Predicting Educational Attainment, Occupational Achievement, Intellectual Skill, and Personal Adjustment Among Gifted Men and Women

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The cognitive potential of many gifted children goes unfulfilled. This study was designed to isolate factors, other than cognitive skill, that might predict adult achievements and personal adjustment among the gifted. Subjects were 1,069 gifted men (n = 595) and women (n = 474) who have been followed for 60 years as part of the Terman Genetic Studies of Genius. Childhood personality traits, parental education, and early home environment variables were examined as predictors of educational and occupational achievement among adults. The final model depicted five longitudinal relationships that predicted educational attainment, intellectual skill, and personal adjustment among both men and women. Two additional paths explained occupational achievement. The implications of this final model are discussed.

Raw intellectual potential among children is not automatically transformed into significant educational and occupational achievements among adults, nor do such cognitive gifts, in isolation, predict personal adjustment in adults. A lengthy educational and socialization process meshes with a child's intellectual skills to mold, ultimately, an adult who is well adjusted and productive.

The fact that many children who have been identified as gifted are not realizing their intellectual potential has become a matter of public concern (DeLeon & Vandenberg, 1985). In 1972, the U.S. Office of Education noted that "We are increasingly being stripped of the comfortable notion that a bright mind will make its own way" (p. 1). A decade later, Gardner (1983) headed a commission to evaluate the nation's schools. In a report titled "A Nation at Risk," the commission proclaimed, "Over half the population of gifted students do not match their tested ability with comparable achievement in school" (p. 8). Both of these authorities concluded that being identified as intellectually gifted as a child does not guarantee educational or occupational achievement. As educators and psychologists, it behooves us to try to ascertain what factors promote the educational and occupational achievements that should accompany such intellectual skill.

Delineating the childhood variables critical to positive adult outcomes requires longitudinal information on individuals that spans a lifetime. Fortunately, such data are available from the longitudinal archives of the Genetic Studies of Genius (P. S. Sears, 1979; P. S. Sears & Barbee, 1977; R. R. Sears, 1977, 1984; Terman, 1925, 1930; Terman & Oden, 1947, 1959). The first data collection phase of this study of 1,528 gifted children occurred in 1922 under the auspices of Lewis Terman. The most recent data collection phase was completed in 1986 under the direction of Robert Sears and Albert Hastorf. In the 64 years spanned by the study, researchers have collected data concerning the subjects' early childhood, education, personality characteristics, careers, families, physical and mental health, and adjustment to retirement. The existence of these data offers a unique opportunity to study the childhood variables that predict adult achievement. Thus we examined the ability of a variety of childhood indexes to predict the educational achievement, occupational achievement, intellectual skill, and personal adjustment of these adults.

Unlike many longitudinal studies that followed small numbers of subjects, Terman's Genetic Studies of Genius involved 1,528 children. The numbers of male (856) and female (672) subjects are large enough to allow the use of data-analytic techniques such as factor analysis and structural equation modeling. These statistical procedures permit the identification of underlying components of the data and allow the construction of models that describe the longitudinal relations among these components (Connell, 1987). One of the difficulties in using structural equation modeling is the prior specification of antecedent and consequent variables. In longitudinal data sets, in which temporal priority is established, the credibility of the structural model is enhanced (Cranon & Mendoza, 1987).

Although longitudinal studies that continue for more than 5 years are rare, several studies follow the development of achievement and adjustment in samples of children not specifically identified as gifted. Three longitudinal studies, collectively known as the Berkeley Growth Studies, have traced the development of individuals over a span of 50 years. J. Block (1971), in his seminal book Lives Through Time, evaluated these data, focusing particularly on the stability of personal variables across time and the consistency of the ordering of
individuals on the particular personal variables. In the process, he identified several adolescent variables that are associated with positive life outcomes for adults. The family and personal variables that he noted served as theoretical guides in our study.

The home environment that children experience assumed importance in several longitudinal studies (Albert & Runco, 1986; D. Baumrind, personal communication, November, 1986; J. Block, 1985; J. H. Block & Block, 1980; Kagan & Moss, 1962; R. R. Sears, Maccoby, & Levin, 1957). J. Block (1985), reporting on childhood predictors of adolescent adjustment, noted that parents of boys who were well adjusted in adolescence were warm, supportive, accepting, structuring, and not overly deferent or capitulating to their children. These boys' homes were characterized as active, busy, sophisticated, and complex environments, where the mother emphasized an intellectual orientation and encouraged independence. Baumrind (1971; personal communication, November, 1986) also noted that parental styles used with preschool children made a dramatic difference in adolescents' social competence. Interestingly, in both of these studies, J. Block and Baumrind found a positive home environment to be a particularly strong force among adolescent boys, but less salient among the girls. These are only two of a growing number of studies documenting an impressive set of longitudinal relations among boys, relations that are not duplicated in female samples (Gjerde, Block, & Block, 1986).

Home environments characterized as negative clearly have a long-term impact on children (J. Block, 1971). Longitudinal studies of divorce suggest that a sizable proportion of children suffer some long-term consequences from the conflict in the home and the reduced contact that results when parents divorce (Wallerstein & Kelly, 1980). Longitudinal studies of children characterized as vulnerable document the positive impact that a supportive environment can have in helping a child overcome difficulties (Werner & Smith, 1982). Emerging literature on the adult children of alcoholics shows that growing up in a dysfunctional family has lifelong consequences (Woititz, 1983). In all of these longitudinal investigations, the researchers found that characteristics of the home environment can enhance or inhibit a person's personal adjustment and achievement during adulthood.

Personality variables are a second set of marker variables that appear repeatedly in the longitudinal literature as predictors of adult outcome. Variously called temperamental variables, personality characteristics, or enduring dispositions, these variables can be appropriately evaluated as factors that are independent of the home environment, although they interact with that environment. In Lives Through Time, J. Block (1971) described personality characteristics that persist through childhood, adolescence, and adulthood and that have a noticeable impact on individual development. Chess and Thomas (1984) delineated similar temperamental variables that they had watched evolve during a 20-year longitudinal study. McCrae and Costa (1984) depicted enduring dispositions among their adult subjects. All of these investigators found consistency in the order of personal variables that transcended specific situations and endured across decades.

Retrospective analyses of the childhoods of particularly eminent groups of adults have also been used to highlight characteristics that set these children apart from their peers (Cox, 1926; Getzels & Csikszentmihalyi, 1976; McCurdy, 1957; Roe, 1953; Zuckerman, 1979). Cox (1926) identified men and women who had achieved eminence as adults and evaluated their childhoods through biographical accounts and original sources. Her sample included statesmen, philosophers, scientists, writers, military leaders, and artists, including Rembrandt, Mozart, James Madison, Descartes, Sir Francis Drake, and Michael Faraday. The childhood traits that she was able to pinpoint as diagnostic of future success were persistence, intellectual energy, originality, and ambition. She also noticed unusual motivation, self-confidence, and strength of character. Roe's (1953) study of scientists highlighted the role of professional parents and suggested that the scientists shared some tendency toward childhood isolation. McCurdy (1957) reported that eminent adults had had attentive parents, had received abundant nurturance, and had received intensive educations. In these retrospective studies, the researchers examined the early lives of artists, writers, scientists, and statesmen. Across all of these samples, it seems that these adults were able to capitalize on their unique abilities through a combination of beneficial personal traits and a facilitative home environment (Sternberg & Davidson, 1985).

