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Results reveal that key student variables related to the development of
academic talent include the amount of independent reading, enrollment in
academic programs, high educational aspirations, amount of time spent on
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hold high aspirations for their educational futures are more likely to be
talented. However, parents who do not interfere with their children's
academic performance and grades, but who often discuss college plans with
their children are more likely to have talented children. Students in the
Northeast are more likely to be talented than students in the South. Black
and Hispanic students are greatly under-represented among the talented
sample, while Whites and Asian students were relatively over-represented.
Moreover, certain key differences between talented Blacks and Hispanics and
their White and Asian counterparts are observed. (Contains 4 tables and 118
references.) (Author/SLD)

PREDICTORS OF ACADEMIC GIFTEDNESS AMONG U.S. HIGH SCHOOL STUDENTS

EVIDENCE FROM A NATIONALLY REPRESENTATIVE MULTIVARIATE ANALYSIS

Paper presented at the Annual Meeting of the
American Educational Research Association
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Logistic regression analyses were employed using a national representative sample of high school seniors to determine how student, SES, home environment, community, and school variables relate to academic talent. Results revealed that key student variables related to the development of academic talent include amount of independent reading, enrollment in academic programs, high educational aspirations, amount of time spent on homework, and extra curricular activities. In addition, students whose parents hold high aspirations for their educational future are more likely to be talented. However, parents who do not interfere with their children's academic performance and/or grades, but who often discuss college plans with their children are more likely to have talented children. Students in the North East were more likely to be talented than students in the South. Finally, Black and Hispanic students were greatly underrepresented among the talented sample, while Whites and Asian students were relatively over-represented. Moreover, certain key differences between talented Blacks and Hispanics and their White and Asian counterparts were observed.

INTRODUCTION

Although Francis Galton had written *Hereditary Genius* as long ago as 1869, scientific inquiry into the correlates and nature of exceptional talent began in earnest only after the development of reliable and valid instruments to measure intelligence in the early twentieth century. Indeed, Lewis Terman began his landmark *Genetic Studies of Genius*, in 1921, less than five years after perfecting the Stanford-Binet Individual Test of Intelligence.

There are many reasons to study exceptional talent, or giftedness[1]. The Jacob K. Javits Gifted and Talented Students Education Act of 1988 called gifted students a "natural resource vital to the future of the Nation and its security and well-being." Identification and appropriate education of talented students is essential to maintain high national standards of achievement in education, as well as international economic competitiveness. Labor market efficiency requires accurate identification and management of intellectual talent. Gifted students as individuals are believed to have different emotional and educational needs than average students (Brounstein, et al, 1991; Hollingworth, 1926; Janos, 1983). For their well-being and for educational equity, it is necessary to identify talented students and their special needs, and to address them.

Moreover, entry into high-level professions, among them medicine, engineering, and mathematics is contingent upon high levels of ability, and some professions exhibit non-linear returns (financial or social) to ability, whereby small differences in ability in the upper end of the talent distribution are translated into disproportional levels of success (Frank, 1996; Rosen, 1981). This type of distortion can lead to ever-increasing social inequality, particularly if exceptional academic talent is not distributed evenly across social and economic groups.

The purpose of the present study is to explore various correlates, or predictors of academic talent for American high school students, using methods which allow us to control for their relative effects. The paper is organized into four sections: introduction, method, results, and discussion. In this section, the literature on talent and academic achievement is reviewed, focusing on definition and identification of talent, minorities and talent, and correlates of talent. The introductory section concludes with a discussion of some weaknesses of the literature on talent. The methods of this study, including the researchers' definition of academic talent, the data set used, and the data analytic techniques employed, are described in the second section. The third section presents the results of both the preliminary and primary analyses, as well as the separate analyses conducted for minority students. The paper concludes with discussion and interpretation of some of the salient findings of the study and suggests directions for future research and policy.

Definition and identification of talent

The US Office of Education Report of 1972 outlined six general areas of giftedness: general intellectual ability, academic talent, creative and productive thinking skills, leadership, visual and performing arts, and psychomotor skills (see Tuttle & Becker, 1980). Much research has focused on definition, identification, and determinants of intellectual and/or academic

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[1] The two terms are used interchangeably in this paper.

giftedness in individuals. Terman (1925) used the Stanford-Binet IQ test to identify the talented youth in his landmark study. Later definitions of giftedness incorporated a measure of creativity (Getzels & Jackson, 1962; Lewis, 1969; Marland, 1971; Wallach & Kogan, 1965). Other studies identified individuals based on exceptional achievements by early adulthood (Bloom, 1985; Roe, 1953). Finally, many gifted individuals are identified by achievement or aptitude tests such as statewide standardized tests and/or the SAT (Stanley, Keating, & Fox, 1974).

The students identified as talented in this study scored at or above the 95th percentile on a composite academic achievement test. However, different researchers have fixed widely disparate cutoffs points for the definition of talent. Hollingworth (1942) studied children with IQs over 180, while Gottfried and his colleagues, (Gottfried, Gottfried, Bathurst, & Guerin, 1994) chose students with IQs at least two standard deviations above the mean, approximately 130. The disadvantaged minority students in Prom-Jackson et al's (Prom-Jackson, Johnson, & Wallace, 1980) study were deemed academically talented, yet their average high school grade point average in academic courses was below "B."

Gifted minorities

Prom-Jackson et al's study points to a potentially problematic, if well-intentioned tendency among many researchers dismayed by the scarcity of talented minorities. While much of the literature on identification of talent in minorities for educational opportunities has rightfully focused on testing bias (Astin, 1975; Hoffman, 1962; Klineberg, 1935), many researchers have set criteria for giftedness below conventional mainstream standards, or have emphasized other domains of talent besides intellectual or academic for minority students (Bruch, 1975; Mercer, 1971; Torrance, 1969). For example, Harris and Ford (1991) advocated the adoption of "multi-modal assessment procedures" and curricula which would recognize "non-cognitive, non-academic skills" such as creativity and psychomotor ability. Meanwhile, studies of academically talented or high-achieving minority students such as those of Edwards (1979) and Prom-Jackson et al. (1987) used samples of students who by mainstream standards would be considered marginally above-average at best. While relatively high-achieving minorities should be recognized and encouraged and while schools should recognize all areas of talent, the presence of many talented minorities excelling in other domains should not detract attention from their near-absence in the mainstream academic one. Further research into the determinants of superior academic talent by mainstream criteria for minority students is needed.

There are many factors mediating against academic achievement for disadvantaged minorities. Ogbu (1988), calling them a "castelike minority", argued that for Blacks, succeeding in school is often perceived unfavorably as a White value, while Ford and Harris (1992) identified an "anti-achievement ethic" among Blacks, especially males, arising partly from a lack of faith that their academic achievements will be fairly rewarded in the job market. Valencia (1985) found minorities who are verbally gifted in their native language are unlikely to be identified as verbally gifted in English. Some researchers believe this type of language problem exists even for African American students (Labov, 1972). Moreover, linguistic minority parents may not press for their children's best interests for cultural or language reasons.

Several researchers concluded that the main differences between high-achieving and low-achieving talented individuals are due to personality characteristics more than intelligence, or socio-economic characteristics (Baird, 1985; Johnson, 1992[2]). Bandura (1986) found that talented minority students exhibited high degrees of resiliency and self-efficacy in the face of disadvantageous environments.

Correlates of talent

We investigated the predictive efficacy of five categories of variables on high academic achievement: characteristics of the individuals themselves, socioeconomic status of their families, home environment variables, school characteristics, and community characteristics[3]. A review of the literature on academic achievement and/or talent, as well as our own beliefs pointed to these areas as potentially being important in the formation of talent, although previous research indicates that the relationships between these characteristics and talent tend to differ by age and gender of the student, their degree and domain of giftedness, and other factors.

Student characteristics

Student characteristics included ascriptive, attitudinal, and behavioral characteristics of the students themselves. Many researchers have found large and persistent gender differences among high-scoring individuals (Terman, 1925; Benbow, 1988; Hedges & Nowell, 1995). In a review of nationally standardized achievement and aptitude tests Stanley and his colleagues found statistically significant score differences favoring males on 83 of 86 tests (Stanley, Benbow, Brody, Dauber, & Lupkowski, 1992). The disproportionate achievements or lack of achievements of particular race or ethnic groups has also been documented. Howe (1990) and Storfer (1990) discussed various explanations for the disproportionate numbers of talented Asian children, while the low levels of general achievement and low incidence of giftedness among African-American (Ford & Harris, 1992; Ogbu, 1988; Serwatka, Deering, & Stoddard, 1989), Native American, and Hispanic (Bean & Tienda, 1987) children has been well documented. We explored the effects of both gender and race on talent.

Attitudinal and behavioral variables (often termed "psycho-social characteristics") also figure prominently in studies of the correlates of achievement and talent. Many researchers have observed differences between gifted and normal children in levels of self-confidence, independence, perseverance, and ambition.

