CHILDHOOD PERSONALITY, COGNITIVE ABILITY, AND MORTALITY:

Analyses from Project Talent

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Abstract

Researchers have shown that childhood cognitive ability and personality predict mortality, although the mechanisms by which they operate remain largely undetermined, and relatively few nationally representative longitudinal studies exist that enable the examination of both measures and their effects on mortality. In this paper, we present findings from a mortality-linked, nationally representative subsample of Project Talent participants, a longitudinal study of a cohort of American high school students in 1960. Our findings indicate that for white, non-Hispanic males, personality – particularly impulsiveness - predicts mortality, and suggest different effects by race/ethnicity, Among males, cognitive ability does not predict mortality. Findings for women indicate that one domain of cognitive ability – abstract reasoning - predicts decreased risk of mortality, but that personality does not predict mortality. These results demonstrate the ability of personality and cognitive ability to predict mortality over a 40-year span, and introduce researchers to a new, longitudinal source of data on mortality.

Introduction

Over the past two decades researchers have established links between early cognitive ability, personality, and mortality (Batty, Deary, and Gottfredson, 2007; Kern and Friedman 2008, Roberts et al, 2007). With the links well established across a range of diverse samples, more recent research has focused on understanding the specific causal mechanisms that affect health and mortality, including specific cognitive domains and personality traits, as well as factors that may moderate or mediate these effects. A diversity of samples has led to findings with differences in the effects of IQ and personality on mortality depending on the domains being measured, age at time of assessment, the time span and age range for which mortality is assessed, and the consideration of mediating and moderating factors (Batty, Deary, and Gottfredson 2007; Kern and Friedman 2008).

However, there remains a relative scarcity of nationally representative mortality studies that include measures of both IQ and personality assessed early in life. Batty, Deary, and Gottfredson (2007) note that most samples are not U.S.-based and are largely Caucasian, and relatively few are representative of a national population. In this paper, we present preliminary findings from a mortality-linked subsample of data from Project Talent, a nationally representative sample of a cohort of high school students in1960. We examine the effects of personality and cognitive ability assessed in mid to late adolescence on mortality between approximately ages 30 and 70. Assessments of personality and cognitive ability, along with a range of self-reported demographic information, were collected when the subjects were in high school. Follow-up surveys captured information on educational and occupational attainment, family formation, and health behaviors in subsequent years, which allows for an analysis of the role of behavioral and socioeconomic factors.

Childhood cognitive ability and personality, and their relationship with adult mortality

The relationship between IQ and mortality has been studied at length since the 1980's, and research shows a consistent inverse relationship between cognitive ability and longevity (Batty Deary and Gotfredson 2007). Regardless of the time point at which IQ is measured, and across a range of different measures, researchers have consistently found that greater IQ predicts mortality, including all-cause and cause-specific mortality.

Liu et al. (1990) found that cognitive ability measured in adulthood predicted mortality over an 8-10 year span in a sample of over 2,000 participants in the Framingham Heart Study. They found that those adults who scored in the bottom quartile on a composite score of cognitive ability had relative risks of mortality between 1.3 and 1.7 times higher than those who scored in the top quartile.

Wilson et al. (2009) studied a sample of older adults in the Chicago area, and found that cognitive ability was inversely related to mortality over a 14-year span. They found that the association did not differ for whites and blacks, but that it was stronger among the older adults in their sample, and the relationship was more pronounced for their measure of perceptual speed than it was for other cognitive measures assessed.

Hart et al. (2003), in their analysis of data from the Scottish Mental Studies – Midspan linkage, found that childhood IQ predicted mortality in a sample of adults first assessed at approximately age 11 in 1921, and then followed for 25 years starting in the mid-1970's. They found that a one standard deviation decrease in IQ was associated with a 17% increase in the risk of mortality over the 25 year period, and that after controlling for possible intervening factors, a 12% increase in mortality risk remained.

Cognitive epidemiologists propose different mechanisms by which IQ affects longevity. Deary (2005) suggests four possible ways that IQ may affect mortality. He proposes that higher IQ individuals attain higher levels of education and occupations that situate them in healthier environments, which decreases the risk of mortality. Another mechanism is that higher IQ individuals engage in healthier behaviors, leading to increased longevity, A third mechanism is that lower IQ reflects the effect of earlier (including pre-natal) insults to the brain. A fourth mechanism is that higher IQ is a reflection of a generalized level of "system integrity," which enables individuals to more effectively cope with future stresses and therefore increases longevity. While researchers have consistently found that cognitive ability predicts longevity, there is less consistent evidence regarding the mechanisms.

Osler et al. (2003) examined the relationship between early life SES, birth weight, childhood cognitive ability, and adult mortality in a longitudinal sample of Danish Males who were assessed at age 12 and whose mortality was determined as of 2002 (when the oldest would have been approximately 49 years old). They found that cognitive ability predicted mortality, even after controlling for early life SES and birth weight. Specifically, they found that men in the lowest quartile of ability were at higher risk of all-cause mortality between ages 15 and 49 than were those males in the highest quartile. Their analysis suggests support for the effects of early life disadvantages, but did not have mid-life outcomes to allow for an examination of other possible mechanisms.

Hemmingsson et al. (2006) examined IQ in late adolescence, early SES, later SES (at approximately age 35) and mortality over 30 years in a sample of Swedish males assessed at ages 18-22 and followed through mortality in 2000 (when the oldest would have been 51 years old). They found that IQ predicted mortality, that controlling for early SES had little effect on the predictive power of cognitive ability, and that further controlling for mid-life SES had no effect on the relationship between cognitive ability and mortality.

Kuh et al. (2004) assessed IQ in a sample of males and females at age 8, along with measures of prior health and socioeconomic status (SES), later educational attainment and SES, and followed the sample through age 54. They found that men in the bottom quartile of cognitive ability were nearly twice as likely to die by age 54, but did not find an effect for women. Further, their analyses considered whether prior health and SES accounted for the observed relationship between cognitive ability and mortality. They found that both poor health and low SES in early childhood were associated with mortality, and that for men, these factors slightly attenuated the effects of cognitive ability on mortality, but that independent effects remained. They considered possible intervening factors – educational attainment, adult SES, and smoking – and found that for males, when controlling for educational attainment and adult SES, the effect of childhood IQ on mortality was no longer significant, while controlling for smoking behavior had no such effect. They concluded that their work supported the model whereby early cognitive ability predicts entry into safe, healthy environments, which in turn reduces the risk of mortality through midlife.

