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Understanding Educational Aspiration among People in Prison

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Introduction

Education and incarceration are intertwined. The number of people in US prisons has grown by over 700 percent since 1970 to reach 1.5 million, primarily driven by an increased rate of incarceration among low-income young men of color who have not completed high school (Western, 2007; Travis et al, 2014). Today, one in three black men without high school diplomas will spend time in prison (Pew, 2010). Similar, although not as severe disparities in incarceration exist for white and Hispanic men and women and for black women who do not complete high school – all see an elevated rate of incarceration as compared to those with higher levels of educational attainment (Pew, 2010; Travis et al, 2014). Yet during the period of massive growth in the numbers of people behind bars who share a need for adult basic, high school, and higher education, the United States has decreased its investment in educational programs in prisons both at the state and federal levels (Western, 2007). Perhaps due to this disinvestment, education has received limited attention in the research on prisons – a gap which the field of criminologists, policy researchers, and practitioners are just recently beginning to address.

The majority of the research on education in prison has focused on outcomes relevant to criminal justice policymakers, specifically that education reduces recidivism, increases employment, and improves facility safety (Davis et al, 2013; Bozick et al, 2018; Lockwood et al, 2015; Pompoco et al 2017; Fine et al, 2001; Winterfield et al, 2009; Correctional Association, 2009). Recidivism is high in the United States: 55 percent of people released from prison return within five years (Durose et al, 2014). Education in prison, whether adult basic, high school completion, vocational, or postsecondary, reduces the likelihood of returns to prison for those who participate by up to 43 percent (Davis et al, 2013; Davis et al 2014; Bozick et al, 2018). The odds of employment may increase by up to 13 percent after release for people who participated in education, as compared to those who did not participate in education during their prison terms (Davis et al, 2013; Bozick et al, 2018; Lockwood et al, 2012). In addition, research has shown that participation in education is associated with reductions in the frequency of violent incidents, making prisons safer for incarcerated people and staff. In 2017, Pompoco and colleagues found that high school and college courses, but not vocational programs, reduced the likelihood that a participant would engage in violence while still in prison (Pompoco et al, 2017). Less rigorous research has found similar effects (Fine et al, 2001; Winterfield et al, 2009; Correctional Association, 2009).

Considerably less research has focused on measures of educational attainment (i.e., the educational milestones a student has completed, such as 10th grade, a high school diploma, or a Bachelor's degree), achievement (i.e., grade point averages, test scores) or aspiration (i.e., the highest degree or credential the student hopes to complete). However, attainment, achievement, and aspiration are common topics of inquiry among researchers who study education programs in the community. This research identifies pervasive gaps in achievement and between achievement and aspiration along race, class, and gender lines. Low-income and minority youth tend to score lower on measures of achievement, such as reading and math test scores (Entwisle et al, 2000; Ferguson, 2000; Farkas and Beron, 2004); to be seen as less motivated, less focused on school, and to lack basic educational study skills (Ogbu, 2003; Carter, 2003; Downey, 2008; Harris, 2006; Morris, 2008); to be subject to more severe school discipline sanctions (Morris and Perry, 2016; Ferguson, 2000); to drop out of high school more frequently, enroll in less selective colleges, struggle to complete college, and see lower earnings after graduation (Sterns, 2007; Attewell and Lavin, 2007; Karen and Dougherty, 2005; Monaghan and Attewell, 2015). Despite lower achievement scores, low-income and minority students still aspire to college and

professional careers (Carter, 2003; Downey, 2008). In terms of gender, girls and women tend to score higher on reading and literacy measures from an early age, to enter school with stronger social behavioral skills that support their educational engagement, and to see lower earnings than men after completion of college (DiPrete and Jennings, 2011; Autor and Wasserman, 2012). Research also suggests that parental educational attainment and household income have a strong influence on achievement and attainment (Karen, 2007; Karen and Dougherty, 2005; Attewell and Lavin, 2007; Dale and Kreuger, 2015; Thomas and Zhang, 2005). These gaps may be of interest to researchers seeking to better understand the relationship between education and prison.