Talented individuals tend to have high degrees of self-confidence, especially with regard to academic self-concept (Brounstein et al, 1991; Cox, 1926; Feldhusen & Hoover, 1986; Gustin, 1987; Lehman & Erdwins, 1981). We included a measure of students' self-confidence (self-perceived ability to do things as well as others).

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[2] According to Johnson (1992), the characteristics most important for motivating achievement among Blacks are the same as for other groups: locus of control, self-concept, and self-perceived ability.
[3] Some of the variables included in our analyses could fall into more than one category. Time spent watching television, for example, can indicate students and parents valuing time spent constructively.

Talented students are also believed to need and thrive on autonomy and independence (Baird, 1985; Freeman, 1979; Griggs & Price, 1980; Hogan, 1980; Hollingworth & Rust, 1937; Taylor, 1965; Werner & Bachtold, 1969). This need is related to their need for autonomy; talented students perform better when given more control over learning activities (Matheny & Edwards, 1974; Howe, 1984; Griggs & Price, 1980). Our analysis included measures of students' self-reliance (whether they depended on parents to solve their problems) and autonomy in academic matters (whether the parents imposed a rule regarding minimum grade point average, how often they discussed grade point average, and whether they frequently contacted the school about academic performance).

Many researchers believe task persistence or perseverance to be an important correlate of giftedness (Csikzentmihalyi, Rathunde, & Whalen, 1993; Franks & Dolan, 1982; Freehill & MacDonald, 1981; Griggs & Price, 1980). Further, Renzulli (1977) advocates the inclusion of "task persistence" as a key component of the *definition* of talent, and Terman and Oden (1959) included "motivation" as part of their definition. Two related concepts are achievement orientation and ambition. Wittek (1973) found talented individuals to be more motivated and competitive, and Terman (1925) found a disproportionate number of talented males intended to pursue a career in the professions. Of the students in Tidwell's 1980 study of nearly 1600 talented high school students in California, over 50% intended to attain at least a master's degree. Our analyses included whether a student had high educational aspirations (at least a master's degree) and whether they were enrolled in an academic program in school. We were also interested in talented students' school attendance rates and included an indicator of whether they ever cut class. Finally, one psycho-social characteristic which is not frequently explored in the literature is the effect of religiosity on talent. Whether a student considers him- or herself to be religious was included in our analyses.

How a student spends his or her time out of school is also correlated with talent. Gifted students prefer to stay busy, spending more time than other students on extra-curricular activities and hobbies (Feldman, 1982; Gottfried, Gottfried, Bathurst, & Guerin, 1994; Miles, 1954; Pollin, 1983). Gifted children also read a great deal on their own (Gustin, 1987; Terman, 1925; Tidwell, 1980). We investigated the effects of how much time students spent reading, watching television, and participating in extra-curricular activities.

Socioeconomic status

The positive association between socioeconomic status (typically indicated by variables such as parents' educational attainment, father's occupation, and family income) and academic achievement is one of the most robust findings in the social sciences (Coleman & Hoffer, 1987; Jencks et al. 1979; Neff, 1938; White, 1982; White, Reynolds, Thomas, 7 Gitzlaff, 1993). A similar correlation persists between socioeconomic status and giftedness (Benbow & Stanley, 1980; Csikszentmihalyi et al, 1993; Getzels & Jackson, 1961; Roe, 1953). Many studies have found socioeconomic status an important mediator of IQ in predicting future socioeconomic status and occupational achievement (Baird, 1985; Feldman, 1982; Jencks et al., 1979; Terman & Oden, 1959). Our analyses included measures of parents' education (whether the mother and father were college graduates), father's occupational status (white collar or not) and family income.

Home environment

Other variables correlated with talent and/or achievement include parental expectations, attitudes and behavior. In any case, the literature suggests that precious few individuals have achieved eminence without intensive adult involvement during their childhood and adolescence (Howe, 1980; Winner, 1996). By most accounts, parents of gifted students are responsive to rather than controlling of their children's learning needs (Feldman & Goldsmith, 1991); value hard work and success (Bloom, 1985); encourage spending time constructively (Bloom 1985); value and are actively involved in their children's education (Freeman, 1979; Gustin, 1987; McCurdy, 1957); devote a great deal of time to their children (Bloom, 1985; McCurdy, 1957; Roedell, Jackson, & Robinson, 1980) and, in general, provide a supportive child-focused environment which is conducive to learning and achievement (Bloom, 1985; Csikzentmihalyi et al, 1993; Feldman & Goldsmith, 1991; Howe, 1990).

Some studies have investigated the effects of mother's employment status on children's achievement. The effects of maternal employment seem to vary in their strength and direction across many factors, including family structure, occupational complexity, race, and gender of the child (Blau & Grossberg, 1992; Menaghan & Parcel, 1991; Milne, Myers, Rosenthal & Ginsburg, 1986). For example, Milne et al. (1986) found maternal employment had an adverse effect on the achievement of White children from two-parent homes, but positive effects on the achievement of Black children from single-parent homes. In addition, there is evidence that mother's employment status and talent are not significantly related (Gottfried, Bathurst, & Gottfried, 1994; Gottfried et al., 1994). We included mother's employment status in our analyses to test this relationship individually and when other variables are taken into account.

We investigated the effects of having a computer in the home as a proxy for educational resources provided by parents and whether the student watched television during the week as an indicator of parents encouraging constructive uses of free time. Father's educational aspirations (whether the father wanted the student to get at least a master's degree) and whether college was often discussed with parents were included as indicators of high parental expectations, support for student's educational aspirations, and how much value they placed on education. On the other hand, frequent discussions about grade point average, rules about minimum grade point average, and frequently contacting the school about educational performance were considered indicators of parents exerting too much control or interfering too much (also see above, regarding students' academic autonomy).

Parental aspirations for their children are also correlated with talent. McClelland et al. (McClelland, Atkinson, Clark, & Lowell, 1953) found that parental expectations are associated with high achievement motivation in children, and Chamrad and Robinson (1986) demonstrated that many high-achieving minority students credit their parents, especially mothers, with setting high expectations, and believing in their potential.

Last, we included family structure variables in our analyses. Family structure variables associated with giftedness include marital stability, family size, and birth order. Bloom (1985), Getzels and Jackson (1961), Freeman (1979), and Cornell (1984) all found that the gifted children in their samples were more likely than other children to come from intact families.

Terman and Oden's mid-life (1959) follow-up of the original Terman sample showed that more of the high-achieving adults came from intact families than the less-achieving adults. Previous findings on family size are somewhat mixed. Benbow and Stanley (1980) found that the mean family size for their gifted students was above the population average, while Sheldon (1954) found that gifted children tend to come from smaller families. The achievement literature, on the other hand points more consistently to a negative relationship between family size and academic achievement (Kellaghan et al., 1993). The family structure variables used in our analysis were family size, measured as number of siblings, birth order, measured as first or only children, and type of family (i.e., intact, single-parent, step-parent, or alternative family).

A strong relationship has also been documented between birth order and giftedness. Many researchers have found evidence that gifted individuals are disproportionately firstborn or only children (Benbow & Benbow, 1987; Feldman & Goldsmith, 1991; Sheldon, 1954; Terman, 1925; Zajonc, 1976). However, recent research qualifies this result, suggesting that individuals of different ordinal positions may simply more or less likely to succeed in different academic domains (Colangelo & Davis, 1997).

School characteristics

The relationship between school characteristics and student achievement or incidence of talent is controversial. Research into the effects of schools on talent development suggests that lack of intellectual challenge in schools may lead many talented individuals to be academic underachievers (Rimm, 1986; Whitmore, 1980; Winner, 1996). There is also evidence that students' verbal and mathematics achievement growth is higher in Catholic schools than in public schools, even when researchers controlled for student background characteristics such as minority and socioeconomic status (Coleman & Hoffer, 1987; Raudenbush & Bryk, 1989). Composition of the student body may also affect achievement through the effects of peers on student attitudes and behavior (Bryk & Raudenbush, 1988; Csikzentmihalyi et al., 1993). Coleman (1960) observed how a peer culture which does not value academic success can have negative effects on achievement.

We included the resources for accelerated students (percent of students receiving advanced placement courses); school sector (private, public or parochial); student body composition (percent minority, percent disadvantaged[4]); and student behavior (average daily attendance rate, percent dropping out before grade 12) in our analyses. We also included a variable indicating whether the student's friends' considered continuing their education past high school very important. While recognizing that students' friends may not all attend the same school, we used this variable as an indicator of peers' attitudes towards education and included it with school characteristics.

Community characteristics

Finally, research into the effects of the community on is sparse. Perhaps because most studies have focused on students from a particular locale (a school, district, or state), there is

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[4] "Disadvantaged" is defined as eligible for free lunch in school.

little research investigating whether talented students come disproportionately from certain regions or types of community. Lynn (1979) studied mean population IQ in different regions of the United Kingdom, finding that IQ decreased with distance from London, most likely due to selective migration. Research suggests that in the United States, rural schools are likely to have the least resources for identification and appropriate education for gifted students (Fetterman, 1988; Pendarvis, Howley, & Howley, 1990; Purcell, 1993; Spicker, Southern, 7 Davis, 1987). We included urbanicity and geographic region variables in our analyses.