Hauser and Palloni (2010) propose that "the effects of IQ are mediated by variables that could be correlated with it, but also represent traits quite different from intellectual skills and are more suitably thought of as indicators of character and personality as well as behaviors during adulthood." In their analysis of data from the Wisconsin Longitudinal Study, they found that class rank consistently explained the effects of IQ on both health behaviors and subsequent mortality. They conclude that the "leading candidate to explain the IQ-survival relationship would appear to be lifelong attitudinal and behavioral patterns that contribute both to academic success in secondary school and to systematic accumulation of health benefits."

Researchers have emphasized the role of personality on longevity through behaviors (including, but not limited to, health behaviors) that maximize benefits and minimize risks to longevity (Bogg and Roberts 2004) or through increased capability to successfully cope with negative events (Danner, Snowden and Friesen 2001). Over the past 30 years there have been a number of studies that address this question (Roberts et al. 2007), although, as with studies of IQ and mortality, there are relatively few longitudinal studies of mortality that assess childhood personality.

Danner, Snowden and Friesen (2001) found that positive emotion assessed in early adulthood was associated with a decreased risk of death between age 75-93, even after controlling for educational attainment. However, not all personality domains have consistent findings. For example, some studies have reported that neuroticism is associated with an increased risk of mortality (Christensen et al. 2002), while others have shown a protective effect of neuroticism (Friedman and Martin 2011, Weiss and Costa 2005). Research on the effects of hostility on mortality suggests the possibility of different results depending on the age at measurement. For example, while a number of studies show that hostility measured in adults is associated with an increased risk of mortality (e.g. Barefoot et al, 1995), results are more mixed in research where hostility is assessed at younger ages; some research (e.g., Barefoot, Dahlstrom, and Williams 1983; Barefoot et al 1989) shows that high levels of hostility in young adults are associated with increased risk of all-cause mortality, but other research (McCranie et al 1986; Hearn et al 1989) finds no such effect.

More recently, the personality domain of conscientiousness has been an area of research interest, and has been shown to predict decreased risk of mortality (Kern and Friedman 2008). Weiss and Costa (2005) showed that conscientiousness is associated with decreased risk of all-cause mortality over five years in a sample of older adults (age 65-100). Terracciano et al (2005) followed adults ranging from 18 to 98 years of age over a 50 year period as part of the Baltimore Longitudinal Study of Aging, and found that conscientiousness (in addition to facets of extraversion and low neuroticism) predicted decreased risk of mortality, with these effects operating largely independent of other factors, such as smoking and obesity. Hill et al. (forthcoming) showed an association between conscientiousness and mortality, even after controlling for demographic measures, cognitive functioning, and health conditions. They also found that conscientiousness did not predict health conditions, but did predict cognitive functioning, and suggested a possible indirect effect of conscientiousness on mortality, through increased cognitive ability.

The emergence of the Terman Life-Cycle Study, which followed a sample of intellectually gifted children from approximately age 11, provided researchers with a rich source of data on early life events and mortality provided. Friedman et al. (1995) examined personality, assessed at age 11, and mortality in the Terman sample, examining mortality when surviving respondents would have been approximately 80 years of age. They found that personality, life stressors (such as parental divorce) and health behaviors (such as smoking and excessive alcohol consumption) maintained independent effects on mortality and did not show an indirect effect of personality on mortality through health-related behaviors. In a later analysis of the Terman data, Kern et al. (2009) examined the association between conscientiousness, occupational success, and mortality through approximately age 95. They found that both conscientiousness and occupational success predicted mortality and that conscientiousness attenuated the negative effects of low occupational success. While studies based on the Terman data have shown the role of early personality in predicting longevity, the sample is restricted to intellectually gifted individuals, and is not representative of the national population.

Deary et al. (2008) examined data from the nationally representative Scottish Mental Survey of 1947. Children were assessed at age 11, and periodically re-contacted through 1963 (at approximately age 27); death was ascertained as of 2003. Their analysis showed that childhood dependability (comprised of perseverance, stability of mood, and conscientiousness) and IQ predicted mortality, even after controlling for demographic factors such as educational attainment and later SES.

Researchers have attempted to disentangle the effects of both IQ and personality on mortality, and determine how prior or intervening factors may affect these relationships (for example, see Hauser and Palloni 2010). One of the difficulties of addressing these questions is insufficiencies in the available data, which often suffers from significant limitations that affect the type of hypotheses that can be tested or the extent to which conclusion can be generalized to the population. Many longitudinal studies of mortality consist of cohorts of older adults at the time of sampling; by the start of the study, a significant proportion of the birth cohort represented by the sample are already deceased, data must be gathered retrospectively, and cognitive decline may have already begun. Often these studies consist of samples that are limited in the population from which they are drawn (e.g., college students, intellectually gifted children, military veterans, or participants in health-related studies). There are some notable exceptions, including studies such as the Wisconsin Longitudinal study and the Scottish Mental Studies, but caution must be taken in applying conclusions drawn from these studies to the U.S. population, in part or in whole. Because of the difficulty of fielding a prospective, longitudinal study of aging, there are currently few studies that meet the necessary criteria – well-designed measures of both cognitive ability and personality, measures of early- and mid-life experiences, and a representative sample; to our knowledge there is no study that meets this criteria for the U.S. population.

Research questions

In these first results from the mortality-linked 1% subsample from Project Talent, we provide findings from our analysis of the effects of personality and cognitive ability on mortality in a nationally representative sample of a 1960 cohort of American high school students. In doing so, we address the following questions:

Do personality and cognitive ability, measured in adolescence, predict mortality occurring between approximately ages 30 and 70?

Do the effects of personality and cognitive ability on mortality differ by race/ethnicity?

How do behavioral measures, such as high school academic performance, and mid-life measures such as marital status and educational attainment, affect the relationship between personality, cognitive ability, and mortality?

Methods

Data

Data from these analyses come from a 1% subsample of Project Talent. Project Talent is a large, nationally representative longitudinal study of men and women who were in high school in 1960 and who are now in their mid-to late-60s. Conducted by the American Institutes for Research (AIR), Project Talent collected extensive information on characteristics and cognitive abilities of approximately 440,000 high school students in 1960. Subsequent follow-up studies collected data on the students' educational, career, and personal experiences through approximately age 30.

