

Personality and SES

Personality and the Reproduction of Social Class

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A burgeoning literature in psychology and economics examines how personality characteristics predict indicators of attained status. We build on this research by suggesting that connections between personality and attained status are also socially contingent: Valued personality characteristics are stronger predictors of attainments at lower levels of parent education (the resource substitution hypothesis), but such characteristics are less likely among the children of less educated parents (the structural amplification hypothesis). We examine these possibilities by drawing on the Mini-IPIP (a standardized instrument assessing personality), the National Longitudinal Study of Adolescent Health, and a statistical framework to test for moderated mediation. Results reveal that (1) personality characteristics have notable associations with educational attainment, hourly wages, and self-direction at work; (2) personality often has stronger associations with status attainments at lower levels of parent education; and (3) personality is a weak mediator of associations between parent education and attained status. That is, the children of less educated parents may benefit more from valued personality characteristics, but they are slightly less likely to possess such characteristics. These results are discussed in terms of new avenues for research into diverse forms of capital and status attainment.

The study of personality and educational and occupational outcomes is well established in psychology (Beaujean et al. 2011; Swanberg and Martinsen 2010) and, increasingly, the focus of study among economists (Almlund et al. 2011;

This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due to Ronald R. Rindfuss and Barbara Entwisle for assistance on the original design. Information on how to obtain the Add Health data files is available on the Add Health website (<http://www.cpc.unc.edu/addhealth>). No direct support was received from grant P01-HD31921 for this analysis. This research was supported by a grant from NICHD (R01 HD061622-01, Shanahan PI). Send correspondence to Michael J. Shanahan, Department of Sociology, University of North Carolina at Chapel Hill, 155 Hamilton Hall, CB 3210, Chapel Hill, NC 27599-3210; email: mjshan@unc.edu.

Ferguson, Heckman, and Corr 2011). Psychologists have sought to identify reliable, valid measures of personality and to interrelate its major factors and dimensions to central indicators of attainment, including grade point average, job performance, and wages (Richardson, Abraham, and Bond 2012). Building on psychological studies, economists view personality as “soft” skills, behavioral traits that increase wages by contributing to, among other things, productivity (Bowles, Gintis, and Osborne 2001), and they also have sought to strengthen causal claims about soft skills and attainment processes (Cunha, Heckman, and Schennach 2010).

Psychologists and economists, however, have expressed little interest in how personality characteristics that are rewarded in schools and labor markets can be traced to the socioeconomic status (SES) of the parents. Sociologists have, of course, made seminal contributions to the study of the intergenerational reproduction of SES, but they have expressed little interest in connections between their research and personality (Farkas 2003; for a notable exception, see George et al. 2011). Thus, psychologists and economists have documented connections between personality and attained status but have not considered parental SES as an exogenous factor, and sociologists have documented effects of parental SES on attained status but have not considered personality as a potential mediator.

In this paper, we join these two lively areas of research and demonstrate the relevance of personality to sociological studies of status attainment in two respects, both of which highlight the socially contingent nature of personality in status attainment processes. First, young adults from low-SES households benefit more from rewarded personality characteristics than their counterparts from high-SES origins (i.e., personality interacts with parent education). Personality thus “substitutes” for a critical, but diminished, form of capital that otherwise increases attained status. Second, however, low-SES parents are less likely than high-SES parents to have children with personality traits that are valued in schools and workplaces. This expectation suggests mediation, such that high-SES parents encourage valued personality characteristics in their children, resulting in their enhanced attainments.

Jointly, these expectations are consistent with what Ross and Mirowsky (2011) have termed “resource substitution with structural amplification”: Youth from low-SES households benefit to a greater degree from valued personality traits compared to youth from high-SES households (resource substitution, suggesting moderation), but such youth are less likely to have them (structural amplification, suggesting mediation). We test these ideas with data from the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative study of young adults (Harris et al. 2009), a widely accepted instrument to measure personality, and statistical tests for moderated mediation (Preacher, Rucker, and Hayes 2007).

Personality and Status Attainment

Personality traits typically refer to relatively enduring, automatic thoughts, feelings, and behaviors that are manifest in similar situations over time

(Roberts 2009). Beginning in the 1960s, psychometricians reported evidence supporting “five-factor models” of personality (Goldberg 1981; Norman 1963), leading to widespread acceptance of a five-factor solution and the emergence of the now-dominant Big Five model (John, Naumann, and Soto 2008), according to which personality traits can be organized into five broad domains: neuroticism, extraversion, openness, agreeableness, and conscientiousness.

Many studies have examined the Big Five and aspects of educational and work careers. Of the five factors of personality, conscientiousness is most commonly identified as a salient predictor of life-course outcomes, including attainment processes (Borghans et al. 2008). The domain of conscientiousness includes five facets that describe the attributes of conscientious people: orderly, responsible, industrious, self-controlled, and traditional (Roberts, Walton, and Bogg 2005). Intuitively, such traits should be substantially related to school performance and success in the workplace. In fact, meta-analyses show that conscientiousness is associated with grades at the secondary and tertiary levels (McAbee and Oswald 2013; Poropat 2009), job performance, salary, promotion (Borghans, ter Weel, and Weinberg 2008; Judge et al. 1999; Ng et al. 2005), and attained occupational prestige (Cheng and Furnham forthcoming). Sociological investigations suggested the importance of dimensions of conscientiousness for attained status over three decades ago (Jencks 1979).

Studies of labor market outcomes among GED recipients also suggest the importance of conscientiousness for wages. The cognitive skills of high school graduates who do not attend college and GED recipients are similar, but wages of GED recipients generally resemble those of high school dropouts. In reviewing this body of research, Heckman and Rubinstein (2001) observe that GED recipients have soft skills more closely resembling high school dropouts, apparently reflecting differences in planning, persistence, and self-discipline, all of which are frequently considered aspects of conscientiousness. Conscientiousness was also shown to predict higher accumulated net worth in late middle age in the Health and Retirement Study (Duckworth and Weir 2012).

Neuroticism is also frequently identified as a correlate of educational and occupational attainment. The facets of neuroticism include anxiety, depression, irritability, and insecurity (John, Naumann, and Soto 2008). Items taken from multiple measures of neuroticism suggest the key importance of mood swings, particularly toward negative affect. Emotional stability is considered the obverse of neuroticism, and meta-analyses suggest that, after conscientiousness, it may be the most consistent personality correlate of indicators of attainment (Borghans et al. 2008). Meta-analyses conclude that neuroticism is associated with academic performance at lower grade levels (Poropat 2009, 2011). Negative emotionality may be associated with occupational attainment in young adulthood (Roberts, Caspi, and Moffitt 2003) and also with wages among men (Mueller and Plug 2006). Neuroticism is likely to affect attainment processes principally because of its hallmark negative emotions that interfere with smooth interpersonal relationships with teachers, fellow students, bosses, and coworkers.

Studies also suggest the importance of agreeableness which, in contrast to neuroticism, is likely associated with emotionally rewarding interpersonal

relationships in schools and workplaces. The domain of agreeableness includes dimensions such as warmth, compliance, nurturance, humility, and generosity. Typical questionnaire items suggest the centrality of empathy and concern for others. Meta-analyses conclude that agreeableness is correlated with grades (to a lesser degree than conscientiousness) (Poropat 2009). Heckman and Kautz (2012) review three interventions (based on experimental designs) that target young children, showing that children's intelligence did not improve durably, but that improvements in personality (aspects of conscientiousness and agreeableness) were positively associated with classroom behaviors, academic motivation, and other indicators of adjustments (see also Almlund et al. [2011]).

Research currently supports no firm conclusions regarding other aspects of personality—extraversion and openness. Extraversion—the enjoyment of other people, surgency, and enthusiasm—is likely unrelated to education (Poropat 2009, 2011; Richardson, Abraham, and Bond 2012) but may well be related to job performance (Judge et al. 1999). Openness—imagination, curiosity, an appreciation for diverse experiences, and intellectualism—has been associated with academic performance in many studies (Caprara et al. 2011), but a meta-analysis suggests a very small association (Poropat 2009). However, openness is apparently unrelated to occupational outcomes in most studies. The Mini-IPIP does not directly assess openness but rather intellect/imagination—imagination, abstract ideas, and a reflective and sophisticated nature. The intellect facet of openness may affect occupational outcomes, but one might also expect that its effect is indirect, through mechanisms such as IQ. Very little research examines intellect/imagination, although it is an intuitively plausible correlate of academic performance. Indeed, Clausen (1991) reported that a “cognitively committed” dimension of planful competence was quite predictive of attainments many decades later.

