grader scoring at college-entry level (McCarthy, 1998; Van Tassel-Baska, 1998). Parents generally viewed the talent search test results as confirmation that their child was bright. There was no indication that parents were comparing their child to entering college freshmen. If talent search test results are valued only as confirmation of known abilities, then test data are little more than an intellectual curiosity.

Implications for Practice

Parents cannot use the data generated by out-of-level testing if they do not understand their implications. The talent search programs report scores to parents,

along with interpretive information. The local school should contact parents before and following testing, to review and to explain in layman's terms the implications of their child's score and how the results will affect services offered to their child in the school. Often the parents, not the school, are the primary advocates for children in securing alternative and auxiliary educational opportunities (Lupkowski-Shoplik & Assouline, 1994). It is therefore imperative that parents grasp the full implications of out-of-level testing for services and levels of services in order to be effective advocates for their children.

Research Question 6

Why do parents of talent search participants choose or not choose to seek recommended or suggested educational options?

Most parents of talent search participants did not choose to seek extracurricular or curricular/instructional options recommended following the talent search. Practical concerns of time, cost, and location were considered prohibitive in choosing the recommended extracurricular options. In addition, there was a perception that the extracurricular options were not available in their school or were inappropriate for middle-school children. Parents did not choose to seek curricular/instructional options because they believed that honors, advanced, and/or preAP classes provided a sufficient challenge.

Van Tassel-Baska (1998) criticized a university talent search because only one-fifth of the students who qualified for special programs actually participated. Although the scores earned by the participants in the present study were, on the average, higher

than the average score for all talent search participants, the number of students who chose extracurricular, curricular, or instructional options did not approach one-fifth of the qualified students. Of course, not every child who participated in the talent search was eligible for a special program or earned a score that suggested that curricular/instructional changes were needed.

A talent search, by design, is limited in the number of students served following testing (Stanley, 1996; Van Tassel-Baska, 1998). First of all, only students scoring in the top 5% on a grade-level achievement test are invited to participate. Talent search testing creates a new distribution out of the top 5% of scorers. Many students in the top 5% can be well-served by honors or ability-grouped classes. Students at the higher end of the new curve may need exceptional curricular accommodations. Not all of the students who participate will score high enough to qualify for university-sponsored summer programming. However, the extremely low number of parents in the present study who chose to pursue options is alarming. As Van Tassel-Baska noted, any local program with such a poor identification-to-service ratio would cease to exist (Van Tassel-Baska, 1998). More parents might have chosen suggested options if they were informed of them and were encouraged by their local school.

Schools that choose to participate in talent search need to evaluate their commitment to talent search and their buy-in to the model itself. Schools need to determine whether their commitment to talent search's goal of identification is equal to their commitment to the goal of intervention and service. There are three possible reasons why schools may be more committed to identification than to intervention and

service. First, it is possible that schools are more interested in identification because it supplies a tangible, quantifiable commodity. School quality is most often judged by hard numbers such as test scores, percentage of students passing state tests, number of identified gifted/talent students, number of students receiving special education services, or years of experience and advanced degrees of teachers. Schools can point to hard numbers of talent search participants as an indicator of quality. Providing exceptional services to a limited number of students is harder to define, quantify, and publicize. Second, schools may also be more interested in identification because they are comfortable with the paradigm of academic awards. Honor rolls and honor societies are routinely selected, but selection does not imply academic interventions will be made. Schools may be comfortable with identifying, recognizing, and honoring talent search participants, but do not emphasize intervention because they do not wish to provide it. A third possibility is underlying power issues. Talent search is organized and administered completely outside the school. Talent search may be seen as "someone else's program." It is therefore possible that schools do not feel obliged to promote talent search or to use the data for anything except student recognition or as a practice test. Both of these uses are low-level uses of talent search data, but are non-obligating to the local school.

Extracurricular Options

Parents who chose not to pursue extracurricular options cited many of the same reasons noted in the literature: cost, location, and scheduling. These reasons were also given by parents in the present study who chose not to have their child tested for the

talent search. None of the parents who cited the cost of programs mentioned pursuing information on financial aid. However, the special summer and weekend programs presented in the Duke TIP catalogue are very expensive, often costing more than $2,000. It is likely that even if scholarship money was applied to program tuition, the remaining cost plus the cost of travel across several states would still be prohibitive to many families.

Regardless of cost, many parents were reticent to send middle-school children to locations far from home. Many parents believed that the length of time required for most Duke TIP programs (usually three weeks) was not conducive to demanding family schedules.

Overall, parents wanted local programming. Parents desired reasonably priced special programming through local institutions with which they were familiar. The present study highlights the need to investigate the availability and effectiveness of programming offered outside of sponsoring talent search universities.

