NBER WORKING PAPER SERIES

ADOLESCENT COGNITIVE AND NON-COGNITIVE CORRELATES OF ADULT HEALTH

Robert Kaestner

Working Paper 14924
http://www.nber.org/papers/w14924

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
April 2009

I thank James Heckman, Sergio Urzua, seminar participants at the University of Chicago and Georgia State University. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

Adolescent Cognitive and Non-cognitive Correlates of Adult Health
Robert Kaestner
NBER Working Paper No. 14924
April 2009
JEL No. I12

ABSTRACT

While it is widely acknowledged that the family and childhood environments affect adult well being, why they matter is still an area of significant debate. Previous research concerned with this issue has focused on the influence of family income, family structure, and cognitive ability. Much of this research has focused on economic and social outcomes. Notably, the influence of childhood environments on adult health has not received as much attention as other outcomes, and when health has been the focus, interest has been mainly on childhood health. Here, I present a descriptive analysis of the associations between cognitive and non-cognitive traits measured at the end of childhood (age 14) and mental and physical health at age 41. Results suggest that, on average, adolescent cognitive ability and self esteem have a significant association with health at age 41. Other non-cognitive factors such as locus of control and adolescent substance use do not have significant associations with adult health. Net of adolescent influences, completed education has a significant association with adult health.

Robert Kaestner
Institute of Government and Public Affairs
University of Illinois
815 West Van Buren Street, Suite 525
Chicago, IL 60607
and NBER
kaestner@uic.edu

Introduction

There is considerable evidence that childhood environments, which depend on genetic, economic and social factors, significantly shape adult economic and social outcomes. Perhaps the most compelling evidence of this fact comes from studies of twins and siblings. Across several domains, studies have found that adult outcomes of siblings (twins) are significantly correlated and that a significant part of the total variation in adult outcomes is between families. For example, several studies of siblings have demonstrated the influence of the "family" on adult education and labor market outcomes such as wages and earnings (Hauser and Sewell 1986; Solon et al. 1991; Solon et al. 2000; Bjorklund et al. 2002; Mazumder 2008). Mazumder (2008) reported that approximately 50% of the variation in wages, earnings and household income in the US is due to differences between family (childhood) environments. Similarly, studies of health and longevity have found significant sibling correlations in life expectancy, incidence of heart disease, mental illness and body mass (Stunkard et al. 1986; Marenberg et al. 1994; Christensen and Vaupel 1996; Kiessepa et al. 2004; vB Hjelmborg et al. 2006; Petersen et al. 2008). Christensen and Vaupel (1996) reported that most studies found that approximately 25% of variation in life expectancy is attributable to shared childhood environments (i.e., family).[1]

While it is widely acknowledged that the family and childhood environments matter, why they matter is still an area of significant debate. Purely genetic explanations are least interesting from a policy perspective, so researchers have focused on identifying the importance of various aspects of the childhood environment that can be changed by intervention such as family income, family structure, and quality of (pre) schools. Much of this research has focused on economic and social outcomes. Notably, the influence of childhood environments on adult health has not

[1] It is notable that the sibling correlations in economic outcomes are higher than those for health, which suggests that childhood environments play a particularly important role in determining these outcomes (Mazumder 2008).

received as much attention as other outcomes and much of the research in this area has focused on the relationship between early (e.g., in utero) health shocks and adult health (Currie 2007).

In this paper, I present a descriptive analysis of the associations between several personal and family characteristics of children aged 14 and 15, and adult health at age 41. In particular, I obtain associations between adolescent cognitive and non-cognitive (e.g., self esteem) traits, adolescent health, family background (income, family size and structure, mother's education), and mental and physical health at age 41. This research is intended to provide evidence as to the importance of childhood environment in influencing adult health and to add to the relatively small literature in this area that has focused mainly on childhood health and not other factors.

Another contribution of the research is the attention paid to cognitive and non-cognitive determinants of adult health. While many studies have shown that early cognitive ability significantly affects adult wages and social outcomes (Murname et al. 1995; Johnson and Neal 1996; Cawley, Heckman and Vytlacil 2001), there has been much less attention paid to non-cognitive factors (Heckman et al. 2006; Goldsmith et al. 1997). However, Heckman et al. (2006) have shown that, compared to cognitive ability, non-cognitive factors have an equally important (relative) effect on adult outcomes.

Interest in the influence of early non-cognitive factors on adult well being is growing because these factors may help explain why a substantial part of the population fails to sufficiently invest in human capital and consequently, fails to reap the large monetary and non-monetary returns to such investments. Monetary constraints alone cannot explain this phenomenon. However, non-cognitive factors may influence the (psychic) costs of making human capital investments and may explain why such a large portion of the population forgoes the benefits of those investments.

The importance of identifying early determinants of adult health (and other outcomes) is underscored by the models of Becker (2007) and Heckman (2007). Both authors presented models in which different forms of human capital, or what Heckman (2007) refers to as capabilities, are complementary. Therefore, investments in one form of human capital, for example a non-cognitive factor such as rate of time preference, cause further investments in other forms of human capital (or capabilities) that also improve adult outcomes. There is a multiplier effect between investments in human capital. Heckman and colleagues (Cunha et al. 2006; Cunha and Heckman 2007; and Heckman 2007) expand this model of complementary investments in human capital by incorporating a developmental aspect that recognizes that the timing of investments is also important and that temporal investments in human capital are also complementary. Therefore, investments in cognitive ability during adolescence are more productive when earlier investments in cognitive ability (and other forms of complementary human capital) have been made. In sum, childhood, and particularly early childhood, investments in human capital may be extremely cost-effective ways to produce adult outcomes. Here, we present evidence on the associations between adolescent (at the end of child hood) attributes including cognitive and non-cognitive factors and adult health, which will provide descriptive evidence of the importance of these factors in determining adult health, which is an understudied outcome.

Previous Literature

Several papers have examined the relationship between cognitive achievement, family background and adult health. These papers have focused on whether the return to schooling (on health) is affected by the inclusion of measures of cognitive ability and family background, which parallels the literature examining the labor market return to education. The emphasis of

these papers is on the completed schooling effect and much attention is paid to addressing the endogeneity of schooling. However, these papers also report, in limited ways, estimates of the associations between cognitive ability and family background, and adult health.

Auld and Sidhu (2005) and Elias (2005) conducted very similar analyses. Both studies used data from the National Longitudinal Survey of Youth—1979 Cohort (NLSY79). Auld and Sidhu (2005) used data from the year 2000 and a sample of male and female respondents between the ages of 36 and 43, and Elias (2005) used data from the year 2002 and a sample of male respondents between the ages of 40 and 45. Both papers made use of the longitudinal aspect of these data and included an earlier measure of cognitive achievement, taken from 1979 survey wave, and measures of family background in their analyses. Dependent variables differed; Auld and Sidhu (2005) focused on whether a person had a condition that limited work whereas Elias (2005) used self-reported health status (e.g., excellent or good v. other).

Regression estimates from these studies indicated that cognitive ability, as measured by scores on the Armed Forces Qualification Test (AFQT), was associated with better adult health. In Auld and Sidhu (2005), estimates indicated that a one standard deviation increase in AFQT score was associated with approximately a two to three percentage point (20 to 30 percent) decrease in the probability of having a health limitation. The magnitude of the estimates were unaffected by inclusion of family background variables, but Auld and Sidhu (2005) do not report direct estimates associated with family background. Estimates of the effect of cognitive ability were nearly twice as large when completed schooling was omitted from the model suggesting that approximately half the effect of cognitive ability works through completed schooling. Elias (2005) reported that a one standard deviation increase in AFQT percentile score was associated with a 1.2 (Black males) to 1.6 (White males) percentage point (approximately 2.5 percent)

increase in the probability of reporting being in excellent or good health.[2] Elias (2005) also reported estimates related to parental education and family structure in 1979, and in general these estimates were not significantly associated with adult health.[3]

A comprehensive analysis of the relationship between adult health behaviors and completed education is presented by Cutler and Lleras-Muney (2007). While the emphasis in this paper is also on the effect of completed education on adult health behaviors, Cutler and Lleras-Muney (2007) include a wide array of factors in their analysis including family background measures, and early cognitive and non-cognitive attributes. Most of their analysis used data from the 1998 and 2002 waves of the NLSY79 and a sample of males and females between the ages of 33 and 44. Although they do not report direct estimates of the effect of family background, cognitive ability (AFQT) and non-cognitive traits, results indicated that family background and cognitive ability are significantly associated with adult health behaviors with family background having a larger average effect. Non-cognitive factors such as self esteem, locus of control and depressive symptoms tend to have a smaller influence. However, it is hard to ascertain the direct effect of these variables because Cutler and Lleras-Muney (2007) only reported the mediating effect of these variables on completed education.[4] Nevertheless, for some important outcomes, vigorous exercise, visits to a physician for preventive care, and illegal

[2] This estimate is the author's calculation using estimates reported in Elias (2005) and assuming that the standard deviation of the AFQT percentile score is 10 (see NLSY User's Guide, http://www.bls.gov/nls/79guide/2002/nls79g4a.pdf).

[3] It is notable that estimates related to cognitive ability obtained by Elias (2005) are substantially smaller than those reported by Auld. One difference between the two studies is that Auld and Sidhu (2005) used a sample of males and females, and included adults of younger ages than Elias (2005).