The research that does cover achievement and aspiration among students in prison has suggested that measures of achievement are dynamic and can be raised by educational programs, influenced by the prison experience, and are associated with educational aspirations (Reed, 2015; Piccone, 2006; Meyer, 2011). This research also suggests that GED holders in prison may have stronger cognitive skills in some domains than GED holders in the community. In addition, those holding high school rather than GED credentials may have higher educational aspirations (Harlow et al, 2010; Meyer, 2011). Demonstrated achievement measures, or cognitive skills (i.e., a students' ability to learn, remember information, reason, or problem solve across a number of domains such as literacy and numeracy), may serve as the controlling factor for whether students have opportunities to meet their aspirations in prison. This is because assessments of cognitive skills determine the educational programs to which an incarcerated person is assigned (Piccone, 2006). But, raising cognitive skills may raise aspirations and change the programs in which incarcerated people may be interested (Meyer, 2011).

This view of educational aspiration as dynamic and linked to skills may add a new dimension to studies of education in prison. Notably, a debate has emerged in the field of education in prison over how to appropriately compare outcomes of those who enroll in education programs in prison and those who do not. Calls for rigorous research comparing outcomes of those who do and do not attend education programs in prison raise concerns about appropriate comparison groups and matched samples. Davis and colleagues suggest that fundamental differences in the motivations of students who pursue education and those who do not may explain the differences in outcomes after prison that researchers observe (Davis et al, 2013). This concern is echoed in ongoing dialogue within the field of education in prison. It is often followed by a call for randomized controlled trials to account for these unobserved differences (Davis et al, 2013). However, this observation, and study designs that attempt to account for these differences, often discuss motivation as if it is a binary variable: a characteristic that a student either has or does not and which separates the successful person from his or her peers. In practice, this may be narrowed to the binary question of whether a person chooses to sign up for education programs or does not. We suggest that the starting point for understanding differences between students who enroll or do not may be an examination of aspiration and the ways in which aspiration can be cultivated, predicted, or better understood - particularly by building on the research that examines the relationships between attainment, achievement, and aspiration.

The PIAAC survey provides an opportunity to examine the connection between achievement as measured in cognitive skills and aspiration to participate in education programs in prison. This survey is administered both among US households and within a representative sample of US prisons. It collects background information on respondents, as well as assessing their cognitive skills in literacy and numeracy domains.

- The primary research question that this study aims to answer is: What demographic and skill-level factors predict the aspiration to enroll in *any* education class or program among people in prison in the U.S.? This study uses logistic regression to determine the relevant predictors of enrolling in any educational program during a term of incarceration.
- To hone in on the specifics of those interested in postsecondary education (which make up a majority of those who want to participate in any type of education), this study also includes a secondary chi-square analysis that examines what characteristics are correlated with interest in such a program. This statistical approach was selected based on the number of valid cases in dependent variable and the independent variables. There were not enough cases to produce a logistic regression analysis that would yield statistically valid results.

To pursue these research questions, we draw independent variables from the literature on prison and community-based programs that relate to educational achievement and aspiration. These include race, gender, age, educational attainment, parental educational attainment, and cognitive skills.

Although, the two groups are not compared in this analysis, it may be illuminating to review the ways in which the PIAAC prison sample differs from the U.S. household population on the variables included in this analysis. Each of these differences in population distribution was found by Rampey to be statistically significant. The prison population is skewed heavily male, far from the 49/51 percent split seen in the general population, prisons are 93 percent male and only 7 percent female (Rampey et al, 2016). Nearly 60 percent of incarcerated people identify as black (37 percent) or Hispanic (22 percent) (Rampey et al, 2016). In comparison, only about 12 percent of the American population is black and just 14 percent are Hispanic (Rampey et al, 2016). Educational attainment is remarkably low among people in prison: 30 percent of incarcerated people had not completed high school and 64 percent listed high school as their highest educational attainment – in other words, 94 percent listed high school or less (Rampey et al, 2016). In comparison, 38 percent of American residents have completed education beyond high school (Rampey et al, 2016).