Personality traits are associated with other noncognitive factors that have been linked with status attainment. Constructs that fall into the category of poor mental health, such as depression, are commonly linked to a lack of educational persistence (Miech et al. 1999; Needham, Crosnoe, and Muller 2004), although recent studies conclude that the evidence is mixed (Duncan et al. 2007; McLeod, Uemura, and Rohrman 2012). The key conceptual and empirical distinction between personality traits and indicators of mental health is that the latter typically reflect episodic states that fluctuate over time. The episodic, state-like nature of constructs such as depression make them unlikely causes of educational outcomes, but rather proxies for either events or vulnerabilities that cause depression. Personality traits are, however, some of the most robust predictors of mental health (Kotov et al. 2010), and they have been shown to be the causes of depression's effects (Kendler and Myers 2010; Tang et al. 2009). Similar findings hold for episodic constructs such as well-being (Weiss, Bates, and Luciano 2008) and motivation (Barrick, Mount, and Strauss 1993).

To summarize: Meta-analyses conclude that conscientiousness and, to a lesser extent, agreeableness and neuroticism are associated with academic performance and income. Such people are thought to be proficient in their work and easy to get along with. Extraversion may be related to job outcomes (reflecting the popularity of engaged, enthusiastic people). There is little evidence for intellect/

imagination. *Aim 1 is to test direct main associations between a standardized, widely accepted measure of personality traits and status attainment in a nationally representative sample.*

Personality as a Mediator in the Status Attainment Process

Personality may serve as a mediator of the well-established parental SES-attained status association such that high-SES parents foster valuable personality traits in their children. Economists argue that parents wish to “transmit” behavioral attributes that increase the likelihood of socioeconomic success, particularly behavioral attributes such as dependability and industriousness (which reflect conscientiousness), emotional stability, and agreeableness (Bowles, Gintis, and Osborne 2001). Alternatively, personality traits may mediate the parental SES-attained status association not through any direct socialization on the part of parents, but because of the opportunity structures afforded at higher levels of SES. For example, children living in higher-SES homes and communities may develop higher levels of trust (fostering agreeableness) and efficacy (e.g., conscientiousness) because their lives are not only more predictable, but more controllable. Stressors in the household—often reflecting economic difficulties—are associated with interpersonal conflicts and emotional challenges and thus may be associated with lowered agreeableness and emotional stability (Conger and Donnellan 2007).

In reviewing empirical research, Bowles, Gintis, and Osborne (2001) noted that associations between parental socioeconomic status and their adult children’s wages remained significant with controls for the latter’s years of education, school quality, and cognitive test scores (see also Heckman and Kautz [2012]). They argued that employers would pay a wage premium for “incentive-enhancing preferences,” behavioral attributes that are related to productivity (e.g., agreeableness) and that also suggest that prospective employees will satisfy employment contracts (e.g., conscientiousness).

Further, these behavioral attributes would explain the intergenerational transmission of status, since high-SES parents would possess incentive-enhancing preferences and transmit them to their children (Bowles, Gintis, and Osborne 2001). Thus, conscientiousness, agreeable, emotionally stable people attain higher status than others, and they encourage these behavioral patterns in their children. Such an argument is in keeping with findings from developmental psychology showing that the childhood precursors to personality reflect qualities of the parent-child relationship (Kochanska and Aksan 2004). However, neither the economic tradition represented by Bowles and Gintis nor the developmental psychological tradition has examined whether parental SES is indeed associated with their offspring’s personality and mediates the parental SES-attained status association.

Within sociology, to be sure, there is a considerable body of research suggesting associations between social class and capacities of children that are likely related to socioeconomic successes. For example, middle-class jobs are characterized by self-direction, which fosters a psychological orientation that values initiative, thought, and independent judgment (as opposed to conformity

to external standards, which characterize factory work); in turn, middle-class fathers “generalize” these objective work attributes to the home setting, where they foster these attributes in their children by way of child-rearing values (Kohn 1977; Kohn and Schooler 1983). There is now extensive empirical evidence that work experiences generalize to parents’ personality and perhaps their personality may in turn be passed to their children, although this latter idea has not been empirically documented (Weininger and Lareau 2009).

More recently, Lareau (2011) has proposed that social class is reproduced across generations by way of the “cultural logic” of parenting. According to this perspective, the middle-class parenting strategy, “concerted cultivation,” includes extensive extracurricular activities with unrelated adults (who assess their children with objective criteria), intensive verbal exchanges and use of reasoning, and a sense of entitlement. In contrast, the lower-class parenting strategy, “natural growth,” emphasizes unstructured leisure activities (Roksa and Potter 2011), use of simple language and directives, and a sense of distrust in social institutions. Importantly, the concerted cultivation strategy instills behavioral patterns that promote children in educational settings (Bodovski and Farkas 2008; Calarco 2011) and presumably, the workplace.

Although Kohn, Schooler, and Lareau (and their progeny) were not concerned with personality (in the Big Five sense), they nevertheless demonstrated that parental occupational class is associated with the child’s values and behavioral patterns that are likely, in turn, associated with their own attained status. Indeed, to a limited degree, self-direction and concerted cultivation may be related to specific aspects of personality. The independence and thoughtful nature of self-directed behavior would appear to be conceptually close to conscientiousness, emotional stability, and intellect/imagination. And concerted cultivation—by way of its emphasis on scheduling and reasoning—could promote dependability, industriousness, and thoughtfulness (i.e., aspects of conscientiousness and openness). Irrespective of these possibilities, however, the foregoing suggests that parental SES shapes parenting practices that specifically promote noncognitive attributes (including personality traits) that, in turn, are associated with socioeconomic attainments.

Personality as a Moderated Mediator

In addition to hypothesizing that personality mediates the parent SES-attained relationship, we further hypothesize that valued personality characteristics are more strongly associated with attained status at lower levels of parent education.

Mirowsky and Ross (2003) have proposed the “resource substitution hypothesis,” which states that resources will have more beneficial effects among people with fewer alternative resources. As Ross and Mirowsky (2006) explain, “Resources can substitute for one another . . . one can fill the gap if the other is absent, so each has less of an effect if the other is present” (1401). For example, education influences health more among people with less (versus highly) educated parents (Ross and Mirowsky 2011).

Although formulated with reference to education and health, resource substitution may well apply to personality and status attainment. Some of the

compensatory effects of personal education are likely due to conscientious behaviors and personality characteristics. Indeed, Mirowsky and Ross suggest that personal education is compensatory because—in addition to cognitive skills (such as analytic reasoning) and self-efficacy—attained education reflects the capacity to develop plans and implement them by way of conscientious behaviors such as planning, engagement in goal-directed behaviors, and perseverance. The interventions reviewed by Heckman and Kautz (2012) also suggested the importance of agreeableness and emotional stability in school settings. That is, some of the substitution effect of the child's education that was observed by Ross and Mirowsky is likely attributable to personality characteristics that promote both education and health (see also Hauser and Palloni [2011]). Moreover, children from lower-class households may be lacking diverse forms of cultural capital (linguistic and behavioral patterns indicative of middle-class upbringing; see Bourdieu and Passeron [1977]), but such children may compensate for these missing resources by being conscientiousness, agreeable, emotionally stable, and open.

When the potential compensatory effect of personality is coupled with a potential mediating effect, Ross et al. refer to this pattern as structural amplification. Structural amplification is a special instance of resource substitution that occurs when social circumstances (low parent education) decrease the likelihood of high levels of the resource (personality) that would otherwise compensate for them (Ross, Mirowsky, and Pribesh 2001; Shanahan et al. 2012).

To summarize: *Aim 2 is to test whether valued personality characteristics compensate for lower socioeconomic origins (resource substitution; statistical moderation), and Aim 3 examines whether personality characteristics mediate the association between parental SES and attained status such that youth from low-SES households are less likely to have those personality characteristics valued in school and the workplace (structural amplification; mediation).*

Data and Methods

Sample

The data for this analysis come from waves I and IV of the National Longitudinal Study of Adolescent Health (Add Health). Wave I of Add Health is a nationally representative sample of 20,745 adolescents enrolled in middle school or high school in the United States in 1994. A fourth wave of data was collected roughly 14 years after wave I. Of the eligible respondents from wave I, 93 percent were relocated and 80 percent were reinterviewed, resulting in 15,701 adult in-home interviews.

Add Health provides sample weights to adjust for unequal probabilities of selection into the original sample and sample attrition. Valid sample weights are available for 14,800 respondents. Respondents missing data for any of the exogenous covariates and personality measure were dropped in order to facilitate the bootstrapping procedure discussed below ($N = 838$). This results in a baseline analysis sample of 13,962—94 percent of the respondents with valid sample weights.