Weaknesses in previous research

The existing literature of research into giftedness has some salient gaps and weaknesses. Identification and selection of talented individuals for study has taken several main forms. Some researchers simply selected eminent or high achieving adults to retrospectively profile (Bloom, 1985; Howe, 1990; Roe, 1953;). Gifted students sampled for research on giftedness were often found simply through teacher or school administrator referrals, or through their participation in programs for gifted students, whose entry criteria vary widely (see, Prom-Jackson et al, 1987; Tidwell, 1980). Several studies used a school as their sample (Getzels & Jackson, 1962; Lewis, 1969; Csikzentmihalyi et al., 1993). Some (Johns Hopkins Talent Search Program, Illinois Talent Search Program) invited students to apply to a talent search, after initial screening by school-administered standardized tests, according to the model developed by Stanley et al., (1974). It is impossible to know the extent of bias in these samples; however, we can assume that localized sampling and selection bias (due to imprecisely defined selection criteria, self-selection, and selective nominations) preclude most of the statistical studies on giftedness from generalization to the national population of high school students.

Analytical methods have also varied, from simple correlations and descriptive statistics (see Sloane 1985; Terman, 1925), to in-depth biographical profiles of talented or eminent individuals (see Eriksson, 1996; Howe, 1990), often resulting in somewhat anecdotal evidence of their common characteristics. Some statistical studies lacked even a comparison group with which to compare their samples of gifted students (see Tidwell, 1980; Benbow & Stanley, 1980). Though high zero-order correlations have been shown between talent and many individual variables, more sophisticated multivariate analyses are needed to reveal the effects of intervening variables. Few studies on correlates of talent have employed multivariate techniques, and a predictive model of talent based on a nationally representative sample of students has never been proposed.

METHOD

Definition of Talent

According to the 1972 US Office of Education Report, an individual who demonstrates superior ability in any of the areas of general intellectual ability, academic talent, creative and productive thinking skills, leadership, visual and performing arts, and psychomotor skills, singly or in any combination, is considered to be talented (see Tuttle & Becker, 1980). The area of academic talent includes students who are high achievers in school, as well as those who score extremely well on aptitude or achievement tests. In this study, high school seniors with high scores on a composite measure of general academic achievement were classified as academically talented students. This composite measure contained a combination of math and reading scores[5]. Since NELS:88 is a national probability sample, the percentiles of the weighted[6] NELS composite score distribution can be considered national norms.

Students scoring at or above the 95th percentile of the national composite score distribution were classified as talented. A dichotomous variable for talent was constructed, which took the value of one (1) if a student scored in the top 5% of the national composite score distribution and the value of zero (0) otherwise. This binary variable defining talented students was the primary dependent variable used in this study. A total of 890 students were classified as talented in our sample.

Data Set

The National Educational Longitudinal Study (NELS-88) is a longitudinal study of eighth graders who were enrolled in public or private schools in 1988. A nationally representative sample of students was selected using a two-stage national probability sampling procedure. The students were surveyed in 1988 and in two follow-up studies in 1990 and 1992. Data for this study came from the second follow-up conducted in 1992. Only responses from students still enrolled in school in the 1991-1992 academic year were used. This sample of 12,856 high school seniors completed an 85-minute battery of four cognitive tests: reading, mathematics, science, and social studies. The reading test contained five short passages which students were asked to interpret, and evaluate. The mathematics portion included equations, graphs, word problems, quantitative comparisons, and geometric figures and assessed general math knowledge as well as advanced problem solving skills.

Data Analysis

The variables used in this study came from questionnaires completed by the participants as well as by their parents, school principals and classroom teachers. Information for the student characteristics, family background, and community variables came from responses by the

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[5] The composite scores were obtained by first summing reading and math scores and then standardizing them to express them on the same metric.

[6] Sampling weights were provided and used to make projections to the 1992 population of twelfth graders.

students and their parents, while information for the school-level variables was provided by the schools.

Most of the predictor variables in this study were coded as indicator variables which took the value of one (1) when the characteristic of interest was present and the value of zero (0) otherwise. For example, the variable for the race/ethnic category Black took the value of one (1) when students reported they were Black and the value of zero (0) for all other responses (i.e., White, Hispanic, Asian, or other race). Missing variables for all predictors were similarly flagged with binary indicators. Mean values of each predictor were imputed for all missing values.

Two-way contingency tables were employed to analyze the bivariate zero order associations between the explanatory dichotomous variables and talent. Logistic regression was used to investigate the dependency between the predictors and talent. This technique is analogous to multiple regression. However, in linear regression analysis the response variable is continuous, whereas in logistic regression analysis the dependent variable is dichotomous. Since in this study the dependent variable is discrete, the method of ordinary least squares (OLS) estimation was not appropriate. As a result, logistic regression was employed since this statistical technique is designed to describe the relationship between a set of categorical and/or continuous explanatory variables[7] and a binary outcome variable (see Agresti, 1996; Menard, 1995).

Another set of analyses were conducted using multiple regression analysis with the same set of predictors, and the entire range of responses on the composite measure as the response variable. These analyses were performed to determine the predictive efficacy of the explanatory variables on the composite achievement scores in a linear model as well as to allow comparisons between the non-linear and the linear model.

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[7] In this study a total of 74 independent variables, including the missing indicators, were used in the logistic regression model to predict talent.

RESULTS

Preliminary Analysis

The bivariate association between talent and the set of independent variables are displayed in Table 1. The predictors[8] are listed in the first column of Table 1. Each predictor represents a subgroup of the overall population of high school seniors having the characteristic identified with that predictor. For example, the race/ethnic category Hispanic refers to a subgroup of students of the total population of high school seniors who identified themselves as Hispanics; the referent subgroup in this case is non-Hispanics. The percentage in the national population of high school seniors having the characteristic identified by each predictor appears in the second column. The percentage of the population of high school seniors classified as talented having the characteristic of interest is reported in the third column. For example, Blacks constitute 11.5% of the national population of high school seniors and 1.4% of the national talented population of high school seniors.

The ratios in column 4 represent the percent of the talented population having the characteristic defined by the predictor who are talented, relative to the percent of the talented population that do not have the characteristic who are talented. This quantity is the ratio of the "rate of talent" among those who have the characteristic of interest to the "rate of talent" for those who do not. This ratio, which is often called relative risk, is commonly used in epidemiological work (e.g., in estimating the risk of developing a disease), and can be a useful measure of the relationship among dichotomous variables (see Stokes, Davis, & Koch, 1995). For instance, a ratio of two (2) means that students who have a specific characteristic such as high educational aspirations, are twice as likely to be classified as talented than those who do not have the characteristic. In contrast, a ratio of 0.5 means that students who have a characteristic are one half as likely to be considered talented than those who do not have it.

The odds ratio, which is the ratio of the odds of being talented for students who have a particular characteristic to the odds of being talented for those students who do not possess the characteristic is reported in column five. The odds ratio is another measure of association among dichotomous variables which is often useful in logistic regression models (Agresti, 1990). In cases where the rate of occurrence of the outcome of interest is relatively low, as in this case where less than 10% of the students were classified as talented, the odds ratio and the relative risk take similar values (Agresti, 1990, 1996; Stokes, Davis, & Koch, 1995;). As a result, the odds ratio[9] can be thought of as an approximation of the relative risk, and therefore be interpreted as a relative risk ratio (Agresti, 1996).

Student Characteristics

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[3]The referent groups in all the dummy coded variables presented were those groups not having the characteristic of interest (i.e., the referent group for Blacks was non-Blacks).

[9] The most striking results are reported in terms of odds ratios. An odds ratio of one (1) corresponds to independence between a certain characteristic of interest and talent, while values farther than one (1) in any given direction indicate stronger association (positive or negative) between that characteristic and talent (Agresti, 1996).

Black and Hispanic students were under represented in the upper tail of the composite score distribution. Students who were not Black (i.e., Whites, Hispanics, Asian, and other) were nine times more likely to be talented than Black students. A similar pattern held for Hispanic students. Non-Hispanic students were approximately five times more likely to be talented than Hispanic students. In contrast, Asian students were nearly 3 times more likely to be talented than non-Asian students. The majority of the students in the national population of talent -- 85.5%-- were Whites. Moreover, White students were nearly twice as likely to be considered talented as non-white students. These results are in accord with findings of previous investigations (Bean & Tienda, 1987; Ford & Harris, 1992; Howe, 1990).

Talented students were found to be more achievement-oriented and ambitious than non-talented students. Specifically, students with high educational aspirations (masters' degree and above) were nearly seven times more likely to be talented than students with lower educational aspirations, a finding consistent with Tidwell's (1980) findings. Further, high school seniors enrolled in academic programs were nearly eight and a half times more likely to be talented than students who were enrolled in general or vocational programs.