Age is relevant to understanding postsecondary aspiration in the PIAAC data. According to Rampey and colleagues, people age 55-65 were more likely than younger people in prison to have participated in postsecondary education during their prison term. This is in conflict with other research indicating that younger people tend to enroll more frequently than older adults in adult education programs in the community (Rampey et al, 2016; National Center for Education Statistics, 2007). The higher likelihood of those who were older having participated in postsecondary education may be a result of those individuals serving very long prison sentences and therefore having been in prison when Pell grants were available to incarcerated people in the years before 1994 (Boldin, 2018). In terms of the distribution of the data: compared to the household population, prisoners fell in larger proportions into the categories of ages 16-24 (13 percent), 25-34 (35 percent), and 35-44 (25 percent), as compared to 17, 18, and 18 percent, respectively (Rampey et al, 2016). Other differences in age were not statistically significant.

Measures of cognitive skills among people in prison as compared to the household population are a unique contribution of the PIAAC survey to the body of knowledge on the characteristics of incarcerated people (Rampey et al, 2016). In comparison to the U.S. household population, incarcerated people score lower in literacy (249 vs. 270) and numeracy (220 vs. 255)

and the difference is statistically significant (Rampey et al, 2016). Both those who expressed an interest in postsecondary education in prison and those that actually participated in such programming behind bars had the highest levels of cognitive skills in the literacy and numeracy domains among those surveyed and that these differences were statistically significant (Rampey et al, 2016).

Rampey and colleagues did not compare levels of parental education between prison and household populations, but in research on students in the community, parental education has been shown to be a strong predictor of a student's achievement and aspiration (Karen, 2007; Karen and Dougherty, 2005; Attewell and Lavin, 2007; Dale and Kreuger, 2015; Thomas and Zhang, 2005). Rampey and colleagues did compare educational attainment within the prison population by parental educational attainment, but it is difficult to draw conclusions from this data because it is divided by the level of education the respondent themselves completed while in prison. Because many people do not have access to or do not enroll in education programs in prison, about 60 percent of those in each of the three parental education categories (at least one parent with a college degree, at least one parent with a high school degree, neither parent with a high school degree) did not complete any education in prison (Rampey et al, 2016).

Finally, the dependent variable, interest in enrolling in an education program during prison, was asked only of the prison sample. As a result, there are no comparison responses in the household data.

Data and Methods

As noted above, the data for this study were selected from the 2014 U.S. Program for the International Assessment of Adult Competencies (PIAAC) Prison Study's Public Use Files (PUF). The PIAAC is an international assessment administered to a sample of individuals worldwide and was designed by the Organization for Economic Cooperation and Development (OECD). The primary intent of the PIAAC survey is to assess adults' level of competency in a series of "four core competency domains of adult cognitive skills that are seen as key to facilitating the social and economic participation of adults in advanced economies: literacy, reading components, numeracy, and problem solving in technology-rich environments" (Rampey et al., 2016).

Data

The 2014 U.S. PIAAC Prison Study (Prison Study) was administered in 98 state and federal prisons in the United States to a nationally representative sample of 1,315¹ incarcerated adults aged 16 to 74 between February and June 2014 (Rampey et al., 2016). The Prison Study was part of a larger national supplement to the 2012 U.S. PIAAC household study, which was administered to a nationally representative sample of adults living in the U.S. who were not

¹ The number of respondents who completed both the 2014 PIAAC cognitive assessment and the prison-specific background questionnaire (BQ). The final prison reporting sample consisted of 1,319 respondents, including 1,315 respondents who completed the BQ, plus the four respondents who were unable to complete the BQ for literacy-related reasons. See, Hogan, J., Thornton, N., Diaz-Hoffmann, L., Mohadjer, L., Krenzke, T., Li, J., VanDeKerckhove, W., Yamamoto, K., and Khorramdel, L. (2016). *U.S. Program for the International Assessment of Adult Competencies (PIAAC) 2012/2014: Main Study and National Supplement Technical Report* (NCES 2016-036). U.S. Department of Education: Washington, DC.

incarcerated. And unlike the PIAAC household study, the prison study was conducted exclusively in the U.S.