Key Variables

The analysis focuses on three measures of attained status: (1) educational attainment; (2) hourly wages; and (3) self-direction at work (see table 1 for descriptive statistics).¹ The first two measures are standard measures of socioeconomic attainment. The third measure is included as an indicator of the quality of jobs people obtain. Educational attainment is a five-category measure, with responses including 1 “less than high school” (8 percent), 2 “high school degree or GED” (17 percent), 3 “some college or vocational/technical training beyond high school” (43 percent), 4 “four-year degree” (20 percent), and 5 “more than a 4-year degree” (12 percent). Hourly wages were constructed by dividing annual personal income by the hours worked per week multiplied by 50. Respondents who reported working less than 10 hours per week ($N = 2,709$) and respondents who reported no personal income or were missing personal income ($N = 200$ and $N = 189$, respectively) were excluded from the analyses of income. This results in 10,864 respondents with valid hourly wages and an average hourly wage of \$19.15. Hourly wages are logged for the analysis.

Wave 4 included a question asking respondents who had ever held a full-time job ($N = 13,757$), “Overall, how often (do/did) you have the freedom to make important decisions about what you (do/did) at work and how you (do/did) it?” Responses ranged from 0 “none or almost none of the time” to 3 “all or almost all of the time.” This measure, the best available, serves as a proxy of Kohn’s formulation of self-direction at work, which includes decision-making capacity, substantive complexity, routinization, and freedom from close supervision (Kohn and Schooler 1983).

The analysis assesses the big five dimensions of personality as potential mediators and moderators of the relationship between parent education and status attainments. Wave IV of Add Health includes the Mini-IPIP (see appendix A for items), which is a 20-item short-form version of the International Personality Item Pool designed to measure the Big Five factors of personality (Donnellan et al. 2006). Measurement models for the five personality dimensions were used to obtain factor scores. Separate models were estimated to allow for different relationships between the indicators of each personality trait and the trait itself across sex and racial/ethnic subgroups, as has been found among the Add Health respondents (Baldasaro, Shanahan, and Bauer 2012).

By construction, the factors scores have a mean of 0. For the sake of descriptive statistics, we constructed simple averages of the items for each aspect of personality (ranging from 1 to 5). The weighted averages for these scales are agreeableness = 3.8, conscientiousness = 3.7, extraversion = 3.3, imagination/intellect = 3.6, and neuroticism = 2.6. These young adults tend toward agreeableness, conscientiousness, and imagination. They are somewhat extraverted but do not score highly on neuroticism. The standard deviations for the scales range from around 0.6 to 0.7, which indicates that a fairly broad range of personalities are represented among the respondents.

The measure of parent education is drawn from the parent questionnaire (fielded at wave I) and augmented with respondent reports when missing. Parent

Table 1. Weighted Descriptive Statistics for Social Attainments, Personality Dimensions, and Covariates

	Valid N	Mean/pr	SD	Min	Max
<i>Social attainments:</i>					
Educational attainment	13,962	3.10	1.08	1	5
Hourly wages (log)	10,737	2.69	0.69	0	6.91
Self-direction at work	13,757	1.90	0.95	0	3
<i>Personality:</i>					
Agreeableness	13,962	3.80	0.61	1	5
Conscientiousness	13,962	3.65	0.67	1	5
Extraversion	13,962	3.31	0.77	1	5
Imagination	13,962	3.62	0.62	1	5
Neuroticism	13,962	2.59	0.68	1	5
<i>Covariates:</i>					
Wave 4 age	13,962	28.34	1.83	24	34
Female	13,962	0.49		0	1
Hispanic	13,962	0.11		0	1
Black	13,962	0.16		0	1
Asian	13,962	0.03		0	1
Native American	13,962	0.02		0	1
Other race	13,962	0.01		0	1
White	13,962	0.66		0	1
West	13,962	0.16		0	1
Midwest	13,962	0.31		0	1
South	13,962	0.39		0	1
Northeast	13,962	0.13		0	1
Two biological parents	13,962	0.56		0	1
Two parents	13,962	0.17		0	1
Single mother	13,962	0.20		0	1
Single father	13,962	0.03		0	1
Other family structure	13,962	0.04		0	1
Wave I GPA	13,962	2.81	0.77	1	4
Parent education	13,962	2.94	1.21	1	5

Note: 127 cases had log wages less than 0, which is equivalent to having hourly wages less than \$1. We estimated the models excluding these cases and obtained the same results.

education is a five-category measure of the highest level obtained by either parent (if two parents are present). The categories are the same as with respondent education and range from 1 “less than high school” to 5 “more than a four-year college degree.”

A number of covariates commonly included in status attainment models and potentially associated with personality are used in the analysis. All the models adjust for sex, race/ethnicity, age at wave IV, region of the country, family structure at wave I (living with two biological parents, living with two parents at least one of whom is not a biological parent, a single mother, a single father, or some other arrangement), and self-reported GPA from wave I.²

Statistical Models

The analyses focus on the associations between personality characteristics and status attainments (Aim 1); the extent to which these effects may depend on level of parent education (Aim 2; resource substitution, statistical moderation); and the extent to which personality mediates parent education–attained status links (Aim 3, structural amplification, statistical mediation). These aims can be addressed simultaneously by estimating the following equations:

$$M_i = a_0 + a_1P_i + \mathbf{a}'_2\mathbf{x}_i + e_{1i}, \quad (1)$$

$$Y_i = b_0 + b_1M_i + b_2P_i + b_2MP_i + \mathbf{b}'_4\mathbf{x}_i + e_{2i}, \quad (2)$$

where M_i is a personality characteristic (a candidate mediator/moderator), P_i is parent education, MP_i is an interaction term, \mathbf{x}_i is a vector of additional covariates, and Y_i is an outcome. In addition, our method of estimation, seemingly unrelated regressions (SURs), allows for e_{1i} and e_{2i} to be correlated.³ The parameter b_1 represents the association between personality and the status attainment outcome (Aim 1). The parameter a_1 gives the effect of parent education on the personality characteristic, and the parameter b_3 gives the effect of the interaction between parent education and the personality characteristic on the status attainment outcome.

The estimates from equations (1) and (2) can be used to calculate conditional indirect effects (CIEs) of parent education on the SES outcomes. CIEs are parameter estimates that capture the extent to which the indirect effects of parent education on adult attainments vary across different levels of parent education, thus providing a direct statistical approach to assess resource substitution and structural amplification hypotheses. The CIE is given by

$$CIE = \hat{a}_1(\hat{b}_1 + \hat{b}_3 P_i), \quad (3)$$

with a standard error obtained via bootstrapping (Preacher, Rucker, and Hayes 2007). CIEs allow us to address Aims 2 and 3. If the estimates of the CIEs are not statistically significant, this suggests that the personality characteristic does not mediate the relationship between parent education and the status attainment outcome (Aim 2). Equation (3) also shows that if the estimated interaction effect is close to 0, then any indirect effect of parent education on status attainment through personality characteristics will not depend on parent education (i.e.,

one component of moderation, Aim 3). To our knowledge, this is the first study to use CIEs to test resource substitution and structural amplification hypotheses and, beyond the present study, to provide methodological leverage in considering all manner of moderated mediation hypotheses.

Equations (1) and (2) were estimated in Stata 12 with seemingly unrelated regressions (StataCorp 2011). CIEs were calculated using the estimated parameters, and standard errors were obtained through bootstrapping with 1,000 replications. Bootstrapping is preferred due to the potential non-normal distributions of the estimated CIEs (Preacher, Rucker, and Hayes 2007).

Assumptions

The measures of personality are available only in the latest wave of data, wave IV, and are thus measured simultaneously with educational attainment, income, and self-direction at work. This concurrence raises the possibility of endogeneity bias in that educational attainment, income, and self-direction at work may influence personality. Furthermore, our theoretical model suggests that personality may compensate for childhood and adolescent disadvantages. This in part suggests that personality interacts with different aspects of childhood and adolescent social circumstances. One would ideally have information on dimensions of personality in childhood and adolescence to capture this dynamic.

The analyses thus rely on two assumptions: (1) that personality traits are sufficiently stable between adolescence (ages 11 to 21) and early adulthood (ages 24 to 34) and thus that the measures of personality in early adulthood are reasonable proxies for personality in adolescence; and (2) that the effects of personality on status attainments are greater than the effects of status attainments on personality. With respect to the first assumption, a significant body of research in psychology has examined the degree of stability (or instability) in personality over the life course. An influential meta-analysis of this body of work concludes that the rank-order consistency of personality traits, as measured by correlations over time, from adolescence to young adulthood is around 0.5 (Roberts and DelVecchio 2000). This result suggests that the measures of personality at wave IV should be moderately to strongly associated with what would have been observed at wave I; thus, the Mini-IPIP at wave IV is a plausible, albeit imperfect, measure of personality in adolescence and young adulthood.

A sensitivity analysis was performed to assess the possible impact of this assumption on the findings. We treat the wave IV measures of each personality dimension as indicators of latent personality dimensions in adolescence. The rank-order correlation of consistency can be thought of as an estimate for the reliability of the indicators at wave IV for adolescent personality. The models outlined above in equations (1) and (2) were then re-estimated, substituting latent personality dimensions for the observed measures at wave IV and fixing the error variances of the wave IV measures based on the estimated rank-order correlations of 0.5 to identify the model. That is, this approach allows one to assess, in part, whether treating the wave IV measures of personality

as imperfect indicators of adolescent personality (i.e., measures with a known degree of measurement error) has any effect on the main findings.