In the spring of 1960, Project Talent participants completed a battery of tests and inventories designed to provide baseline data on the aptitudes and abilities of these individuals, and assess their interests and various personal characteristics. The four half-days of testing included measures of language and mathematics, interests, reasoning ability, and educational aspirations. In addition to the aptitude and ability tests, students filled out a 394-item questionnaire that collected information about student and family characteristics, health, activities in and outside school, and future plans for college, military service, career, and family. In subsequent follow-up interviews, conducted 1, 5, and 11 years after high school graduation, Project Talent participants were asked about their postsecondary education and work experiences, personal life, future plans, aspirations, and quality of life. For more information on Project Talent, including the ability and personality assessments, see Flanagan et al. (1962), Wise, McLaughlin, and Steel (1979), or www.projecttalent.org.

The 1% sample is a subset of the full Project Talent file, with cases selected such that it is representative of the population. To be included in this subsample, the case had to have data from the 1960 base year data collection, and have completed the the 1-, 5-, and 11-year follow-ups. Thus, all subjects in these analyses were alive when they were approximately 30 years old.[1]

Measures

Mortality

Mortality status was determined as of December 1, 2010. Project Talent cases were matched to death records using multiple methods. First, we contracted with LexisNexis to provide information on confirmed deaths as part of ongoing respondent tracing activities. We provided LexisNexis with respondent Social Security Numbers (SSNs), name (including first, middle, and last name as provided in 1960 as well as additional name information acquired as part of tracing activities through the late 1970's), date of birth, and last known

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[1] This requirement enables researchers to conduct analyses using data collected through age 30, but has implications for analyses due to sample attrition over time. This is further discussed in the Limitations section of this paper.

address. LexisNexis identified 268 of the 4,000 records as deceased and provided dates of death for these cases.

Next, we obtained the Social Security Administration's Death Master File (DMF), which provides information on deaths through December 2010. All cases in the one percent file were matched to the DMF using a combination of SSN, subject's first, middle, and last name in 1960 (along with any additional name information), and date of birth. Matching by these criteria produced considerable overmatching, including a few instances in which multiple Project Talent records were matched to a single DMF record, and many instances where multiple DMF records were matched to a single Project Talent record. All possible matches were manually inspected. Records were sorted and classified according to their probability of being "true" matches. We classified 399 records as confirmed deaths because they matched on 8 or 9 digits of the SSN[2], as well as the name and date of birth fields.[3] Another 60 records were classified as confirmed deaths because, while no SSN was available in the Project Talent data, the records matched on name and date of birth; the amount of certainty for these 60 matches depended on the combinations of variables determined to be matches.

An additional evaluation step was taken with 17 cases classified as low certainty matches. Low certainty matches were those cases without an SSN in Project Talent records

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[2] SSNs were available for 84 percent of the cases.

[3] Matches on name and date of birth fields allowed for minor differences, such as differences in spelling or variations (e.g., James vs. Jim), or minor differences in date of birth that could be attributed to typographical errors.

and where some, but not all fields matched between Project Talent and the DMF (for example, a case without a SSN in Project Talent matched a record in the DMF by name, but the date of birth fields did not entirely match, or the dates of birth matched exactly, but the DMF records contained only the initials for the first name). Since there was no SSN in the Project Talent records, the evaluator attempted to obtain the SSN in Microbilt[4] using the existing name and date of birth information. The resulting SSNs were then matched to the DMF and reevaluated. Of the 17 records reviewed in this step, 8 were determined correct matches (deaths), and 9 were determined to not be correct matches (not deaths).

LexisNexis and AIR matches were then compared. LexisNexis and AIR both identified 251 cases as deceased, 17 were identified as deceased by LexisNexis but not by AIR, 213 were identified as deceased by AIR but not LexisNexis, and 3,519 were not identified as deceased by either. The dates of death matched for 246 of the 251 cases identified as deceased by both AIR and LexisNexis; the DMF date of death obtained by AIR was used for the remaining five cases. The date of death returned by both Lexis Nexis and AIR confirmed that one individual was deceased before the 11-year survey;[5] this case was excluded from all subsequent analyses. The 17 records identified as deceased by LexisNexis but not by AIR received additional review. Three of the LexisNexis-only cases had dates of death after December 1, 2010 and were classified as not deceased for these analyses. One was determined to be not deceased, and the classification was changed. The

[4] Microbilt offers commercial applications to access an extensive database of records, including death records.

[5] The 11 year questionnaire was returned indicating that the participant was deceased. The case was classified as an 11-year complete and was eligible for inclusion in the 1% subsample.

final result from the combined matching effort result in 3,532 cases not identified as deceased by either AIR or LexisNexis, 467 cases (11.68%) identified as deceased, and one case omitted because the date of death was outside of the scope of this analysis. The 11.7 percent death rate was lower than the expected 18.0 percent, suggesting that our matching efforts fell short of identifying all deceased persons. While some of the records not identified as deceased are known to be alive,[6] we are not currently able to verify survival status of the majority of the 3,532 cases that were not identified as deceased, and in these analyses all will be assumed to be of undetermined mortality. Table 1 shows the distribution of cases identified as deceased by race/ethnicity and gender.

Personality

In Project Talent, personality was assessed through 10 scales: Sociability; Social Sensitivity; Impulsiveness; Vigor; Calmness; Tidiness; Culture; Leadership; Self-Confidence; and Mature Personality. Our analyses focus on the three personality scales most similar to measures found in the research literature to be associated with mortality: Impulsiveness, Mature Personality, and Calmness. All scales were standardized separately for males and females for these analyses.

Cognitive ability

Cognitive ability is assessed through multiple scales. We conducted exploratory analyses using nine scales that were validated in previous confirmatory and exploratory

[6] As part of our ongoing tracing activities, we have confirmed the live status of many of the participants. However, this information has not been obtained systematically and was not considered for these analyses.

factor analyses (McArdle 2010, McPhee 2010): Vocabulary I (crystallized intelligence); Spatial visualization in 3 dimensions (visualization); Mathematics II (Quantitative ability); Clerical checking (speed); Memory for sentences (Long-term retrieval); Memory for words (Short-term retrieval), Abstract reasoning; Arithmetic reasoning (Mathematical reasoning); and Creativity. These items were standardized separately for males and females for these analyses. Our exploratory analyses indicated that when considered individually, several cognitive ability scales predicted mortality. When considered simultaneously, one measure – Abstract Reasoning – was consistently related to mortality, and was therefore used in these analyses.

Moderating and control variables

Our analyses controlled for demographic factors that have been shown to be related to mortality (Yao and Robert 2008, Hauser and Palloni 2010). For more information on these variables, including the construction of derived variables, see Wise, McLaughlin, and Steel (1979). Distributions of these variables in the subsample used in these analyses as well as the full Project Talent sample are shown in Table 2.