In addition to surveying individuals regarding their cognitive skill levels, the respondents are also given a background questionnaire to complete. For the Prison Study, this background questionnaire was designed to address the unique circumstances of incarceration. According to Rampey and colleagues, the questions “focused on collecting information about various educational and training activities in prison, such as participation in academic programs and [English as a Second Language] classes, experiences with prison jobs, and involvement in vocational training and nonacademic programs such as employment readiness classes” (Rampey et al., 2016). The Prison Study is the most recent survey of incarcerated adults that assessed cognitive skills as well as obtained demographic information from participants.²

The variable *P_Q060* from the PIAAC Prison Study’s background questionnaire serves as the dependent variable in this analysis. It is a binary variable that assesses whether a respondent is interested in enrolling in any type of primary, secondary, or postsecondary educational class or program during their incarceration (i.e., no = 0; yes = 1). For this analysis, the sample is comprised of the respondents (n = 1,190) who provided a valid response (i.e., yes/no) to the survey question: *Do you want to enroll in an academic class or program of study?* The survey respondents that had attained at least at 7th grade education (as measured by the personal education level variable, *B_Q01a3US*) were those asked this question.

The independent variables were selected in consultation with the literature on participation in education programs and higher education programs in prison, as described above. They are organized into two categories of data: demographic covariates and cognitive skills. Five PIAAC demographic covariates derived from respondents’ answers to the Background Questionnaire were selected for the analysis. Each of these were treated as nominal, categorical variables, and recoded as dummy variables (0=no, 1=yes). These include: gender, age, race, educational attainment, and parental educational attainment. The cognitive skills included in this analysis were the average scores plausible values for literacy and numeracy. For more detail on these variables, please see Appendix A.

Descriptions of the variables in the analysis and the ways in which they were recoded for the purposes of this analysis. Note: the reference groups for the dummy variable are indicated by an * symbol.

Measures

Co-Variates

- Gender
 - Gender was included in the analysis through the use of the binary categorical variable *GENDER_R*, with *Male** and *Female* being the only two values.
- Age
 - The variable used to measure respondents’ age was *AGEG10LFSEXT*, which represents age as an ordinal variable organized by 10-year age bands: ages 24 or younger; 25-34; 35-44; 45-54; 55-65; and 66 or older. In this analysis, the variable was recoded and treated as a categorical variable. In addition, the two

² Prior to the 2014 PIAAC Prison Study, two studies aimed to assess literacy levels among people who were incarcerated: 1) the National Assessment of Adult Literacy (NAAL) in 2003; and 2) The National Adult Literacy Survey (NALS) in 1992.

older age groups (55-65 and 66 or older) were collapsed into a new value (“Above 54”) in order to ensure that there was a more adequate number of cases for the logistic regression analysis. The dummy codes derived from this variable include: *Below 25*, *25-34**, *35-44*, *45-54*, and *Above 54*.

- Race/ethnicity
 - Race and ethnicity was captured by the nominal variable *RACETHN_4CAT*, which contained the following values for respondents to choose from: *Black*, *Hispanic*, *White**; and *Other* – each of which became dummy codes.

- Personal education level
 - The variable representing personal education level attainment (*EDCAT6*) is being treated as nominal variable in this analysis. *EDCAT6* is derived from the educational attainment of respondents using International Standard Classification of Education (ISCED).³ The ISCED system presents educational attainment in six values derived from the International Standard Classification of Education (ISCED): *Lower secondary or less (ISCED 1,2, 3C short or less)*, *Upper secondary (ISCED 3A-B, C long)*, *Post-secondary, non-tertiary (ISCED 4A-B-C)*, *Tertiary - professional degree (ISCED 5B)*, *Tertiary - bachelor degree (ISCED 5A)*, *Tertiary -master/research degree (ISCED 5A/6)*, and *Tertiary –bachelor/master/research degree (ISCED 5A/6)*. *EDCAT6* was coded into dummies that represented the levels of education into which respondents in the prison sample were most likely to be distributed based on the literature discussed above:
 - *BelowHS2* (ISCED Levels 1, 2, 3C short or less = *EDCAT6* value 1);
 - *HSequivalent* (ISCED Levels 3A-B, C long = *EDCAT6* value 2), and;
 - *BeyondHS2* (ISCED Levels 4A-B-C, 5B, 5A, 5A/6 = *EDCAT6* values 3-7).

- Parental educational level
 - The nominal variable *PARED* was used to measure the respondents’ parents’ highest level of education. This variable was measured with four responses: that neither of their parent had attained a high school; that at least one parent had attained a high school credential and a vocational or technical postsecondary credential; that at least one parent had attained an associate’s degree or higher; and that the respondent did not know their parents’ highest educational attainment.⁴ The dummy codes derived from this variable include: *NeitherPARENTuppersecondary*, *AtLeastOneParentUppersec_postsec*, *AtLeastOneParentTertiary**, and *PARED_DK*.