[4] The mediating effect of family background, cognitive ability and non-cognitive traits is a function of the direct effect of these variables on adult health and the (partial) correlation of these variables with education. To illustrate the difficulty of identifying the direct effect of these variables, consider that adding non-cognitive factors to the model decreases the (negative) effect of education on smoking. It is unknown whether non-cognitive factors (self esteem, locus of control) should be positively or negatively related to smoking or education, so it is quite difficult to identify the direct (beneficial or harmful) effect of these variables.

drug use, cognitive ability, which is known to be strongly and positively related to education, tends to have an effect that is surprisingly opposite that of education.

The last study I review is Hartog and Osterbeek (1998), who examined the relationship between education, early cognitive ability, family background and adult health. This study used data on Dutch males and females who attended school in one Dutch province in 1953 and who were approximately 53 in 1993 when they were re-surveyed. Health was measured by self-reported health status; cognitive ability at age 12 was measured by scores on math and verbal ability tests; and family background was measured by parental (mother and father) education and father's occupation. Estimates indicated that math test scores at age 12, but not verbal scores, and father's education and occupation, were significantly associated with better health. However, controlling for completed schooling reduced the magnitude of these estimates by approximately 50%. After controlling for completed schooling, father's education and occupation had minimal effects on adult health, and math scores had only a small effect (e.g., two standard deviation increase in score increases the probability of being in excellent health by 15 percent).

While there are a few other studies that present simple correlations between adult health and childhood cognitive ability, the studies just reviewed are the most rigorous and pertinent to my study.[5] Three of the four studies used the same data and came to very different conclusions. Auld and Sidhu (2005) reported large effects of cognitive ability on health limitations, and other results implied that family background measures such as parental education and presence of educational materials in home had little effect on whether a person had a health limitation. Auld and Sidhu (2005) also reported that 50% of the effect of early cognitive ability worked through

[5] There are a series of studies that use a sample of Scottish adults from Aberdeen to assess the correlation between age 11 test scores and dementia, mortality and heart disease (Whalley et al. 2000; Whalley and Dreary 2002; Hart et al. 2004).

completed schooling. In contrast, Elias (2005) reported small effects of cognitive ability on self-rated health, but like Auld and Sidhu (2005) reported that family background had little effect.[6] Cutler and Lleras-Muney (2007) reported findings that differ from these two papers. In their analysis, estimates implied that cognitive ability and family background measures were significantly related to health behaviors such as smoking, and that the influence of family background was larger than cognitive ability.[7] Finally, Hartog and Osterbeek (1998) reported that both family background and cognitive ability are associated with adult health, and that 50% of the effect of cognitive ability on health, and nearly all of the effect of family background on health, work through completed schooling.

Unlike these studies, which focused on how the effect of schooling on health was mediated by family background, cognitive ability and non-cognitive attributes, in this study, I focus on the direct effects of these variables. Moreover, like Cutler and Lleras-Muney (2007), I consider an extensive set of factors. Subsequent to identifying the direct effect of early determinants of adult health, I assess whether effects of these variables work through schooling and adult health behaviors—two important factors (mechanisms) known to affect health.

Another important difference between these studies and mine is that I focus on attributes at age 14 and 15 and relate these to adult health 25 years later at age 41. Auld and Sidhu (2005), Elias (2005) and Cutler and Lleras-Muney (2007) include older teens and young adults in their

[6] It is difficult to identify the direct effect of family background from estimates presented in Auld and Sidhu (2005). However, it is widely believed that family background factors such as parental education are strongly and positively related to education. So failure to find a significant mediating effect of family background on education effect is evidence that these factors have small direct effects.

[7] However, it is difficult to compare these estimates to Auld and Sidhu (2005) and Elias (2005) because Cutler and Lleras-Muney (2007) never presented estimates of the direct effects of any factor other than education. Moreover, because of the way Cutler and Lleras-Muney (2007) grouped variables, results from their study can only be used to assess the combined effect of true family background measures such as parental education and family income while young and current income and socioeconomic status. Cutler and Lleras-Muney (2007) incorporate non-cognitive traits, but effects of these variables on health or health behaviors are not possible to ascertain from reported estimates.

analyses and consider the effects of cognitive and non-cognitive factors measured between ages 14 to 21, sometimes even later, and adult outcomes as early as age 33. One problem with this approach that is not completely addressable is that many young adults age 18 to 21 have completed schooling at the time they take the test of cognitive ability (AFQT) available in the NLSY79. Therefore, separating the effects of education from cognitive ability is difficult. Similarly, the later teen years are the period when health behaviors related to smoking, drinking and drug use are largely determined. Controlling for health behaviors at this age, as in Cutler and Lleras-Muney (2007), may be diminishing the full effect of earlier factors that are likely to cause these behaviors. Focusing on early adolescence—at the end of childhood—is also important given the interest in assessing the significance of childhood in determining adult health.

While Auld and Sidhu (2005), Elias (2005) and Cutler and Lleras-Muney (2007) all show that completed education continues to be an important predictor of health and health behaviors after controlling for other factors, without knowing the direct importance of early determinants of adult health, policymakers do not have sufficient information to develop the most effective (efficient) way to improve adult health. As Heckman (2007) emphasizes, investments in raising completed schooling may be very costly relative to investments in improving cognitive and non-cognitive factors earlier in life. Finally, given the mixed evidence reported by previous studies, even those that use very similar data, this study will provide valuable additional evidence that may help toward building a consensus in this important research area.

Empirical Model

Ideally, to obtain estimates of the effect of early cognitive and non-cognitive factors on adult health, one would estimate a model similar to that presented in Heckman (2007):

$$H_{it} = g(\alpha_{0H}, \alpha_{0C}, \alpha_{0NC}, I_{H1},...,I_{H(t-1)}, I_{C1},...,I_{C(t-1)}, I_{NC1},...,I_{NC(t-1)}, f_H, f_C, f_{NC})$$

(1) $i = 1,..., N$ (persons)

$t = 0,..., t$ (age)

Equation (1) shows that adult health (H) at age t is a function of initial (time 0) endowments of health (H), cognitive (C) and non-cognitive (NC) abilities; investments in health, cognitive and non-cognitive abilities from age 0 to age t-1, and family endowments (f) of health, cognitive and non-cognitive abilities. As Heckman (2007) describes, the determinants of adult health shown in equation (1) may produce health through a dynamic process in which different forms of human capital (H, C and NC) are complementary and complementarities may exist between investments at different ages. Estimating such a model is quite difficult.

In this paper, I will obtain estimates of the association between early cognitive and non-cognitive factors, and adult health using an admittedly ad-hoc specification that is justified only by its simplicity. It is not intended to reflect a structural model such as that given by equation (1), and its purpose is purely to help present a descriptive analysis of the data. Given the lack of study in this area, providing descriptive information is valuable. Specifically, I will estimate a model similar to the following:

(2) $$H_i = \alpha_0 + \sum_j \delta_j DEMOG_{ij} + \sum_k \lambda_k COG\_14_{ik} + \sum_n \gamma_n NONCOG\_14_{in} + \sum_m \beta_m FAMILY_{im} + e_i$$

In equation (2), adult health, measured at age 41, will depend on demographic factors (e.g., race/ethnicity, natality); cognitive ability at age 14 or 15, as measured by AFQT; non-cognitive traits at age 14 or 15 (e.g., self esteem, locus of control); and family background factors (e.g., maternal education).

A comparison of equations (1) and (2) reveals that equation (2) omits important determinants of adult health and fails to incorporate any of the complementarities described by Becker (2007) and Heckman (2007). However, these omissions are arguably likely to result in

estimates of the associations between cognitive and non-cognitive attributes at age 14, and adult health that are too large (from a structural point of view). For example, estimates of the association between cognitive ability at age 14 will include the effects of cognitive ability at age 14 and the effects of cognitive ability and other complementary forms of human capital at earlier ages. It will also include the effects of contemporaneous forms of human capital (capabilities) that are correlated with cognitive ability, but that are omitted. Similarly, initial endowments and some parental endowments are missing from equation (3) and these factors will tend to be complements with age 14 cognitive and non-cognitive traits. The complementarities between variables suggest that estimates are likely upward biased (in terms of their interpretation as structural estimates).[8] Therefore, failing to reject the null hypothesis of no effect provides evidence that these factors, and earlier investments in these factors, are not likely to be important (structural) determinants of adult health. To be clear, I do not want to push this argument too far because measurement error may result in failure to reject the null, and I make it explicitly in reference to the measured variables and not the underlying conceptual variables they often a proxy for. Nevertheless, for some of the well measured (validated) variables such as self esteem, locus of control and AFQT score, failing to reject the null of no effect in this descriptive analysis, suggests that structural effects would likely be small.

Data

The data for my analysis is drawn from the 1979 cohort of the National Longitudinal Survey of Youth (NLSY79). The NLSY79 is a nationally representative sample of 12,686 respondents age 14 to 22 in 1979, which was the initial survey year. Respondents were re-surveyed annually until 1994 and then biennially up to the current date. Attrition has been

[8] All variables are measured in such a way to expect positive partial correlations, which is consistent with the argument that complementarities will result in upward biased estimates.

modest and by 2002 approximately 75 percent of the eligible sample was re-contacted. The NLSY79 disproportionately sampled Blacks, Hispanics, low-income non-Black and non-Hispanic persons, and military personnel. The military and low-income (non-Black and non-Hispanic) samples were not surveyed after 1985 and 1990, respectively.

I limit the sample to those who were age 14 or 15 in 1979 and who were re-surveyed in 2004 or 2006 when they reached the age of 40 or 41. I limit the sample to those who were age 14 or 15 because I am interested in assessing the effects of childhood cognitive and non-cognitive factors on adult health and these are the youngest ages in the NLSY79. In addition, I wanted to focus on persons who had not yet finished schooling and for whom the AFQT was a better measure of cognitive ability net of completed schooling. I use the 2004 and 2006 surveys because prior to these years, the NLSY79 did not collect much information from respondents about health, but when respondents turned 40, they were asked a more extensive set of questions. Those aged 14 or 15 in 1979 did not turn 40 until 2004 or 2006.