Drawing from these studies, we examined personality characteristics of the Terman children at approximately 11 years of age. Both parents and teachers rated the children from the Terman sample on 25 personality characteristics in 1922. We examined the force of these personal attributes, extended over a period of 40 or more years, especially as they affected adult achievement and adjustment.

In the majority of studies of academic achievement, social class variables assume explicit importance. High levels of education, occupation, and income among parents predict intellectual achievement of children with amazing regularity (Janos & Robinson, 1985). Rather than evaluate these as static variables, determined primarily by the father's occupational status, we have tried to think about parental attributes that would globally promote educational and occupational achievement at the same time as they presaged positive emotional adjustments. The single dimension that best encompasses this continuing influence is Parental Education.

In this study, then, we took as a theoretical starting point previous longitudinal studies of achievement and personal adjustment. We used them to instruct us in selecting variables from the childhood years that might well be predictive of adult achievement and personal adjustment in a large sample of gifted men and women. The variables selected were intended to measure five constructs: Family Harmony, Intellectual Determination, Social Responsibility, Sociability, and Parental Education. In turn, these constructs were examined for their ability to predict Occupational Achievement, Educational Attainment, Intellectual Skill, and Personal Adjustment among adults.

Hypotheses concerning the final form of the model were derived from the literature already reviewed. Personal adjustment during adulthood was expected to be primarily influenced by the harmony or lack of harmony in the family of
analysis validated the theoretical structure of the variables. Furthermore, exploratory factor analysis before model construction facilitates the development of more reasonable models by reducing the size of the data set (Crano & Mendoza, 1987). Although such a factor analysis enhances the fit of the model, it does not artificially inflate the value of the path coefficients between theoretically implicated variables. As such, this approach can provide a useful preliminary means of investigating the structure of relations that exist among a set of variables (Crano & Mendoza, 1987).

In Step 3, a path model was constructed to describe the relations between childhood predictors and the intellectual, educational, occupational, and emotional outcomes of adults. The large sample size and the small number of theoretically relevant variables that were being investigated meant that structural equation modeling techniques could be used to examine the relations between childhood and adult variables (Crano & Mendoza, 1987).

Given the uniqueness of this 60-year longitudinal study, replicating the results of our study would be almost impossible. However, because of the large sample, a statistical replication is possible through the use of cross-validation techniques (Bentler & Bonett, 1980). In our study, then, data from two thirds of the sample were used to develop a structural model. Data from the remaining third of the sample provided an independent test of this model.

The steps involved in model building are similar to the procedure suggested by Crano and Mendoza (1987) for analyzing data from the Berkeley Growth Study. Although this procedure does not focus on immediate hypothesis testing, it does provide "a solid foundation for later, more focused, confirmatory investigations of the causal relationships that exist among a set of variables" (p. 38). Given that the Terman sample represents the only long-term study of gifted individuals, it seems appropriate to examine these data for such relations.

**Variable Selection**

The Terman data set consists of approximately 4,000 variables from 21 questionnaires administered between 1922 and 1986. In order to assess what factors would predict adult intellectual accomplishment and general adjustment, the questionnaires were divided into two broad categories. Questionnaire items administered in 1940 and earlier were classified as predictor variables, and post-1940 items were classified as outcome variables. Because the average years of birth were 1910 for the men and 1911 for the women, separating predictors from outcomes at 1940 reflected the point at which the average Terman study participant had achieved young adult status. By 1940 the Terman subjects were approximately 30 years old and typically had made the transition from their families of origin to their adult families. In addition, they were likely to have completed their education, to have married, and to be immersed in the adult phase of their lives.

**Predictor Set 1: Childhood personality characteristics.** In 1922, during the first data collection phase, parents and teachers were asked to rate the subjects on 25 personality traits (see Table 1). These trait ratings were chosen on the basis of their potential importance as indexes of the child's intellectual, social, and emotional characteristics. A 13-point scale was used to assess sense of humor, leadership skills, self-confidence, general intelligence, perseverance, desire to know, desire to excel, and so forth (see Table 1). Two of the trait ratings were recorded so that the middle of the scale became the positive developmental node and both extremes indicated less functional behaviors. For example, permanency of moods was marked at one end by moods extraordinarily permanent and at the other by always alternating between extreme joy and extreme sadness; the middle point was average for age. Similarly, sensitivity to approval and disapproval was marked by extraordinary sensitiveness at one
Table 1  
Factor Analyses of the Combined Parent and Teacher Trait Ratings

<table>
<thead>
<tr>
<th>Description</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor 1</td>
<td>Factor 2</td>
</tr>
<tr>
<td>Freedom from vanity</td>
<td>0.70</td>
<td>-0.30</td>
</tr>
<tr>
<td>Sympathy and tenderness</td>
<td>0.48</td>
<td>-0.11</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>0.82</td>
<td>0.12</td>
</tr>
<tr>
<td>Prudence and forethought</td>
<td>0.53</td>
<td>0.30</td>
</tr>
<tr>
<td>Generosity and unselfishness</td>
<td>0.54</td>
<td>-0.23</td>
</tr>
<tr>
<td>Truthfulness</td>
<td>0.74</td>
<td>0.04</td>
</tr>
<tr>
<td>Willpower and perseverance</td>
<td>0.17</td>
<td>0.48</td>
</tr>
<tr>
<td>Desire to excel</td>
<td>0.24</td>
<td>0.39</td>
</tr>
<tr>
<td>Desire to know</td>
<td>0.04</td>
<td>0.70</td>
</tr>
<tr>
<td>Originality</td>
<td>-0.06</td>
<td>0.75</td>
</tr>
<tr>
<td>Common sense</td>
<td>-0.30</td>
<td>0.44</td>
</tr>
<tr>
<td>General intelligence</td>
<td>0.01</td>
<td>0.65</td>
</tr>
<tr>
<td>Self-confidence</td>
<td>-0.34</td>
<td>0.57</td>
</tr>
<tr>
<td>Leadership</td>
<td>-0.04</td>
<td>0.23</td>
</tr>
<tr>
<td>Popularity with other children</td>
<td>0.16</td>
<td>-0.12</td>
</tr>
<tr>
<td>Health</td>
<td>0.02</td>
<td>-0.02</td>
</tr>
<tr>
<td>Amount of physical energy</td>
<td>-0.16</td>
<td>0.10</td>
</tr>
<tr>
<td>Sense of humor</td>
<td>-0.05</td>
<td>0.19</td>
</tr>
<tr>
<td>Cheerfulness and optimism</td>
<td>0.01</td>
<td>0.04</td>
</tr>
<tr>
<td>Music appreciation</td>
<td>-0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>Art/beauty appreciation</td>
<td>0.09</td>
<td>0.10</td>
</tr>
<tr>
<td>Fondness for large groups</td>
<td>-0.12</td>
<td>-0.07</td>
</tr>
<tr>
<td>Mechanical ingenuity</td>
<td>0.01</td>
<td>0.20</td>
</tr>
<tr>
<td>Permanency of moods</td>
<td>-0.24</td>
<td>-0.06</td>
</tr>
<tr>
<td>Sensitivity to disapproval/approval</td>
<td>-0.16</td>
<td>-0.12</td>
</tr>
</tbody>
</table>