Independent Variables: Cognitive Domain Scores Variables

³ “ISCED is designed to serve as a framework to classify educational activities as defined in programmes and the resulting qualifications into internationally agreed categories. The basic concepts and definitions of ISCED are therefore intended to be internationally valid and comprehensive of the full range of education systems” (UNESCO, 2011, p. 6).

⁴ See the National Center for Education Statistics for a translation of American secondary and postsecondary education credentials to international educational attainment measurement levels.

Respondents' literacy and numeracy cognitive domain skill levels assessed in the PIAAC study were included in this analysis using proficiency scores using the average plausible values for both the following variables: literacy proficiency (*PVLIT1* to *PVLIT10*) and numeracy proficiency (*PVNUM1* to *PVNUM10*). The range of possible scores for each of these cognitive domain categories was between 0 and 500. In the logistic regression analysis, this variable is continuous, which is the default option of the IDB Analyzer software tool. One advantage of using the cognitive domain plausible values average scores (versus the various categorical levels) is that allows for the full variability of this measure to be captured in the analysis⁵.

Analytic Strategy

To answer the first research question, we completed a logistic regression that included the co-variates and the independent variables described above. Logistic regression is an appropriate analytic technique to employ when performing a test of the significance of a set of independent variables on a binary dependent variable. This technique also allows for the inclusion of ordinal, nominal, and continuous explanatory variables in the analysis. Moreover, it is an analytic technique that has been commonly used in higher education research (Cabrera, 1994).

To drill down to interest in postsecondary education for the second research question, we produced crosstabs using the weighted survey data and then completed a chi-square test for significance using the un-weighted data (see Table 4). In the structure of the survey, only those who answered yes to the broader question on interest in education were subsequently asked if they would want to enroll in postsecondary education or some other type of education program. This cross tabulation breaks the study sample who indicated yes to education in general (N=822) into those who were interested in postsecondary education and those who were interested in some other type of education. Note: every respondent in this group indicated an interest in education in prison. The key differences are what *type* of education. The test for significance is completed on the un-weighted data. This is because the IDB Analyzer tool did not have the capacity to complete a chi-square test. As a result, the chi-square test does not include the cognitive skill domain independent variables.

Prior to performing the logistic regression analysis, several measures were taken to ensure that the data met the minimum parameters for this statistical method.⁶ Once the necessary assumptions were tested and were shown to have been met as best as possible given the available data, four different logistic regression models were conducted to assess the degree to which

⁵ From von Davier, Gonzalez, and Mislevy (2009): "One way of taking the uncertainty associated with the estimates into account, and of obtaining unbiased group-level estimates, is to use multiple values representing the likely distribution of a student's proficiency. These so-called plausible values provide us with a database that allows unbiased estimation of the plausible range and the location of proficiency for groups of students. Plausible values are based on student responses to the subset of items they receive, as well as on other relevant and available background information. Plausible values can be viewed as a set of special quantities generated using a technique called multiple imputations. Plausible values are not individual scores in the traditional sense, and should therefore not be analyzed as multiple indicators of the same score or latent variable."

⁶ These include ensuring a robust number of cases per predictor. This consists of two measures: first, ensuring that there are at least 10 cases multiplied by the number of independent variables in the model and divided by the proportion of positive cases (yes's) in the population; and second a minimum of 62 cases per dependent variable response (yes/no) for each response category within each independent variable (Peduzzi et al, 1996). Related to the latter diagnostic check, given the analyses' relatively small sample size, the minimum number of cases for each response category between the dependent variable and the independent variable was not always met. As is shown in the tables below, some categories of the dependent variables could not be reported because of low numbers of cases.

incarcerated peoples’ interest in participating in any educational programming are associated with the independent variables described above.

Because of the complex sampling structure used in the survey of prisoners, the data were prepared with sampling and replicate weights provided with the dataset. Using these weights enables researchers to estimate accurate and unbiased parameter and standard error estimations from the data.⁷ The data was prepared and analyzed in SPSS 24. Missing cases were identified and removed using listwise deletion – only cases that had valid responses for the dependent variable and each of the independent variables and covariates were included.