In addition to practical concerns of cost, location, and scheduling, many parents believed that the extracurricular options recommended by the talent search were inappropriate for middle-school students. Strong, elaborative opinions were voiced by parents who felt that the recommended extracurricular options were not developmentally appropriate for middle-school-aged children. This aversion to "pushing" was also seen in the findings regarding the use of college entrance exams, and it is well documented in the literature on academic red-shirting. Again, parents did not make

decisions regarding recommended extracurricular options based on the child's academic ability, but rather on emotional, social, and maturational issues.

It is interesting to note the objection of many parents to "pushing" in academic and/or intellectual areas. Parents often allow their children to participate on select sports teams, select dance troupes, or participate in advanced musical training. It does not appear that being hard or demanding is a barrier to participation in all nonschool activities. Perhaps the determining factor is an understanding of the purpose of the activity and valuing of that purpose.

Curricular/Instructional Recommendations

Parents in the present study believed that honors classes, pre-AP classes, and/or advanced curriculums provided a sufficient challenge and therefore talent search-recommended curricular/instructional options were unnecessary. For most of the participants in the talent search, this was a valid conclusion.

Low-level modifications, such as pre-AP classes and early entry into first-year algebra, were widely available and were probably appropriate for most students who were nominated for the talent search. However, exceptional students who earned high scores on the SAT or ACT were also in pre-AP and early algebra classes and likely looked the same as most of the other nominees on grade-level achievement tests. While honors classes address the needs of most advanced learners, they likely do not address adequately the needs of exceptionally advanced learners.

An honors class will often use the same texts and materials as the regular class, but may possibly add enrichment, depth, or increased pace. This is not sufficient for a student who is capable of functioning several grades above level.

Parents may be satisfied with honors or preAP placements because they are unaware of other options for highly capable students that have been suggested in educational literature. Colangelo et al. (2004) recommended dissemination of educational research findings to parents so they can be better advocates for their highly capable children. Parent satisfaction with honors and preAP placements may also stem from a fear that placement in a class above grade level jeopardizes their child's grades.

Many parents (as well as students) who are accustomed to A's in honors classes may be unwilling to risk class rank or status with work more challenging than typical honors curricula. Schools need to clarify to parents the scope and limitation of honors classes, and what (if any) other options are available and the grade risks involved.

Parents appeared to be comfortable with modifications to curriculum/instruction as long as grade *placement* was not affected. In other words, parents wanted advanced curriculum taught within their child's age-assigned grade level. This finding is consistent with Hertzog and Bennett's (2004) study of parental perceptions of the needs of their gifted children. Parents believed that the needs of challenge and working with peers were a high priority, while a special environment was ranked very low on the list of needs. The finding that most parents consider existing honors classes and/or advanced curriculums to be sufficient was consistent with the parental desire for local service/control persistent throughout the present study.

The present study indicated that more parents may have chosen curricular/instructional options recommended by talent search had they known such options were available. It was beyond the scope of this study to determine what specific options were offered at each of the participating schools. It is likely that parents did not know about such options because they are not available or rarely encouraged by educators (Southern, Jones, & Fiscus, 1989).

Parents did not find that follow-up materials published by the Duke TIP to be particularly useful. One possibility for this perception is that the primary in-depth talent search-related publication is the Duke *Gifted Newsletter,* which is only available by subscription at an additional cost. Parents who only receive notices and catalogues about offers of special programming might perceive follow-up information to be deficient.

Implications for Practice

If talent search-recommended extracurricular, curricular, and/or instructional options are to be viable choices, they should be perceived as locally implemented and supported practices. Local schools or districts may not have the desire or resources to conduct their own talent search, but student data generated from national talent searches are available to each participating school. One challenge to local schools is determining whether and how to use the information in order to best serve advanced students. If talent search data are to inform the education of advanced learners, then talent search recommendations should be embedded into the educational plan. For example, talent search data can be used as the criteria for admission to advanced

classes or gifted programs. One local school district uses data from talent search testing to place students not previously identified as gifted into the middle school gifted program. Students are allowed to choose gifted programming in language arts or science and math, depending on their SAT or ACT score. (J. B. DeLisle, personal communication, November 23, 2004). Ultimately, school personnel must determine their level of commitment to implementing suggested educational options. If schools begin to actively suggest appropriate curricular modifications and/or enrichment, parents will increasingly expect the school to provide these.

Scheduling issues are a concern to parents who do not want to add more to a summer or weekend. Time needs to be bought from the regular school day in order to provide qualifying students the opportunity to take extracurricular advanced exploratory courses.