Interfactor correlations: Factor scales

<table>
<thead>
<tr>
<th>Factor 1: Social responsibility</th>
<th>Factor 2: Intellectual determination</th>
<th>Factor 3: Sociability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.49</td>
<td>-</td>
<td>0.50</td>
</tr>
<tr>
<td>0.27</td>
<td>0.49</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Note. Only the variable loadings in boldface were included in the respective factor scales. $h^2 =$ communality estimate.

end and utterly indifferent at the other. These traits were both recoded so that the middle point of the scale received the highest score (7), and each end point received a low score (1). All of the personality characteristics were coded so that a high score indicated a developmentally mental trait.

The correlations between the teachers' and the parents' ratings of the same trait were evaluated in order to assess whether the ratings were measuring the same traits. As expected, the highest correlation for a teacher's rating of a trait was with the corresponding rating of that trait by the parent, and the reverse was also true (intrarater correlations ranged from .09 to .41, an expected range given the single-item characteristics of the trait ratings). Given the concordance, the parents' and teachers' ratings were aggregated to provide a more reliable assessment of these early childhood personality characteristics.

**Predictor Set 2: Family-of-origin characteristics.** Thirteen items providing insight into the family of origin were included as predictors (see Table 2): Two items indicated the educational levels of the mother and father, three items concerned the stability of the home environment, and eight retrospective items concerned the quality of the early family environment. Four of the retrospective assessment items were recoded so the higher values would reflect the more favorable and developmentally appropriate direction: amount of punishment, amount/2 of conflict with mother and father, and degree of friction among any family members.

**Outcome set: Adult accomplishment and general adjustment characteristics.** Twelve variables for the women and 13 variables for the men were selected from the post-1940 questionnaires to reflect four primary constructs: Occupational Achievement, Educational Attainment, Personal Adjustment, and Intellectual Skill.

We indexed Occupational Achievement by recoding the United States census occupational status categories (U.S. Department of Commerce, 1962, pp. xi-xviii) into a 4-point quantitative measure in which professional jobs such as doctor and lawyer received the highest score (4), semiprofessional jobs such as manager and contractor were scored 3, retail business and skilled trades such as actor and salesperson were scored 2, and semiskilled jobs such as service station attendant and truck driver received the lowest score (1). Averaging the four rescaled assessments of occupational achievement (rated for 1946–1949) produced a 1950 Occupational Achievement index; the same process for the 1956-1959 occupational ratings produced a 1960 Occupational Achievement index. Educational attainment was indexed by two variables, highest grade level achieved and cumulative education as of the 1950 assessment.

Measures of adult mental health were obtained from the 1950 and 1960 protocols. Two assessments of life adjustment were made by Melita Oden on the basis of a full file review of each subject. The first rating was a 3-point cumulative adjustment rating (3 = satisfactory, 2 = some difficulty, 1 = considerable difficulty), and the second item was a 4-point assessment of how problems were handled (4 = active personal help, 3 = help from family and friends, 2 = professional help, 1 = hospitalization). These two scales were aggregated to achieve a composite index of personal adjustment.

A second index of mental health was the subject's report of his or her current mental health at the time of the 1950 and 1960 followups. This report of current status was indexed in relation to the
cumulative adjustment ratings. The response free from difficulty was scored 4; improved was scored as the cumulative rating plus 1; worse was scored as the cumulative rating minus 1; and no change was scored as equal to the cumulative rating. The same scoring system was used with the 1960 protocol. These procedures resulted in a total of four items reflecting adult mental adjustment: two cumulative and two current indexes of personal adjustment assessed in 1950 and 1960.

Finally, two assessments of adult intellectual skills were chosen: the two forms of the Concept Mastery Test (Terman & Oden, 1959) administered in 1940 (Form A) and 1950 (Form T). This test was devised specifically for the gifted population in order to discriminate among adults at the high end of the intelligence scale by assessing their use of concepts in relation to physical and biological science, mathematics, geography, history, logic, literature, art, religion, music, sports, and so forth.

Exploratory Factor Analyses of the Selected Variables

The items selected for this study involved a range of scales. Different items required 3-point scales, 5-point scales, and 13-point scales. Before factor analysis, all of the selected variables were standardized by gender as T scores with a mean of 50 and a standard deviation of 10. Standardization of the items eliminated the problem of unequal variances among items in factor analysis (Gorsuch, 1983). Any missing values were replaced with the mean.

We then factor analyzed each of the three sets of variables (childhood trait ratings, family-of-origin variables, and outcome variables) by using an iterative principal-factors method. For all factor solutions, a Harris-Kaiser rotation was used. Given the high degree of conceptual similarity among the variables, correlations among the factors were expected. Hence a factor-analytic strategy that allowed correlations between factors was selected.

We created the factor scales for both men and women by averaging the equally weighted contributions of all the variables that defined a factor. The method of unit weighting or scoring was used to maintain the between-group differences in the factor scales. Averaging the items included in the scales also maintains a roughly equivalent metric for all generated scales. Cronbach's alpha reliability was assessed for each factor scale. Any variable that decreased the reliability estimate of a scale for both men and women was deleted from the scale (although it was still represented in the factor solution), so that only the most salient and reliable variables were left to represent the underlying factor structure.

Modeling the Structural Relations Among the Factor Scales

Because of the high degree of concordance among the factor solutions for men and women and the identical operationalization of the scale constructs, the similarities and differences in the structural relations for both groups can be compared directly and statistically. However, in order to do so, we restandardized the variables identified as defining each factor across men and women before calculating the factor scales. This restandardization, in conjunction with the unit weighting, would retain the between-group differences in within-group variance on the factor scales. The differences in variance would thus be defining characteristics from which differential relations could be detected.

The sample of 595 men and 474 women was then split into a derivation sample and a validation sample. The derivation sample was composed of two thirds of the subjects from the male and female samples (397 men and 316 women). The data of the remaining third of the sample (198 men and 158 women), were set aside to cross-validate the model that emerged from the data of the derivation sample.

Establishing the longitudinal model on the derivation sample involved simultaneous two-group analyses of the men and women with maximum likelihood estimation (Jöreskog & Sörbom, 1986). Analyzing the men's and women's data with this method allowed us to statistically evaluate the similarities and differences among the 46 possible structural paths that existed (five predictor scales and three outcome scales, any of which could predict Occupational Achievement for each group of men and women).