Academic performance. Students' self-reported grades overall, and grades in mathematics, science, foreign language, history/social studies, English, and business/commercial courses were used to create a composite score of overall grades. This score was then categorized into within-school and within-grade level quintiles. Respondents with item missing data (n=284) were retained as a separate category.

Educational attainment. Based on their responses to the 11- or 5-year follow up, respondents were classified as "College or higher," indicating having obtained at least a bachelor's degree, "Some college," indicating attending college but not obtaining a 4-year degree, or "No college." This latter category includes individuals who reported that they did not graduate from high school.

Minority status. Data on the race and ethnicity of respondents were collected in the 5- and 11-year follow up surveys. Respondents were classified as minority or non-minority (i.e., white, non-Hispanic). Race data were not available for 62 persons.

Self-reported health before age 10. The 1960 survey contained a number of questions asking students to report on various aspects of their health, including self-reported "usual health" before age 10 (1=Very poor/poor; 2=Good/Average; 3=Excellent/very good). Due to the relatively high percentage of missing data for this item, (n=462) a separate "missing" category was created and included in these analyses.

Family socioeconomic status. For this analysis, the composite measure representing family's socioeconomic status in 1960 (number of books in home, number of rooms in home, student-reported financial well-being) was categorized into quintiles.

Marital status. Respondents who reported their current marital status as "married" in the 11-year follow up were classified as married. Those reporting that they were separated, divorced or annulled, widowed, or never married were coded as not married. Respondents with item missing data (n=160) were included as a separate category.

Age in 1960. Dates of birth were available for 3,958 of the 3,999 students; self-reported ages at the time of testing were available for another 24. Date of birth was imputed for 17 persons using the grade cohort's modal year and a date of June 15. Over 90 percent of the respondents in the one percent sample were between 28 and 30 years of age at the time of the 11-year follow up survey (mean=28.66, sd=0.75).

Analytic approach

Mortality analyses were carried out using Cox proportional hazards regression models, with the number of days between the respondents' 11-year post-graduation follow-up[7] and either the date of death (if deceased) or December 1, 2010 (if censored) as the time axis. Males and females were analyzed separately. Unless otherwise noted, normalized weights were used in all analyses.

Results

Sample characteristics

As with any longitudinal study, selection bias associated with attrition was a concern in this study. That this subsample contains only cases with complete data for all follow-ups compounds these concerns. To evaluate the amount and effect of selection bias, we compared each of the three samples: base year, 11-year follow up (full), and 11-year follow up (1%). Table 2 shows the unweighted sample sizes, unweighted percentage

[7]Dates of July 1 of 1971, 1972, 1973, and 1974 were used for the 12th, 11th, 10th, and 9th grade cohorts, respectively.

distributions, and weighted percentage distributions for these three samples. For the measures collected in 1960, the weighted distributions across the three samples do not differ appreciably across most of the measures. However, the 1% sample has higher proportions of 10th graders, persons with a lower SES, persons in the bottom class rank quintile, and slightly lower mean scores on the cognitive items compared to the other two samples. For the measures collected in follow up surveys, the weighted distributions between the full 11-year follow up sample and the 1% sample also suggest that the 1% sample has a smaller proportion of people with at least some college. Taken together, these comparisons suggest that the one percent sample provides reasonable sample estimates.[8]

Predictors of survival

Tables 3 and 4 show the estimated parameters of the Cox proportional hazards regression models for men and women, respectively. Within each table, model 1 shows the associations of mortality and the 1960 demographic controls available for this analysis. For men, the results from this model show that early life experiences predict mortality as much as 50 years later. Early childhood health and class rank have strong associations with mortality for males. Relative to males who reported being of good or average health before age 10, the mortality risk is significantly higher for males who reported being of poor or very poor health before age 10 (HR=1.73). The odds of mortality are 53 % higher for males in the bottom quintile of their class relative to those in the middle quintiles. For women,

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[8] Regardless, bias due to sample attrition is addressed in these analyses via two methods: the use of nonresponse adjusted longitudinal weights and the inclusion of a selection bias correction variable in the models. These are discussed further in the Limitations section of this paper.

early socioeconomic status is statistically significant as a predictor of mortality. However, the direction of this relationship is counterintuitive, with females in the highest SES quintile in 1960 having an increased risk of mortality.

Model 2 builds on model 1 through the addition of the abstract reasoning scale. For males, abstract reasoning did not predict mortality, nor did its inclusion significantly affect the association between demographic or class rank measures and mortality. For women, abstract reasoning measured in adolescence is inversely related to mortality, with a 1 standard deviation increase in abstract reasoning associated with a 17% decrease in the risk of mortality between ages 30 and 70. Socioeconomic status remains a statistically significant predictor of mortality for women.

Model 3 includes the personality scales in addition to the variables in model 1. For males, exploratory analyses (not shown) suggested the possibility of differential effects of impulsiveness by race/ethnicity, and therefore an interaction term is included. Consistent with our expectations, there are different effects of impulsiveness on mortality by minority status; the model indicates that holding all other variables constant, personality is associated with mortality such that more impulsive behavior yields an increased risk of mortality for white, non-Hispanic males, but not for nonwhite males.[9]

For women, model 3 indicates no significant association between mortality and impulsiveness, calmness, or mature personality.

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[9] Note that while the effect of impulsiveness on mortality for nonwhite males is negative, although with a significance level of .09 (not shown).

Model 4 includes the measures of cognitive ability as well as personality. For males, abstract reasoning remained nonsignificant as a predictor of mortality. The effect of impulsiveness remains unchanged, with a 1 standard deviation increase in impulsiveness associated with a 22% increase in mortality risk for white, non-Hispanic males. For women, model 4 indicates that when cognitive ability and personality are considered jointly, personality does not predict mortality, while abstract reasoning continues to be associated with decreased risk of mortality.

In Model 5, we consider possible intervening variables – educational attainment and marital status. For males, educational attainment did not predict mortality. However, males that were married at approximately age 30 were at significantly decreased risk of mortality. Further, inclusion of these intervening variables significantly decreases the effect of poor health, suggesting that the effect of early health on mortality operates indirectly, by affecting mid-life experiences, such as the likelihood of being married.

For women, marital status and educational attainment are unrelated to mortality, and early SES remains associated with mortality. Personality remains non-significant as a predictor of mortality, and abstract reasoning continues to be inversely related to mortality risk.