Findings

Summary Statistics

The weighted descriptive statistics for the study sample are found in Table 1 alongside the weighted descriptive for the larger US prison population for comparison. According to these results, 69.9 percent of the weighted study sample expressed an interest in educational programming – the dependent variable for this analysis. Within the study sample, 93 percent were male and 7 percent were female. The age breakdown of the study sample was 34.4 percent age 25-34, 24.6 percent age 35-44, 19.2 percent 44-54, and 9.6 percent 55 and older. While incarcerated people age 18-24 were included in the study sample, their representation was too small to report in our findings. The reported race/ethnicity of the sample was 36.5 percent black, 21.5 percent Hispanic (interpreted with caution due to low case size), and 35 percent white. Respondents who indicated races other than these three made up too small a group to include in this analysis. The educational attainment levels reported were 28.2 percent below high school, 56.8 percent high school equivalence, and 14.8 percent beyond high school. Parental education levels were 16.2 percent below high school, 40.2 percent some postsecondary, 22.2 postsecondary completion, and 21.5 percent unknown. Finally, the mean cognitive skills scores were 249.56 for literacy and 218.80 for numeracy.

Table 1. *Comparison of the U.S. Prison Population and Analytic Sample, 2014, by dependent variable, select demographic characteristics, and literacy and numeracy cognitive skills*

Variables	Weighted U.S. Prison Population Percent (S.E.)	Weighted Analytic Sample Percent (S.E.)
Education Desire (DV)		
Yes	63.4 (.0143)	69.9 (.0151)
No	36.6	30.1

⁷ The syntax for applying the sampling and replicate weights to the dataset using the statistical software package SPSS 24 was created using the IEA-developed International Database (IDB) Analyzer.

Variables	Weighted U.S. Prison Population Percent (S.E.)	Weighted Analytic Sample Percent (S.E.)
	(.0141)	(.0151)
Demographic Variables (IVs)		
Gender		
Male	93.3 (.0000)	93.6 (.0015)
Female	6.7 (.0000)	6.4 (.0015)
Age		
Below 25	12.7 (.0077)	‡
25-34	34.9 (.0143)	34.4 (.0154)
35-44	24.3 (.0123)	24.6 (.0127)
45-54	19.1 (.0112)	19.2 (.0118)
Above 54	9.0 (.0056)	9.6 (.0063)
Race/Ethnicity		
Black	36.4 (.0007)	36.5 (.0043)
Hispanic	21.9 (.0012)	21.5! (.0048)
White	34.1 (.0103)	35.0 (.0097)
Other	7.2 (.0105)	‡
Personal Education Level		
Below high school	30.0 (.0149)	28.2 (.0156)
High school diploma/equivalent	54.7 (.0148)	56.8 (.0158)
Beyond high school	14.8 (.0088)	14.8 (.0084)
Parental Education Level		
Neither parent completed high school	15.8 (.0114)	16.2 (.0120)
At least one parent completed high school and some postsecondary education	40.3 (.0143)	40.2 (.0140)

Variables	Weighted U.S. Prison Population Percent (S.E.)	Weighted Analytic Sample Percent (S.E.)
At least one parent completed a postsecondary degree	22.5 (.0153)	22.2 (.0163)
Unknown	21.1 (.0119)	21.5 (.0134)
Cognitive Skills (IVs)	Mean Score (S.D.)	Mean Score (S.D.)
Literacy	249.24 (46.24)	249.56 (46.74)
Numeracy	220.48 (53.96)	219.80 (54.21)

! denotes interpret data with caution -- the sample size for this estimate is between 30 and 61 cases. ‡ denotes reporting standards not met.

Table 2 below presents a cross-tabulation of the co-variates and the independent variables. Most notably, among the U.S. prison population, those who desire educational programming while incarcerated have both higher average literacy (252.4) and numeracy (223) scores than those who did not indicate interest in educational programming (i.e., literacy average: 243.1; numeracy average: 212).