Variables were constructed in accord with the specification of equation (2). The dependent variables measuring health were constructed from information obtained at age 40 when respondents were given the Short Form-12 (SF12) questionnaire, which is a reliable and validated instrument that is an inventory of self-reported mental and physical health. Age 40 respondents also completed a nine-question version of the well established Center for Epidemiological Studies Depression Scale (CES-D). From these data, I construct five dependent variables: the SF-12 physical component score; the SF-12 mental component score, the CESD scale of depressive symptoms, good health defined as self-rated health that is excellent or good, and poor health defined as self-rated health that is poor or fair.

The demographic variables used in the analysis are: age at interview (2004 or 2006), which is measured in six-month intervals; race/ethnicity (non-Hispanic Black, non-Hispanic While, Hispanic, other); natality (foreign-born); mother's natality, and whether a foreign-language was spoken in the home. Health at age 14 or 15 was measured by whether respondent has a health limitation, height and height squared, and endowed health was measured by whether respondent's father is deceased by age 40.

Cognitive ability was measured by the percentile score on the Armed Forces Qualification Test (AFQT) taken at age 14 or 15. This measure has been used by many researchers as a measure of cognitive ability. Because the AFQT is known to be correlated with age, I adjusted for differences in the AFQT percentile score by age at time of test.[9] I used the sample distribution of age-adjusted percentile scores to classify people into quartiles of cognitive ability.

For non-cognitive factors I used an extensive set of variables measured at age 14 or 15. There is no accepted definition of what constitutes a relevant non-cognitive factor and there are likely many. Heckman and colleagues (e.g., Heckman et al. 2006) have relied on the Rosenberg self esteem scale and Rotter locus of control scale in the NLSY79. I use both, and these are measured as dummy variables roughly equal to tertiles of the (discrete) distribution. As other proxies for non-cognitive traits, I use church attendance (never/rarely, sometimes, often); history of stealing (never, sometimes, often); and use of tobacco, alcohol and marijuana by age 14. I do not consider this to be an exhaustive (or even necessarily the best) set of non-cognitive factors. They include some widely used measures such as the Rosenberg self esteem scale and Rotter locus of control scale and others that are available and that may be of interest. For example,

[9] Specifically, I regressed the percentile score on a set of age dummy variables indicating half-year of age: 14, 14.5, 15 and 15.5. I estimate separate models for males and females. I then use the residuals from these regressions to classify people into quartiles of the sample distribution.

stealing behavior and substance use may be related to impulsivity and time preference, which are characteristics that may affect investments in health and other forms of human capital.

The variables I considered to be measures of family background were: mother's education (<9, 9-11 years, 12 years, 13 to 15 years, 16 or more years, missing); number of siblings (none, one, two to three, four or more); family structure (two biological parents, two parents, mother only, other) at age 14 or 15; 1978 family income (0-4,999, 5-9,9999, 10-19,999, 20-29,999, 30,000 or more, missing); whether childhood household had library card, magazines or newspapers; whether respondent's mother or father was the most influential person in their life, whether they had a person they considered to be most influential person, and whether the influential person (if any) would approve of not going to college. Again, most of these variables are commonly used to characterize a person's family background, but it is not an exhaustive or perfect list.

Completed schooling is measured in years (less than 12 years including GED, 12 years, 13 to 15 years, and 16 or more years) and health behaviors included whether respondent was a daily smoker in 1998 (last year available), whether respondent binged drank (6 or more drinks at one sitting) in past month in 2002 (last year available), whether respondent was obese (self-reported BMI>30), and the number of times respondent engaged in any vigorous physical activity in past month.

Sample means and proportions of these variables are listed in Appendix Table 1. Separate analyses were conducted by gender. The samples sizes are approximately 850 for males and 775 for females. The mean age at time the dependent variables were measured was 41, and approximately 30 percent of the sample is Black and 20 percent is Hispanic. Approximately 60 percent of males, and 55 percent of females, reported being in good or

excellent health. According to the CESD scale, males reported approximately three, and females four, depressive symptoms. Measures of physical and mental health as measured by the SF-12 scores are similar for males and females and similar to national averages for persons between the ages of 35 and 44 (http://www.bls.gov/nls/79quex/r19/y79r19append19.pdf).

Results

The purpose of the empirical analysis is to obtain associations between cognitive and non-cognitive characteristics at the end of childhood (adolescence) and adult health. This objective is motivated by the evidence that family environments matter, as established by studies of siblings, and the sparseness of evidence on the association between childhood characteristics and adult health. Sibling information is available in the NLSY79. Therefore, I was able to calculate simple correlations between siblings for the outcomes of interest. I used a sample of 785 same-sex sibling pairs who were interviewed at approximately the same age (40) when information about health was collected. For the few families that had more than one same sex sibling pair present in the data, I chose the pair closest in age (closest in survey year after turning 40). I calculated simple correlations with no adjustment for year differences or age differences. However, age differences will be minor because most variables are measured at the time of the first survey after a respondent turns 40 years of age. In addition, all variables (e.g., earnings) except height were measured between 1998 and 2006. Finally, height was measured in 1985 when respondents were between the ages of 20 and 28 when most growth in height has ceased.

Sibling correlations are listed in Table 1. Correlations for adult health and health behaviors are generally low—between 0.06 and 0.14. Smoking is the exception with a correlation of 0.26. In contrast, sibling correlations for AFQT scores, education (≥16 Years) and earnings are 0.69, 0.32 and 0.46, respectively. These correlations are in line with other estimates

in the literature and imply that childhood environments are likely to be less important influences on health, at least the measures of health used here, than on educational attainment and labor market outcomes.

Table 1
Sibling Correlations for Selected Health and Socioeconomic Outcomes at Approximately Age 40

Outcome	Correlation Coefficient	P-value
SF-12 Physical Component Score	0.07	0.05
SF-12 Mental Component Score	0.09	0.02
Self-reported Good Health	0.13	<0.01
Self-reported Poor Health	0.15	<0.01
CESD Score	0.11	<0.01
Height (1985)	0.71	<0.01
Daily Smoker (1998)	0.27	<0.01
Binge Drinker in Past Month (2002)	0.10	<0.01
AFQT Percentile Score (1979)	0.68	<0.01
Annual Earnings	0.33	<0.01
Completed Years of Education ≥16	0.47	<0.01

Notes: Correlations based on 785 same-sex sibling pairs who were observed at approximately age 40.

I now turn to the regression results. For each dependent variable, three models were estimated: one that includes only cognitive and non-cognitive factors; a second that adds measures of adolescent health, health endowment, and family background variables; and a third that adds education and adult health behaviors. All models include demographic variables. Notes to the tables describe the model specifications in detail. Analyses were conducted separately by gender.

Table 2 presents the estimates of the associations between adolescent cognitive ability and adult health of males. I also report the association between cognitive ability and annual earnings to link the estimates here to the literature on the effects of early cognitive ability on adult earnings. Cognitive ability, as measured by AFQT quartile, is positively associated with adult physical and mental health, and earnings. Estimates in column (3) indicate that moving from the bottom to the third quartile of the AFQT distribution is associated with a:

- 30 percent of a standard deviation increase in SF-Physical (statistically significant);

- 14 percent of a standard deviation increase in SF-Mental;
- 35 percent of a standard deviation decrease in CESD (statistically significant);
- 20 percent increase in probability of reporting good health (statistically significant);
- 125 percent decrease in probability of reporting poor health (statistically significant);
- and a 16 percent of a standard deviation increase in earnings.

These estimates represent the direct associations that are net of other factors. The total associations (column 1 estimates) are larger, as part of the total association is indirect through other factors. However, the addition of family background factors, completed education and current health behaviors mediate only slightly the associations between adolescent AFQT score and adult physical and mental health. In contrast, the addition of these factors greatly reduces the association between AFQT and adult earnings; in this case the partial F statistic is no longer statistically significant.

These results imply that the association between cognitive ability at ages 14 or 15 and adult health at age 41 is not solely because cognitive ability is positively associated with education or health behaviors, which are in turn positively associated with health. Instead, cognitive ability is associated with adult health through other mechanisms in addition to the completed schooling pathway. In contrast, associations between cognitive ability and earnings are significantly diminished when education and health behaviors are added to the model, and this change is primarily because of the addition of education. When education is included in the model, cognitive ability no longer has a significant association with annual earnings, although magnitudes of the associations between AFQT and annual earnings are not trivial—being in the top half of distribution is associated with approximately $10,000 (20 percent of a standard deviation) higher earnings. Comparing associations between cognitive ability and health, and cognitive ability and earnings, reveals that cognitive ability has a larger relative effect on health than earnings.

Table 3 presents estimates of the associations between adolescent cognitive ability, and adult health and earnings for the female sample. For this group, adolescent cognitive ability, as measured by AFQT, has relatively little direct (net of other factors) association with adult health and earnings. Total associations (column 1) between adolescent cognitive achievement and adult health and earnings are positive and often substantial. For example, moving from the bottom quartile to the third quartile of the AFQT distribution is associated with a: 25 percent of a standard deviation increase in SF-Physical (statistically significant); 75 percent decrease in probability of reporting poor health (statistically significant); and an 80 percent of a standard deviation increase in earnings. These total associations between cognitive ability and adult health for women are of the same approximate magnitude as the direct (net of other factors) associations found for men. Cognitive ability has a larger relative association with health for males than females.