The null model (see Bentler & Bonett, 1980) was generated as a baseline model that assumed no longitudinal relationships among the predictor and outcome scales. In this baseline model, all correlations among the five predictor scales were estimated, as were all correlations among the four outcome scales. However, as mentioned, no paths from the predictor scale constructs to the outcome scale constructs
were specified. The null model was used to compare the relative goodness of fit of the less constrained substantive models. Specifically, in the null model, all 46 of the possible longitudinal paths were constrained to zero, whereas the substantive models allowed estimated relationships between the predictor and outcome scale constructs. The substantive models also estimated the interpredictor scale and interoutcome scale correlations that were specified in the null model. By comparing the chi-square and degree-of-freedom estimates between the null model and any generated substantive models, we could calculate a measure of the practical fit of the substantive model (the $p$ statistic; see Bentler & Bonett, 1980).

The process of model building entailed the use of the modification indexes and the chi-square estimate generated from maximum likelihood estimation. When the modification indexes were used as a guide, all paths that led to a significant improvement in the chi-square statistic were estimated. Any paths that fell to nonsignificance (when $t < 2.0$ was a criterion) were fixed at zero. This stepwise process of estimating and fixing continued independently for men’s and women’s data until all paths that remained in the model were significant (again, when $t > 2.0$ was a criterion).

Once the freely estimated substantive model was established (Model 1), three additional models were evaluated. Model 2, the least constrained or most saturated of the substantive models tested, allowed the estimation of relations that emerged as unique for the men to be estimated for the women and vice versa. This saturated model was specified to allow statistical assessments of any potential loss in fit for the more constrained models tested. Models 3 and 4 tested for (a) equality of the significant paths that were common for both men and women and (b) equality of corresponding path estimates that were significant for one group only. Using the method of nested relationships among specified models, we evaluated a statistical test of the potential loss of fit for the specified constraints. This procedure allowed us to determine the most appropriate model to represent the derivation sample.

All established models were then fit to the data from the subjects who composed the validation sample. The cross-validation of all models allowed the determination of the most appropriate model to represent the entire sample.

Results

**Exploratory Factor Analyses of the Three Sets of Variables**

**Predictor Set 1: Childhood personality variables.** For both men and women, a three-factor solution was deemed most appropriate for the 25 trait ratings. The rotated factor patterns were very similar for men and women (see Table 1). The conscientiousness rating, which represented a sense of duty and dependability, served as the primary marker for Factor 1 among both men and women. The other defining variables—truthfulness, freedom from vanity, sympathy and tenderness, prudence and forethought, and generosity and unselfishness—reflected positive or negative attributes in the subject’s approach to social interactions. Factor 1 was therefore labeled Social Responsibility. Full sample reliability estimates for this scale (Scale 1) were .80 for men and .81 for women. These and subsequent factor scale reliabilities are a bit inflated because the factor-analytic process has capitalized somewhat on chance.

The ratings represented by Factor 2 (willpower and perseverance, desire to excel, desire to know, originality, common sense, general intelligence, and self-confidence) reflect intellectual characteristics, especially in the face of difficulties. The trait characteristics represented by Factor 2 are somewhat indicative of contemporary intellectual constructs such as achievement motivation and self-worth; however, the relative lack of differentiation among these constructs suggests that a less value-laden descriptor would be more appropriate. Thus Factor 2 was labeled Intellectual Determination. Reliability estimates for this factor scale (Scale 2) were .80 for men and .79 for women.

Factor 3 was represented primarily by more general mood and congeniality items (popularity with other children, health, amount of physical energy, sense of humor, cheerfulness and optimism, music appreciation, art and beauty appreciation, and fondness for large groups) and was labeled Sociability. Reliability estimates for this factor scale (Scale 3) were .75 for men and .74 for women.

In the men’s factor solution, the leadership rating loaded solely on Factor 3, Sociability, whereas in the women’s factor solution, the leadership rating had a split loading with Factor 2, Intellectual Determination, and Factor 3, Sociability (see Table 1). This divergent pattern suggests that when parents and teachers were asked to rate leadership among boys and girls, they evaluated different behaviors. Consequently, the leadership rating was not used in defining any of the three factor scales. In both factor solutions, three ratings (mechanical ingenuity, permanency of moods, and sensitivity to disapproval and approval) were not well represented by any of the three factors. Inclusion of these items as indexes for a factor scale reduced the reliability estimates in both samples; consequently, these items were excluded from the three factor scales. Although two of these items (mechanical ingenuity and permanency of moods) had been recoded, allowing their original coding did not improve their pattern of loadings in either factor analysis solution.

**Predictor Set 2: Family-of-origin variables.** For both men and women, a two-factor solution was deemed the best representation of the underlying factor structure of the 13 family-of-origin variables. The rotated factor patterns were again very similar for men and women (see Table 2). Factor 1 was clearly defined by the two parental education variables. However, the two additional variables, parental financial situation and the family stability index, were not well represented by the factor. Because of the lack of communality and mixed pattern of factor loadings, inclusion of these two items decreased the reliability of the factor scale, and thus they were not included in the scale. Given the two defining loadings, this factor scale (Scale 4) was labeled Parental Education. Reliability estimates were .56 for men and .59 for women.

These somewhat low reliability estimates reflect the fact that there were only two items in the scale—mother’s education and father’s education—and that these two items are not necessarily highly correlated.

The variables loading on Factor 2 were all indicative of the degree of harmony within the early family environment. The marker variables for both groups were the childhood happiness rating, lack of conflict with mother and father, amount of attachment to mother and father, lack of family friction, and lack of punishment. Although amount of punishment
had a low communality estimate, it did not decrease the reliability of the factor scale, and its removal was thus unwarranted. This factor scale (Scale 5) was labeled Family Harmony and had reliability estimates of .65 for men and .69 for women.

**Outcome variables: Adult accomplishment and general adjustment variables.** For both men and women, a three-factor solution was deemed most appropriate for this set of variables. The rotated factor patterns were quite similar in both groups, even with the inclusion of the lifetime success variable in the men’s factor solution (see Table 3). Although the two education variables and the two occupational achievement indexes loaded on the same factor in both solutions, the differential pattern between the two groups (lower loadings in the women’s factor solution, as shown in Table 3) suggested that these variables were of different importance for men and women. To accommodate these gender differences in the derivation model, Factor 1 was divided into two factor scales, Scale 6 and Scale 9. The first scale created from Factor 1 was the average of the two educational variables and was labeled Educational Attainment (Scale 6). For both men and women, the Educational Attainment scale was quite reliable (.95 for men and .94 for women). Scale 9 was the average of the two occupation indexes and was labeled Occupational Achievement. For the women, the Occupational Achievement scale had a reliability estimate of .49, reflecting the inconsistency of occupational success among the women. The much higher reliability estimate of .77 on the Occupational Achievement scale for the men reflects the stability of occupational goals among the men.

The two forms of the Concept Mastery Test defined the second outcome factor. Each form of the Concept Mastery Test provided an index of the maintenance of intellectual skill into adulthood; thus this factor scale (Scale 7) was labeled Intellectual Skill. Reliability estimates for this scale were quite high (.81 for men and .84 for women).