A leadership program, sponsored by a regional Chamber of Commerce in collaboration with local public and private schools, is an example of such a program (Metrocrest Chamber of Commerce, 2000). Local schools work with the program to identify qualified students. Students attend a single weekend retreat and then attend classes for one school day per month for one academic year in order to complete an advanced community leadership course.

Collaborative relationships with local universities and community colleges could provide additional resources for advanced programming. Many high schools currently offer dual credit classes, taught on the school campus, through local colleges. Expanding the number of dual credit classes and allowing dual credit to be earned in

middle-school would open opportunities for exceptionally advanced students within the context of the local school.

Schools may not necessarily need to add additional courses in order to meet the needs of exceptionally advanced learners, but may need to add flexibility to existing courses. Schools could offer credit by examination for basic courses, offer accelerated versions of courses such as algebra I in a single semester, accept college courses (taken on campus or online) for high school credit, compact existing curriculum, or allow self-paced completion of coursework (Southern & Jones, 2004). Most schools lack official policies concerning subject or grade acceleration (Reis & Westburg, 1994). Policies (either explicit or unwritten) which insist on strictly sequential course offerings inhibit curricular flexibility.

Collaborative community programs, dual credit, and flexible course sequencing all allow exceptional students to take advantage of recommended options within the course of a regular school schedule. Parental concerns regarding social and emotional issues may be allayed if their child remains in or near the local school. However, radical modifications such as early college entry reach beyond the local school. Parents concerned with social and developmental issues may be hesitant to send a young teen to college. Although this is a legitimate concern, highly motivated, emotionally stable young students who have been carefully screened have demonstrated a high degree of academic, social, and emotional success as early college entrants. Both residential and commuter early entrance programs offer a variety of social and emotional supports in order to facilitate adjustment to college life (Brody, Muratori, & Stanley, 2004).

Parents of gifted high school students value working with age-peers more than do parents of gifted elementary or middle-school students (Hertzog & Bennett, 2004). Half-day or part-time enrollment in an early college entry program may be a more palatable alternative. Early entry programs that are residential-only may need to consider admitting day students. Often colleges and universities will admit younger students who are qualified (Sayler, 1990; Fluitt & Strickland, 1984). Parents or local schools may not have approached neighboring colleges and universities about the possibilities of dual enrollment for young students. Without the local school as an advocate, parents may be hesitant to approach a college or university about part-time enrollment.

Talent search has some potential for identifying underserved exceptional students. Talents search scores can be used in addition to (or instead of) grades and achievement tests to identify students for honors and preAP classes. This is a vital practical implication, particularly for middle-school students. For example, students who did not take algebra I in eighth grade have been shown to be at a disadvantage in science and math in both high school and college (United States Department of Education, 1997).

A related parental concern that was implied in the qualitative data was the impact of challenging courses, college classes, and challenging extracurricular courses on class ranking and student GPA. Parents were concerned about overloading an already challenging schedule. High grades were mentioned as evidence of an appropriate educational challenge. The overloaded student could be helped by

eliminating courses for which he or she has already mastered most of the content and allowing access to advanced courses that provide developmentally appropriate instruction.

Although it would mean a major overhaul in the way schools approach grading and class rank, schools need to find a way to make it safe for a student to take a challenge. Possibilities include pass/fail options, nongraded classes, contracting for grades, and substantially weighting the grades of advanced and above-grade-level classes. Another possibility for making challenges safer is to find ways of reducing the workload for exploratory courses: classes structured on reading and discussion or simulations without the requirement of written products.

Theoretical and Conceptual Implications

The theoretical rationale for the talent search model is grounded in the developmental learning theories of Hunt (1961), Vygotsky (1978), and Csikszentmihalyi (1990). These learning theories are developmental in nature; that is, learning is viewed as a sequential and developmental process through which children progress at differing rates. All three theorists hold that learning occurs when there is a presentation of content that slightly exceeds content already mastered. The writings of Hunt, Vygotsky, and Csikszentmihalyi reveal common themes: determining the size of the discrepancy between the educational circumstances and a child's abilities, capitalizing on a child's potential to "catch on" to new material, and the inevitability of challenge or even stress as children progress to higher levels of learning.

In the present study, parental aversion to practices perceived as developmentally inappropriate was pervasive. There was an underlying fear of academic pushing regarding all aspects of talent search, from SAT/ACT testing to the kinds of recommended options offered. Pushing was responsible for some children's feelings of stress and inadequacy, according to some parents.