However, as noted, the addition of family background, completed education and adult health significantly diminishes these associations. For example, after adjusting for other factors, moving from the bottom to third quartile of the AFQT distribution is associated with a 40% of a standard deviation decrease in probability of reporting poor health and a 25% percent of a standard deviation increase in annual earnings. These are substantially smaller than figures noted above; mediation is even larger for other outcomes. In contrast to males, net of other factors, cognitive ability has much smaller, sometimes no, direct associations with adult health or earnings for females.

I now turn to the relationship between non-cognitive factors and adult health and earnings. Table 4 presents estimates for males. The only variable that is significantly and consistently associated with adult health or earnings is self esteem. Estimates in column (3)

indicate that moving from roughly the bottom third to top third of the self esteem distribution is associated with a:

- 14 percent of a standard deviation increase in SF-Physical;
- 20 percent of a standard deviation increase in SF-Mental (statistically significant);
- 35 percent of a standard deviation decrease in CESD (statistically significant);
- 20 percent increase in probability of reporting good health (statistically significant);
- 30 percent decrease in probability of reporting poor health (statistically significant);
- and a 12 percent of a standard deviation increase in earnings (statistically significant).

These estimates reflect associations net of other factors. However, a comparison of estimates in columns (1) and (3) reveals that the addition of family background factors, completed education, and health behaviors has virtually no effect on associations between self esteem and adult health. In contrast, the addition of these factors reduces by half the association between self esteem and earnings.[10] Here again, we observe that childhood characteristics, in this case self esteem, has a larger, direct association in relative terms with adult health than with adult earnings.

Estimates in Table 4 also indicate that not smoking is positively associated with adult health (not mental health). Using estimates from column (3), those who did not smoke at age 14, as compared to smokers, have a: 20 percent of a standard deviation increase in SF-Physical (statistically significant); a 12 percent increase in probability of reporting good health (statistically significant), and a 25 percent decrease in probability of reporting poor health (not significant). Family background, completed education and health behaviors mediate slightly these associations

Table 5 reports the estimates of associations between non-cognitive traits, and adult health and earnings for females. The results are similar to those for men. The only variable that

[10] Heckman et al. (2006) used only two of the non-cognitive measures used here: Rotter locus of control scale and Rosenberg self-esteem scale. They combined these variables into one measure. They find a stronger association between these the combined measure and log hourly wage of males and females at age 30. They do not limit the sample to persons for which measurement of cognitive and non-cognitive skills occurred prior to completed schooling.

had a consistent and significant association to these adult outcomes was self esteem. Estimates in column (3) indicate that moving from the approximately the bottom third to the top third of self esteem distribution is associated with a:

- 15 percent of a standard deviation increase in SF-Physical;
- 15 percent of a standard deviation increase in SF-Mental;
- 20 percent of a standard deviation decrease in CESD (statistically significant);
- 20 percent increase in probability of reporting good health (statistically significant);
- 40 percent decrease in probability of reporting poor health;
- and a 14 percent of a standard deviation increase in earnings.

The magnitudes of these (direct) associations are approximately the same as those observed for men, and the direct associations between self esteem and adult health tend to be slightly larger than the direct associations between self esteem and adult earnings. Family background, completed education and health behaviors do not mediate associations related to health, but reduce by half the association between self esteem and adult earnings, which is the same result found for men.

Estimates in Table 5 also provide some evidence that delaying alcohol use is positively associated with health as an adult. Compared to those who drank by age 14, those who did not, have a 20 percent of a standard deviation higher SF-Mental score, a 20 percent higher probability of reporting good health, and a 20 percent lower probability of reporting poor health. However, none of these estimates are statistically significant.

There is a large literature in economics and other disciplines that examines the effects of completed education on health and economic well being. Part of this literature makes use of information on cognitive ability at an earlier age to assess how much of the associations between completed education and outcomes are due to early cognitive ability. Here, I reverse the ordering of the question, and ask how much of the association between adolescent cognitive ability and adult health and earnings works through completed education. The answer is 50

percent or more for earnings for males and females, a much smaller amount for health among males, and a much larger amount for health among females. The extent of mediation provides information about the magnitude of the direct (net of other factors) associations between completed education, and adult health and earnings; more mediation implies larger direct associations. Table 6 presents those direct associations for males.

Estimates in Table 6 indicate that completed education is significantly related to adult outcomes, but the nature of the relationship differs by outcome. Obtaining a high school degree is associated with better SF-12 and CESD measures of health. There appears to be a threshold; receipt of at least a high school degree is associated with 30 percent of a standard deviation increase in mental and physical health and there is little evidence of an education gradient in these health measures. An education gradient is observed for measures of overall health, as health improves with increases in education. A Bachelors degree is associated with a 25 percent increase in reported good health and 150 percent decrease in reported poor health. In the case of earnings, there appears to be another threshold, as only those with a BA or more appear to have higher earnings. Receipt of BA or more is associated with 80 percent of a standard deviation increase in earnings.

Table 6 also presents estimates of associations between adult health behaviors, and adult health and earnings. Again, these are direct associations net of other factors. The only health behavior significantly related to health is obesity. Obese persons are in worse health. Magnitudes of the associations are substantial; for example, obese persons report a 30 percent lower probability of poor health and 75 percent higher probability of good health. The only health behavior related to earnings is smoking. Daily smokers have earnings that are 14 percent of a standard deviation lower than non smokers.

Associations between completed education, and adult health and earnings are somewhat different in the female sample. Estimates in Table 7 show these results. There is strong evidence of an education gradient for all health outcomes and earnings. Magnitudes of the associations are large. Obtaining a high school degree is associated with a:

- 20 percent of a standard deviation increase in SF-12 mental and physical health;
- 20 percent increase in probability of reporting good health;
- 100 percent decrease in probability of reporting poor health (statistically significant);
- and a 40 percent of a standard deviation increase in earnings (statistically significant).

Estimates of associations between adult health behaviors, and adult health and earnings are also shown in Table 7. As the case for men, only obesity is significantly related to health outcomes. Obese women are in significantly worse health than non-obese women.

Discussion

Interest in childhood determinants of adult measures of well being is motivated by the documented correlations between sibling outcomes, which establish that childhood matters for these outcomes, and the possibility that interventions during childhood may be a particularly cost-effective way to improve adult outcomes (Cunha and Heckman 2006; Heckman 2007). While we know that childhood matters, we are not sure as to why it matters. Early research into this question focused on investigating the role of cognitive ability and family background (e.g., family income), and recent research has extended the search to non-cognitive factors. In all cases, more attention has been paid to education and labor market outcomes than health. When health was the outcome of interest, researchers tended to focus on the influence of childhood health and did not pay much attention to cognitive and non-cognitive traits. This is an important omission because there are plausible reasons to expect cognitive ability and non-cognitive traits to affect health in direct (e.g., impulsivity) and indirect ways (e.g., through completed education).

In this paper, I provide descriptive evidence of the importance of cognitive ability and non-cognitive factors on adult health at age 41. The inclusion of non-cognitive factors in the analysis is novel, as there have been no direct estimates reported in the literature as to the importance of these factors on adult health. The paper also adds to a relatively small literature on the effects of non-health, childhood factors on adult health. Data for the analysis came from the NLSY79, which provides information on childhood environment at age 14 and adult health at age 41 for a recent birth cohort.

Results indicate the following. Adolescent cognitive ability and one non-cognitive trait—self esteem—have significant, direct associations with adult health. For males, direct (net of other factors) associations are of same relative magnitude for cognitive ability and self esteem, and cognitive ability and self esteem have larger (relative) associations with health than earnings. For females, direct associations are larger (relatively) for self esteem than cognitive ability, and cognitive ability has small direct associations with health and earnings; maybe slightly larger for earnings.

Total associations between cognitive ability and self esteem, and adult health and earnings are larger than the direct associations, as some of the influence of these variables is through completed education and related to family background. However, differences between the total and direct associations—the extent of mediation—differ by outcome and gender. For males, family background and completed education are more significant mediators of the association between cognitive ability, and self esteem and adult earnings than adult health. Thus much of the association between cognitive ability and self esteem and adult health is not through completed education. In contrast, completed education accounted for a much larger share of the total associations between cognitive ability and self esteem, and adult earnings. Among females,

family background and completed education virtually eliminates associations between cognitive ability, and adult health and earnings—most of the effect is through completed education. These factors mediate only slightly associations between self esteem and adult health and earnings.

Completed education continues to be significantly associated with adult health and earnings net of adolescent and family background characteristics. Among males, there was more evidence that obtaining an educational threshold was associated with adult health and earnings than there was evidence of an education gradient in health and earnings. For example, obtaining at least a high school degree (threshold) is associated with better health and associations are of the same order of magnitude (relative) as the (direct) associations of cognitive ability and self esteem. The threshold for earnings was a Bachelors degree. For females, there was consistent evidence of an education gradient for both health and earnings, and associations are of the same order of magnitude as the (direct) associations of cognitive ability and self esteem.

The evidence I presented is purely descriptive, but it fills an important gap in knowledge and establishes some empirical facts that can be used to inform future research. Making policy statements based on this evidence is not appropriate, but it is possible to identify what types of policies are consistent with the evidence. For males, increasing adolescent cognitive ability and self esteem by the same relative amount, for example moving from bottom third to top third of self esteem distribution or moving from bottom to third quartile of AFQT distribution, suggest similar consequences on adult health, and will have a similar effect as obtaining a high school degree. These results suggest that it may be cheaper to intervene during childhood (AFQT and self esteem) than during later adolescence (HS) under the assumption that the earlier interventions may be cheaper to accomplish (Heckman 2007). Similar implications apply to females, except for females there was more evidence that the associations between cognitive

ability and self esteem were primarily through completed education—there was less evidence of direct associations for these variables and strong direct associations between completed education and adult outcomes. This weakens the likelihood that early interventions will be more cost effective because while potentially significant, a large part of the effect is indirect and interventions such as raising high school graduation rates can produce similar results (but still at unknown cost).