Lastly, Factor 3 of the outcome variables was defined by the four mental health and adjustment variables: (a) cumulative mental health up to 1950, (b) current mental health as of 1950, (c) cumulative mental health up to 1960, and (d) current mental health as of 1960. This scale (Scale 8) had reliability estimates of .79 for men and .80 for women and was labeled Personal Adjustment.

The factor analyses of the predictor and outcome variables validated the cohesive ness of the items being used to investigate these men’s and women’s lives. The measures created allowed us to move to the next step: evaluating the relationship among these constructs by using structural equation modeling.

**Structural Relations Among the Factor Scales**

Four structural equation models of the covariances among the five predictor factor scales (Scales 1–5) and the four outcome factor scales (Scales 6–9) were generated on the male and female derivation subsamples (397 men and 316 women). In the model specification process, the five predictor constructs were seen as harbingers of Educational Attainment, Intellectual Skill and Personal Adjustment. These three intermediate constructs, in turn, were expected to predict Occupational Achievement. For this reason, Occupational Achievement was isolated from the other scales in order to model any potential directed relations that may exist.

The intercorrelations and standard deviations from which the covariances were calculated for the derivation sample are listed in Table 4, along with the scale reliability estimates for men and women.

<p>| Table 3 |
| Factor Analyses of the Outcome Variables |
| Description | Men | | | | Women |</p>
<table>
<thead>
<tr>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>$h^2$</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>$h^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifetime success, 1940–1960</td>
<td>0.58</td>
<td>0.02</td>
<td>0.16</td>
<td>0.37</td>
<td>0.95</td>
<td>−0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>Highest grade level achieved</td>
<td>0.77</td>
<td>−0.04</td>
<td>−0.03</td>
<td>0.05</td>
<td>0.94</td>
<td>−0.01</td>
<td>−0.01</td>
</tr>
<tr>
<td>Cumulative education to 1950</td>
<td>0.68</td>
<td>0.09</td>
<td>0.00</td>
<td>0.52</td>
<td>0.31</td>
<td>0.10</td>
<td>0.04</td>
</tr>
<tr>
<td>Occupational index, 1946–1949</td>
<td>0.68</td>
<td>0.09</td>
<td>0.00</td>
<td>0.52</td>
<td>0.17</td>
<td>0.12</td>
<td>−0.05</td>
</tr>
<tr>
<td>Occupational index, 1956–1959</td>
<td>0.00</td>
<td>0.02</td>
<td>0.00</td>
<td>0.58</td>
<td>−0.02</td>
<td>0.86</td>
<td>0.03</td>
</tr>
<tr>
<td>Concept mastery, Form A: 1940</td>
<td>−0.01</td>
<td>0.03</td>
<td>0.01</td>
<td>0.58</td>
<td>0.00</td>
<td>0.85</td>
<td>−0.02</td>
</tr>
<tr>
<td>Concept mastery, Form B: 1950</td>
<td>0.00</td>
<td>0.02</td>
<td>0.00</td>
<td>0.58</td>
<td>0.00</td>
<td>0.80</td>
<td>0.04</td>
</tr>
<tr>
<td>Current mental health, 1950</td>
<td>0.08</td>
<td>0.00</td>
<td>0.65</td>
<td>0.43</td>
<td>0.03</td>
<td>−0.08</td>
<td>0.68</td>
</tr>
<tr>
<td>Cumulative mental health, 1960</td>
<td>−0.09</td>
<td>0.00</td>
<td>0.77</td>
<td>0.59</td>
<td>0.01</td>
<td>0.01</td>
<td>0.65</td>
</tr>
<tr>
<td>Current mental health, 1960</td>
<td>−0.00</td>
<td>−0.04</td>
<td>0.68</td>
<td>0.47</td>
<td>−0.06</td>
<td>0.08</td>
<td>0.69</td>
</tr>
</tbody>
</table>

**Interfactor correlations: Factor scales**

| Education/Occupation attainment | — | — | 0.44 | 0.41 | — |
| Intellectual skills | 0.03 | −0.20 | — | 0.10 | −0.10 |
| Personal adjustment | — | — | 0.04 | 0.10 | 0.04 |

**Note.** Only the variable loadings in boldface were included in the respective factor scales. $h^2 = estimated$ communality. The Education/Occupation Attainment factor was divided into two factor scales: one consisted of the first two primary loadings and was labeled Educational Attainment, and the second consisted of the last two primary loadings and was labeled Occupational Achievement.
Table 4
Factor Scale Correlations, Standard Deviations, and Reliability Estimates

| Scale description | Trait ratings | | | Family origin | | | Outcome factors | |
|-------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                   | 1 | 2 | 3 | | 4 | 5 | | 6 | 7 | 8 | 9 |
| Factor scale correlations |
| 1. Social responsibility | — | 0.40 | 0.18 | | 0.02 | 0.17 | | 0.08 | 0.00 | 0.14 | 0.04 |
| 2. Intellectual determination | 0.44 | — | 0.40 | | 0.09 | 0.06 | | 0.11 | 0.12 | 0.04 | 0.07 |
| 3. Sociability | 0.28 | 0.48 | — | | 0.05 | 0.08 | | -0.03 | -0.10 | 0.07 | -0.02 |
| 4. Parental education | -0.04 | 0.02 | 0.00 | | — | 0.04 | | 0.26 | 0.16 | -0.01 | 0.13 |
| 5. Family harmony | 0.10 | 0.03 | 0.02 | | 0.07 | — | | 0.09 | -0.13 | 0.27 | 0.01 |
| 6. Educational attainment | 0.16 | 0.06 | -0.11 | | 0.29 | 0.06 | | — | 0.35 | -0.04 | 0.62 |
| 7. Intellectual skill | 0.07 | 0.11 | -0.14 | | 0.14 | -0.07 | | 0.33 | — | -0.20 | 0.30 |
| 8. Personal adjustment | -0.03 | -0.08 | -0.08 | | -0.08 | 0.27 | | 0.07 | -0.10 | — | -0.02 |
| 9. Occupational achievement | 0.06 | 0.12 | -0.05 | | 0.01 | -0.04 | | 0.30 | 0.20 | 0.02 | — |

<table>
<thead>
<tr>
<th>Factor scale standard deviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
</tr>
<tr>
<td>Women</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor scale reliabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
</tr>
<tr>
<td>Women</td>
</tr>
</tbody>
</table>

Note. Men’s correlations are above the diagonal; women’s correlations are below. ns = 397 men and 316 women.

The null model was tested first (see Table 5). The resulting $x^2 (46, N = 713)$ of 435.28, $p < .001$, suggests that the assumption of no longitudinal relations is untenable and that the estimation and evaluation of other models are warranted.