Typical middle-school and high school environments are not conducive to structuring learning according to the theories of Hunt, Vygotsky, and Csikszentmihalyi. It is therefore not surprising that schools do not embrace special placements based on talent search results. Competition for class rank, honor roll, and college entry results in more emphasis on grades than on exploratory learning. Parents and students may be hesitant to accept the challenge of a college-level course or explore a new content area for fear of diminishing the GPA. The developmental learning theories underlying talent search hold that a degree of discomfort is necessary in order to proceed to higher levels of learning. The full implications of these theories cannot be felt in schools where children do not feel safe in taking a challenge. When safeguards to class standing and grades are in place for students wishing to meet their optimal match (Whalen, 2001), the impact of talent search grows.

Conceptually, the talent search model fits into the framework of Gagné's Differentiated Model of Giftedness and Talent (Gagné, 1995; 2000). Gagné's definition of giftedness and talent is in harmony with the goals of talent search to identify and serve exceptionally able students. Because Gagné's model acknowledges specific aptitudes instead of unspecific, universal giftedness, the model integrates well with the

hesitancy of many parents to apply the term gifted to their child. In the present study, it was not unusual for parents to acknowledge areas of specific strength for their child but shy away from an overtly gifted label. Parents are likely more comfortable with a definitive and specific description of their child's abilities. With specific knowledge of aptitudes as expressed in Gagné's model, parents might be more willing to intervene in their child's education if necessary.

Although all of the children of the parents investigated in this study scored in the top 5% on a grade-level achievement test, not all of the nominees for the talent search in the present study had been previously identified as gifted/talented. This finding supports Gagné's contention that universal measures of aptitude often do not identify those with specific exceptional abilities. Of course, not all nominees will prove to be exceptional, but a substantial number of unidentified students in the nominee pool increases the odds of finding undiscovered and underserved abilities.

Limitations of the Study

Internal Validity

Although the logistic regression analysis found the model in the quantitative phase to be a substantial improvement over chance in predicting talent search participation, the descriptive discriminant analysis found only a small effect for variables identification as gifted/talented, number of extracurricular activities, perceived helpfulness of school personnel, prior awareness of talent search, mother's educational level, and father's educational level. It would be difficult to assign credible predictive value based on the small effect size alone. However, the structure coefficients identified

the primary contributing variables and the qualitative data placed the observed effect in context and thus increased the value of the findings. The rich, elaborative descriptions provided by the parents, particularly in response to questions about school personnel and awareness of talent search, were consistent with and lent validity to the quantitative findings.

A second limitation to internal validity was the use of a default cut-rate in the quantitative analysis, resulting in a less-than-reliable hit-rate. The true cut-rate could not be determined because the Duke TIP keeps no records on the ratio of talent search invitations to actual participants. It is probable that parents who chose to have their child participate in talent search would be more apt to respond to a questionnaire concerning their experience, resulting in an artificially high number of participants in the sample.

External Validity

The present study is limited in generalizability because the participating schools from which the respondents were drawn varied greatly in the degree to which they served gifted students. The schools varied from small private schools with no gifted programs to schools in a large public school system with a complex program that included recognition of exceptionally gifted students. The conclusions drawn regarding parental decisions following talent search participation must be tempered with the fact that parents had widely varying exposures to gifted/talented programs and widely varying options within their local school.

A second limitation to generalizability is the lack of a true ratio of all Duke TIP nominees to actual participants. Because the Duke TIP does not maintain this information, there is no way to know whether the sample represents the actual ratio of nominees to participants found in the general population.

A third limit to external validity is the relatively low response rate to the questionnaire. Subsequent analysis did show that nonresponders were likely similar to responders, which strengthens the case for generalizability.

Measurement Issues

A limitation in the measurement used in the study is the reliance on self-reported quantitative data. Several items on the questionnaire called for specifics, for example, grades. There is a possibility that parental recollections of grades will not accurately reflect actual recorded grades. However, parental perceptions that led to parental decisions were integral to the purpose of the present study. Therefore, it may be more important to know that a parent perceives a child to be a straight "A" student than to know the actual grades of the child.

Research Design

A limitation in the quantitative design of the present study was the failure to account for the variations in schools in regards to gifted identification and programming. Schools varied greatly in identification and programming for gifted/talented students, from nonexistent to complex. A nested design would have addressed this problem. However, the sample size was not large enough for a nested

analysis. This limitation was minimized by incorporating rich qualitative interview data into the analysis which allowed the differing perspectives to be examined.

Future Directions

Since the perceived helpfulness of school personnel was a strong factoring in determining whether a parent chose to have a child participate in talent search, future research should investigate and compare individual campuses during the process. A nested research design should be used to identify the importance of specific variables related to talent search participation on each campus. Schools measuring at the extremes on the selected variables should then be the subjects of a thorough, on-site qualitative study. Additionally, a larger and more representative sample would enhance the data and analysis.