With respect to the second assumption, there is some evidence that education and work conditions can influence personality traits (Cheng and Furnham forthcoming; Cunha, Heckman, and Schennach 2010). Therefore, we cannot eliminate the possibility that some degree of reverse causation may inflate some estimates.

Results

We begin with an examination of the correlations among the measures of social attainments, personality characteristics, and parent education. Table 2 reveals notable associations between educational attainment and personality characteristics. In particular, agreeableness, imagination, and neuroticism all have correlations greater than 0.2 (or less than -0.2) with education. The correlations between log wages and self-direction at work with the personality characteristics are not as high as those with education, but some are still notable.

Parent education is associated with several of the dimensions of the adult child's personality. Parent education has correlations with agreeableness, imagination, and neuroticism of at least 0.1 (or -0.1). Parent education, however, has rather low associations with conscientiousness and extraversion. The pattern of associations suggests that agreeableness, imagination, and neuroticism are the best potential candidates for mediating/moderating the relationship between parent education and social attainments. Table 2 reveals low to moderate associations among the different personality dimensions, which is typical of manifest measures, which are imperfect markers of the independent components underlying the Big Five (John, Naumann, and Soto 2008). In particular, people who are more agreeable tend to also be more imaginative and extraverted and less neurotic.

Table 2. Pairwise Correlations between Social Attainments, Personality Characteristics, and Parent Education

	Edu	Wage	S-dir	Agr	Con	Ext	Img	Neu	Par edu
Educational attainment	1.00								
Hourly wages (log)	0.31	1.00							
Self-direction at work	0.10	0.14	1.00						
Agreeableness	0.22	0.09	0.07	1.00					
Conscientiousness	0.10	0.09	0.09	0.14	1.00				
Extraversion	0.07	0.06	0.16	0.28	0.09	1.00			
Imagination	0.20	0.02	0.08	0.30	0.04	0.23	1.00		
Neuroticism	-0.20	-0.10	-0.09	-0.16	-0.16	-0.13	-0.12	1.00	
Parent education	0.43	0.21	0.07	0.13	0.03	0.06	0.16	-0.13	1.00

Note: Weighted estimates.

Personality and Indicators of Status Attainment in Young Adulthood

Education Beginning with educational attainment (table 3), we observe that, consistent with bivariate patterns, the models predicting education show statistically significant associations with all the personality characteristics net of standard predictors in the status attainment model. Agreeableness ($b = 0.70$), conscientiousness ($b = 0.19$), extraversion ($b = 0.26$), and imagination ($b = 0.53$) all have positive main associations with educational attainment. Neuroticism ($b = -0.29$) has a negative association with educational attainment. Given that the personality measures all have roughly the same metric and variance, we can compare the unstandardized estimates across models (the same pattern emerges if we account for the slight differences across the measures with standardized estimates). We see that among Add Health respondents, agreeableness and imagination have the largest associations with educational attainment, while conscientiousness has the smallest association. This is surprising, given the robust literature on conscientiousness, but the associations with agreeableness and imagination are consistent with past studies.

With respect to the CIEs, the models show that for every personality characteristic except conscientious, the three parameters in equation (3)— a_1 (the parameter for parent education), b_1 (the parameter for the personality characteristic), and b_3 (the parameter for their interaction)—have statistically significant estimates. Parent education has significant, albeit modest, positive associations with agreeableness ($b = 0.03$), extraversion ($b = 0.02$), and imagination ($b = 0.06$) and a significant negative association with neuroticism ($b = -0.05$). Finally, we see significant interaction between most personality dimensions and parent education: agreeableness ($b = -0.10$), extraversion ($b = -0.032$), imagination ($b = -0.09$), and neuroticism ($b = 0.05$).

Hourly wages Table 4 reports estimates for the models for hourly wages. Once again, most personality characteristics are associated with this dimension of status attainment: Agreeableness ($b = 0.19$), extraversion ($b = 0.11$), and imagination ($b = 0.17$) all have significant positive associations with log hourly wages, while neuroticism has a significant negative association ($b = -0.14$). Parent education has a positive association with wages, as expected. The effects of parent education on each of the personality dimensions are roughly the same as observed for education (the slight differences are due to the different estimation sample because of missing data for log wages). The only significant interactions, however, are with imagination ($b = -0.05$) and neuroticism ($b = 0.02$). As with education, we find that the largest associations are with agreeableness and imagination, while conscientiousness is unrelated to hourly wages among Add Health respondents.

Self-direction at work Table 5 reports the estimates for self-direction at work and reveals significant associations with every dimension of personality. Agreeableness ($b = 0.28$), conscientiousness ($b = 0.25$), extraversion ($b = 0.41$), and imagination ($b = 0.26$) all have positive associations with self-direction at

Table 3. Parameter Estimates from Seemingly Unrelated Regression Models for Personality Dimensions and Educational Attainment

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Agr	Edu	Con	Edu	Ext	Edu	Img	Edu	Neu	Edu
Personality dimension	0.703*** (0.062)	0.189*** (0.043)				0.258*** (0.040)		0.529*** (0.041)		-0.289*** (0.031)
Parent education	0.028*** (0.002)	0.278*** (0.007)	0.000 (0.003)	0.290*** (0.007)	0.024*** (0.004)	0.287*** (0.007)	0.057*** (0.004)	0.276*** (0.007)	-0.045*** (0.005)	0.284*** (0.007)
Personality × par edu	-0.095*** (0.020)			-0.023 (0.013)		-0.052*** (0.013)		-0.094*** (0.013)		0.045*** (0.010)
Age	0.006*** (0.001)	0.039*** (0.004)	0.006*** (0.002)	0.041*** (0.004)	-0.012*** (0.002)	0.043*** (0.004)	-0.015*** (0.002)	0.045*** (0.004)	-0.003 (0.003)	0.041*** (0.004)
Female	0.001 (0.005)	0.163*** (0.015)	-0.009 (0.008)	0.165*** (0.015)	-0.007 (0.008)	0.164*** (0.015)	-0.003 (0.008)	0.164*** (0.015)	0.023* (0.011)	0.168*** (0.015)
Hispanic	0.041*** (0.009)	0.017 (0.024)	0.012 (0.013)	0.031 (0.025)	0.015 (0.014)	0.033 (0.025)	0.059*** (0.013)	0.018 (0.025)	-0.027 (0.018)	0.027 (0.025)
Black	0.025** (0.008)	0.059*** (0.022)	0.019 (0.012)	0.066** (0.022)	-0.027* (0.013)	0.073*** (0.022)	0.001 (0.012)	0.069** (0.022)	-0.019 (0.016)	0.064** (0.022)
Asian	-0.006 (0.015)	0.137*** (0.041)	-0.035 (0.022)	0.140*** (0.042)	0.009 (0.024)	0.137** (0.042)	-0.037 (0.023)	0.136** (0.041)	0.012 (0.030)	0.138*** (0.041)
Native American	-0.011 (0.019)	-0.228*** (0.053)	-0.080** (0.028)	-0.228*** (0.053)	-0.045 (0.030)	-0.231*** (0.053)	0.081** (0.029)	-0.260*** (0.053)	0.099** (0.038)	-0.224*** (0.053)
Other race	0.020 (0.026)	-0.124 (0.073)	0.094* (0.039)	-0.126 (0.074)	0.070 (0.042)	-0.121 (0.074)	0.097* (0.040)	-0.140 (0.074)	0.012 (0.053)	-0.111 (0.074)