Socioeconomic Status

Socioeconomic status variables such as parental educational attainment and father's occupation were significantly associated ($p < .0001$) to talent. Students with parents who have a college degree were more than five times more likely to be talented than students whose parents are not college graduates. In other words, nearly one out of four high school seniors with college educated parents were talented. In addition, students whose fathers are white collar workers were nearly four times more likely to be talented than those having fathers with lower occupational status.

Home Environment Characteristics

Parents' educational aspirations for their children were strongly associated with talent ($p < .0001$). Students whose parents have high educational aspirations (i.e., masters' degree and above) for their children were 13 to 15 times more likely to be talented than students whose parents had more modest educational aspirations. Further, students who live in households with a computer were 3.6 times more likely to be talented than students who do not have computers at home.

School Characteristics

School sector was positively related to talent. Students attending private (other than Catholic) schools were three times more likely to be talented than those students attending public or Catholic schools. Although only about 4% of all high school seniors in the US go to private schools, nearly 11% of the talented population attended private schools. Peer effects were also positively associated with talent. Students having friends who regarded post-secondary education as very important were more than three times more likely to be talented than students whose peers placed less importance on higher education.

In general, results from the preliminary analyses indicated that high academic ambitions on the part of students and their parents; enrollment in academic programs; constructively involved, highly educated, and professional parents; homes with educational resources; and friends who value education highly are all strongly related to the incidence of academic giftedness. For example, a student with all these characteristics is nearly 24[10] times more likely to be considered talented than a student who does not have any of these characteristics. Nearly 11% of the gifted students had all these characteristics.

Additional analyses were conducted to determine the percentage of students who are talented in both reading and math. Only 30% of high school seniors who were talented in math were also talented in reading. Similarly, nearly 33% of the students who were talented in reading were also talented in math. As a result, only 1.5% of the national population of high school seniors were talented in both math and reading, a finding consistent with previous work (Piirto, 1994; Stanley et al., 1992).

Multivariate Models

The results from the logistic and linear regression analyses are presented in Table 2. The odds ratios[11] are presented in column two, while the slope coefficients from the linear regression model are reported in column three. The results from the logistic regression analysis indicate the magnitude of the association between each predictor and talent when the other explanatory variables are held fixed. Likelihood ratio and Pearson goodness of fit statistics indicated that the model provides an adequate fit to the data. These values, 0.34 and 0.73 respectively, were not statistically significant ($p > 0.05$), indicating that the null hypothesis is tenable (i.e., the model fits the data). In addition, the Hosmer and Lemeshow (Hosmer & Lemeshow, 1989) chi-square statistic ($\chi^2_{(8)}=9.81$; $p>0.05$) provided no evidence of lack of fit and rendered additional support as to the adequacy of the model. The estimated parameters are the natural logarithms of the odds ratios. The odds ratios represent the odds of "success". In other words, these ratios indicate the probabilities that a student with a particular set of characteristics will be talented, all other things being equal. The logistic regression provides estimates of the odds ratios of being talented for each characteristic represented by the predictor and adjusted for the effects of all the other predictors.

Student Characteristics

The values of the odds ratios in Table 2 are similar to those displayed in Table 1. White[12] students were almost five times more likely than Black students to be in the talented category. This indicates that Black students with the same socioeconomic status, family background, school, and community characteristics as White students were still considerably under represented in the talented population. Hispanic students were about one half as likely as their White counterparts to be in the talented category. On the other hand, Asian students were

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[10] A dummy variable was constructed and coded as 1 if a student had all the characteristics of interest and zero otherwise. Consequently, a logistic regression model with only one predictor, this dummy variable, was estimated and an odds ratio of nearly 24 was obtained.

[11] The odds ratios are the anti-logs of the estimated parameters (i.e., e^β, where β is the estimated parameter).

[12] White students constituted the referent group of students for all racial/ethnic categories.

nearly twice as likely to be classified as talented as White students. Female students were less likely to be talented than their male counterparts, a finding consistent with previous research (Benbow, 1988; Stanley et al., 1992).

Students with a strong achievement orientation and high levels of ambition were more likely to be talented. For example, students with high educational aspirations were 2.5 times more likely to be talented than students who had lower educational aspirations. The odds ratio for this variable dropped from 7 in the bivariate analysis to 2.5 when the other predictors were included in the model. Also, students enrolled in academic school programs were more than two and a half times more likely to be talented than those enrolled in non-academic programs. High levels of self-confidence increased the odds of being talented by 66%. Talented students were also more independent: students who did not rely on their parents to solve their problems were about 40% more likely to be talented than those who do count on their parents. Further, talented students were more likely to attend school regularly. Students who never "cut class" were 50% more likely to be high achievers.

Students in the talented category appear to spend their time out of school more constructively by being busy and active. Specifically, talented students were more studious and more likely to participate in extra-curricular activities than non-talented students. Spending seven or more hours a week on homework outside school increased the odds of being talented by 50%, while reading four or more hours per week outside school corresponded to an increase of 70%. Another 50% increase was related to involvement in extra curricular activities. Students who watch less than an hour of TV on weekdays were50% more likely to be talented than those who watch more TV on weekdays.

Socioeconomic Status Variables

The positive relationship between SES and achievement has been widely documented in the social sciences (see White, 1982; White, Reynolds, Thomas, & Gitzlaff, 1993). However, our findings indicate that controlling for individual and family characteristics not related to socio-economic status sharply diminishes the strength of the relationship. In the multivariate logistic model, the odds of being talented for students whose parents are college graduates increased by approximately 30% relative to students whose parents have lower levels of education (see also Tannenbaum, 1983). Whether the father was a white collar worker increased the odds of being talented by 40. Whether the mother was a white collar worker did not significantly predict talent. These are surprising results, because parents' occupation is considered a useful predictor of academic achievement (Freeman, 1979; Gottfried, Gottfried, Bathurst, & Guerin, 1994; White, 1982).

Moreover, there is some evidence that the predictors of extreme academic ability may be different that those for academic ability in general. While neither parent education nor occupation were strong predictors in the logistic model, they were both strong and significant predictors ($p < 0.0001$) of general achievement in the linear regression model. Another striking finding was that family income did not have any significant effects on the incidence of academic giftedness, although its predictive power on academic achievement has been repeatedly demonstrated in the past (Hill & O'Neill, 1993; Parcel & Menaghan, 1990; Patterson,

Kupersmidt, & Vaden, 1990). In contrast, family income was a significant ($p < 0.0001$) predictor of general achievement in the OLS regression. Mother's participation in the labor force was not significantly associated with talent.

Home Environment Variables

When both mother's and father's educational aspirations were entered into the logistic regression equation, neither was found to be a useful predictor of talent. Most likely, this result can be attributed to the high correlation between the two variables. By estimating the model with each variable separately, however, both were found to be related to talent. In the final model only father's educational aspirations was included. Students whose fathers had high aspirations for their children were 2.5 times more likely to be talented than students with fathers having lower educational aspirations for their children, a finding lending additional support to previous findings (Charmad & Robinson, 1986; Keeves, 1975; Kellaghan et al., 1993). However, there was a significant decrease in the odds ratio from 15 (the unadjusted binary relation between father's expectations and talent) to 2.5 (the adjusted multivariate relation of father's expectations to talent).

The availability of a computer at home was related to talent. The odds of being talented increased by nearly 40% for students in families reported having a computer in the home. Although family size did not have a significant impact on talent, birth order was a characteristic significantly related with talent. Specifically, first born or only children were 1.23 times more likely to be talented than students situated differently in the sibling order. This finding, though in line with previous findings (Benbow & Benbow, 1987; Feldman & Goldsmith, 1991; Gottfried, Gottfried, Bathurst, & Guerin, 1994), suggests that the multivariate association between birth order and talent will not be as strong when family size is held constant (see Heer, 1985). Finally, family structure variables such as type of family the student lives in (e.g.. intact, single-family, etc.) were not significantly related to talent.

Parents of talented students seem to avoid interfering with their children's educational performance. The odds of being talented increased by 90% for students in families where there were no rules about school grades. Also, students whose parents never contacted the school about their child's academic performance were 60% more likely to be talented than students whose parents did have this kind of contact. These two findings indicate that in families with talented children, grades or educational performance are not a source of contention, perhaps because these children are exceptional and exhibit excellence in school. Further, students who frequently discuss going to college with their parents were one and a half times as likely to be high achievers as those who do not. However, students who discuss grades with their parents were only about half as likely to be talented as those who do not. As we interpret them, these results indicate that parents of talented individuals are supportive and responsive to their children's educational concerns or needs without being overly interfering (see Cornell, 1984).