Perhaps the most glaring deficit in the research literature uncovered by the present study is the lack of an estimated ratio of students who receive invitations to participate in talent search to actual participants. Since the Duke TIP relies on local school counselors and principals to distribute talent search invitations, the Duke TIP maintains no data on actual distribution. No other talent search-sponsoring university has published a participation ratio. It is difficult to make reliable judgments regarding the value of factors leading to talent search participation or nonparticipation without knowing how many children were actually invited. Future research should involve tracking invitations distributed by selected schools in order to create an estimated ratio of talent search nominees to participants.

A second deficit in the literature uncovered by the present study is the lack of data regarding programs other than those sponsored by the talent search universities. Through the Study for Mathematically Precocious Youth (SMPY), there is a wealth of data regarding participation in and benefits of extracurricular and curricular/instructional options recommended by the talent search. However, the present study concurred with published studies in concluding that university-sponsored programs are extremely under-attended by the majority of eligible students.

The data regarding special programming is therefore only a picture of students for whom cost, travel, and time is not a problem, a minority of students, according to the present study. Collecting data on post-talent search participation in programs not affiliated with the sponsoring university would be valuable in determining the usefulness of such programs to exceptional students. Future research should investigate post-talent search participation in local programs such as duel credit courses and offerings from other nontalent search entities such as hospitals, businesses, and community groups.

Parents often cited philosophical reasons for not choosing to participate in talent search or in follow-up options. Similar philosophical rationales are given for the practice of delaying kindergarten entry. Future study should include assessment of parental traits in the talent search decision-making process in these areas: beliefs regarding maturation, personal philosophy of education, and personal and/or anecdotal educational experiences.

The present study found that parents who chose to have their child participate in talent search often consulted their child during the decision-making process. It would be useful to know the effects of preparing the nominated child for the talent search process prior to the invitation to participate. It would be helpful to know the effects of the following variables: participation in an abbreviated test preparation class, along with peers, prior to receiving the talent search invitation; completion of a test preparation packet at home prior to receiving the invitation; and participation in a conference with former talent search participants prior to receiving the invitation.

Parents routinely evaluate the needs of their children versus the wants, desires, and feelings of their children. The present study raises an interesting question regarding how parents balance their children's *educational* needs with their children's feelings. Future study should include an investigation of parental educational decisions that are driven by feelings rather than need, and the theoretical constructs underlying these decisions. Parental philosophy, child's attitude toward talent search, and the balance of educational needs versus feelings could all be influenced or changed if local schools consistently used talent search test data to make appropriate modifications and explained the benefits clearly to parents.

Conclusion

The present study indicated that the data schools currently have about students is not really useful in finding exceptionally able students because the data schools have do not discriminate between highly capable students and exceptionally capable students. This was evidenced in the finding that school-related factors like grades,

ability grouping, and identification as gifted/talented did not load in either of the quantitative analyses. Additionally, grade-level achievement tests do not discriminate because the upper percentiles contain both gifted and highly gifted students.

The validity of the talent search model is strongly supported in the research literature and is solidly grounded in learning theory. The model has been successfully implemented in special programming associated with talent search universities. However, the talent search model is not designed to be a strictly extracurricular enterprise. Despite the "identify in order to serve" mantra of the originators of the talent search model, the present study found that talent searches are generally viewed by schools as simply a vehicle to recognize and reward outstanding ability. The qualitative data in the present student found that although the information gained from talent search may be useful, it is not being used by schools. Schools are therefore forgoing many opportunities to impact the curriculum and instruction for highly capable students.

Because talent search "burrows under" the school in order to identify students, parents are the primary decision-makers regarding their child's participation. The present study suggests that parents are more likely to have their child participate in talent search when they see value in the testing and have personal support from their local school. Therefore, the attitude of the local school is likely to be reflected in the attitudes of parents as they make the decision to have their child participate or not participate.

APPENDIX A

COVER LETTER

Date

Dear Parents,

I am a doctoral student at the University of North Texas studying children of high academic ability. **As the parent of a highly capable child, your views, experiences, and opinions are very important**.

When your child was a seventh grader, he/she was invited to participate in the Duke Talent Identification Program. At that time, you received a notice inviting your child to take a college entrance test, either the SAT or ACT. I would like your feedback ***whether or not your child actually took the test***.