Midwest	0.001 (0.008)	0.019 (0.023)	-0.010 (0.012)	0.020 (0.024)	0.024 (0.013)	0.017 (0.024)	-0.007 (0.013)	0.017 (0.023)	0.004 (0.017)	0.019 (0.023)
South	-0.021* (0.008)	-0.030 (0.023)	-0.035** (0.012)	-0.035 (0.023)	-0.023 (0.013)	-0.036 (0.023)	-0.020 (0.012)	-0.034 (0.023)	0.034* (0.016)	-0.033 (0.023)
Northeast	0.015 (0.010)	0.189*** (0.027)	-0.017 (0.015)	0.198*** (0.028)	0.055*** (0.016)	0.190*** (0.028)	0.033* (0.015)	0.184*** (0.027)	0.046* (0.020)	0.205*** (0.027)
Two parents	-0.027*** (0.007)	-0.236*** (0.020)	0.011 (0.011)	-0.249*** (0.020)	0.035** (0.012)	-0.251*** (0.020)	0.020 (0.011)	-0.254*** (0.020)	0.096*** (0.015)	-0.234*** (0.020)
Single mother	-0.024*** (0.007)	-0.129*** (0.020)	-0.012 (0.011)	-0.139*** (0.020)	0.011 (0.012)	-0.141*** (0.020)	0.025* (0.011)	-0.145*** (0.020)	0.027 (0.014)	-0.136*** (0.020)
Single father	0.007 (0.015)	-0.158*** (0.043)	-0.027 (0.023)	-0.150*** (0.044)	0.069** (0.025)	-0.162*** (0.044)	0.065** (0.024)	-0.167*** (0.043)	0.085** (0.031)	-0.143** (0.044)
Other family structure	-0.032* (0.013)	-0.328*** (0.037)	0.022 (0.020)	-0.346*** (0.037)	0.019 (0.021)	-0.345*** (0.037)	-0.029 (0.020)	-0.335*** (0.037)	0.130*** (0.027)	-0.321*** (0.037)
Wave I GPA	0.038*** (0.004)	0.504*** (0.010)	0.067*** (0.005)	0.511*** (0.010)	-0.005 (0.006)	0.520*** (0.010)	0.051*** (0.005)	0.506*** (0.010)	-0.109*** (0.007)	0.501*** (0.010)
Constant	-0.367*** (0.043)	-0.255* (0.121)	-0.353*** (0.065)	-0.378** (0.122)	0.257*** (0.070)	-0.442*** (0.122)	0.102 (0.066)	-0.420*** (0.121)	0.473*** (0.087)	-0.342** (0.122)
N		13,962		13,962		13,962		13,962		13,962
R-square	0.031	0.371	0.015	0.358	0.011	0.359	0.04	0.369	0.04	0.365

Note: Weighted unstandardized estimates. Standard errors in parentheses. White is the referent for race/ethnicity. West is the referent for region. Two biological parents is the referent for family structure. *** $p < .001$ ** $p < .01$ * $p < .05$

Table 4. Parameter Estimates from Seemingly Unrelated Regression Models for Personality Dimensions and Log Hourly Wages

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Agr	Ln wage	Con	Ln wage	Ext	Ln wage	Img	Ln wage	Neu	Ln wage
Personality dimension	0.190** (0.068)		0.090 (0.048)		0.107** (0.044)		0.173*** (0.046)		-0.140*** (0.034)	
Parent education	0.026** (0.003)	0.078** (0.007)	-0.006 (0.004)	0.081** (0.007)	0.016** (0.004)	0.079** (0.007)	0.049** (0.004)	0.080** (0.007)	-0.039*** (0.005)	0.078** (0.007)
Personality × par edu	-0.027 (0.021)		0.001 (0.015)		-0.009 (0.014)		-0.054*** (0.014)		0.021* (0.011)	
Age	0.006*** (0.002)	0.055** (0.004)	0.006** (0.002)	0.056** (0.004)	-0.013*** (0.003)	0.057** (0.004)	-0.017*** (0.002)	0.056** (0.004)	-0.003 (0.003)	0.056*** (0.004)
Female	-0.003 (0.006)	-0.177** (0.016)	0.006 (0.009)	-0.178** (0.016)	-0.006 (0.010)	-0.177** (0.016)	0.007 (0.009)	-0.178** (0.016)	0.025* (0.012)	-0.175** (0.016)
Hispanic	0.039*** (0.010)	0.023 (0.026)	-0.007 (0.015)	0.028 (0.026)	0.006 (0.016)	0.027 (0.026)	0.041** (0.015)	0.027 (0.026)	0.000 (0.020)	0.027 (0.026)
Black	0.033*** (0.009)	-0.136** (0.024)	-0.002 (0.014)	-0.133** (0.024)	-0.030* (0.015)	-0.130** (0.024)	0.008 (0.014)	-0.133** (0.024)	-0.028 (0.018)	-0.136*** (0.024)
Asian	0.000 (0.017)	0.128** (0.044)	-0.069** (0.025)	0.135** (0.044)	-0.008 (0.027)	0.129** (0.044)	-0.020 (0.025)	0.123** (0.044)	0.014 (0.033)	0.129** (0.044)
Native American	-0.012 (0.022)	-0.213** (0.058)	-0.098** (0.032)	-0.206** (0.058)	-0.031 (0.035)	-0.212** (0.058)	0.062 (0.033)	-0.216** (0.058)	0.151*** (0.043)	-0.203*** (0.058)
Other race	0.005 (0.033)	0.084 (0.087)	0.104* (0.048)	0.074 (0.087)	0.035 (0.052)	0.081 (0.087)	0.110* (0.049)	0.084 (0.087)	0.015 (0.065)	0.086 (0.086)

Midwest	-0.001 (0.009)	-0.088** (0.025)	-0.017 (0.014)	-0.087** (0.025)	0.012 (0.015)	-0.090** (0.025)	-0.025 (0.014)	-0.090** (0.025)	0.004 (0.019)	-0.089** (0.025)
South	-0.023* (0.009)	-0.128*** (0.024)	-0.039** (0.014)	-0.127*** (0.024)	-0.027 (0.015)	-0.128*** (0.024)	-0.018 (0.014)	-0.130*** (0.024)	0.037* (0.018)	-0.127*** (0.024)
Northeast	0.012 (0.011)	0.070* (0.029)	-0.032* (0.016)	0.075* (0.029)	0.041* (0.018)	0.068* (0.029)	0.021 (0.017)	0.071* (0.029)	0.054* (0.022)	0.077** (0.029)
Two parents	-0.033*** (0.008)	-0.116*** (0.022)	0.021 (0.012)	-0.122*** (0.022)	0.035** (0.013)	-0.123*** (0.022)	0.020 (0.012)	-0.120*** (0.022)	0.102*** (0.016)	-0.113*** (0.022)
Single mother	-0.025** (0.008)	-0.130*** (0.022)	-0.002 (0.012)	-0.133*** (0.022)	0.011 (0.013)	-0.134*** (0.022)	0.024 (0.012)	-0.131*** (0.022)	0.025 (0.016)	-0.131*** (0.022)
Single father	0.019 (0.017)	-0.156*** (0.046)	0.008 (0.026)	-0.155*** (0.046)	0.066* (0.028)	-0.160*** (0.046)	0.078** (0.026)	-0.151** (0.046)	0.092** (0.035)	-0.148** (0.046)
Other family structure	-0.028 (0.016)	-0.161*** (0.042)	0.038 (0.023)	-0.167*** (0.042)	0.034 (0.025)	-0.166*** (0.042)	-0.001 (0.024)	-0.163*** (0.042)	0.115*** (0.032)	-0.155*** (0.042)
Wave I GPA	0.044*** (0.004)	0.160*** (0.011)	0.067*** (0.006)	0.159*** (0.011)	-0.009 (0.007)	0.165*** (0.011)	0.050*** (0.006)	0.164*** (0.011)	-0.101*** (0.008)	0.156*** (0.011)
Constant	-0.353*** (0.049)	0.598*** (0.132)	-0.323*** (0.073)	0.586*** (0.131)	0.352*** (0.079)	0.529*** (0.131)	0.191* (0.075)	0.570*** (0.131)	0.402*** (0.098)	0.590*** (0.131)
N		10,864		10,864		10,864		10,864		10,864
R-square	0.031	0.097	0.015	0.097	0.008	0.096	0.034	0.096	0.035	0.098

Note: Weighted unstandardized estimates. Standard errors in parentheses. White is the referent for race/ethnicity. West is the referent for region. Two biological parents is the referent for family structure. *** $p < .001$ ** $p < .01$ * $p < .05$

Table 5. Parameter Estimates from Seemingly Unrelated Regression Models for Personality Dimensions and Self-Direction at Work