The first substantive model (Model 1 of Table 5) allowed free estimation of all significant directed longitudinal relationships independently for men and women. Model 1 resulted in eight common paths between the men’s and the women’s models with one unique path in each of the two groups. The eight common paths that emerged for Model 1 are represented by the single headed arrows in Figure 1 and are labeled $\beta_1$, $\beta_2$, $\beta_4$, $\beta_5$, $\beta_6$, $\beta_8$, $\beta_9$, and $\beta_{10}$. The one unique path for the women’s data was path $\beta_3$, Sociability to Educational Attainment, and the one unique path for the men’s data was path $\beta_7$, Family Harmony to Intellectual Skill. The statistical goodness-of-fit indexes for this model were quite sound, $x^2 (28, N = 713) = 35.78$, $p = .15$, as was the measure of practical fit, $p = .97$, meaning that the reproduced covariances among the nine scales for each group did not differ significantly from the actual covariances.

The second substantive model, Model 2 of Table 5, allowed the free cross-group estimation of the unique paths found in the male and female samples and was designed to evaluate the relative significance of any unique paths found. In this model, the path that was unique for the women ($\beta_3$) was estimated for the men, and the unique path for the men ($\beta_7$) was estimated for the women. Because Model 2 allowed the two unique relations found among the men and women to be freely estimated in the other group, a cross-group equality constraint for either of the estimates would be a one-degree-of-freedom chi-square test of the significance of the equality of the corresponding parameters. For path $\beta_3$, which was significant for the women, the equality constraint did not significantly alter the level of fit, $x^2 (1, N = 713) = 0.48$, $p = .49$, which suggested that the respective magnitudes of the relations are equivalent for both sexes. Similarly, the equality constraint applied to path $\beta_7$, which was significant for the men, did not reduce the level of fit, $x^2 (1, N = 713) = 1.44$, $p = .23$. Furthermore, for both constrained paths, the LISREL $t$ values were significant. Given these results, we can conclude that both paths reflect a relationship that is reliable and equal for both sexes.

The third substantive model (Model 3 in Table 5) equated the corresponding path coefficients that were common to men and women. At the same time, Model 3 allowed the two estimates unique to one sex or the other to be freely estimated. The statistical fit indexes for Model 3 are also quite sound, $x^2 (34, N = 713) = 36.58$, $p = .35$, and the practical fit is even

Table 5
Summary of the Goodness-of-Fit Statistics for the Models Tested

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Derivation sample</th>
<th>Validation sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$x^2$</td>
<td>df</td>
<td>$p$</td>
</tr>
<tr>
<td>0</td>
<td>Baseline, null model</td>
<td>438.28</td>
<td>46</td>
</tr>
<tr>
<td>1</td>
<td>Independent estimation</td>
<td>35.78</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>Freed cross-estimation</td>
<td>31.88</td>
<td>26</td>
</tr>
<tr>
<td>3</td>
<td>Equating 8 parameters</td>
<td>36.58</td>
<td>34</td>
</tr>
<tr>
<td>4</td>
<td>Equating 10 parameters</td>
<td>38.52</td>
<td>36</td>
</tr>
</tbody>
</table>
higher than for Model 1 or Model 2 ($\rho = .99$). Because Model 3 is nested within Model 2, the goodness of fit indexes between the two models are directly comparable. Hence the difference in the chi-square statistic between the two substantive models is also distributed as a chi-square, and a statistical test of the decrease in fit from the less constrained Model 2 to the more constrained Model 3 can be evaluated. The resulting probability of $.79$, $\chi^2(8, N = 713) = 4.70$, indicates that constraining the path coefficients to equality across groups led to a nonsignificant decrease in the statistical fit. Although this finding alone might argue for Model 3, comparisons of Models 2 and 3 with the null model showed that Model 3 led to an improvement in practical fit from a $\rho$ value of .97 to one of .99.

In Model 4, all estimated paths, whether common or unique, were equated. This model produced the level of fit that was strongest both statistically, $\chi^2(36, N = 713) = 38.52$, $p = .36$, and practically, $\rho = .99$. Because Model 4 is a theoretically more parsimonious and constrained representation of the structural relations among the factor scale constructs, and because the level of fit of Model 4 was moderately better than that of Model 3—that is, the difference in statistical fit was nonsignificant, $\chi^2(2, N = 713) = 1.94, p = .38$—Model 4 was deemed the most appropriate representation of the data. Constraining the common paths to be of equal effect is also a form of cross-validation for the generated model. In this case, the set of equaled path coefficients represented equally well the structural relations among the five predictor and four outcome constructs, and these relations held for both men and women.

Figure 1 provides a pictorial representation of the specified relations for Model 4 and includes the estimated path coefficients from the standardized solution (with the standard errors of these coefficients enclosed in parentheses). The 10 directed paths in Figure 1 represent significant longitudinal relations spanning 40 years from childhood to adulthood. The 10 path coefficients presented indicate the direction of the significant ($t > 2.00, p < .05$) relationships between the predictor and outcome constructs. One may assess the relative magnitude of these directed relationships by multiplying the path coefficients by the standard deviation of the scale where the path originates. The estimate of effect size indicates the expected change in an outcome scale, given a one-unit or one standard deviation change in a predictor scale. However, indirect effects would be mediated through the intercorrelations among the predictor constructs (see Table 4). The most significant correlations were among the three personality constructs for both
men and women. Similar correlations (.25 to .45) among traits are very common in the psychological literature. However, the intercorrelations among the three intermediate outcome scales (Scales 6, 7, and 8) were residual variance intercorrelations. For these scales, the highest intercorrelations were between Intellectual Skill and Educational Attainment for both men (r = .35) and women (r = .31). The residual variance of Personal Adjustment was not strongly related to either Intellectual Skill (rs = -.19 for men and -.10 for women) or Educational Attainment (rs = -.06 for men and .10 for women).

The strength of the relations depicted in Figure 1 is examined more completely in Table 6, in which the size of the effect for each estimated path is calculated and presented. The effect size estimates indicate the relative strength of the relationship among the scales that predict a specific outcome. The effect sizes, then, can be compared for that outcome variable. However, the effect size comparison is valid only for within-group comparisons. In this case, the effect sizes can be compared only within the women's sample or the men's sample, but not across the two groups.

In order to compare across groups, the amount of variance explained by a path coefficient needed to be calculated (see Table 6). Path β1, for example, explained 2.76% and 1.84% of the variance among women and men, respectively. These estimates of explained variance were semipartial estimates and thus were not completely unique influences.

Given the relations that emerged in Model 4, what can be said about the prediction of Occupational Achievement, Educational Attainment, Intellectual Skill, and Personal Adjustment?

Predictors of Educational Attainment. The first path in Figure 1, β1, described the importance of Social Responsibility for Educational Attainment among both men and women. In Table 6, which can be read in concert with Figure 1, we present the positive and negative effects per unit of change (see Scale SD in Table 6) for each path. For example, the Social Responsibility factor among women resulted in an increase in the Educational Attainment scale of .76, given a unit change of 5.16, and explained 2.76% of the variance. For the men, Social Responsibility explained 1.84% of the variance. Path β3 described the negative effect in the Educational Attainment scale that resulted from a unit change in the Sociability scale. This path explained 1.02% and 1.33% of the Educational Attainment scale variance for men and women, respectively. Path β5 described the common influence of Parental Education on Education Attainment. For the women, this path explained 9.70% of the variance in Educational Attainment. For the men, this effect accounted for a more modest 6.52% of the variance. Overall, the three predictors of Educational Attainment explained a total of 12.25% of the variance in the women's data and 8.81% of the variance in the men's data.