Enclosed is a brief questionnaire regarding your high ability child. Please fill it out. It should take no longer than 5 to 15 minutes to complete. Then, return it in the stamped envelope provided. In appreciation for your help, all who return a completed questionnaire will be entered in a drawing for one of six cash prizes ($20.00 each). A few parents will be asked to answer follow-up questions by email or phone.

Everything is completely confidential. No names of students, parents, or schools will ever be published or made public. Your participation or nonparticipation in this study will in no way affect your child's grades or school standing. This study will last six weeks.

Please contact me if you have any questions. Thank you in advance your help.

Sincerely,

Janet Ray

APPENDIX B

QUESTIONNAIRE

1. During grades 4, 5, 6, and 7, **where did your child attend school**? *Please check one box for each grade level.*

Grade **4**: ☐ public school ☐ private school ☐ home school
Grade **5**: ☐ public school ☐ private school ☐ home school
Grade **6**: ☐ public school ☐ private school ☐ home school
Grade **7**: ☐ public school ☐ private school ☐ home school

2. How old was your child when he/she **started kindergarten**?
Please check one box.
☐ Four years old or less on September 1 of the kindergarten year.
☐ Five years old on September 1 of the kindergarten year.
☐ Six years old on September 1 of the kindergarten year.
☐ Seven years old or more on September 1 of the kindergarten year.

3. During **sixth grade *and* seventh grade**, I would describe my child's **report card grades** as:
Please check one box.
☐ All A's
☐ Only A's and B's
☐ Only A's, B's, and C's
☐ Only B's and C's
☐ Only C's
☐ Some D's and F's
☐ Other (please specify) _____

4. Some schools place students in separate sections for math, reading, language arts, or science according to their ability in the subject. High ability classes may be known as "the top group", "honors", or "pre-AP".
Which of these describes your child's experience in ***grades one through six***?
Please check one box.
☐ **Did not** participate in a separate high ability class during grades 1 through 6.
☐ **Participated** in high ability class(es) **in one or more subjects** during grades 1through 6.

In what subjects and during which grades? (for example, reading 4-6)
_____

5. Which of these describes your child's experience in grade ***seven***?
Please check one box.
☐ **Did not** participate in a separate high ability class during 7th grade.
☐ **Participated** in high ability class(es) **in one or more subjects** during **grade 7**.

In which subject(s)? _____

6. Has your child ever been identified for a gifted and talented program?
Please check one box.
☐ No
☐ Yes In what grade was he/she first identified? _____

7. Some students "skip" one grade or more during their school years. For example, they may go from kindergarten to second grade.
   Has your child ever skipped a grade?
   Please check one box.
   - ☐ No
   - ☐ Yes Which grade(s)? _____

8. Some students remain in their grade, but go to a class for older students for one or more subjects. Some students may remain in their room, but work in the next grade's book. This is called "subject acceleration".

   Has your child ever experienced "subject acceleration"?
   Please check one box.
   - ☐ No
   - ☐ Yes When and in what subject(s)? _____

9. Some students participate in classes, workshops, or camps in areas such as art, music, language, science, drama, math, history, and reading ***outside of school*** (after school, weekends, summer, etc.).

   In how many such programs (**Do not include** sports or physical activities) has your child participated during

   the last three years? _____

10. Did your school or school district offer any special programs to explain to you the Duke Talent Identification Program or to train your child on taking the test?
    Please check one box.
    - ☐ No
    - ☐ Yes Please describe: _____

      _____

11. Please rate **your school personnel** as to how helpful they were in explaining the Duke Talent Identification Program process to you and/or providing you with information about the test **PRIOR TO** the testing dates:
    Please check one box.
    - ☐ Very helpful
    - ☐ Helpful
    - ☐ Somewhat helpful
    - ☐ Not helpful

12. How much did you know about the **purpose** and the **process** of the Talent Search ***before*** your child was asked to participate? Please rate your **level of awareness** about the Talent Search program ***before*** your child was invited to participate:
    Please check one box.
    - ☐ I was very aware of the Talent Search program
    - ☐ I was aware of the Talent Search program
    - ☐ I was somewhat aware of the Talent Search program
    - ☐ I was not aware of the Talent Search program

13. Which of these applies to your child?
Please check one box.

☐ My child **did not take a test** for the Duke Talent Identification Program*

***Why not**? Please list all the reasons you chose not to have your child take the test (for example, not interested, cost of the test, distance to the center, schedule conflict, illness):