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Agr	Self-dir	Con	Self-dir	Ext	Self-dir	Img	Self-dir	Neu	Self-dir
Personality dimension	0.279*** (0.069)	0.279*** (0.069)	0.246*** (0.048)	0.413*** (0.044)	0.263*** (0.046)	-0.100** (0.034)				
Parent education	0.027** (0.002)	0.027** (0.007)	-0.002 (0.003)	0.022*** (0.004)	0.025*** (0.007)	0.056*** (0.004)	-0.044*** (0.005)	0.025*** (0.007)	-0.044*** (0.005)	0.027*** (0.007)
Personality × par edu	-0.037 (0.022)	-0.037 (0.022)	-0.026 (0.015)	-0.039** (0.014)	-0.043** (0.014)	-0.004 (0.011)				-0.004 (0.011)
Age	0.007*** (0.001)	0.011* (0.004)	0.007*** (0.002)	0.011* (0.002)	-0.012*** (0.002)	0.015*** (0.004)	-0.014*** (0.002)	0.014** (0.004)	-0.003 (0.003)	0.012** (0.004)
Female	0.000 (0.005)	-0.144*** (0.016)	-0.006 (0.008)	-0.143*** (0.016)	-0.006 (0.009)	-0.142*** (0.016)	-0.003 (0.008)	-0.143*** (0.016)	0.023* (0.011)	-0.141*** (0.016)
Hispanic	0.039*** (0.009)	-0.111*** (0.027)	0.010 (0.013)	-0.107*** (0.027)	0.014 (0.014)	-0.108*** (0.027)	0.052*** (0.013)	-0.111*** (0.027)	-0.025 (0.018)	-0.108*** (0.027)
Black	0.027*** (0.008)	-0.124*** (0.024)	0.027* (0.012)	-0.124*** (0.024)	-0.024 (0.013)	-0.111*** (0.024)	0.007 (0.012)	-0.120*** (0.024)	-0.024 (0.016)	-0.122*** (0.024)
Asian	-0.005 (0.015)	-0.013 (0.046)	-0.040 (0.022)	-0.007 (0.046)	0.008 (0.024)	-0.014 (0.045)	-0.037 (0.023)	-0.013 (0.046)	0.012 (0.030)	-0.013 (0.046)
Native American	-0.011 (0.019)	0.035 (0.058)	-0.079** (0.028)	0.044 (0.058)	-0.048 (0.030)	0.047 (0.057)	0.086** (0.029)	0.018 (0.058)	0.100** (0.038)	0.043 (0.058)
Other race	0.017 (0.026)	-0.083 (0.082)	0.103** (0.040)	-0.096 (0.082)	0.066 (0.043)	-0.099 (0.081)	0.095* (0.040)	-0.094 (0.082)	0.016 (0.053)	-0.079 (0.082)

Midwest	-0.002 (0.008)	0.002 (0.026)	-0.017 (0.013)	0.004 (0.026)	0.018 (0.014)	-0.003 (0.026)	-0.017 (0.013)	0.002 (0.026)	0.007 (0.017)	0.002 (0.026)
South	-0.024** (0.008)	-0.010 (0.025)	-0.045*** (0.012)	-0.006 (0.025)	-0.030* (0.013)	-0.004 (0.025)	-0.027* (0.012)	-0.010 (0.025)	0.038* (0.016)	-0.010 (0.025)
Northeast	0.014 (0.010)	-0.084** (0.030)	-0.025 (0.015)	-0.077* (0.030)	0.048** (0.016)	-0.096** (0.030)	0.029 (0.015)	-0.087** (0.030)	0.048* (0.020)	-0.076* (0.030)
Two parents	-0.029*** (0.007)	-0.017 (0.022)	0.010 (0.011)	-0.024 (0.022)	0.035** (0.012)	-0.033 (0.022)	0.021 (0.011)	-0.026 (0.022)	0.100*** (0.015)	-0.011 (0.022)
Single mother	-0.024*** (0.007)	-0.026 (0.022)	-0.012 (0.011)	-0.029 (0.022)	0.008 (0.012)	-0.033 (0.022)	0.026* (0.011)	-0.034 (0.022)	0.025 (0.014)	-0.028 (0.022)
Single father	0.003 (0.016)	0.055 (0.048)	-0.023 (0.023)	0.061 (0.048)	0.066** (0.025)	0.035 (0.048)	0.063** (0.024)	0.048 (0.048)	0.093** (0.032)	0.066 (0.048)
Other family structure	-0.031* (0.013)	-0.023 (0.041)	0.039* (0.020)	-0.036 (0.041)	0.032 (0.022)	-0.038 (0.041)	-0.019 (0.020)	-0.025 (0.041)	0.131*** (0.027)	-0.014 (0.041)
Wave I GPA	0.040*** (0.004)	0.081*** (0.011)	0.071*** (0.005)	0.075*** (0.011)	-0.004 (0.006)	0.088*** (0.011)	0.055*** (0.005)	0.079*** (0.011)	-0.110*** (0.007)	0.075*** (0.011)
Constant	-0.366*** (0.044)	1.418*** (0.135)	-0.377*** (0.065)	1.416*** (0.134)	0.271*** (0.070)	1.275*** (0.133)	0.084 (0.066)	1.352*** (0.134)	0.464*** (0.088)	1.402*** (0.134)
N		13,757		13,757		13,757		13,757		13,757
R-square	0.032	0.023	0.017	0.026	0.010	0.044	0.040	0.024	0.040	0.025

Note: Weighted unstandardized estimates. Standard errors in parentheses. White is the referent for race/ethnicity. West is the referent for region. Two biological parents is the referent for family structure. *** $p < .001$ ** $p < .01$ * $p < .05$

work, while neuroticism ($b = -0.10$) has a negative association. Similar to the results for hourly wages, however, there are significant interactions between parent education and only two of the personality dimensions, extraversion ($b = -0.04$) and imagination ($b = -0.04$). In contrast to the pattern with educational attainment and hourly wages, we find that extraversion has the largest association with self-direction, while agreeableness, conscientiousness, and imagination all have similar associations. The finding with extraversion may in part reflect the fact that we have only a single item to assess Kohn's formulation, and the particular item we have, freedom to make decisions at work, may be attuned to extraverted individuals.

Aim 1 Summary We find significant associations among every dimension of personality and the three different attainment outcomes—education, hourly wages, and self-direction at work. These associations are net of key sociodemographic characteristics (sex, race, family structure, and parent education) and adolescent grade point average. People who are less neurotic and more agreeable, extraverted, conscientious, and imaginative are also observed to report more education, higher wages, and more self-directed work after adjusting for standard covariates from a typical status attainment model.

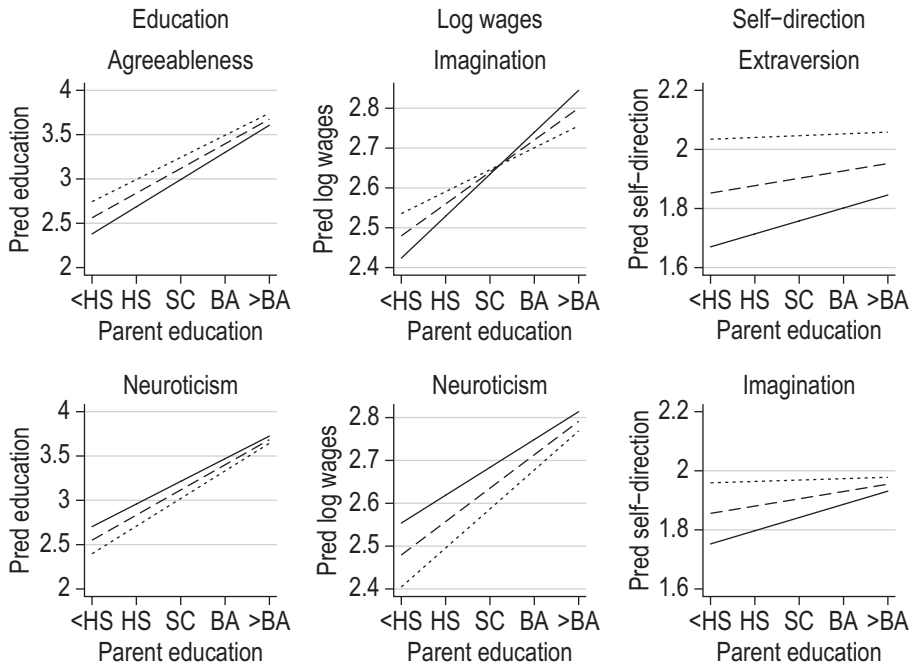
Personality's Moderated Mediation of Parent Education on Attained Status

The conditional indirect effects (CIEs) capture the extent to which the indirect effects of parent education on adult attainments vary across different levels of personality. CIEs were calculated for every level of parent education using the results from the SURs reported in tables 3, 4, and 5, with standard errors obtained via bootstrapping.

To facilitate interpretation, we present two sets of figures for illustrative moderators/mediators and outcomes (figures illustrating all of the moderators/mediators and outcomes are available on request). Figure 1 illustrates the magnitude of select interactions between personality and parent education (i.e., the total conditional effects) with plots of predicted values of status attainment outcomes by parent education for people with different personality characteristics. This figure facilitates an assessment of the resource substitution hypothesis (Aim 2). We examined 95 percent confidence intervals for the estimates at each level of parent education (not shown in figure 1); non-overlap at a given level of parent education is an indication that personality and parent education interact at that particular level.

Figure 1 depicts the overall extent to which personality moderates the effects of parent education on status attainments and the particular patterns of moderation. Beginning with educational attainment (column 1 of figure 1), we observe a common pattern of convergence in predicted educational attainment with increasing parent education. Accordingly, at low levels of parent education, people one standard deviation above the mean for agreeableness are predicted to have close to half a unit higher educational attainment than people

Figure 1. Illustrations of the total conditional effects for selected personality dimension and parent education on predicted educational attainment, log hourly wages, and self-direction at work



one standard deviation below the mean. At this level of education, such a gap lies between completing high school and obtaining some college or vocational training beyond high school. Estimated 95 percent confidence intervals at each level of parent education suggest that the difference persists up to and including parents who graduated from college. That is, as shown in figure 1, it is always advantageous to be agreeable with respect to educational attainment, but the “payoff” is higher when the student’s parents are poorly educated, diminishes with increasing parent education, and disappears among the children of parents with professional degrees.