Several limitations of the study need to be noted. First, data was available only for a relatively narrow window of childhood (age 14 and 15) and for a relatively early adult age (41) in terms of health. A more detailed analysis of the history of childhood environment and observations on adults at later ages would have strengthened the current analysis and are opportunities for future analyses. In addition, sample sizes were relatively small and this resulted in somewhat imprecise estimates. Second, many of the variables used in the analyses are proxies and are measured with error. Cunha and Heckman (2006) showed that such measurement error can significantly affect estimates and interpretation of findings. Finally, there remain many omitted variables that are likely to be more germane (e.g., actual measure of time preference) determinants of health that, if included, would likely alter the associations found here and alter the conclusions.

References

Auld, Christopher and Nirmal Sidhu. 2005. "Schooling and Cognitive Ability." *Health Economics,* 14(10): 1013-1034.

Becker, Gary. 2007. "Health as Human Capital: Synthesis and Extensions." Oxford Economic Papers, 59(3):379-410.

Björklund, Anders, Bernt Bratsberg, Tor Eriksson, Markus Jäntti and Oddbjørn Raaum. 2002. "Inter-Industry Wage Differentials and Unobserved Ability: Siblings Evidence from Five Countries." IZA discussion paper No. 1080.

Cawley, John, James Heckman and Edward Vytlacil. 2001. "Three Observations on Wages and Measured Cognitive Ability." *Labour Economics,* 8(4):419-442

Christensen, K. and J.W. Vaupel. 1996. **"**Determinants of Longevity: Genetic, Environmental and Medical Factors." *Journal of Internal Medicine,* 240:333–341.

Cunha, Flavio, James Heckman, Lance Lochner, and Dimitriy Masterov. 2006. "Interpreting the Evidence on Life Cycle Skill Formation." In *Handbook of the Economics of Education*, edited by Eric A. Hanushek and Frank Welch. Amsterdam: North-Holland, 697–812.

Cunha, Flavio and James Heckman. 2007. "The Technology of Skill Formation." IZA Discussion Paper No. 2550.

Currie, Janet. 2007. "Healthy, Wealthy, and Wise: Socioeconomic Status, Poor Health in Childhood, and Human Capital Development." NBER Working Paper No. 13987.

Cutler, David and Adriana Lleras-Muney. 2007. "Understanding Differences in Health Behaviors by Education." NBER Working Paper.

Elias, Julio. 2005. "The Effects of Ability and Family Background on Non-monetary Returns to Education." University of Chicago Working Paper.

Goldsmith, Arhtur H., Jonathan Veum, and William Darity, Jr. 1997. "The Impact of Psychological and Human Capital on Wages." *Economic Inquiry* 35(4):815-829.

Grafova, Irina and Frank Stafford. Undated. "Smoking Behavior and Wages Over the Life Course." University of Michigan Working Paper.

Grossman, Michael. 2000. "The Human Capital Model," In *Handbook of Health Economics,* edited by Anthony Culyer and Joseph Newhouse. Amsterdam: North-Holland, Elsevier Science, 347-405.

Hartog, Joop and Hessel Osterbeek. 1998. "Health, Wealth, and Happiness: Why Pursue Higher Education?" *Economics of Education Review*, 17(3):245-256.

Hauser, Robert and William Sewell. 1986. "Family Effects in Simple Models of Education, Occupational Status, and Earnings: Findings from the Wisconsin and Kalamazoo Studies." *Journal of Labor Economics*, 4(3):S83-S115.

Heckman, James, Jora Stixrud and Susan Keller. 2006. "The Effects of Cognitive and Noncognitive Ability on Labor Market Outcomes and Social Behavior." *Journal of Labor Economics*, 24(3):411-482.

Heckman, James. 2007. "The Economics, Technology, and Neuroscience of Human Capability Formation." NBER Working Paper No. 13195.

Johnson, William and Derek Neal. 1996. "The Role of Premarket Factors in Black-White Wage Differences." *Journal of Political Economy*, 104(5):869-895 .

Kieseppä, Tuula, Timo Partonen, Jari Haukka, Jaakko Kaprio and Jouko Lönnqvist. 2004. **"**High Concordance of Bipolar I Disorder in a Nationwide Sample of Twins." *American Journal of Psychiatry,* 161:1814-1821.

Levine, Phillip, Tara Gustafson and Ann Velenchik. 1997. "More Bad News for Smokers? The Effects of Cigarette Smoking on Wages." *Industrial and Labor Relations Review,* 50(3):493-509.

Marenberg, Marjorie, Neil Risch, Lisa Berkman, Birgitta Floderus and Ulf de Faire. 1994. "Genetic Susceptibility to Death from Coronary Heart Disease in a Study of Twins." *The New England Journal of Medicine*, 330(15):1041-1046.

Mazumder, Bhashkar. 2008. "Sibling Similarities and Economic Inequality in the US." *Journal of Population Economics,* 21(3):685-701.

Murnane, Richard J., Willett, John B. and Levy, Frank S. 1995. "The Growing Importance of Cognitive Skills in Wage Determination." *The Review of Economics and Statistics*, 77(2):251-266.

Petersen, Liselotte, Per Kragh Andersen and Thorkild Sorensen. 2008. "Genetic and Environmental Effects on Mortality Before Age 70 Years." *Epidemiology*, 19(3):472-476.

Solon, Gary, Mary Corcoran, Roger Gordon and Deborah Laren. 1991. "A Longitudinal Analysis of Sibling Correlations in Economic Status." *Journal of Human Resources*, 26:509-534.

Solon, Gary, Marianne Page and Greg Duncan. 2000. "Correlations Between Neighboring Children in Their Subsequent Educational Attainment." *Review of Economics and Statistics*, 82:383-392.

Stunkard, A. J., T. T. Foch and Z. Hrubec. "A Twin Study of Human Obesity." *Journal of American Medical Association*, 256(1):51-54.

v.B. Hjelmborg, J., I. Iachine, A. Skytthe, J. Waupel, M. McGue, J. Kaprio, N.L. Pedersen and K. Christensen. 2006. "Genetic Influence on Human Lifespan and Longevity." *Human Genetics*, 119(3):312-321 .

Ware, John, Mark Kosinski and Susan Keller. 1995. *SF-12: How to Score the SF-12 Physical and Mental Health Summary Scales, 2nd edition*. Boston: The Health Institute, New England Medical Center.

Table 2 - Males
Estimates of Associations Between Adolescent Cognitive Ability, and Adult Health and Earnings

	SF-Physical			SF-Mental			CESD		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
AFQT—2nd	1.37*	1.41*	1.51*	1.01	1.04	0.76	-0.96**	-0.94*	-0.85*
	(0.68)	(0.70)	(0.72)	(0.74)	(0.76)	(0.78)	(0.37)	(0.38)	(0.39)
AFQT—3rd	2.48**	2.15**	2.28**	1.58*	1.56	1.03	-1.51**	-1.45**	-1.27**
	(0.72)	(0.76)	(0.80)	(0.78)	(0.83)	(0.88)	(0.38)	(0.41)	(0.43)
AFQT—4th	3.33**	2.86**	2.58**	1.75*	1.82	1.12	-2.09**	-2.13**	-1.77**
	(0.79)	(0.86)	(0.95)	(0.85)	(0.94)	(1.04)	(0.42)	(0.47)	(0.51)
Partial F	6.52**	3.95**	3.14**	1.73	1.49	0.54	8.79**	7.26**	4.22**
Observations	872	866	854	872	866	854	858	852	841
	Good Health			Poor Health			Earnings		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
AFQT—2nd	0.054	0.065	0.068	-0.110**	-0.107**	-0.094**	8,449	7,254	3,595
	(0.047)	(0.049)	(0.049)	(0.032)	(0.033)	(0.033)	(4780)	(4816)	(4798)
AFQT—3rd	0.108*	0.114*	0.112*	-0.199**	-0.186**	-0.164**	20,511**	13,943**	8,047
	(0.050)	(0.053)	(0.055)	(0.034)	(0.036)	(0.037)	(4976)	(5154)	(5281)
AFQT—4th	0.188**	0.153*	0.125	-0.200**	-0.181**	-0.134**	44,596**	28,667**	12,173
	(0.054)	(0.065)	(0.068)	(0.037)	(0.041)	(0.044)	(8,449)	(7,254)	(3,595)
Partial F	4.25**	2.36	1.58	13.28**	9.80**	6.47**	25.88**	8.54**	1.39
Observations	884	878	866	884	878	866	845	839	830

Notes:

1. All models include dummy variables for adult age at time of survey (measured in half year intervals), race/ethnicity (non-Hispanic Black, non-Hispanic White, Hispanic), foreign born, mother foreign-born, and foreign language spoken at home when young.
2. Estimates in column (1) are from model that also includes AFQT quartile dummy variables and measures of non-cognitive traits. Non-cognitive traits include self esteem, locus of control, religiosity, stealing behavior, and substance use. Tables 3 and 4 list the exact measures.
3. Estimates in column (2) are from model that add adolescent health in 1979 (height, height squared, and health limitation in 1979), and measures of family background. Appendix Table 1 lists the full set of family background measures.
4. Estimates in column (3) are from model that adds respondent's completed education and current/recent health behaviors. Current health behaviors include smoking, drinking, exercise and obesity. Tables 5 and 6 list the exact measures.
5. Standard errors in parentheses. * indicates ($0.05 < p\text{-value} \leq 0.10$) ** indicates ($p\text{-value} \leq 0.05$)