To investigate whether high school academic performance affects the relationship between personality, cognitive ability, and mortality, we ran one additional model. We compared model 5 to an additional model that omitted the 1960 class rank variables (see table 5). In this model without class rank, we found that for men, the mature personality scale was significantly and inversely related to mortality, with a 1 standard deviation increase in mature personality decreasing the risk of mortality by 17%. The inclusion of academic performance in the model reduced the significance of mature personality to less that 0.05. The effect of impulsiveness is not affected by the presence or absence of class rank in the model. For women (not shown) the presence or absence of class rank in the model did not significantly change the effect of abstract reasoning on mortality.

Conclusions

The purpose of these analyses was to determine whether personality and cognitive ability predict mortality, whether these effects differ by race/ethnicity, and to determine whether behavioral measures in early life or intervening experiences affect the relationship between personality, cognitive ability, and mortality. We found that adolescent personality and cognitive ability predict mortality between ages 30 and 70, but with different patterns observed in separate analyses of males and females. For white, non-Hispanic males, impulsiveness increases the risk of mortality, but no such effect was found for non-white males. For females, abstract reasoning is inversely related to mortality risk. As noted, there is evidence of differential effects of personality on mortality by race/ethnicity. Finally, results for males suggest that some personality domains may operate indirectly through behaviors. Although causality cannot be determined, it appears that the mature personality domain may have an indirect effect on mortality, operating through behaviors such as high school academic performance (as measured by class rank). Neither educational attainment nor marital status attenuated the effect of personality on mortality for males.

Limitations

These analyses are preliminary and we are cautious in stating our conclusions. First, the observed mortality rate in our data is about 12%. However, we expect that in the population, the death rate for this cohort is approximately 18%. Because we have not yet confirmed those not identified as deceased as in fact alive, we are likely including deaths with our presumed live cases. As we continue to refine our record linking procedures and verify currently live participants, we will improve the accuracy of our mortality status measures.

Second, this analysis is intended to consider how mid-life measures, such as educational attainment, affect the relationship between personality, cognitive ability, and mortality. Therefore, we chose a subsample of Project Talent with complete data for the 3 follow-up collections (1, 5, and 11 years after high school graduation). As is often the case in longitudinal studies, there was significant sample attrition over time, and presumably those who responded to all data collections differed from those who did not. It is important to note that the longitudinal design of Project Talent incorporated an intensive nonresponse follow-up subsample, with the results used to adjust the longitudinal weights to account for bias. Additionally, we included a sample selection bias correction (Heckman 1979) in the models. However, we expect that some attrition bias was not correctable, and may affect these analyses.

Third, these data represent the cohort of high school students in 1960, and do not include those individuals who should have been enrolled in high school but who either graduated early or who dropped out prior to the ninth grade.

Additionally, we have not yet matched the Project Talent 1% percent file to the National Death Index (NDI) to determine cause of death, and therefore cannot at this time distinguish between accidental and health-related deaths.

Issues of measurement may have affected our results and limited us in our ability to draw conclusions. For example, the demographic measures used in these analyses are self-reported, which may result in meaningful measurement error for some important measures. For example, students reported on the items used to create a family SES measure for 1960. Research has shown that student reports of the components of parent SES measures may not be as valid or reliable as measures obtained from the parents themselves (Hauser and Andrew 2007, McLaughlin and Cohen 1997). Also, student grades and health were self-reported. Transcript data and observed health measures are not available in the 1960 data collection, and therefore our measures of class rank and early health rely on self-reports and may suffer from reporting bias. Furthermore, personality and cognitive ability were measured simultaneously along with academic performance, so these analyses cannot determine any causal mechanisms.

Further Analyses

Linking these data to the NDI will allow us to consider specific types of death (for example, separating accidental and health-related deaths in our analyses). We will also expand these analyses to include consideration of additional measures of cognitive ability and personality as these measures are validated and possible factors identified. Additionally, we will further investigate race/ethnicity differences, and attempt to determine whether among males, factors that increase mortality risk for whites may have protective effects for minorities.

In addition to creating a mortality-linked 1% file of complete cases for all waves of data collection, we are developing a second mortality-linked subset of the full Project Talent file. This second file will represent a random subset without regard to follow-up completion status. This file will be better suited for analyses focused on early life factors only, eliminating concerns about the effects of sample attrition.

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Table 1. Mortality Rates by Sex and Race/Minority Status

	Unweighted Estimates		Weighted Estimates	
	Total Number of Cases	**Mortality Rate**	**Total Number of Cases**	**Mortality Rate**
Sex				
Male	1944	13.5%	1944	13.4%
Female	2055	9.9%	2055	9.4%
Race/Minority Status				
Minority	367	15.3%	396	15.9%
Nonminority	3570	11.4%	3522	10.9%
Missing	62	8.1%	81	6.1%
Sex and Race/Minority Status				
Males				
Minority	152	20.4%	172	18.6%
Nonminority	1764	13.2%	1733	13.2%
Missing	28	0.0%	39	0.0%
Females				
Minority	215	11.6%	224	13.7%
Nonminority	1806	9.6%	1789	8.8%
Missing	34	14.7%	43	11.6%

Table 2. Comparison of 1960, 11-year follow up, and one percent sample distributions on key variables