Predictors of Intellectual Skill. Four paths, common to both men and women, predicted Intellectual Skill across the approximately 40-year time span. The first predictor, Path β2, reflecting the influence of Intellectual Determination on Intellectual Skill, explained 3.45% of the variance for women and 3.21% for men. The second predictor, Path β4, described a negative effect for the influence of Sociability on Intellectual Skill and explained 3.61% of the variance in the women's sample and 3.95% of the variance in the men's sample. The third predictor of Intellectual Skill, Path β6, was Parental Education. This path explained 2.27% of the variance in the women's sample and 2.18% of the variance in the men's sample. The last predictor of Intellectual Skill, Path β7, explained 1.70% of the variance for women and 1.37% of the variance for men. The four common predictors of intellectual skill explained a total of 7.46% of the variance in the women's data and 7.99% of the variance in the men's data. The semipartial estimates of variance explained by each of the four predictors sums to 11.03% for women and 10.71% for men, which suggests that suppression effects have occurred because of the multicolinearity among the predictor scales (Cohen & Cohen, 1983).

Predictors of Personal Adjustment. Only one scale, Family Harmony, predicted Personal Adjustment. However, the single path β8 explained 7.88% of the variance for women and 6.93% of the variance for men.

Predictors of Occupational Achievement. The two remaining paths presented in Figure 1, β9 and β10, represent the direct effects of Educational Attainment and Intellectual Skill.

---

Table 6

<table>
<thead>
<tr>
<th>Predictor scale</th>
<th>Path</th>
<th>Outcome scale</th>
<th>Women (n = 316)</th>
<th>Men (n = 397)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Path weight</td>
<td>Scale SD</td>
<td>Effect size</td>
</tr>
<tr>
<td>Social responsibility</td>
<td>β1</td>
<td>.15</td>
<td>5.16</td>
<td>0.76</td>
</tr>
<tr>
<td>Sociability</td>
<td>β3</td>
<td>-1.1</td>
<td>5.62</td>
<td>-0.60</td>
</tr>
<tr>
<td>Parental education</td>
<td>β5</td>
<td>.28</td>
<td>8.29</td>
<td>2.29</td>
</tr>
<tr>
<td>Intellectual determination</td>
<td>β2</td>
<td>.18</td>
<td>6.65</td>
<td>1.21</td>
</tr>
<tr>
<td>Sociability</td>
<td>β4</td>
<td>-1.9</td>
<td>5.62</td>
<td>-1.10</td>
</tr>
<tr>
<td>Parental education</td>
<td>β6</td>
<td>.15</td>
<td>8.29</td>
<td>1.23</td>
</tr>
<tr>
<td>Family harmony</td>
<td>β7</td>
<td>-1.2</td>
<td>6.09</td>
<td>-0.75</td>
</tr>
<tr>
<td>Family harmony</td>
<td>β8</td>
<td>.27</td>
<td>6.09</td>
<td>1.65</td>
</tr>
<tr>
<td>Educational attainment</td>
<td>β9</td>
<td>.36</td>
<td>8.43</td>
<td>3.07</td>
</tr>
<tr>
<td>Intellectual skill</td>
<td>β10</td>
<td>.08</td>
<td>9.28</td>
<td>0.71</td>
</tr>
</tbody>
</table>

Note: The 10 paths listed correspond with the 10 directed arrows of Figure 1.
on Occupational Achievement. The first path, $\beta_9$ from Educational Attainment, explained 6.16% of the Occupational Achievement variance in the women's model and 34.69% of the variance in the men's model. The final path presented in Figure 1, $\beta_{10}$, depicts the relatively weak effect of Intellectual Skill on Occupational Achievement and accounts for .34% of the women's and 1.34% of the men's Occupational Achievement variance.

Validation of the Final Model

The final step of the analysis was a cross-validation of the results with a second sample composed of one third of the subjects (198 men and 158 women). All models that were specified for the derivation sample were fit to the validation sample (see Table 5). Overall, the validation sample yielded a level of fit comparable with that described for the derivation sample. Eight of the paths identified in the derivation sample were significant in the validation sample. Seven of these were significant for both men and women. One path was only significant for the men, but it emerged in both the derivation and validation samples. The cross-validation indicated that 2 of the 10 paths (Paths $\beta_1$ and $\beta_3$) identified in the derivation sample fell to nonsignificance in the smaller validation sample. The lack of significance represents a failure to replicate, and thus these two paths should be considered of minor importance. Overall, the remarkable consistency of the eight bold paths depicted in Figure 1 suggests that these paths are robust longitudinal relations for this cohort of gifted men and women.

Discussion

Predicting life outcomes over a 40-year period is an ambitious task. In this particular cohort, societal events, such as the Depression and a world war, intervened and interrupted the educational and occupational goals of many of these gifted men and women (Terman & Oden, 1947). Added to these major societal events, which affected both sexes, was a cultural zeitgeist that differentially mediated the educational and occupational success of men and women (Elder, 1985; Tomlinson-Keasey, 1990). At a more individual level, family responsibilities, the existence or lack of support systems, and periodic tragedies shifted men's and women's educational and occupational plans (Stroud, 1981; G. Vaillant, personal communication, January 1988). Although these and many other idiosyncratic forces were not measured in this study and hence swayed the outcomes in unknown ways, the predictive power of several constructs suggested by decades of psychological research were assessed over a 40-year-period.

Personal adjustment during adulthood had a single important predictor for both men and women, and that was the harmony that existed in the family of origin. This predictive path replicates similar findings in other contemporary longitudinal findings (D. Baumrind, personal communication, November 1986; J. Block, 1985; Vaughn, Block, & Block, 1988). In our study, the effect of the bond between family members was maintained over a 40-year period and continued to influence adult adjustment well after the period of direct family influence ended. This result extends J. Block's (1971) conclusion that competent adults come from families in which the father and mother have a positive relationship and are affectionate with and available to their children. Surprisingly, the child's Sociability did not predict the adult's Personal Adjustment. The correlations for both men and women were close to zero.

Intellectual Skill in adulthood was another outcome of interest. How well did these children, identified as gifted at age 11 or 12, maintain their intellectual superiority as adults, and what variables predicted their continuing interest in the intellectual sphere? For both sexes, three factors predicted Intellectual Skill in adulthood. Parental Education and Intellectual Determination were positively associated with maintaining intellectual skills; Sociability was negatively associated with maintaining intellectual skills. The first two findings were expected. Parental Education has appeared repeatedly in the literature as one of several indicators of the family's socioeconomic status and is often depicted as an indicator of the value that parents place on education (see Henderson, 1981; White, 1982; Willerman, 1979). When parents place a premium on education, this attitude pervades the home environment and becomes a part of the child's value structure.