For neuroticism, the pattern is also significant and shows that lower neuroticism is more advantageous at lower levels of parent education. Confidence intervals suggest that this advantage persists among parents who attended but did not graduate from college or university, which is once again a considerable level of education. The results suggest meaningful resource substitution in the population for education and agreeableness, imagination (not shown in figure 1), and neuroticism.

A similar pattern is observed for neuroticism across levels of parent education for log hourly wages. To give an idea of the magnitude, we observe that at low levels of parent education, people one standard deviation below the mean for neuroticism are predicted to earn roughly \$12.81 ($\exp[2.55]$) per hour, as compared with \$11.02 ($\exp[2.40]$) per hour for people one standard deviation above

the mean. This difference is substantially reduced at the highest levels of parent education. At high levels of parent education, we find that people one standard deviation below the mean are predicted to earn roughly \$16.61 ($\exp[2.81]$) per hour, as compared with \$15.96 ($\exp[2.71]$) per hour for people one standard deviation above the mean.

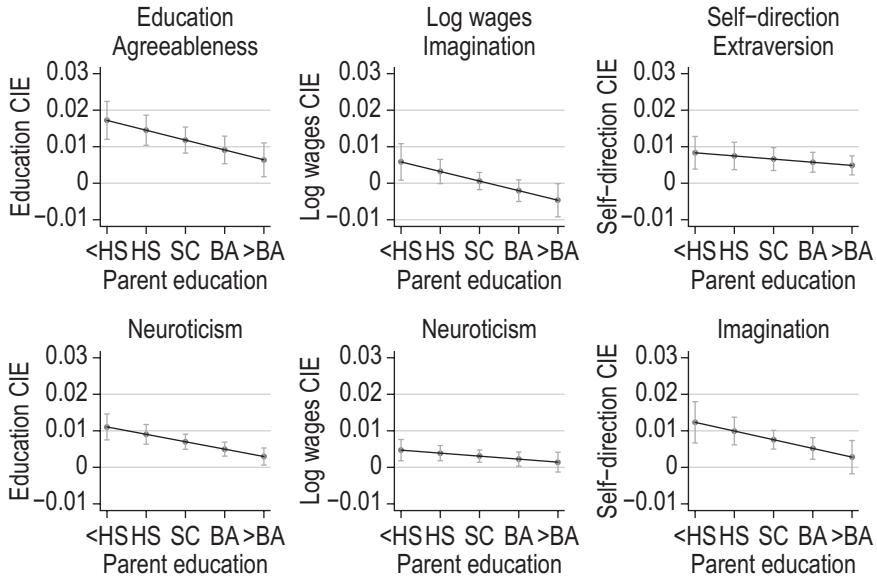
The predicted log hourly wages for people with different levels of imagination converge around the middle of the range of parent education and diverge in the opposite direction at higher levels of parent education. Imagination is compensatory when parents are poorly educated—with less than a high school degree. Then, at the highest level of parent education (more than a four-year degree), high levels of imagination are associated with lowered wages. This finding was unexpected, and so we compared data describing careers (such as occupational prestige scores, number of jobs held, and hours worked per week) for this highly imaginative/highly educated parents group with low imaginative/highly educated parents. No clear explanatory factors emerged, although the highly imaginative group showed a somewhat greater number of job changes (four jobs per year versus three jobs per year), which could undermine their hourly wage.

Finally, with respect to self-direction at work, extraversion and imagination significantly interact with parent education. Figure 1 shows some convergence for extraversion, but large differences remain even among the children of highly educated parents. Thus, extraverted people are much more likely to have self-directed work, and this is somewhat more true among workers whose parents were less educated. A similar pattern is observed for imagination, with some differences persisting even among parents who graduate from college.

Figure 2 plots the estimated CIEs with 95 percent confidence intervals for selected moderators/mediators and outcomes (figures illustrating all of the moderators/mediators and outcomes are available on request). The points for which the confidence intervals do not include 0 indicate statistically significant indirect effects. The extent of the slope of the lines provides a sense of whether the indirect effects are moderated by parent education. The estimated indirect effects bear directly on the structural amplification hypothesis, and the slope indicates the direction, if any, of moderation by parent education.

Beginning with the CIEs for educational attainment (column 1 in figure 2), we see a clear downward trend in the indirect effects as parent education increases for agreeableness and neuroticism. In addition, the CIEs at every level of parent education for agreeableness and neuroticism are statistically significant. The statistically significant effects and the downward trends suggest that these dimensions of personality both mediate and moderate the effects of parent education on educational attainment. Furthermore, the downward trends support the resource substitution hypothesis: The indirect effect of parent education on educational attainment through personality is greater for people who come from families with lower levels of education. That is, for example, the mediating effect of agreeableness on the young adult's education is stronger as parent education decreases. Viewed in terms of resource substitution, agreeableness and neuroticism are more potent as the critical resource of parent education lowers, but—reflecting associations between personality and parent

Figure 2. Illustrations of the estimated conditional indirect effects (CIEs) with 95 percent confidence intervals of parent education via selected personality dimensions on educational attainment, log hourly wages, and self-direction at work



Bars indicate bootstrap 95% CIs.

education—higher levels of these personality resources are less likely at lower levels of parent education.

Selected CIEs for log hourly wages are presented in the middle row of figure 2. For log wages, the trends in CIEs are less pronounced than those observed for educational attainment, but they are all either flat or downward sloping. For imagination, the CIEs at the lowest and highest levels of parent education are significant, but CIEs in the middle of the distribution are not statistically significant. The downward trend, however, is apparent, suggesting that imagination acts as a resource substitution mechanism but only at the more extreme values of parent education. Thus, imagination mediates the parent education–wages association, but only at very low and high levels of parent education. A similar pattern is observed for neuroticism in that the CIEs are statistically significant only at low levels of parent education. That is, emotional stability (the “reverse” of neuroticism) may have some positive mediating influence among children of very poorly educated parents. Overall, the CIEs for log wages provide limited evidence that personality mediates the effects of parent education on log hourly wages.

As with the CIEs for log hourly wages, the trends in CIEs for self-direction at work are less pronounced than those for educational attainment. The CIEs, however, are largely statistically significant for every measure of personality, with the exception of conscientiousness. This indicates that most of the personality dimensions mediate the effects of parent education on self-direction at work. The trends in the CIEs are mostly flat, with the exception of the CIEs

for imagination, which show a downward trend that is consistent with resource substitution theory.

Summary for aims 2 and 3 The estimates for the total conditional effects and the CIEs show clear support for the resource substitution hypothesis: personality characteristics moderate the effects of parent education on status attainments such that socially desirable personality characteristics become more salient mediators at lower levels of parental SES. Figure 2 provides evidence that, consistent with structural amplification, these personality characteristics are less commonly observed at lower levels of parental education. The pattern of results is largely consistent across the three different measures of social attainments and four of the five personality dimensions (conscientiousness being the exception). The estimated CIEs are not large (owing to small correlations between parent education and personality, as shown in table 2) but, in combination with the conditional direct effects, “desirable” personality traits can compensate for low parent education.

Sensitivity Analysis

All of the models reported in tables 3, 4, and 5 (and their CIEs) were re-estimated with the addition of all personality characteristics as controls (results available on request). These models represent a high level of rigor with respect to controls; indeed, because the scales are measured with only four items each, correlations among the personality characteristics—which are, in theory, orthogonal—may be somewhat higher than if they had been measured with longer, more reliable scales. In any event, the results from these additional analyses suggest that substantive conclusions do not change, although two parameters shift slightly and become statistically insignificant.

In addition, all the models in tables 3, 4, and 5 were re-estimated with latent personality measured by the wave IV personality measures with fixed error variances based on estimated reliability of 0.5. The results were largely unchanged, which suggests that the main substantive conclusions are robust to treating the wave IV measures as imperfect indicators of personality traits in adolescence. (Results from all discussed sensitivity analyses are available on request.)

Discussion

Although there is a fast-emerging literature in psychology and economics that examines personality as precursors to attained status, such studies typically view personality as an “inner resource” of the person that may be valued by teachers, employers, and fellow students and workers. The present paper shifts the focus of this line of research by suggesting the socially contingent nature of personality in status attainment. We proposed that, consistent with the resource substitution hypothesis, valued personality characteristics become more important as parent education decreases. Further, however, the children of poorly educated parents are less likely to have these valued personality characteristics (compared with

the children of highly educated parents), consistent with the structural amplification hypothesis. That is, in contrast to the “inner resource” view of personality, we have proposed that personality reflects social class and that its effects are more or less pronounced depending on social class.