Table 3 - Females
Estimates of Associations Between Adolescent Cognitive Ability, and Adult Health and Earnings

	SF-Physical			SF-Mental			CESD		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
AFQT—2nd	1.93*	1.46	0.92	1.29	1.27	0.29	-0.71	-0.38	-0.02
	(0.96)	(1.01)	(1.02)	(0.91)	(0.95)	(0.98)	(0.45)	(0.47)	(0.48)
AFQT—3rd	2.37*	1.90	0.80	0.37	0.55	-0.74	-0.84	-0.54	-0.04
	(1.02)	(1.09)	(1.13)	(0.97)	(1.03)	(1.08)	(0.48)	(0.51)	(0.53)
AFQT—4th	2.97**	1.90	0.02	0.20	0.37	-1.50	-1.05*	-0.68	0.17
	(1.14)	(1.27)	(1.35)	(1.09)	(1.20)	(1.29)	(0.53)	(0.59)	(0.63)
Partial F	2.62*	1.16	0.51	0.82	0.68	0.93	1.52	0.51	0.06
Observations	798	792	783	798	792	783	780	775	767
	Good Health			Poor Health			Earnings		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
AFQT—2nd	0.079	0.068	0.033	-0.100**	-0.095*	-0.069	9,613**	7,063**	4,309
	(0.051)	(0.053)	(0.054)	(0.037)	(0.039)	(0.040)	(2571)	(2673)	(2716)
AFQT—3rd	0.125*	0.097	0.038	-0.129**	-0.122**	-0.073	16,029**	12,293**	8,158**
	(0.054)	(0.057)	(0.059)	(0.040)	(0.043)	(0.044)	(2762)	(2924)	(3028)
AFQT—4th	0.198**	0.135*	0.038	-0.157**	-0.145**	-0.071	19,793**	14,359**	6,732
	(0.061)	(0.067)	(0.070)	(0.045)	(0.050)	(0.053)	(3054)	(3364)	(3554)
Partial F	3.61**	1.45	0.17	4.88**	3.51**	1.18	15.76**	7.27**	2.43
Observations	798	792	783	798	792	783	755	749	741

Notes: See notes to Table 1a.

Table 4 - Males
Estimates of Associations Between Adolescent Non-Cognitive Traits (Self Esteem, Locus of Control, Religiosity, and Stealing) and Adult Health and Earnings

	SF-Physical			SF-Mental			CESD		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Self Esteem-Middle	0.86	0.73	0.99	0.35	0.37	0.36	-0.95**	-0.96**	-0.98**
	(0.68)	(0.69)	(0.69)	(0.74)	(0.75)	(0.76)	(0.36)	(0.37)	(0.37)
Self Esteem-Top	1.03	0.85	1.06	1.61*	1.64*	1.66*	-1.23**	-1.24**	-1.25**
	(0.63)	(0.64)	(0.64)	(0.68)	(0.69)	(0.70)	(0.33)	(0.34)	(0.34)
Internal Locus-Middle	-0.04	-0.02	-0.10	0.48	0.54	0.70	-0.70*	-0.66*	-0.68*
	(0.59)	(0.60)	(0.60)	(0.64)	(0.65)	(0.66)	(0.31)	(0.32)	(0.32)
Internal Locus-Top	-0.71	-0.89	-0.92	0.84	0.90	0.98	-0.55	-0.46	-0.45
	(0.60)	(0.61)	(0.61)	(0.65)	(0.66)	(0.67)	(0.32)	(0.32)	(0.33)
Partial F	1.10	1.17	1.41	2.32*	2.33*	2.42*	4.74**	4.47**	4.42**
Religious Att.-Sometimes	0.63	0.16	0.21	0.93	0.68	0.64	-0.56	-0.52	-0.53
	(0.62)	(0.64)	(0.64)	(0.67)	(0.69)	(0.70)	(0.33)	(0.34)	(0.34)
Religious Att.- Frequent	0.98	0.71	0.63	0.25	-0.00	-0.26	-0.31	-0.30	-0.18
	(0.54)	(0.56)	(0.57)	(0.58)	(0.61)	(0.62)	(0.29)	(0.30)	(0.30)
Stole Sometimes	-0.01	0.00	-0.11	1.30	1.34	1.10	-0.52	-0.62	-0.51
	(0.70)	(0.71)	(0.72)	(0.75)	(0.77)	(0.78)	(0.37)	(0.38)	(0.38)
Stole Never	-0.39	-0.41	-0.46	1.05	0.99	0.85	-0.18	-0.24	-0.17
	(0.62)	(0.64)	(0.64)	(0.68)	(0.70)	(0.70)	(0.33)	(0.34)	(0.35)
Partial F	0.98	0.59	0.45	1.31	1.06	0.92	1.27	1.31	1.04
Observations	872	866	854	872	866	854	858	852	841

Notes:
1. See notes to Table 1a.
2. Self Esteem is the Rosenberg Scale and respondents are grouped roughly into tertiles: low (omitted), middle and top.
3. Internal Locus of Control is measured by Rotter Scale and respondents are grouped roughly into tertiles: low (omitted), middle and top.
4. Religiosity is frequency of religious attendance: not at all/infrequently (omitted), 1-3 times per month, and once or more a week.
5. Stealing (Stole) is whether person stole often (omitted), sometimes, or never.

Table 4 - Males
Estimates of Associations Between Adolescent Non-Cognitive Traits (Self Esteem, Locus of Control, Religiosity, and Stealing) and Adult Health and Earnings

	Good Health			Poor Health			Earnings		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Self Esteem-Middle	0.061	0.049	0.066	-0.053	-0.043	-0.050	6,631	4,415	5,226
	(0.047)	(0.048)	(0.048)	(0.032)	(0.032)	(0.032)	(4726)	(4688)	(4588)
Self Esteem-Top	0.123**	0.115**	0.130**	-0.040	-0.031	-0.036	10,012*	6,851	6,370
	(0.043)	(0.044)	(0.044)	(0.029)	(0.030)	(0.030)	(4309)	(4302)	(4215)
Internal Locus-Middle	-0.018	-0.017	-0.022	-0.008	-0.014	-0.012	-3,030	-2,676	-3,504
	(0.041)	(0.041)	(0.041)	(0.028)	(0.028)	(0.028)	(4105)	(4087)	(3976)
Internal Locus-Top	0.037	0.042	0.045	-0.015	-0.018	-0.014	2,649	1,610	-259
	(0.042)	(0.042)	(0.042)	(0.028)	(0.028)	(0.028)	(4152)	(4119)	(4042)
Partial F	2.84*	2.61*	3.22**	0.82	0.58	0.71	2.06	1.02	0.89
Religious Att.-Sometimes	0.029	-0.003	-0.008	-0.035	-0.010	-0.007	-245	-867	-1,996
	(0.043)	(0.044)	(0.044)	(0.029)	(0.030)	(0.030)	(4312)	(4339)	(4227)
Religious Att.- Frequent	0.026	0.009	-0.008	-0.062*	-0.045	-0.028	-458	-4,007	-8,196*
	(0.037)	(0.039)	(0.039)	(0.026)	(0.026)	(0.026)	(3741)	(3784)	(3732)
Stole Sometimes	0.118*	0.111*	0.093	-0.046	-0.035	-0.023	2,714	3,491	2,631
	(0.048)	(0.049)	(0.049)	(0.033)	(0.033)	(0.033)	(4794)	(4791)	(4694)
Stole Never	0.050	0.036	0.024	-0.027	-0.022	-0.017	2,106	2,866	2,077
	(0.043)	(0.044)	(0.044)	(0.029)	(0.030)	(0.030)	(4296)	(4319)	(4219)
Partial F	1.72	1.43	1.05	2.07	1.11	0.46	0.09	0.44	1.36
Observations	884	878	866	884	878	866	845	839	830

Notes:
1. See notes to Table 3a.

Table 4 - Males
Estimates of Associations Between Adolescent Non-Cognitive Traits (Substance Use), and Adult Health and Earnings

	SF-Physical			SF-Mental			CESD		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
No Cigarette Use	1.78**	1.78**	1.55**	0.34	0.08	-0.19	-0.39	-0.28	-0.15
	(0.51)	(0.52)	(0.52)	(0.55)	(0.57)	(0.57)	(0.27)	(0.28)	(0.28)
No Alcohol Use	-0.23	-0.13	0.04	0.60	0.68	0.76	-0.10	-0.06	-0.12
	(0.69)	(0.70)	(0.71)	(0.75)	(0.77)	(0.77)	(0.37)	(0.37)	(0.38)
No Marijuana Use	-1.09	-1.17	-0.86	-0.08	-0.23	0.02	0.14	0.11	0.04
	(0.67)	(0.68)	(0.68)	(0.72)	(0.74)	(0.74)	(0.35)	(0.36)	(0.37)
Partial F	3.77**	3.97**	3.21**	0.97	0.80	0.62	0.69	0.49	0.19
872	866	854	872	866	854	858	852	841	872
		Good Health			Poor Health			Earnings	
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
No Cigarette Use	0.093**	0.099**	0.075*	-0.048*	-0.048	-0.029	4,483	5,190	2,046
	(0.036)	(0.036)	(0.036)	(0.024)	(0.024)	(0.024)	(3549)	(3539)	(3471)
No Alcohol Use	0.028	0.018	0.030	-0.023	-0.018	-0.025	5,180	4,981	5,382
	(0.048)	(0.049)	(0.048)	(0.032)	(0.033)	(0.033)	(4749)	(4756)	(4654)
No Marijuana Use	0.023	0.017	0.043	0.031	0.028	0.021	-8,866	-9,338*	-10,509*
	(0.046)	(0.047)	(0.047)	(0.031)	(0.032)	(0.032)	(4598)	(4581)	(4477)
Partial F	2.46*	2.57*	2.06*	2.67*	2.54*	1.67	1.50	1.78	1.67
Observations	884	878	866	884	878	866	845	839	830

Notes: See notes to Table 1a.