Community and School Characteristics

Talented children were more likely to be found in certain regions of the country than others. The odds of being talented increased by 50% for students dwelling in the North East part

of the country compared to those in the South[13]. Similarly, odds ratios of smaller magnitude were obtained for students in the Midwest and the West regions of the country. Significant associations between urbanicity and talent were not found. School composition variables such as percent of minority, or disadvantaged students in school were not significant predictors of talent. Further, students attending Catholic schools were only slightly more than half as likely to be talented as those attending public schools. This is a striking result because previous research has shown that students in Catholic schools perform better than students in public schools (Coleman & Hoffer, 1987; Raudenbush & Bryk, 1989). Again, this suggests that the predictors which predict general academic ability may not be as useful in predicting academic giftedness. Private (non-Catholic) school effects on talent were not significant in the multivariate logistic model, although in the multiple linear regression model private schools had significant ($p <$ 0.01) positive effects on students' achievement compared to public schools. The odds of being talented increased 25% because of positive peer characteristics. Specifically, students who have friends who consider post high school education very important were more likely to be talented than those students whose friends do not consider education after high school so important. Percent of student body dropping out of high school was negatively related to talent. However, the odds ratio was nearly one indicating no association. Finally, average daily school attendance was not related to talent.

Analysis of Disadvantaged Minorities and Talent

An important finding was the relative paucity of talented minorities. With the exception of Asian-Americans, minorities are highly underrepresented among talented students. Only 26 Hispanic students out of 1460 and only 10 Black students out of 1152 in the NELS:92 sample scored at or above the 95th percentile of the composite test. By contrast, 708 Whites and 143 Asian-Americans scored this high.

To put these numbers in some perspective, consider the following: although Blacks comprised 11.5% of the population of American 12th-graders and Hispanics 9.7%, they comprised only 1.4% and 2.9% of the talented population, respectively. The statistics for Asian-Americans are almost the reverse: although they comprise only 4.3% of the population, they make up 10.5% of the talented population. Finally, Whites, who comprise 73.5% of the population comprise 85.6% of the talented population. The implication of these numbers or the population is that in 1992, we could have expected to find only about 1388 talented Black and 2351 talented Hispanic twelfth-graders *in the entire country*.[14]

Black Students

In fact, the size of the group of talented identified in this study was so small as to preclude statistical analysis. However, without attempting to infer too much about group differences among talented students, we can construct a profile of a hypothetical talented Black

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[13] Students in the South was the referent category.
[14] We obtained these estimates from weighted frequencies of talented students by race. The weights used are from the NELS:92 dataset.

teen using characteristics that all or most of these students had. If at least eight of the ten students had a particular characteristic, it was included in the profile.

The talented Black teen is typically female[15]. This finding corroborates previous research finding Black American males to be at high risk of failing and underachieving academically. She typically considers herself to be religious, has a great deal of confidence in her own abilities, and rarely counts on her parents to solve her problems. She is enrolled in an academic program, values education highly, and has high educational aspirations, backed by the high hopes of both parents. She typically lives with two parents (although one may be a step-parent) and at least one sibling. The average family income for talented Blacks appears to be much lower than for other talented students; the mean for our sample was about $30,000, while the mean for non-Black talented students was nearly $88,000. Finally, she is most likely to attend a school with a substantial minority population (at least 30%), even if she attends a private school.

Hispanic Students

The picture for Hispanics is slightly different. There is far more variation within the sample of talented Hispanic students than among talented Blacks, making it impossible to describe the "typical" talented Hispanic. However, as the sample size of talented Hispanics is somewhat larger, it was deemed reasonable to employ statistical methods to test whether talented Hispanics differ from other talented students. It appears that talented Hispanic students are much more similar to their White and Asian-American counterparts than are talented Blacks with regard to the variables in this study. There are several key differences, nonetheless. A cross-tabulation was done to compare talented Hispanics with their non-Hispanic counterparts in terms of parental education and father's occupation. Talented Hispanics are far less likely than other talented students to have parents (either father or mother) with college degrees or white collar occupations ($p < 0.05$). A t-test procedure revealed that talented Hispanics' annual family incomes are much lower than non-Hispanic talented students' ($p < 0.01$), although this differential appears to be less pronounced than for Black students. The percent minority populations at schools they attend are also higher on average than for non-Hispanics ($p < 0.01$).

One last observation which deserves some comment regards the specific ethnic origin of talented Hispanics. Fifteen of the 26 (58%) talented Hispanics categorized themselves as "other" when asked about specific Hispanic origin; that is, they were neither Mexican, nor Cuban, nor Puerto Rican. By contrast, most (63.5%) of Hispanics in the general student population are Mexican, and 75% fall into one of the three specifically defined cultural groups. Given this difference, it is possible and indeed likely that at least several of those talented students who categorized themselves as "Hispanic" may not be members of a disadvantaged minority at all, but rather may be either European or Latin American of European descent. Thus, this result calls into question even the minute numbers of Hispanics identified in the present study; possibly the prevalence of talented among disadvantaged Hispanics is even lower than we might otherwise infer from this investigation.

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[15] Nine out of the ten students in our sample of talented Blacks were girls. Only one student out of our original sample of 12,856 was a talented Black male.

DISCUSSION

This study used a national survey conducted in 1992 to identify factors associated with high academic achievement. This section summarizes and discusses the key findings from our preliminary and primary analyses.

Although it is well-known that certain minorities are at a severe disadvantage with regard to academic outcomes, we were dismayed at the extremely limited chances of Black and Hispanic students to be talented, even after controlling for many factors besides race. Yet, while Black and Hispanic students were under-represented in the talented population of high school seniors, Asian and White students were over-represented. In addition, another interesting finding related to talented minorities is the number of Black students who considered themselves religious. Although religiosity is otherwise negatively correlated with talent, almost all the talented Blacks considered themselves religious, Black female students in particular.

Students' sex differentiated talented from non-talented children. Male students were more likely to be represented in the talented population of high school seniors than female students. This finding supports earlier research on sex differences in talent (Hedges & Nowell, 1995; Stanley et al., 1992).

Further, students with high self-confidence[16] were more likely to be talented. This finding may indicate that talented children are aware of their special abilities and therefore more self-confident (see Feldhusen & Hoover, 1986). In addition, students who only infrequently depended on their parents to solve their problems were more likely to be talented, a result we interpreted as evidence of greater independence among talented students (Feldman, 1982; Tuttle & Becker, 1980). Moreover, students with high academic aspirations were also more likely to be talented (see also Tidwell, 1980).

Students who were enrolled in academic tracks, attended school regularly, and spent their time out of school constructively were also more likely to be talented. Specifically, talented students read more on their own (see Bloom, 1985), spent more time on homework assignments, participated more often in extra curricular activities (see Gottfried, Gottfried, Bathurst, & Guerin, 1994), and watched less TV (Gottfried, Gottfried, Bathurst, & Guerin, 1994) than their non-talented counterparts.

Highly educated parents were more likely to have talented children, a finding consistent with previous investigations (Applebee, Langer, & Mullis, 1989; Benbow & Arjmand, 1990; Chamrad & Robinson, 1986; Gottfried, Gottfried, Bathurst, & Guerin, 1994). Mother's labor force status did not distinguish talented from non-talented children, a finding in accord with

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[16] The variable used to assess self-confidence was a measure of how well students believed they could do things compared to others. Previous research has often investigated different aspects of self-confidence of talented students, finding them to score high on measures of academic self-confidence and low on other measures (e.g. social or athletic). Thus, it is likely that this analysis may have underestimated the effects of academic self-confidence on talent.

previous research (Gottfried, Bathurst, & Gottfried, 1994; Gottfried, Gottfried, Bathurst, & Guerin, 1994).

Surprisingly, family income was not predictive of talent, once other variables were taken into account. Perhaps family income does not contribute further to the development of talent after the early school years and its effects eventually fade out by the time children attend high school (see Csikszentmihalyi et al., 1993). Another likely explanation involves the simultaneous effects of student, family, school, and community factors on talent; while income was associated with talent in the bivariate analysis, its value as a predictor of talent virtually disappeared once a broad range of other factors was taken into account. Similarly, the effects of parental education and father's occupation decreased in the final model, albeit not as dramatically. The effects of having a parent with a college degree, while still present, fell by more than 70% in the final model and the effects of having a father who is a white collar worker fell by more than 50%.

Families who have a computer in the home were more likely to produce talented children. Though this finding supports the notion of a positive association between the possession of a computer in the home and high achievement, research on this area has produced mixed and conflicting results (Papagiannis, Douglas, Williamson, & Le Mon, 1987). Perhaps the ambiguity in the literature is due to the lack of a good explanation of how a computer contributes to talent. Families who perceive academic potential in their children, or those who are willing to make investments in educational resources, or even simply those with more income[17] may all be more likely to invest in a computer; these, and not the computer itself may be the factors underlying the positive association between computers in the home and achievement. Moreover, the presence of a computer in the home does not provide information on whether the computer is used for educational purposes (see Kellaghan et al., 1993). The results from this investigation suggest however, that computers in the home do have a significant independent effect on talent.