Intellectual Determination during childhood has appeared, under other rubrics, as a predictor of Intellectual Skill among adults. J. Block (1981) reported that for men, a "high aspiration level" remains relatively stable over a 40-year period, as do responses to the statement "genuinely values intellectual and cognitive matters." Kagan and Moss (1962) and J. Block (1971) found that "achievement behavior" remains part of a person's behavior pattern throughout life. J. Block (1971) noted that such behavior is consistent for both sexes and, across two longitudinal studies, a "uniformity of relationship that is rare" (p. 79). Our investigation adds a third longitudinal study documenting the importance of personal determination in maintaining intellectual skills and interests.

An unexpected result in our study indicated that the Sociability of the child had a negative effect on Intellectual Skill among adults. Furthermore, this relationship held for both sexes and across both the derivation and validation samples. In other words, children who were popular, enjoyed good health, radiated physical energy, and maintained a cheerful and optimistic attitude were less likely to maintain their intellectual skill as adults, whereas less popular children were more likely to evidence intellectual interests as adults. How might such social skills detract from intellectual pursuits? Several authors have reported that being somewhat isolated as a child seems to direct gifted persons toward intellectual endeavors (Albert & Runco, 1986; McCurdy, 1957; Roe, 1953). Albert (1978) discussed the importance of the "capacity to think and work alone" as an instigator of creative thoughts. An alternative explanation focuses on the fact that the less sociable children often had extensive interaction with adults. The intellectual pattern of their lives could easily have been formed by their association with adults rather than by the isolation from peers. The biographies of many eminent people reveal a prominent adult who funneled the energies of the child into scientific and creative outlets (Albert, 1978). In
addition, gifted men and women who achieved eminence often had parents who devoted an almost missionary zeal to their child's education (Albert & Runco, 1986).

Perhaps the finding that childhood sociability is negatively correlated with adult intellectual skill represents a straightforward decision by the person to pursue excellence in interpersonal realms. Children who learn to enjoy and value social outlets may become less involved with intellectual matters. This explanation seems particularly appropriate for the Terman women. Intellectual outlets were not conspicuous in many of these women's lives, and their intelligence became organized around social ventures (Tomlinson-Keasey, 1990).

A final significant path for intellectual skill appeared only among the men in the sample. Family harmony detracted from the boys' ability to maintain their intellectual talent as adults. The effect is small and may well be an extension of the sociability finding in the sense that some conflict in the home may draw a child toward more isolated and intellectual pursuits. Albert (1978), however, cited a sizable literature on creative and eminent adults and argued that the "creative person-to-be comes from a family that is anything but harmonious—one which has built into its relationships, its organization of roles, and its levels of communication a good deal of tension if not disturbances at time" (p. 203). In contrast, J. Block (1971) and Bayley and Schaefer (1964) discussed the vital impact of a positive home environment on boys' intellectual development. Working with longitudinal data sets, they argued that nurturing environments provide a base from which intellectual skills proceed. Perhaps the family dynamics that foster eminence among men differ from the family dynamics that foster more customary intellectual achievement. An equally plausible explanation is that gifted individuals require more stimulation to realize their potential, and a home with some conflict provides that stimulation. Looking at the issue from a developmental perspective, one might also hypothesize that nurture and support are important during the early years for boys, but an environment with texture, with challenges and pitfalls, is more likely to foster intellectual striving among young adults. In any case, Albert's suggestion to look very carefully at the families of gifted children seems to be an appropriate way to begin to resolve the issue.

Educational attainment was a third outcome of interest in our study. Current literature suggests that many able subjects are not reaching their cognitive potential (DeLeon & VandenBos, 1985). Identifying the factors that predict such attainment may suggest educational strategies that will foster achievement. Parental Education was the single determiner of Educational Attainment that emerged from the derivation and validation samples. Furthermore, Parental Education was significant for both the men and the women in the study. This finding indicates that parents model the appropriate behavior, and well-educated parents have high expectations concerning their child's Educational Attainment.

The Educational Attainment of the Terman subjects, not unexpectedly, exceeded the educational attainments of their less gifted peers. Only 12 of the 1,528 subjects did not graduate from high school (9 of those 12 were women). Approximately 70% of the men and 67% of the women graduated from college. Comparable figures for the general population in California at that time indicated that 8% graduated from college (Terman & Oden, 1947). The educational attainment of the men and women diverged more sharply in graduate school. Almost 40% of the men did some postgraduate work, in comparison with 22% of the women. The women's postgraduate education was usually more limited in scope; women sought a master's degree or a particular credential, whereas men pursued law degrees, medical degrees, and PhDs. These highly intelligent subjects showed much less variance in Educational Attainment than a more average sample of students. Despite the restriction of range in Educational Attainment evidenced by the gifted subjects in the Terman sample, parental education remained a differentiating variable. One might expect that Parental Education would assume even more importance among a less able sample and one not so thoroughly studied. Although two other paths involving personal traits predicted Educational Attainment among the derivation sample, these paths were not replicated in the validation sample and hence were not examined further.

Occupational Achievement was the final outcome of interest in our study. The current complex, technologically sophisticated, and internationally interdependent society depends on highly able adults who use their education productively to shape the society. Occupational Achievement was expected to be predicted by the three mediating factors, Educational Attainment, Intellectual Skill, and Personal Adjustment, as well as a constellation of childhood traits indicating Intellectual Determination. However, only Educational Attainment and Intellectual Skill proved to be significant paths. The correlation between Educational Attainment and Occupational Achievement was .60 for the men, and that particular pathway accounted for 34% of the variance in the men's Occupational Achievement. Among the women, the correlation was .30, and the pathway from Educational Attainment to Occupational Achievement accounted for only 6% of the variance. The sex difference was expected, given that the cultural zeitgeist made it difficult for the women in the Terman study to transform their educational skills into occupational success.

Intellectual Skill was a significant but small factor in the Occupational Achievement of the men (r = .30) and the women (r = .20). The fact that all of the subjects were gifted and had ample intellectual skill probably accounts for this small relationship. Among subjects who exhibited a full range of intellectual skills, this relationship would surely be more compelling. Personal Adjustment did not yield a significant pathway to Occupational Achievement for either the men or the women.

Our study details eight pathways that describe significant relationships that endured over 40 years. Two reasons for the small effect sizes could be suggested. First, the statistical procedures used were conservative in that the analyzed covariances were not corrected for attenuation. Performing such corrections would have increased the "apparent correspondence" for all paths (J. Block, 1964). A second reason for the small effect size is the duration of the study. Trying to predict adult outcomes from selected data gathered during the elementary years assumes some canalization for complex, mul-
tificates outcomes. One might reasonably argue that finding any significant paths over a 40-year period is surprising. Despite the significance of these paths, the results certainly indicate that adult Intellectual Skill, Educational Attainment, Occupational Achievement, and Personal Adjustment are not highly canalized and that a variety of other variables and experiences at different points during development may well have a significant impact on the adult's achievements.

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