Table 5 - Females
Estimates of Associations Between Adolescent Non-Cognitive Traits (Self Esteem, Locus of Control, Religiosity, and Stealing) and Adult Health and Earnings

	SF-Physical			SF-Mental			CESD		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Self Esteem-Middle	1.28	1.52	1.13	1.63	1.87*	1.51	-1.43**	-1.52**	-1.30**
	(0.97)	(1.00)	(1.00)	(0.93)	(0.95)	(0.95)	(0.46)	(0.47)	(0.47)
Self Esteem-Top	1.73*	1.80*	1.42	1.82*	1.78*	1.43	-1.20**	-1.12**	-0.95*
	(0.83)	(0.85)	(0.86)	(0.79)	(0.81)	(0.82)	(0.39)	(0.40)	(0.41)
Internal Locus-Middle	0.62	0.61	0.87	-0.61	-0.71	-0.55	-0.13	-0.10	-0.22
	(0.82)	(0.84)	(0.84)	(0.78)	(0.80)	(0.80)	(0.38)	(0.39)	(0.39)
Internal Locus-Top	-0.68	-0.94	-0.81	-0.22	-0.37	-0.40	-0.17	-0.06	-0.16
	(0.86)	(0.89)	(0.88)	(0.82)	(0.84)	(0.84)	(0.40)	(0.41)	(0.41)
Partial F	1.60	1.87	1.64	1.66	1.67	1.03	3.16*	3.02*	2.17
Religious Att.-Sometimes	-0.78	-1.09	-0.54	0.66	0.49	0.74	-0.07	-0.01	-0.11
	(0.94)	(0.98)	(0.97)	(0.89)	(0.92)	(0.93)	(0.44)	(0.45)	(0.46)
Religious Att.- Frequent	-0.75	-1.00	-1.07	2.48**	2.50**	2.58**	-0.41	-0.41	-0.36
	(0.76)	(0.80)	(0.79)	(0.73)	(0.76)	(0.76)	(0.36)	(0.37)	(0.37)
Stole Sometimes	0.40	0.18	0.27	0.39	0.37	0.27	0.04	-0.07	0.05
	(1.28)	(1.32)	(1.31)	(1.22)	(1.25)	(1.25)	(0.60)	(0.61)	(0.61)
Stole Never	0.10	-0.10	-0.17	0.35	0.23	-0.29	0.32	0.27	0.50
	(1.14)	(1.18)	(1.18)	(1.08)	(1.12)	(1.13)	(0.53)	(0.55)	(0.55)
Partial F	0.33	0.51	0.54	3.25*	3.17*	3.23*	0.54	0.58	0.65
Observations	798	792	783	798	792	783	780	775	767

Notes: See notes to Table 3a.

Table 5 - Females
Estimates of Associations Between Adolescent Non-Cognitive Traits (Self Esteem, Locus of Control, Religiosity, and Stealing) and Adult Health and Earnings

	Good Health			Poor Health			Earnings		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Self Esteem-Middle	0.144**	0.158**	0.143**	-0.068	-0.073	-0.055	1,918	1,664	601
	(0.052)	(0.053)	(0.052)	(0.038)	(0.039)	(0.039)	(2606)	(2645)	(2617)
Self Esteem-Top	0.129**	0.131**	0.119**	-0.077*	-0.082*	-0.064	6,265**	5,399*	3,627
	(0.044)	(0.045)	(0.045)	(0.032)	(0.033)	(0.033)	(2202)	(2248)	(2240)
Internal Locus-Middle	0.103*	0.102*	0.119**	-0.038	-0.044	-0.053	-2,471	-2,466	-1,491
	(0.044)	(0.044)	(0.044)	(0.032)	(0.033)	(0.033)	(2196)	(2225)	(2204)
Internal Locus-Top	0.035	0.027	0.036	0.030	0.030	0.028	-22	-375	356
	(0.046)	(0.046)	(0.046)	(0.034)	(0.035)	(0.034)	(2316)	(2342)	(2311)
Partial F	3.86**	4.00**	4.12**	2.45*	2.69*	2.51*	2.92*	2.12	1.12
Religious Att.-Sometimes	0.033	0.013	0.032	0.012	0.019	-0.003	-3,783	-4,391	-2,772
	(0.050)	(0.051)	(0.051)	(0.037)	(0.038)	(0.038)	(2520)	(2595)	(2564)
Religious Att.- Frequent	0.051	0.040	0.035	-0.009	-0.004	-0.002	-465	-1,217	-1,597
	(0.041)	(0.042)	(0.042)	(0.030)	(0.031)	(0.031)	(2031)	(2108)	(2076)
Stole Sometimes	-0.020	-0.048	-0.036	-0.012	-0.003	-0.011	3,926	2,795	2,795
	(0.068)	(0.069)	(0.068)	(0.050)	(0.052)	(0.051)	(3396)	(3466)	(3409)
Stole Never	-0.009	-0.034	-0.043	-0.022	-0.007	-0.010	-410	-1,911	-2,266
	(0.061)	(0.062)	(0.062)	(0.044)	(0.046)	(0.046)	(3039)	(3125)	(3077)
Partial F	0.42	0.36	0.31	0.17	0.12	0.02	1.60	1.86	1.64
Observations	798	792	783	798	792	783	755	749	741

Notes: See notes to Table 3a.

Table 5 - Females
Estimates of Associations Between Adolescent Non-Cognitive Traits (Substance Use), and Adult Health and Earnings

	SF-Physical			SF-Mental			CESD		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
No Cigarette Use	-0.28	-0.36	-0.29	-0.14	-0.22	-0.22	-0.04	0.09	0.13
	(0.73)	(0.74)	(0.74)	(0.69)	(0.71)	(0.70)	(0.34)	(0.34)	(0.35)
No Alcohol Use	1.35	1.16	1.23	2.38*	2.46*	2.03	-0.78	-0.72	-0.55
	(1.12)	(1.14)	(1.13)	(1.06)	(1.08)	(1.08)	(0.52)	(0.52)	(0.53)
No Marijuana Use	-0.33	-0.58	-0.89	-0.18	-0.71	-0.84	-0.76	-0.64	-0.62
	(1.02)	(1.05)	(1.04)	(0.97)	(1.00)	(1.00)	(0.48)	(0.49)	(0.49)
Partial F	0.58	0.55	0.54	1.39	1.73	1.74	1.50	1.04	0.93
Observations	798	792	783	798	792	783	780	775	767
	Good Health			Poor Health			Earnings		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
No Cigarette Use	-0.006	-0.000	0.009	0.023	0.021	0.019	1,835	1,936	1,810
	(0.039)	(0.039)	(0.038)	(0.028)	(0.029)	(0.029)	(1927)	(1955)	(1917)
No Alcohol Use	0.118*	0.110	0.095	-0.022	-0.027	-0.037	-1,283	-2,175	-2,503
	(0.059)	(0.060)	(0.059)	(0.043)	(0.044)	(0.044)	(2984)	(3016)	(2982)
No Marijuana Use	-0.068	-0.089	-0.098	0.030	0.037	0.054	1,043	779	17
	(0.054)	(0.055)	(0.055)	(0.040)	(0.041)	(0.041)	(2729)	(2779)	(2734)
Partial F	1.35	1.36	1.42	0.38	0.47	0.70	0.35	0.52	0.37
Observations	798	792	783	798	792	783	755	749	741

Notes: See notes to Table 1a.

Table 6 - Males
Estimates of Associations Between Adult Education and Health Behaviors, and Adult Health and Earnings

	SF-Physical	SF-Mental	CESD	Good Health	Poor Health	Earnings
HS	1.21	2.31*	-0.84	0.040	-0.143**	-869
	(0.88)	(0.96)	(0.48)	(0.060)	(0.040)	(5753)
Some College	0.71	2.84*	-0.86	0.062	-0.155**	8,937
	(1.04)	(1.14)	(0.56)	(0.071)	(0.048)	(6871)
BA or more	2.08	2.84*	-1.38*	0.146	-0.195**	38,565**
	(1.17)	(1.28)	(0.63)	(0.080)	(0.054)	(7736)
Partial F	1.49	2.29	1.64	1.42	4.93**	18.45**
Daily Smoker	-0.04	-0.56	0.31	-0.030	0.049	-7,707*
	(0.56)	(0.61)	(0.30)	(0.038)	(0.026)	(3696)
Binge Drinker	0.44	-0.46	-0.03	0.032	-0.001	1,071
	(0.56)	(0.61)	(0.30)	(0.038)	(0.026)	(3638)
Vigorous Activity	0.00	0.01*	-0.00	0.000	-0.000	-9
	(0.00)	(0.00)	(0.00)	(0.000)	(0.000)	(15)
Obese	-2.27**	-1.52**	0.58*	-0.179**	0.104**	1,112
	(0.53)	(0.58)	(0.29)	(0.037)	(0.025)	(3518)
Partial F	4.58**	3.26**	1.31	5.26**	6.15**	1.09
Observations	872	858	872	866	866	830

Notes:
1. Daily smoking is measured in 1998, which is last year available.
2. Binge drinking is whether respondent binge drank in last month and is measured in 2002, which is last year available.
3. Vigorous activity is whether person engaged in vigorous physical activity recently.
4. Estimates are from a model corresponding to column (3) in Table 1. All models include dummy variables for adult age at time of survey (measured in half year intervals), race/ethnicity (non-Hispanic Black, non-Hispanic White, Hispanic), foreign born, mother foreign-born, foreign language spoken at home when young, AFQT quartile dummy variables, measures of non-cognitive traits (Tables 3 and 4), adolescent health in 1979 (height, height squared, and health limitation in 1979), and measures of family background (Appendix Table 1).
5. Standard errors in parentheses. * indicates ($0.05 < \text{p-value} \leq 0.10$) ** indicates ($\text{p-value} \leq 0.05$)Estimates from a model See notes to Table 1a.