First, with respect to Aim 1, the findings show that all five personality factors are associated with attained education; that all factors but conscientiousness are associated with hourly wages; and that all aspects of personality are associated with self-direction at work. These main effects are often comparable in magnitude with covariates typically found in status attainment models, although the effects attenuate somewhat when all personality factors are simultaneously included in the models. The particular patterns of association suggest that agreeableness and intellect/imagination have the largest associations with educational attainment and hourly wages, while extraversion has the strongest association with self-direction at work among the Add Health respondents.

Surprisingly, despite a large body of work establishing conscientiousness as a correlate of attained status, our analysis found a modest association with educational attainment and no association with hourly earnings. This discrepancy with prior research may reflect a content validity issue with the Mini-IPIP instrument: Its conscientiousness scale emphasizes orderliness, which is less likely to predict achievement-related outcomes than other facets of conscientiousness, such as industriousness or self-control (MacCann, Duckworth, and Roberts 2009).

Very little extant evidence bears on intellect/imagination and status attainment, although such associations are plausible, given this factor’s emphasis on interest in abstract ideas and imagination. The results suggest that agreeableness and intellect/imagination may be at least as important to attainment as conscientiousness, and future work should assess the contributions of all five dimensions of personality.

Second, with respect to Aim 2, we observe evidence for resource substitution, that valued personality characteristics are more salient at lower levels of parent education than at higher levels. As shown in tables 3–5 and illustrated in figure 1, it is generally advantageous to be highly agreeable, conscientious, extraverted, imaginative, and emotionally stable (the obverse of neuroticism) in terms of status attainments. However, we observe greater returns on these valued characteristics at lower levels of parent education: In the case of attained education, for agreeableness, imagination, and emotional stability; in the case of hourly wages, emotional stability, with notable trends for agreeableness and extraversion; and in the case of self-direction, for extraversion and imagination, with a trend once again for agreeableness. There are thus many instances of resource substitution according to which young people’s personality may be compensating for disadvantages associated with their parents’ lower education. Indeed, the findings were somewhat surprising, in that significant differences between the high- and low-personality groups (shown in figure 1) continued to be observed even at high levels of parent education.

Two findings are especially intriguing with respect to Aim 2. Only one aspect of personality, conscientiousness, shows no signs of resource substitution, which

is intriguing because this aspect of personality is typically the most reliable predictor of attained status (Borghans et al. 2008). This finding may reflect the limited content validity of the instrument. On the other hand, that conscientiousness may benefit everyone equally, regardless of socioeconomic background, suggests its central importance as a social psychological resource promoting attainment. Also of interest is the unanticipated cross-over interaction observed for intellect/imagination and hourly wages: At low levels of parent education, we observe resource substitution, but at high levels of parent education, there is a significant penalty for this personality characteristic. Highly imaginative young adults whose parents have more than four-year degrees tend to have more jobs (suggesting career turbulence), but we could identify no other meaningful differences.

Finally, with respect to Aim 3, the correlations between parent education and personality factors (table 2) were modest in size and, not surprisingly, we observed weak evidence for structural amplification. That is, less educated parents are somewhat less likely to have children with more valued personality characteristics, when compared to more educated parents. This mediational pattern is observed for agreeableness, imagination/intellect, and neuroticism for personal education; for neuroticism and intellect/imagination for hourly wages; and for all personality factors but conscientiousness for self-direction at work. With the exception of models predicting personal education, the mediational patterns are slight.

The findings suggest the importance of two compensatory mechanisms. First, in the absence of highly educated parents, personality factors that create interpersonal ease and comfort (agreeableness, emotional stability, and extraversion) become compensatory. Across all three outcomes, agreeableness moderates and mediates (except wages) parent education; emotional stability moderates and mediates education and wages; and extraversion moderates wages and self-direction. To speculate, the interpersonal skills associated with these dimensions of personality may be especially important when social and cultural capital associated with highly educated parents is missing. In the absence of, for example, social capital originating with the parents' networks, students who are positive, outgoing, and agreeable create their own social capital. Second, in the absence of highly educated parents, the intellect/imagination factor becomes compensatory with respect to education and self-directed work. Parent education is associated with intellectually stimulating households (e.g., books, cultural events, and highly verbal interaction patterns); perhaps in the absence of this enriched setting created by the parents, students who are interested in abstract ideas and engaging in imaginative play create their own enriched settings. Thus, both mechanisms suggest that personality is important to status attainment because it provides skills with which the child develops otherwise-missing forms of capital that promote attainment.

The findings clearly suggest the importance of interpersonal skills and intellect/imagination in the absence of higher parent education, but it remains for future work to determine exactly how these skills are compensatory, and for what missing forms of capital. The findings raise the intriguing issue of the possible functions served by personality in the absence of high parent education. It may be that valued personality characteristics substitute for forms

of capital—particularly social and cultural—that promote attainment and are associated with parental SES. Thus, for example, students lacking cultural tools (dress, speech, exposure to high culture) indicative of a middle-class household may nonetheless win the teacher’s favor with agreeableness and emotional stability. On the other hand, students with highly educated parents, who are more likely to possess these forms of capital, need not be as agreeable and emotionally stable. By implication, there may be many different “packages” of capital—social, cultural, psychological, physical—that lead to similar status attainments, a form of causal complexity called equifinality.

Prior empirical work on resource substitution relies on a traditional multiplicative test of moderation (the equivalent of the total conditional effects). The present analyses build on this work by reporting these results but also consider whether the indirect effect of parent education on status attainment via personality exists and, if so, is conditional on the level of parent education (the CIEs). This latter extension represents a stringent test of resource substitution with structural amplification because it ultimately focuses only on the portion of the effect of parent education that operates through personality. The total conditional effects would appear to capture the essence of resource substitution, but a test of moderated mediation would seem most appropriate to test resource substitution with structural amplification.

Although the results are consistent with past work and theoretical expectations, they should not be taken as causal estimates of the effects of parent education or personality dimensions. This limit is in part due to the potential for omitted variables and other sources of biases that threaten a causal interpretation. This limit is also in part due to the fact that personality is measured concurrently with educational attainment, hourly wages, and self-direction at work, which raises two issues: (1) whether personality measured in adulthood is a reasonable proxy for personality in adolescence; and (2) whether the associations are driven by the effects of status attainments on personality, rather than vice versa. Sensitivity analyses suggest that treating the measures of personality as imperfect indicators with measurement error does not substantively alter our results. Nonetheless, ultimately these are assumptions that cannot be tested with our data and thus should be addressed in future research.

Additionally, although the CIEs are consistent with theoretical expectations and the combination of the conditional indirect and direct effects is sizable, the magnitude of the CIEs suggests that the mechanism involving resource substitution with structural amplification is not particularly strong. More work is needed across a range of candidate moderators/mediators and outcomes to determine how significant this mechanism is in the reproduction of inequality.

Nonetheless, the conceptual model and empirical results jointly suggest that personality is related to status attainment outcomes, but that these associations depend on social circumstances. In this paper, we have focused on how personality “substitutes” for parent education, but exactly how personality compensates for low parent education remains for future research. Moreover, our results suggest a new avenue of research that explores how diverse forms of capital join in complex combinations to promote or detract from status attainments.

Notes

1. We also examined a socioeconomic index measure (occupational education, as outlined by Hauser and Warren [1997]) as an additional status attainment outcome. The results were quite comparable to those observed for hourly earnings (available upon request).
2. In auxiliary models, we also included educational aspirations and cognitive ability (available at wave IV) and found the same pattern of substantive results.
3. We also estimated ordered logit models for educational attainment and self-direction at work. We found the same pattern of statistically significant predictors of each outcome.

Appendix

Appendix A. Personality Inventory in Add Health, Wave IV

Dimension	Variable	Item wording
Extraversion	H4PE1	I am the life of the party.
	H4PE9	I don't talk a lot.
	H4PE17	I talk to a lot of different people at parties.
	H4PE25	I keep in the background.
Agreeableness	H4PE2	I sympathize with others' feelings.
	H4PE10	I am not interested in other people's problems.
	H4PE18	I feel others' emotions.
	H4PE26	I am not really interested in others.
Conscientiousness	H4PE3	I get chores done right away.
	H4PE11	I often forget to put things back in their proper place.
	H4PE19	I like order.
	H4PE27	I make a mess of things.
Neuroticism	H4PE4	I have frequent mood swings.
	H4PE12	I am relaxed most of the time.
	H4PE20	I get upset easily.
	H4PE28	I seldom feel blue.
Intellect/imagination	H4PE5	I have a vivid imagination.
	H4PE13	I am not interested in abstract ideas.
	H4PE21	I have difficulty understanding abstract ideas.
	H4PE29	I do not have a good imagination.

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