	1960 Base Year Sample			11-Year Follow Up (Full Subsample)			11-Year Follow Up (1% Subample)		
	n	Percent / Mean (St. Error)		n	Percent / Mean (St. Error)		n	Percent / Mean (St. Error)	
	(unweighted)	(unweighted)	(weighted)	(unweighted)	(unweighted)	(weighted)	(unweighted)	(unweighted)	(weighted)
Grade Level (1960)									
Grade 9	103,893	27.6%	27.9%	23,042	24.5%	28.2%	1,000	25.0%	24.2%
Grade 10	99,573	26.4%	26.4%	21,792	23.2%	26.5%	1,000	25.0%	29.7%
Grade 11	92,419	24.5%	24.4%	25,051	26.6%	24.9%	999	25.0%	24.8%
Grade 12	81,099	21.5%	21.4%	24,160	25.7%	20.4%	1,000	25.0%	21.2%
Sex (1960)									
Male	188,154	49.9%	50.3%	46,165	49.1%	49.6%	1,944	48.6%	48.6%
Female	188,830	50.1%	49.7%	47,880	50.9%	50.4%	2,055	51.4%	51.4%
Age (1960)									
Number Valid	374,710	99.4%	99.4%	93,789	99.7%	99.4%	3,982	99.6%	99.4%
Number Imputed	2,275	0.6%	0.6%	256	0.3%	0.6%	17	0.4%	0.6%
Mean age in 1960	374,710	15.768	15.777	93,789	15.793	15.744	3,982	15.862	15.834
		(0.002)	(0.002)		(0.004)	(0.010)		(0.020)	(0.023)
Mean age in 1960 (includes imputed)	376,985	15.767	15.776	94,045	15.794	15.763	3,999	15.863	15.833
		(0.002)	(0.002)		(0.004)	(0.010)		(0.020)	(0.023)
Age (in 1960, by Grade level)									
Grade 9: Mean Age	103,312	14.445	14.461	22,998	14.300	14.448	999	14.439	14.470
		(0.002)	(0.003)		(0.004)	(0.012)		(0.024)	(0.028)
Grade 10: Mean Age	99,050	15.403	15.418	21,765	15.281	15.389	995	15.390	15.433
		(0.002)	(0.002)		(0.004)	(0.013)		(0.022)	(0.028)
Grade 11: Mean Age	91,907	16.340	16.354	24,995	16.260	16.358	997	16.384	16.436
		(0.002)	(0.002)		(0.004)	(0.012)		(0.022)	(0.028)
Grade 12: Mean Age	80,440	17.265	17.281	24,031	17.200	17.246	991	17.246	17.256
		(0.002)	(0.002)		(0.004)	(0.011)		(0.020)	(0.025)
Family Socioecoomic Status (1960)									
Bottom 20% (<= 88)	66,012	18.4%	19.1%	11,061	12.3%	18.1%	724	19.2%	21.5%
Middle 60%	211,255	59.0%	59.1%	54,185	60.2%	59.9%	2,200	58.4%	59.6%
Top 20% (>= 106)	80,737	22.6%	21.8%	24,803	27.5%	22.0%	840	22.3%	18.9%
Missing	(18,981)	(5.0%)	(6.0%)	(3,996)	(4.2%)	(5.7%)	(235)	(5.9%)	(7.1%)
Mean		97.733	97.491		99.726	97.744		97.628	96.915
		(0.017)	(0.018)		(0.032)	(0.087)		(0.167)	(0.207)

Table 2. Comparison of 1960, 11-year follow up, and one percent sample distributions on key variables – continued

	1960 Base Year Sample			11-Year Follow Up (Full Subsample)			11-Year Follow Up (1% Subample)		
	n	Percent / Mean (St. Error)		n	Percent / Mean (St. Error)		n	Percent / Mean (St. Error)	
	(unweighted)	(unweighted)	(weighted)	(unweighted)	(unweighted)	(weighted)	(unweighted)	(unweighted)	(weighted)
Usual Health Before Age 10 (1960)									
Very poor or Poor	19,575	5.9%	5.9%	4,700	5.4%	5.8%	190	5.4%	5.4%
Good or Average	108,108	32.5%	32.4%	27,147	31.5%	32.1%	1,107	31.3%	32.7%
Very good or Excellent	205,385	61.7%	61.7%	54,467	63.1%	62.1%	2,240	63.3%	61.9%
Missing	(43,917)	(11.6%)	(12.7%)	(7,731)	(8.2%)	(11.9%)	(462)	(11.6%)	(13.5%)
Class Rank (1960)									
Bottom 20%	69,019	19.5%	19.5%	13,260	14.9%	19.3%	740	19.9%	22.4%
Middle 60%	214,892	60.8%	60.9%	53,395	60.0%	61.2%	2,277	61.3%	61.7%
Top 20%	69,483	19.7%	19.6%	22,321	25.1%	19.5%	698	18.8%	15.9%
Missing	(23,591)	(6.3%)	(7.4%)	(5,069)	(5.4%)	(7.3%)	(284)	(7.1%)	(8.6%)
Impulsiveness Scale (1960)									
Mean	370,040	1.939 (0.003)	1.939 (0.003)	92,762	1.923 (0.005)	1.902 (0.013)	3,933	1.931 (0.026)	1.917 (0.031)
Calmness Scale (1960)									
Mean	370,040	4.145 (0.004)	4.129 (0.004)	92,762	4.442 (0.008)	4.154 (0.021)	3,933	4.243 (0.040)	4.070 (0.049)
Mature Personality Scale (1960)									
Mean	370,040	10.934 (0.009)	10.896 (0.009)	92,762	11.657 (0.018)	10.967 (0.043)	3,933	11.019 (0.084)	10.676 (0.100)
Vocabulary Score (1960)									
Mean	371,073	11.827 (0.007)	11.777 (0.007)	92,931	13.201 (0.013)	11.849 (0.035)	3,942	11.935 (0.066)	11.325 (0.081)
3D Visualization Score (1960)									
Mean	366,936	8.340 (0.005)	8.340 (0.006)	92,358	9.143 (0.011)	8.399 (0.027)	3,897	8.443 (0.051)	8.162 (0.061)
Math II (Introductory high school mathematics) Score (1960)									
Mean	367,306	10.152 (0.008)	10.092 (0.008)	92,412	11.637 (0.016)	10.153 (0.039)	3,895	10.176 (0.077)	9.531 (0.089)
Clerical Checking Score (1960)									
Mean	364,936	37.324 (0.025)	37.065 (0.026)	91,838	37.621 (0.046)	36.863 (0.123)	3,878	37.220 (0.232)	36.744 (0.289)

Table 2. Comparison of 1960, 11-year follow up, and one percent sample distributions on key variables – continued