☐ My child **did take** a test for the Duke Talent Identification Program

14. Do you have any additional comments regarding the Duke Talent Identification Program or talent searches in general?

15. I am the child's
Please check one box.
☐ Mother/female guardian
☐ Father/male guardian
☐ Other

16. What is the **highest** level of education obtained by the mother/female guardian?
Please check one box.
☐ No high school diploma or equivalent
☐ High school diploma or equivalent
☐ 1 or more years of college, no degree
☐ Associate degree
☐ Bachelor's degree
☐ Master's degree
☐ Doctoral-level degree (M.D., J.D., Ph.D., etc)
☐ Not Applicable

17. What is the highest level of education obtained by the father/male guardian?
Please check one box.
☐ No High School diploma or equivalent
☐ High School diploma or equivalent
☐ 1 or more years of college, no degree
☐ Associate degree
☐ Bachelor's degree
☐ Master's degree
☐ Doctoral-level degree (M.D., J.D., Ph.D., etc)
☐ Not Applicable

If your child **did not take a test** (the SAT or ACT) for the Duke Talent Identification Program, you may stop here. Please return your questionnaire in the stamped envelope provided. Thank you!

If your child **took a test** (the SAT or the ACT) as part of the Duke Talent Identification Program, **please go to the next page.**
If your child **took a test** (the SAT or the ACT) as part of the Duke Talent Identification Program, **please continue** to answer the next few questions:

18. As a seventh grader, my child took the

☐ SAT composite (total) score _____

☐ ACT composite (total) score _____

☐ I don't know

19. Did your child receive a notice indicating that he/she scored high enough for **State Recognition**?
Please check one box.
☐ No
☐ Yes*

*If Yes, did your child attend the recognition ceremony?
Please check one box.
☐ No
☐ Yes Comments:

20. Did your child receive a notice indicating that he/she scored high enough for **National Recognition**?
Please check one box:
☐ No
☐ Yes*

*If Yes, did your child attend the recognition ceremony?
Please check one box.
☐ No
☐ Yes Comments:

21. **After you received your child's score**, did your child take any advanced class or course through Duke University or any other university during the summer, on weekends, or after school?
Please check one box:

☐ No Why not? _____

☐ Yes Please name the class(es):_____

Comments:

22. **After you received your child's score**, did you contact the school about making any changes in your child's courses, grade level, or any other type of accommodation for your child in the upcoming school year?
Please check one box:

☐ No, because _____

☐ Yes. I contacted the school about_____

Comments:

23. **After the school received your child's scores**, did the school initiate contact with you about making any changes in your child's courses, grade level, or any other type of accommodations for your child in the upcoming school year?
Please check one box:

☐ No Comments? _____

☐ Yes Please specify:_____

Comments:

24. Do you have any additional comments regarding the Duke Talent Identification Program or talent searches in general?

Thank you very much!
Please return your questionnaire in the stamped envelope provided.

APPENDIX C

CONSENT FORM

Date _____

PLEASE READ THE FOLLOWING AND RETURN THIS PAGE WITH THE QUESTIONNAIRE:

I understand that all information obtained in this study will be kept in strict confidence. No names or school names will be attached to the questionnaire. No names or school names will ever be used in print or published. After the data are collected, the researcher will destroy all identifying marks. Your decision to participate or not will in no way affect your child's grades or school standing. You may withdraw your permission at any time during the study, with no consequences for your child.

This research project is being conducted by Janet Ray, a doctoral student at the University of North Texas. Her faculty sponsors for this research are Mike Sayler, Ph.D. and Ron Wilhelm, Ph.D., faculty members in the College of Education at the University of North Texas. They can be reached at (940-565-3940).

This research study has been reviewed and approved by the University of North Texas Committee for the Protection of Human Subjects (940-565-3940).

Please indicate your consent to participate in this study by signing below:

I CONSENT to participate in this study

(signature)_____

May the researcher contact you by email or phone if needed to follow up on a response?

_____ Yes _____ No

If you responded "Yes", please provide the following information:

Email: _____ Phone _____

APPENDIX D

INTERVIEW GUIDING QUESTIONS

Guiding Questions for Follow-up Interviews

The following are questions to be used in guiding the follow-up interviews with selected questionnaire respondents. Not all questions will be asked of each respondent. In addition, specific questions pertaining to open-ended responses given on the questionnaires will be addressed.

1. Why did you decide *not* to have your child take the test for the Duke Talent Identification Program? What, if anything, would have made you decide differently?
2. Why did you choose to have your child participate in the Duke Talent Identification Program?
3. Why do you think Duke wants the students to take a college-level test like the SAT? How do you think the SAT or ACT is different from tests your child takes at school (like TAAS, TAKS, or Iowa)?
4. Why did you choose to send your child to a special program/class/course after you received the test scores? Why did you choose that particular program? Was that your first choice? Why or why not?
5. Why did you *not* choose to send your child to a special program/class/course following the testing?
6. Why did you choose to talk to school personnel after the testing? What was the response of the school? Was any action taken?
7. Why did you *not* choose to talk to school personnel after the testing? What, if anything, would have made you decide differently?