Further, parents who often discuss college with their children and who have high educational expectations for their children were more likely to produce talented individuals (see Charmad & Robinson, 1986; Keeves, 1975). These two variables and talent probably have mutually reinforcing effects; although parents are likely to expect a great deal from students with high potential, parents' expectations are also likely to advance student achievement (see Kellaghan et al., 1993). It seems that parents who intervene in positive ways in their children's education, that is, by investing in educational resources, encouraging their children's potential, and being available to discuss educational matters with them are more likely to have talented children.

On the other hand, although parents of talented students are typically involved in their children's education, they are less likely to discuss or have rules about grades, or to contact the school about their children's academic performance. It may simply be that parents of high-achieving students are not concerned with their children's grades in school, because they already know their children are doing well in school. Parents of talented students may also value

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[17]The average family income of talented students in the population was about $76,000, compared to $48,000 for non-talented students.

learning and higher education over grades and test performance. Last, perhaps setting rules about grades and contacting the school directly are indicators that parents are overly controlling in their children's education, which may actually impede high achievement.

The findings on firstborn or only children, were somewhat different from previous research which typically reported strong associations between birth order and talent (see Benbow & Benbow, 1987; Feldman & Goldsmith, 1991; Terman, 1925). In addition, although in the bivariate analysis, firstborn or only children were 1.4 times more likely to be talented, in the multivariate analysis, the odds ratio fell to 1.2. According to Heer (1985), the relationship between birth order and talent is likely to fall when family size is held constant. Nonetheless, there were no effects of family size, as measured by number of siblings, in either the linear or the logistic regressions.

We also tested for the effects of single parent, step-parent and alternative family types on talent. Family type had no effect on either talent, or on academic achievement. These findings from the multivariate models are consistent with previous research on family structure and achievement (Desai, Chase-Lansdale, & Michael, 1989; Hetherington, Camara, & Featherman, 1981; Milne, Myers, Rosenthal, & Ginsburg, 1986).

Students in the northeast region of the country were one and a half times more likely to be talented than students in the South. Some possible causes for the educational preeminence of the Northeast may be selective migration to the most urbanized region of the United States (see Lynn, 1979), longevity of the historical tradition of formal schooling, historically higher literacy rates, higher spending on education, and proximity to the nation's most elite institutions of higher education. The same pattern held for students in the midwest and the west, although the effects were less marked.

Urbanicity was not related to talent. This finding is interesting because it has been argued that rural students are at a distinct disadvantage compared to urban students in terms of access to important school resources for talented youth and are therefore less likely to be identified early on and to receive appropriate attention to develop their talent (Pendarvis et al., 1990; Spicker et al., 1987). Though our bivariate analysis suggests that living in a rural area in itself constitutes a risk factor, the multivariate association indicates that when other factors are held constant, the negative effects of attending a rural school disappear.

Talented students attended mostly public or private schools (see Table 1). Students who attended Catholic schools were less likely to be talented compared to students who attended public schools. In addition, the results of the linear regression suggest that there were no Catholic school effects on academic achievement despite findings of previous research (Coleman & Hoffer, 1987; Lee & Bryk, 1989). Although the bivariate association between talent and Catholic schools was positive, the multivariate association was negative indicating that students with same personal characteristics, SES, home environment, school and community characteristics who attend Catholic students are less likely to be talented than students with same characteristics who attend public schools. Perhaps variables such as enrollment in an academic

program are responsible for this result since it is known from previous work that most students in Catholic schools pursue an academic program[18] (see Lee & Bryk, 1988).

The percent of students receiving AP courses at the school was included as a measure of special school arrangements for advanced students and did not predict talent. This finding, along with the findings on rural schools suggest that special gifted and talented programs may not be a crucial condition for the development of academic talent in teenagers, when student, SES, and family characteristics are controlled.

Previous findings on school achievement and school racial composition and poverty concentration notwithstanding (see Bryk & Raudenbush, 1988; Lee and Bryk, 1989), percent minority and percent disadvantaged of the student body had no effects on talent in the present study. Dropout rates also had a very small negative effect on talent, while school attendance had no effect. However, having friends who value education highly did have a positive effect on talent (see Coleman, 1960).

In sum, the present study undertook to investigate the relative effects of individual, family socio-economic, home environment, school, and community variables on the incidence of academic talent, using a nationally representative sample of American high school seniors. One of the main lessons from our analyses is the importance of controlling for many factors to assess the predictive strength of each variable relative to others. Our results from the multivariate analyses provided convincing evidence that certain student, SES, and home environment characteristics, have individual positive effects on talent. Yet, we found that while socio-economic and school variables taken alone are important, their effects are dramatically mitigated by student, parent, and peer attitudes and behavior. For example, rather than having the above-average socio-economic indicators one might expect would be necessary to overcome the large independent negative race effects for Blacks and Hispanics we found in our analyses of talented disadvantaged minority students that talented Black and Hispanic students had lower average family incomes, parental educational attainment, and father's occupational status. This finding suggests that other student and parent attitude and behavioral variables, such as educational aspirations, constructive leisure time activities, and academic program may be more critical in the development of talent.

Similarly, the bivariate and multivariate logistic regressions highlighted the importance of such attitude and behavioral variables in mitigating the effects of socio-economic and school variables on talent. Surprisingly, school composition and special school programs for advanced students seemed to matter little relative to individual and family variables.

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[18] Separate logistic models were run testing the effects of school sector and academic enrollment on talent. Though the bivariate association between talent and sector was positive and significant, when academic program was added in the model, sector lost its predictive efficacy.

Table 1. Zero Order Associations Between Predictor Variables and Talent				
EXPLANATORY VARIABLES	% POPULATION	% TALENTED POPULATION	RELATIVE RISK	ODDS RATIO
STUDENT CHARACTERISTICS				
BLACK	11.51	1.41	0.11	0.10
HISPANIC	9.69	2.38	0.23	0.22
WHITE	73.27	85.50	2.15	2.22
ASIAN	4.33	10.52	2.60	2.82
OTHER RACE	0.90	0.11	0.13	0.12
FEMALE	49.04	46.35	0.90	0.89
HIGH EDUCATIONAL ASPIRATIONS	30.46	73.05	6.17	6.90
STUDENT ENROLLED IN ACADEMIC PROGRAM	44.38	86.00	7.69	8.42
HIGH SELF-CONFIDENCE	38.45	60.83	2.49	2.61
STUDENT NEVER CUTS CLASSES	50.55	62.95	1.66	1.71
STUDENT SPENDS MORE THAN SIX HOURS ON HOMEWORK WEEKLY	37.71	64.11	2.95	3.13
STUDENT SPENDS MORE THAN THREE HOURS ON READING OUTSIDE SCHOOL WEEKLY	21.06	35.13	2.03	2.12
STUDENT WATCHES TV UP TO AN HOUR ON WEEKDAYS	20.49	40.21	2.61	2.79
STUDENT IS RELIGIOUS	60.71	65.33	1.22	1.23
STUDENT SPENDS MORE THAN AN HOUR A WEEK ON EXTRA CURRICULAR ACTIVITIES	57.64	81.15	3.16	3.33
STUDENT DOES NOT COUNT ON PARENTS TO SOLVE OWN PROBLEMS	69.34	86.26	2.78	2.89
FAMILY BACKGROUND (SES)				
FATHER IS COLLEGE GRADUATE	29.06	67.52	5.08	5.61
MOTHER IS COLLEGE GRADUATE	23.61	58.76	4.61	5.13
FATHER IS WHITE COLLAR WORKER	23.12	54.21	3.94	4.33
MOTHER IS WHITE COLLAR WORKER	17.92	29.04	1.88	1.95
MOTHER IN THE LABOR FORCE	86.86	92.50	1.87	1.92
FAMILY BACKGROUND (HOME ENVIRONMENT)				
FAMILY OWNS COMPUTER AT HOME	42.54	71.49	3.39	3.61
FATHER'S HIGH EDUCATIONAL ASPIRATIONS	79.95	98.28	14.29	15.20
MOTHER'S HIGH EDUCATIONAL ASPIRATIONS	79.96	98.04	12.50	13.30
STUDENT DISCUSSES GRADES WITH PARENTS	80.09	90.18	2.28	2.36
STUDENT OFTEN DISCUSSES WITH PARENTS ABOUT GOING TO COLLEGE	36.38	67.62	3.65	3.93
FAMILY HAS NO RULE ABOUT GPA	25.00	43.05	2.27	2.39
PARENTS NEVER CONTACT SCHOOL ABOUT ACADEMIC PERFORMANCE	40.98	58.34	2.02	2.10
STUDENT LIVES IN A SINGLE PARENT FAMILY	15.35	10.61	0.65	0.64
STUDENT LIVES IN A STEP PARENT FAMILY	13.30	11.90	0.88	0.88
STUDENTS LIVES WITH OTHER RELATIVES	3.75	1.60	0.42	0.40
STUDENT LIVES IN AN INTACT FAMILY	53.71	70.29	2.04	2.11
STUDENT IS A FIRSTBORN OR AN ONLY CHILD	41.19	49.15	1.38	1.41
COMMUNITY VARIABLES				
NORTH EAST	19.92	30.09	1.73	1.79
MIDWEST	26.73	27.92	1.06	1.07
SOUTH	35.10	23.55	0.57	0.56
WEST*	18.25	18.44	1.01	1.01
URBAN COMMUNITY	26.49	31.63	1.28	1.30
SUBURBAN COMMUNITY	40.39	42.31	1.08	1.09
RURAL COMMUNITY	33.00	25.76	0.70	0.69
SCHOOL VARIABLES				
STUDENT ATTENDS CATHOLIC SCHOOL	5.99	7.60	1.29	1.31
STUDENT ATTENDS OTHER PRIVATE SCHOOL	3.83	10.60	2.98	3.29
STUDENT ATTENDS PUBLIC SCHOOL	90.17	81.80	0.49	0.47
AMONG FRIENDS VERY IMPORTANT FOR POST HIGH SCHOOL EDUCATION	54.67	79.60	3.24	3.41
*Note: The zero-order association between the region category WEST and talent did not reach statistical significance.				
All other bivariate associations between the explanatory variables and talent were significant at the 0.01 level.				