Table 7 - Females
Estimates of Associations Between Adult Education and Health Behaviors, and Adult Health and Earnings

	SF-Physical	SF-Mental	CESD	Good Health	Poor Health	Earnings
HS	2.34	2.38	-0.29	0.110	-0.125*	11,761**
	(1.28)	(1.23)	(0.61)	(0.067)	(0.050)	(3435)
Some College	4.20**	4.49**	-1.19	0.146	-0.208**	15,138**
	(1.43)	(1.37)	(0.68)	(0.075)	(0.056)	(3806)
BA or more	5.53**	4.80**	-1.60*	0.226**	-0.232**	26,408**
	(1.62)	(1.55)	(0.77)	(0.085)	(0.063)	(4295)
Partial F	4.73**	4.57**	2.86*	2.45	5.64**	13.85**
Daily Smoker	-1.27	-1.42	0.91*	-0.085*	0.028	-1,346
	(0.81)	(0.78)	(0.38)	(0.043)	(0.032)	(2128)
Binge Drinker	3.19**	1.00	-0.06	0.042	-0.101*	3,628
	(1.12)	(1.07)	(0.53)	(0.059)	(0.044)	(2957)
Vigorous Activity	0.00	-0.00	-0.00	0.001	-0.000	-2
	(0.01)	(0.01)	(0.00)	(0.000)	(0.000)	(19)
Obese	-2.51**	0.15	0.12	-0.202**	0.087**	-894
	(0.75)	(0.72)	(0.35)	(0.039)	(0.029)	(1959)
Partial F	4.85**	1.04	1.29	7.12**	3.66**	0.50
Observations	783	783	767	783	783	741

Notes: See notes to Table 5.

Appendix Table 1. Sample Means and Proportions of Selected Variables Used in Analysis

	Females		Males	
	Mean	Std.Dev.	Mean	Std.Dev.
SF-12 Physical Score	51.0	9.3	52.7	7.0
SF-12 Mental Score	52.0	8.8	54.0	7.5
CESD Score	3.7	4.3	2.7	3.7
Good Health	0.54		0.60	
Poor Health	0.16		0.13	
Annual Earnings	25347	25512	44980	50521
Age	41	0.7	41	0.7
Hispanic	0.21		0.20	
Black	0.31		0.29	
Foreign-born	0.06		0.06	
Mother Foreign-born	0.11		0.12	
Foreign Language in Home	0.23		0.22	
Health Limitation in 1979	0.03		0.04	
Height in 1985 (Age 20 or 21)	64.3	3.0	69.9	3.1
Father Deceased	0.37		0.37	
Father Deceased Missing	0.04		0.04	
AFQT Percentile (1979)	34.8	24.9	34.1	27.0
Self Esteem Score (1980)	31.4	4.0	31.3	3.7
Locus of Control Score (1979)	9.4	2.0	9.3	2.1
Mother-Father Most Influential Person (1979)	0.66		0.71	
No Influential Person in Life (1979)	0.04		0.04	
Influential Person Approve Not Going College (1979)	0.22		0.26	
Attend Church Sometime (1979)	0.21		0.24	
Attend Church Often (1979)	0.48		0.39	
Stole Sometimes (1979)	0.20		0.23	
Stole Never (1979)	0.70		0.54	
No Tobacco Use by Age 14	0.56		0.49	
No Alcohol Use by Age 14	0.89		0.85	
Two Biological Parents (1979)	0.60		0.64	
Two Parents (1979)	0.08		0.10	
Mother Only (1979)	0.27		0.27	
Number of Siblings (1979)	2.2	1.6	2.4	1.8
Mother's Education 9-11 Years	0.27		0.21	
Mother's Education 12 Years	0.35		0.38	
Mother's Education 13-15 Years	0.07		0.10	
Mother's Education 16+ Years	0.08		0.07	
Missing Mother's Education	0.06		0.08	
Family Income in 1978	16751	11934	16815	11615
Missing Family Income in 1978	0.05		0.07	
Respondent Years of Completed Schooling: 12	0.40		0.50	
Respondent Years of Completed Schooling: 13-15	0.29		0.19	
Respondent Years of Completed Schooling: 16+	0.23		0.21	
Daily Smoker (1998)	0.28		0.30	
Binge Drinker in Past Month (2002)	0.11		0.26	
Number of Vigorous Physical Activity Past Month	16.9	45.5	40.4	102.5
Obese	0.31		0.29	
Missing Obese	0.05		0.03	

Notes: The sample sizes are approximately 800 for females and 875 for males with fewer valid observations for annual earnings (females approximately 750 and males approximately 850). Means of several variables are shown for continuous analog to dummy variable specification used in regression models: age, self esteem, locus of control, family income, and number of siblings. Mean of family income does not include zeros for those with missing values.

Appendix Table 2- Estimates of Associations Between Family Background Variables, and Health and Earnings, Males

	SF-Physical	SF-Mental	CESD	Good Health	Poor Health	Earnings
Two Biological Parents	0.26	1.24	-0.04	0.070	-0.049	4,560
	(0.66)	(0.72)	(0.35)	(0.045)	(0.031)	(4379)
One Biological Parent	0.14	1.78	-0.61	0.115	-0.054	28
	(0.91)	(1.00)	(0.49)	(0.063)	(0.043)	(6029)
Other Type Parental Status	-1.53	1.18	-0.61	0.020	0.038	-9,963
	(1.52)	(1.67)	(0.85)	(0.106)	(0.071)	(9962)
One Sibling	-1.96*	0.76	-0.04	-0.047	0.026	-2,725
	(0.88)	(0.96)	(0.47)	(0.060)	(0.041)	(5723)
Two Siblings	-1.39	1.56	-0.43	-0.015	0.017	-4,279
	(0.82)	(0.89)	(0.44)	(0.056)	(0.038)	(5298)
Three or More Siblings	-1.09	1.99	-0.68	0.026	-0.013	-9,755
	(0.94)	(1.03)	(0.51)	(0.064)	(0.043)	(6160)
Family Income 5000-9999	-0.30	1.46	-0.37	-0.009	-0.063	-1,553
	(0.91)	(1.00)	(0.51)	(0.063)	(0.043)	(6111)
Family Income 10000-19999	-1.27	0.39	0.14	-0.125	-0.017	-3,520
	(0.92)	(1.01)	(0.51)	(0.064)	(0.043)	(6199)
Family Income 20000-29999	0.08	0.79	-0.22	0.018	-0.109*	4,907
	(1.04)	(1.14)	(0.57)	(0.072)	(0.049)	(6975)
Family Income 30000 or more	-0.58	0.47	0.44	0.004	-0.043	21,048**
	(1.21)	(1.32)	(0.66)	(0.083)	(0.056)	(8068)
Magazines in House	-0.03	0.10	-0.32	-0.069	-0.016	5,917
	(0.57)	(0.62)	(0.30)	(0.039)	(0.027)	(3792)
Newspapers in House	-0.90	-0.06	0.30	-0.031	0.015	-2,514
	(0.61)	(0.67)	(0.33)	(0.042)	(0.028)	(4046)
Library Card in House	0.46	0.27	-0.77**	-0.024	0.010	1,500
	(0.54)	(0.59)	(0.29)	(0.038)	(0.025)	(3608)
Mother 9-11 Years School	-0.37	0.47	0.09	-0.036	-0.022	-4,121
	(0.84)	(0.92)	(0.45)	(0.058)	(0.039)	(5590)
Mother 12 Years School	0.27	0.16	0.07	-0.043	-0.003	-2,283
	(0.84)	(0.92)	(0.45)	(0.058)	(0.039)	(5564)
Mother 13-15 Years School	0.61	1.16	0.13	0.075	-0.057	13,578
	(1.11)	(1.21)	(0.59)	(0.077)	(0.052)	(7374)
Mother 16 or More Years School	0.55	-0.55	0.52	-0.007	0.018	-1,801
	(1.25)	(1.37)	(0.66)	(0.086)	(0.058)	(8356)
Influential Person Approve No College	-0.83	-0.22	-0.12	-0.064	0.032	-3,282
	(0.56)	(0.61)	(0.30)	(0.039)	(0.026)	(3708)
Mother/Father is Most Influential Person	-1.26*	-0.34	0.58	-0.048	0.056*	-2,189
	(0.57)	(0.62)	(0.30)	(0.039)	(0.026)	(3731)
No Influential Person in Life	-1.45	-0.30	-0.21	-0.194*	-0.029	-7,949
	(1.38)	(1.51)	(0.74)	(0.096)	(0.065)	(9576)

Notes:

1. Estimates are from a model corresponding to column (3) in Table 1.