8. What is the purpose of a talent search?
9. Did you find out anything about your child that you did not know before he/she participated in the talent search?
10. Do you read the follow-up materials sent to you by Duke? What do you find most helpful? Least helpful?

APPENDIX E

FREQUENCIES FOR OUTCOME (DEPENDENT) VARIABLES

Frequencies for Outcome (Dependent) Variables

TIP (*N* = 169)

Score	Frequency	Percent
.00	54.0	32.0
1.00	115.0	68.0

EXC (*N* = 110)

Score	Frequency	Percent
.00	106.0	96.4
1.00	4.0	3.6

CIO (*N* = 111)

Score	Frequency	Percent
0.00	109.0	98.2
1.00	2.0	1.8

APPENDIX F

FREQUENCIES FOR PREDICTOR (INDEPENDENT) VARIABLES

Frequencies for Predictor (Independent) Variables

PS (*N* = 169)

Score	Frequency	Percent
0.00	50.0	29.6
1.00	9.0	5.3
2.00	5.0	3.0
3.00	2.0	1.2
4.00	103.0	60.9

KE (*N* = 168)

Score	Frequency	Percent
1.00	9.0	5.4
2.00	141.0	83.9
3.00	18.0	10.7

GR (*N* = 169)

Score	Frequency	Percent
1.00	3.0	1.8
2.00	3.0	1.8
3.00	3.0	1.8
4.00	24.0	14.2
5.00	82.0	48.5
6.00	54.0	32.0

PAG (N = 169)

Score	Frequency	Percent
0.00	46.0	27.2
1.00	123.0	72.8

RAG (N = 169)

Score	Frequency	Percent
0.00	21.0	12.4
1.00	148.0	87.6

IGT (*N* = 169)

Score	Frequency	Percent
0.00	46.0	27.2
1.00	123.0	72.8

GA (*N* = 169)

Score	Frequency	Percent
0.00	167.0	98.8
1.00	2.0	1.2

SA (*N* = 169)

Score	Frequency	Percent
0.00	115.0	68.0
1.00	54.0	32.0

XC (*N* = 164)

Score	Frequency	Percent
0.00	74.0	45.1
1.00	39.0	23.8
2.00	26.0	15.9
3.00	12.0	7.3
4.00	5.0	3.0
5.00	2.0	1.2
6.00	3.0	1.8
8.00	1.0	0.6
12.00	1.0	0.6
20.00	1.0	0.6

IN (*N* = 168)

Score	Frequency	Percent
0.00	87.0	51.8
1.00	81.0	48.2

PR (*N* = 163)

Score	Frequency	Percent
1.00	52.0	31.9
2.00	48.0	29.4
3.00	39.0	23.9
4.00	24.0	14.7

AW (*N* = 169)

Score	Frequency	Percent
1.00	83.0	49.1
2.00	39.0	23.1
3.00	28.0	16.6
4.00	19.0	11.2

ME (*N* = 167)

Score	Frequency	Percent
1.00	3.0	1.8
2.00	20.0	12.0
3.00	28.0	16.8
4.00	8.0	4.8
5.00	74.0	44.3
6.00	30.0	18.0
7.00	4.0	2.4

FE (*N* = 163)

Score	Frequency	Percent
1.00	2.0	1.2
2.00	13.0	8.0
3.00	17.0	10.4
4.00	16.0	9.8
5.00	60.0	36.8
6.00	38.0	23.3
7.00	17.0	10.4

CS (*N* = 86)

Score	Frequency	Percent
1.00 - 10.00	7.0	8.1
11.00 - 20.00	6.0	6.9
21.00 - 30.00	5.0	5.9
31.00 - 40.00	6.0	7.0
41.00 - 50.00	6.0	7.0
51.00 - 60.00	5.0	5.8
61.00 - 70.00	7.0	8.2
71.00 - 80.00	10.0	11.6
81.00 - 90.00	10.0	11.7
91.00 - 99.00	24.0	28.1

SR (*N* = 108)

Score	Frequency	Percent
0.00	69.0	63.9
1.00	39.0	36.1

NR (*N* = 108)

Score	Frequency	Percent
0.00	105.0	97.2
1.00	3.0	2.8

AT (*N* = 108)

Score	Frequency	Percent
0.00	88.0	81.5
1.00	20.0	18.5

IC (*N* = 111)

Score	Frequency	Percent
0.00	109.0	98.2
1.00	2.0	1.8

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