Table 2. Parameter estimates from logistic and linear regressions					
	Logistic Regression			Linear Regression	
EXPLANATORY VARIABLES	Estimate	Pr>Chi-Square	Odds Ratio	Estimate	Pr>|T|
STUDENT CHARACTERISTICS					
INTERCEPT	-6.01	0.0001		-1.28	0.0001
BLACK	-1.55	0.0001	0.21	-0.44	0.0001
HISPANIC	-0.74	0.0011	0.48	-0.22	0.0001
ASIAN	0.64	0.0001	1.90	0.03	0.2984
OTHER RACE	-1.33	0.1971	0.27	-0.33	0.0001
FEMALE	-0.34	0.0001	0.72	-0.04	0.0052
HIGH EDUCATIONAL ASPIRATIONS	0.93	0.0001	2.53	0.25	0.0001
STUDENT ENROLLED IN ACADEMIC PROGRAM	0.98	0.0001	2.66	0.42	0.0001
HIGH SELF-CONFIDENCE	0.51	0.0001	1.66	0.07	0.0001
STUDENT NEVER CUTS CLASSES	0.39	0.0001	1.48	0.04	0.0015
STUDENT SPENDS MORE THAN SIX HOURS ON HOMEWORK WEEKLY	0.39	0.0001	1.47	0.11	0.0001
STUDENT SPENDS MORE THAN THREE HOURS ON READING OUTSIDE SCHOOL WEEKLY	0.54	0.0001	1.71	0.20	0.0001
STUDENT WATCHES TV UP TO AN HOUR ON WEEKDAYS	0.40	0.0001	1.50	0.09	0.0001
STUDENT IS RELIGIOUS	-0.26	0.0049	0.77	-0.06	0.0003
STUDENT SPENDS MORE THAN AN HOUR A WEEK ON EXTRA CURRICULAR ACTIVITIES	0.40	0.0002	1.49	0.08	0.0001
STUDENT DOES NOT COUNT ON PARENTS TO SOLVE OWN PROBLEMS	0.35	0.0062	1.41	0.31	0.0001
FAMILY BACKGROUND (SES)					
MOTHER IS COLLEGE GRADUATE	0.25	0.0157	1.28	0.08	0.0001
FATHER IS COLLEGE GRADUATE	0.31	0.0097	1.36	0.14	0.0001
FATHER IS WHITE COLLAR WORKER	0.37	0.0001	1.45	0.11	0.0001
FAMILY INCOME	0.004	0.6573	1.00	0.006	0.0016
MOTHER IN THE LABOR FORCE	0.21	0.1836	1.24	0.10	0.0001
FAMILY BACKGROUND (HOME ENVIRONMENT)					
FAMILY OWNS COMPUTER AT HOME	0.31	0.0008	1.36	0.09	0.0001
FATHER'S HIGH EDUCATIONAL ASPIRATIONS	0.91	0.0010	2.48	0.27	0.0001
STUDENT DISCUSSES GRADES WITH PARENTS	-0.51	0.0091	0.60	0.10	0.0003
STUDENT OFTEN DISCUSSES WITH PARENTS ABOUT GOING TO COLLEGE	0.43	0.0001	1.53	0.09	0.0001
FAMILY HAS NO RULE ABOUT GPA	0.63	0.0001	1.88	0.11	0.0001
PARENTS NEVER CONTACT SCHOOL ABOUT ACADEMIC PERFORMANCE	0.46	0.0001	1.59	0.16	0.0001
NUMBER OF SIBLINGS	-0.02	0.4121	0.98	-0.004	0.2982
STUDENT IS A FIRSTBORN OR AN ONLY CHILD	0.21	0.0202	1.23	0.09	0.0001
STUDENT LIVES IN A SINGLE PARENT FAMILY	0.02	0.0156	1.02	0.02	0.3260
STUDENT LIVES IN A STEP PARENT FAMILY	0.03	0.8133	1.03	-0.02	0.2300
STUDENTS LIVES WITH OTHER RELATIVES	-0.33	0.3335	0.72	-0.08	0.0469
COMMUNITY VARIABLES					
NORTH EAST	0.40	0.0005	1.49	0.06	0.0017
MIDWEST	0.23	0.0439	1.26	0.05	0.0072
WEST	0.28	0.0327	1.33	0.06	0.0054
SUBURBAN COMMUNITY	-0.18	0.0844	0.83	-0.03	0.0735
RURAL COMMUNITY	-0.18	0.1823	0.84	-0.03	0.2094
SCHOOL VARIABLES					
PERCENTAGE OF STUDENT BODY RECEIVING ADVANCED PLACEMENT COURSES	0.003	0.1796	1.00	0.002	0.0006
STUDENT ATTENDS CATHOLIC SCHOOL	-0.51	0.0045	0.60	-0.0004	0.9907
STUDENT ATTENDS OTHER PRIVATE SCHOOL	0.005	0.9717	1.01	0.08	0.0083
PERCENTAGE OF MINORITY STUDENTS	0.002	0.4109	1.00	-0.0001	0.6533
PERCENTAGE OF HIGH SCHOOL DROP-OUTS	-0.04	0.0028	0.96	-0.004	0.0055
AVERAGE DAILY ATTENDANCE	-0.009	0.2568	0.99	0.002	0.2197
PERCENTAGE OF DISADVANTAGED STUDENTS	-0.005	0.0989	1.00	-0.001	0.0007
AMONG FRIENDS VERY IMPORTANT FOR POST HIGH SCHOOL EDUCATION	0.23	0.0251	1.25	0.03	0.0451

Talented Blacks

OBSERVATION	1	2	3	4	5	6	7	8	9	10	mean	meanblacks	talentmeans
Student Characteristics:													
FEMALE	0	1	1	1	1	1	1	1	1	1	0.90	0.34	0.48
STUDIOUS	0	0	1		0	1	1	1		1	0.67	0.56	0.68
NEVERCUT	0	1	1	0	0	1	0	1	0	0	0.40	0.38	0.63
ACADPROG	1	1	1	1	1	1		1	0	1	1.00	0.56	0.87
MOREXTRA	0	1	1	1	1	1	1	0	1	1	0.80	0.16	0.84
READMORE	0	1	0	1	0	0	1	0	1	0	0.30	0.10	0.33
TVNO	1	0	0	0	0	1	0	0	0	1	0.30	0.34	0.40
HIGHPLNS	1	1	1	1	0	1	0	1	0	0	0.90	0.49	0.75
ABLE	1	0	1	1	1	1		1	1	1	0.80	0.57	0.58
NOCOUNTP	0	0	1	1	0	1	1	1	1	1	0.80	0.61	0.84
RELIG	1	1	1	0	1	1	1	1	1	1	0.90	0.53	0.60
VIMPCNED	1	1	0	1	1	1	1	1	1	1	0.90		0.80
Socioeconomic Status:													
MCOLGRAD	1	0	0	0		0					0.30	0.19	0.62
DCOLGRAD	1	1	0	0	1	0	0	1	0	0	0.50	0.19	0.71
DWHITECL	1	1	0	0	1	0	0	0	1	0	0.40	0.11	0.42
MWHITECL	0	0	0	0		0	0	0	1	0	0.20	0.10	0.23
MOMWK	1	1	1	1	1	0		1	0	1	1.00	0.82	0.92
INCOME	42500	30000	30000	22500	150000	12500	30000	62500	62500	42500	48500.00	30323.64	87840.00
Home Environment:													
COMPUYES	1	1	1	0	1	0	0			0	0.60	0.34	0.72
HIGHDDES	1	1	1		1	0	0	1	1	1	1.00	0.83	0.98
HIGHMDES	1	1	1	1	1	1	1	1	1	1	1.00	0.84	0.98
OFTENDIS	0	1	1	0	1	1	1	1	1	0	0.50	0.36	0.68
DISCGPA	1	0	1	1	1	0	1	1	0	1	0.80	0.72	0.90
GPANO	1	0	0	1	1	0	1	1	1	1	0.80	0.72	0.90
NOCONT	1	1	1	0	1	0	1	1	0	1	0.50	0.14	0.46
SIBLING	3	2	3	2	1	1	0	1		1	0.78	0.38	0.58
SNGLPAR	0	0	3	1	1	7	2	1	5	2	2.80	3.23	1.88
STEPFAM	0	0	0	0	0	1	0	0	0	0	0.20	0.35	0.10
ALTFAM	0	0	1	0	0	0	1	0	0	0	0.20	0.13	0.10
	0	0	0	0	0	0	0	0	0	0	0.00	0.06	0.01
School Characteristics:													
PMINOR	37	17	5	87	87	37	87	87	87	37	56.80	52.94	21.48
PDISADV	0	5	5	30	5	30	75	30	5	5	19.00	33.17	11.79
PCTAP	25	10	2	7	0	12	9	100	1	0	16.60	10.24	18.18
DROP12	1	4	8	26	0	3	1	2	8	0	5.30	4.32	1.90
ADA12	98	90	93	95	93	91	87	99	90	95	93.10	91.81	93.29
CATHOLIC	0	0	0	0	0	0	0	0	0	0	0.00	0.06	0.07
PRIVE	0	0	0	0	1	0	0	1	0	1	0.30	0.03	0.29
Community Characteristics:													
NEAST	0	0	0	0	1	0	0	1	1	1	0.40	0.15	0.30
MIDWEST	1	1	0	0	0	0	0	0	0	0	0.20	0.13	0.26
WEST	0	0	0	1	0	0	0	0	0	0	0.10	0.05	0.17
SUBURBAN	1	0	1	0	0	0	1	1	1	0	0.50	0.28	0.41
RURAL	0	0	0	0	0	1	0	0	0	0	0.10	0.32	0.19