	1960 Base Year Sample			11-Year Follow Up (Full Subsample)			11-Year Follow Up (1% Subample)		
	n	Percent / Mean (St. Error)		n	Percent / Mean (St. Error)		n	Percent / Mean (St. Error)	
	(unweighted)	(unweighted)	(weighted)	(unweighted)	(unweighted)	(weighted)	(unweighted)	(unweighted)	(weighted)
Race/Minority Status (5- and 11-year follow up)									
Minority	9,667	6.1%	6.1%	5,535	5.9%	9.4%	367	9.3%	10.1%
Nonminority	148,537	93.9%	93.9%	87,570	94.1%	90.6%	3,570	90.7%	89.9%
Missing	(218,781)	(58.0%)	(58.0%)	(940)	(1.0%)	(1.9%)	(62)	(1.6%)	(2.0%)
Educational Attainment (5- and 11-year follow up)									
No college	39,100	24.0%	24.4%	22,233	23.7%	31.9%	1,322	33.1%	36.7%
Less than H.S.	5,973	3.7%	3.8%	2,924	3.1%	6.3%	258	6.5%	7.6%
H.S. only	32,548	20.3%	20.6%	19,309	20.6%	25.6%	1,064	26.6%	29.1%
At least some college	69,814	43.6%	44.0%	38,001	40.5%	43.2%	1,694	42.4%	43.4%
Completed college or more	51,927	32.4%	31.7%	33,660	35.8%	24.9%	978	24.5%	20.0%
No information available	(216,723)	(57.5%)	(57.5%)	(151)	(0.2%)	(0.2%)	(5)	(0.1%)	(0.2%)
Marital Status (11 year follow up)									
Not married	15,382	17.3%	17.0%	15,381	17.3%	19.2%	761	19.8%	20.5%
Married	73,784	82.7%	83.0%	73,783	82.7%	80.8%	3,079	80.2%	79.5%
Missing	(287,819)	(76.3%)	(76.1%)	(4,881)	(5.2%)	(4.0%)	(159)	(4.0%)	(3.6%)

Note: The 11-year and 1 percent samples exclude any persons identified as deceased in the 11-year follow-up (n=156 in 11-year follow up sample and n=1 in the 1 percent sample).

Table 3. Hazard ratios for mortality among males approximately 30-70 years of age

Parameter	Model 1: Demographic Controls		Model 2: Cognitive		Model 3: Personality		Model 4: Personality & Cognitive		Model 5: Personality, Cognitive, & Intervening	
	Hazard Ratio	95% Conf. Limits	Hazard Ratio	95% Conf. Limits	Hazard Ratio	95% Conf. Limits	Hazard Ratio	95% Conf. Limits	Hazard Ratio	95% Conf. Limits
Heckman Bias Correction (Continuous)	0.94	(0.53,1.69)	1.13	(0.59,2.17)	0.94	(0.52,1.68)	1.12	(0.59,2.16)	1.13	(0.58,2.21)
Minority (Nonminority)	1.54*	(1.02,2.33)	1.57*	(1.04,2.38)	1.51†	(0.99,2.31)	1.54*	(1.01,2.36)	1.54*	(1.00,2.36)
Bottom SES Quintile (Middle 60%)	1.08	(0.77,1.50)	1.09	(0.78,1.52)	1.08	(0.77,1.51)	1.09	(0.78,1.53)	1.09	(0.78,1.53)
Top SES Quintile (Middle 60%)	0.97	(0.68,1.39)	0.97	(0.67,1.38)	0.93	(0.65,1.34)	0.93	(0.64,1.33)	0.97	(0.67,1.41)
SES Missing (Middle 60%)	2.24	(0.81,6.21)	2.27	(0.83,6.23)	2.13	(0.76,5.96)	2.16	(0.78,6.00)	2.42†	(0.88,6.63)
Poor health before age 10 (Good)	1.73*	(1.07,2.82)	1.72*	(1.06,2.79)	1.71*	(1.05,2.79)	1.69*	(1.04,2.75)	1.63†	(1.00,2.66)
Excellent health before age 10 (Good)	0.82	(0.61,1.10)	0.82	(0.61,1.09)	0.83	(0.62,1.11)	0.83	(0.62,1.11)	0.83	(0.62,1.11)
Health before age 10 Missing (Good)	0.35**	(0.18,0.68)	0.35**	(0.18,0.67)	0.37**	(0.19,0.72)	0.36**	(0.19,0.71)	0.36**	(0.19,0.71)
Age at baseline (12-21)	1.00	(0.90,1.11)	1.00	(0.90,1.11)	1.00	(0.91,1.11)	1.01	(0.91,1.12)	1.00	(0.90,1.12)
Bottom Class Rank Quintile (Middle 60%)	1.53**	(1.15,2.04)	1.54**	(1.15,2.05)	1.45*	(1.08,1.96)	1.46*	(1.09,1.97)	1.39*	(1.03,1.88)
Top Class Rank Quintile (Middle 60%)	0.93	(0.60,1.44)	0.92	(0.60,1.42)	1.00	(0.64,1.55)	0.99	(0.63,1.54)	1.02	(0.66,1.60)
Class Rank Missing (Middle 60%)	1.40	(0.61,3.21)	1.37	(0.61,3.12)	1.33	(0.58,3.07)	1.30	(0.57,2.99)	1.17	(0.52,2.65)
Abstract reasoning scale			1.09	(0.94,1.27)			1.10	(0.94,1.28)	1.10	(0.95,1.29)
Calmness scale					1.10	(0.93,1.29)	1.09	(0.93,1.28)	1.10	(0.93,1.30)
Mature personality scale					0.85†	(0.71,1.00)	0.85†	(0.71,1.01)	0.86†	(0.72,1.02)
Impulsiveness scale					1.21**	(1.06,1.38)	1.22**	(1.07,1.38)	1.20**	(1.07,1.36)
Minority (White) * Impulsiveness scale					0.58*	(0.35,0.96)	0.58*	(0.35,0.96)	0.55*	(0.33,0.91)
Some college (No college)									1.08	(0.79,1.48)
College+ (No college)									0.80	(0.52,1.23)
Married at Y11 follow up (Not married)									0.69*	(1.52,0.92)
Marital Status Missing (Not married)									0.65	(0.31,1.34)
-2 log likelihood (df)	3603.15 (12)		3601.80 (13)		3589.64 (16)		3588.16 (17)		3578.65 (21)	

Note: Analysis conducted on 1,830 male Project Talent participants alive at the time of their 11-year follow up (number censored = 1,580). Reference groups are shown in parentheses. All scale scores were standardized separately for males and females.
†$p < .10$. *$p < .05$. **$p < .01$, *** <.001.