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Talented Hispanics

OBS:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
HISPORIG	Mexican	Unknown	Mexican	Mexican	Unknown	Cuban	Mexican	Unknown	Unknown	Mexican	Unknown	Mexican	Unknown	P.Rican	Unknown	Cuban	Unknown	Cuban
Student Characteristics:																		
FEMALE	1	0	0	1	0	0	0	1	0	1	1	0	0	0	1	1	1	0
STUDIOUS	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1
NEVERCUT	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	1	1
ACADPROG	1	0	0	1	0	1	1	1	1	1	0	1	1	1	0	0	0	0
MOREXTRA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
READMORE	0	1	1	1	1	1	0	1	1	0	1	0	1	1	1	1	1	1
TVNO	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
HIGHPLNS	1	0	1	0	1	1	0	0	1	0	0	0	0	0	0	1	1	0
ABLE	0	1	1	0	1	1	0	1	1	1	0	1	0	0	0	0	0	0
NOCOUNTP	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0	1	1	1
RELIG	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1
VIMPCNED	0	1	1	0	0	1	1	1	0	1	0	1	1	1	1	0	1	1
ENGLISH	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0	0	0
Socioeconomic Status:																		
MCOLGRAD	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0
DCOLGRAD	0	1	0	0	1	1	0	0	1	0	1	1	0	1	1	0	1	1
DWHITECL	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0
MWHITECL	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
MOMWK	1	0	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	1
INCOME	22500	82500	42500	62500	225000	62500	22500	22500	62500	12500	62500	62500	62500	8750	62500	62500	30000	62500
Home Environment:																		
COMPUYES	0	1	0	0	1	1	0	0	1	0	0	1	0	0	1	1	0	0
HIGHDDES	1	1	1	0	1	1	1	1	1	0	1	1	1	0	1	1	1	1
HIGHMDES	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	1
OFTENDIS	1	1	0	1	1	1	0	0	0	1	0	0	0	1	0	0	0	0
DISCGPA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
GPANO	1	0	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0
NOCONT	1	0	1	0	1	0	0	0	1	1	1	0	0	0	0	1	1	1
SIBLING	4	0	2	0	3	2	1	3	3	3	1	1	0	4	2	2	1	2
SINGLPAR	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
STEPFAM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
ALTFAM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENGL	0	1	0	1	1	0	0	0	1	0	1	1	0	1	1	0	0	0
LANGHOME	1	0	0	1	0	1	1	1	0	1	0	0	0	0	1	1	1	1
School Characteristics:																		
PMINOR	5	5	17	87	37	37	37	87	17	62	17	37	37	17	37	87	37	87
PDISADV	5	30	5	75	0	0	30	30	17	30	5	5	5	0	0	30	5	30
PCTAP	3	20	0	3	60		10	15	10	20	30	2	25	25	13	22	5	30
DROP12	5	1	3	5	0		4	1	1	1	0	11	1	1	0	0	7	20
ADA12	93	88	90	93	99		98	93	98	90	96	93	95	91	98	94	85	94
CATHOLIC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRIVE	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0
Community Characteristics:																		
NEAST	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
MIDWEST	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
WEST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBURBAN	1	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
RURAL	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0

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Talented Hispanics

BEST COPY AVAILABLE

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OBS	19	20	21	22	23	24	25	26	mean	Mean	talent means
HISPORIG	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Cuban	Unknown	unknown	mexican	
Student Ch											
FEMALE	1	0	0	0	0	0	1	0	0.38	0.51	0.48
STUDIOUS	1	1	0	1	0	1	1	0	0.69	0.38	0.68
NEVERCUT	1	0	1	1	0	0	1	0	0.54	0.38	0.63
ACADPROG	1	1	1	1	0	1	1	1	0.88	0.36	0.87
MOREXTRA	1	1	1	1	0	0	1	1	0.88	0.54	0.84
READMORE	0	0	0	0	0	1	0	1	0.38	0.20	0.33
TVNO	0	0	0	0	1	0	0	0	0.23	0.16	0.40
HIGHPLNS	1	1	1	1	1	1	1	0	0.68	0.29	0.75
ABLE	0	0	1	1	1	1	0	0	0.58	0.37	0.58
NOCOUNTY	1	1	1	1	1	1	1	0	0.77	0.57	0.84
RELIG	1	1	1	1	0	1	1	0	0.62	0.55	0.60
VIMPCNED	1	1	1	0	1	1	1	1	0.85	0.51	0.80
ENGLISH	0	0	1	1	1	1	0	0	0.56	0.51	
Socioecono											
MCOLGRAD	0	1	0	0	0	0	0	0	0.27	0.12	0.62
DCOLGRAD	0	0	1	0	1	0	1	1	0.50	0.15	0.71
DWHITECL	0	0	0	0	0	0	1	1	0.23	0.11	0.42
MWHITECL	0	1	0	0	0	0	0	0	0.15	0.08	0.23
MOMWK	1	1	0	0	1	1	1	1	0.88	0.81	0.92
INCOME	22500	82500	62500	8750	42500	.	12500	150000	57717.39	34950.55	87840.00
Home Envi											
COMPUYES	1	1	1	1	0	0	0	1	0.54	0.25	0.72
HIGHDDES	1	1	1	1	1	1	0	1	0.95	0.79	0.98
HIGHMDES	1	1	1	1	1	1	1	1	0.92	0.80	0.98
OFTENDIS	0	1	1	0	0	1	1	1	0.58	0.27	0.68
DISCGPA	1	1	1	1	1	0	1	1	0.85	0.67	0.90
GPANO	1	0	1	0	0	0	1	1	0.42	0.17	0.46
NOCONT	1	1	1	1	0	0	1	1	0.67	0.34	0.58
SIBLING	2	3	3	5	3	1	1	4	2.08	3.09	1.88
SINGLPAR	1	0	0	0	1	0	1	0	0.27	0.15	0.10
STEPFAM	0	0	0	0	0	0	0	0	0.12	0.10	0.10
ALTFAM	0	0	0	0	0	0	0	0	0.00	0.03	0.01
PENGL	0	1	1	1	0	0	0	0	0.44	0.35	
LANGHOME	1	1	0	1	1	1	1	1	0.64	0.7	0.29
School Cha											
PMINOR	87	37	5	5	5	37	37	37	38.40	54.54	21.48
PDISADV	75	5	5	30	0	0	0	0	16.46	32.63	11.79
PCTAP	4	33	0	4	8	10	12	40	15.84	9.82	18.18
DROP12	0	2	1	6	5	10	0	0	2.36	5.64	1.90
ADAI2	99	92	94	92	94	84	92	85	92.80	91.98	93.29
CATHOLIC	1	0	0	0	0	0	0	0	0.04	0.05	0.07
PRIVE	0	0	0	0	0	0	0	1	0.12	0.03	0.29
Communit											
NEAST	1	1	1	1	0	0	0	0	0.23	0.10	0.30
MIDWEST	0	0	0	0	0	0	0	0	0.12	0.10	0.26
WEST	0	0	0	0	1	1	0	1	0.38	0.44	0.17
SUBURBAN	0	1	0	0	1	0	0	1	0.38	0.32	0.41
RURAL	0	0	1	1	0	0	0	0	0.12	0.22	0.19

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