Table 4. Hazard ratios for mortality among females approximately 30-70 years of age

Parameter	Model 1: Demographic Controls		Model 2: Cognitive		Model 3: Personality		Model 4: Personality & Cognitive		Model 5: Personality, Cognitive, & Intervening	
	Hazard Ratio	95% Conf. Limits	Hazard Ratio	95% Conf. Limits	Hazard Ratio	95% Conf. Limits	Hazard Ratio	95% Conf. Limits	Hazard Ratio	95% Conf. Limits
Heckman Bias Correction (Continuous)	2.43*	(1.22,4.83)	1.78	(0.83,3.79)	2.44*	(1.23,4.85)	1.78	(0.84,3.79)	1.94†	(0.90,4.19)
Minority (Nonminority)	1.02	(0.62,1.67)	0.96	(0.58,1.59)	1.03	(0.63,1.70)	0.98	(0.59,1.61)	0.91	(0.54,1.53)
Bottom SES Quintile (Middle 60%)	0.98	(0.65,1.46)	0.95	(0.63,1.43)	0.99	(0.66,1.48)	0.96	(0.64,1.44)	0.96	(0.64,1.45)
Top SES Quintile (Middle 60%)	1.49*	(1.00,2.20)	1.54*	(1.04,2.28)	1.51*	(1.01,2.25)	1.56*	(1.05,2.32)	1.55*	(1.03,2.35)
SES Missing (Middle 60%)	0.59	(0.16,2.21)	0.60	(0.16,2.27)	0.62	(0.16,2.38)	0.65	(0.17,2.48)	0.67	(0.18,2.57)
Poor health before age 10 (Good)	0.54	(0.24,1.24)	0.53	(0.23,1.21)	0.55	(0.24,1.27)	0.54	(0.24,1.24)	0.55	(0.24,1.25)
Excellent health before age 10 (Good)	0.76†	(0.54,1.05)	0.75†	(0.54,1.04)	0.77	(0.55,1.07)	0.76	(0.55,1.06)	0.77	(0.55,1.08)
Health before age 10 Missing (Good)	1.05	(0.53,2.07)	1.07	(0.54,2.10)	1.02	(0.51,2.03)	1.03	(0.52,2.05)	1.05	(0.53,2.09)
Age at baseline (12-21)	0.99	(0.87,1.13)	0.98	(0.86,1.12)	0.99	(0.87,1.13)	0.99	(0.86,1.13)	0.98	(0.86,1.12)
Bottom Class Rank Quintile (Middle 60%)	0.93	(0.62,1.41)	0.89	(0.58,1.35)	0.91	(0.60,1.39)	0.86	(0.57,1.32)	0.84	(0.55,1.29)
Top Class Rank Quintile (Middle 60%)	1.37	(0.93,2.03)	1.42†	(0.96,2.11)	1.41†	(0.94,2.11)	1.47†	(0.98,2.21)	1.37	(0.90,2.08)
Class Rank Missing (Middle 60%)	1.20	(0.43,3.31)	1.21	(0.44,3.35)	1.17	(0.43,3.25)	1.18	(0.42,3.26)	1.08	(0.39,3.01)
Abstract reasoning scale			0.83*	(0.70,0.99)			0.83*	(0.69,0.98)	0.83*	(0.69,0.99)
Calmness scale					1.07	(0.90,1.29)	1.09	(0.90,1.31)	1.08	(0.90,1.30)
Mature personality scale					0.94	(0.77,1.13)	0.92	(0.76,1.12)	0.92	(0.76,1.12)
Impulsiveness scale					0.94	(0.79,1.11)	0.94	(0.79,1.11)	0.93	(0.79,1.11)
Minority (White) * Impulsiveness scale					0.97	(0.58,1.61)	0.96	(0.58,1.59)	0.94	(0.57,1.56)
Some college (No college)									0.78	(0.55,1.10)
College+ (No college)									1.16	(0.69,1.93)
Married at Y11 follow up (Not married)									0.85	(0.58,1.23)
Marital Status Missing (Not married)									1.61	(0.80,3.27)
-2 log likelihood (df)	2623.25 (12)		2618.95 (13)		2621.71 (16)		2617.14 (17)		2609.58 (21)	

Note: Analysis conducted on 1,948 female Project Talent participants alive at the time of their 11-year follow up (number censored = 1,761). Reference groups are shown in parentheses. All scale scores were standardized separately for males and females.
†*p* < .10. **p* < .05. ***p* < .01, *** <.001.

Table 5. Hazard ratios for mortality among males approximately 30-70 years of age

Parameter	Model 5: Cognitive, Personality, & Intervening Hazard Ratio	95% Conf. Limits	Model 6: Academic Performance Removed Hazard Ratio	95% Conf. Limits
Heckman Bias Correction (Continuous)	1.13	(0.58,2.21)	1.14	(0.59,2.21)
Minority (Nonminority)	1.54*	(1.00,2.36)	1.54*	(1.00,2.37)
Bottom SES Quintile (Middle 60%)	1.09	(0.78,1.53)	1.09	(0.78,1.53)
Top SES Quintile (Middle 60%)	0.97	(0.67,1.41)	0.97	(0.67,1.40)
SES Missing (Middle 60%)	2.42†	(0.88,6.63)	2.48*	(1.15,5.37)
Poor health before age 10 (Good)	1.63†	(1.00,2.66)	1.63†	(1.00,2.65)
Excellent health before age 10 (Good)	0.83	(0.62,1.11)	0.83	(0.62,1.11)
Health before age 10 Missing (Good)	0.36**	(0.19,0.71)	0.37**	(0.19,0.73)
Age at baseline (12-21)	1.00	(0.90,1.12)	1.02	(0.92,1.13)
Bottom Class Rank Quintile (Middle 60%)	1.39*	(1.03,1.88)		
Top Class Rank Quintile (Middle 60%)	1.02	(0.66,1.60)		
Class Rank Missing (Middle 60%)	1.17	(0.52,2.65)		
Abstract reasoning scale	1.10	(0.95,1.29)	1.10	(0.95,1.29)
Calmness scale	1.10	(0.93,1.30)	1.10	(0.94,1.29)
Mature personality scale	0.86†	(0.72,1.02)	0.83*	(0.70,0.98)
Impulsiveness scale	1.20**	(1.07,1.36)	1.20**	(1.05,1.37)
Minority (White) * Impulsiveness scale	0.55*	(0.33,0.91)	0.53*	(0.32,0.89)
Some college (No college)	1.08	(0.79,1.48)	1.08	(0.79,1.47)
College+ (No college)	0.80	(0.52,1.23)	0.76	(0.50,1.16)
Married at Y11 follow up (Not married)	0.69*	(1.52,0.92)	0.68**	(1.51,0.90)
Marital Status Missing (Not married)	0.65	(0.31,1.34)	0.64	(0.31,1.32)
-2 log likelihood (df)	3578.65 (21)		3583.23 (18)	

Note: Analysis conducted on 1,830 male Project Talent participants alive at the time of their 11-year follow up (number censored = 1,580). Reference groups are shown in parentheses. All scale scores were standardized separately for males and females.
† p < .10. * p < .05. ** p < .01, *** <.001.