Table 2. *Weighted Crosstabs Frequencies of Dependent Variable (P_Q060) by the Independent Variables within the Analytic Sample, U.S. PIAAC Prison Study, 2014*

Variable	Interest in Education Percent (S.E.)	No Interest in Education Percent (S.E.)
Gender		
Female	72.1 (3.86)	27.9 (3.86)
Male	69.7 (1.60)	30.3 (1.60)
Age		
Below 25	83.6 (4.34)	‡
25-34	81.7 (2.05)	18.3 (2.05)
35-44	70.6 (2.69)	29.4 (2.69)
45-54	57.6	42.4

Variable	Interest in Education Percent (S.E.)	No Interest in Education Percent (S.E.)
	(3.65)	(3.65)
Above 54	33.1! (3.33)	67.0 (3.33)
Race/Ethnicity		
Black	69.5 (2.70)	30.5! (2.70)
Hispanic	78.9 (2.51)	21.1! (2.51)
White	64.3 (2.41)	35.7 (2.41)
Other	71.9! (6.32)	‡
Personal Education Level		
Below high school	69.7 (3.16)	30.3 (3.16)
High school diploma/equivalent	72.2 (1.63)	27.8 (1.63)
Beyond high school	62.0 (4.20)	38.0 (4.20)
Parental Education Level		
Neither parent completed high school	63.3 (3.07)	36.7 (3.07)
At least one parent completed high school and some postsecondary education	72.1 (2.01)	28.0 (2.01)
At least one parent completed a postsecondary degree	73.9 (3.22)	26.1 (3.22)
Unknown	66.6 (3.32)	33.4 (3.32)
Cognitive Domains	Mean Score (S.D.)	Mean Score (S.D.)
Literacy	252.4 (44.61)	243.1 (50.74)
Numeracy	223.0	212.3

Variable	Interest in Education Percent (S.E.)	No Interest in Education Percent (S.E.)
	(53.29)	(55.56)

Note: ! denotes interpret data with caution -- the sample size for this estimate is between 30 and 61 cases. # denotes reporting standards not met.

Research Question 1: Logistic Regression of Interest in Educational Programs on Participant Demographics and Cognitive Domain Skill Levels

Table 3 below illustrates the results of the four models that make up this logistic regression analysis. For each model, the odds ratios of the predictors, the standard errors of the odds ratios, and significance levels are presented. The first regression model includes the demographic independent variables related to: gender, race, age, educational attainment, parental educational attainment). In this model, age significantly predicted interest in educational programs. Compared to those age 25-34, the odds are 1.79 times higher for 35-44 year olds to express an interest in education while in prison, 2.98 times higher for those 45-54, and for those over 54, the odds of members of this group expressing interest in higher education were 7.95 times higher than those who were 25-34 years of age (although the oldest group should be interpreted with caution due to sample size). In addition, for Hispanic respondents, the odds of expressing interest in education were .54 times as great as those of white respondents, although this finding should be interpreted with caution due to the relatively small number of Hispanic survey respondents.

The second model introduced the literacy scores of respondents. With this additional variable, age remained significant, although the coefficients decreased slightly. Compared to the reference group, those age 25-34, the odds of 35-44 year olds expressing interest in education were 1.77 times higher, among those aged 45-54, the odds were 2.76 times higher, and for those over age 54 were, the odds were 7.58 times higher (although the oldest group should be interpreted with caution due to sample size). In addition, the odds of Hispanic respondents expressing interest in education was .49 times those of Whites—a finding that should be interpreted with caution. For each point higher that respondents scored in in the literacy cognitive skills domain, their likelihood of expressing interest in education increased by a small margin (1.0045).

In the third model, the literacy scores were removed and replaced with numeracy scores. In this model, as before age remained significant. Compared to those age 25-24, the odds of 35-44 year olds expressing interest in education were 1.76 times higher, for those 45-54 of age, the odds were 2.71 times higher, and for those over 54 years, the odds were 7.41 times higher (although the oldest group should be interpreted with caution due to sample size). In addition, for Hispanic respondents, the odds were .48 times as great as those of white respondents in terms of interest in educational programming, although this finding should be interpreted with caution. For each point higher that respondents scored in in the numeracy cognitive skills domain, their likelihood of expressing interest in education increased by a small margin (1.0040).

In the final model, both literacy and numeracy scores were included in the predictors. Compared to those age 25-24, the odds were 1.76 times higher for 35-44 year olds to express interest in education, 2.70 times higher for those aged 45-54, and 7.45 times higher for those

over age 54 (although the oldest group should be interpreted with caution due to sample size). In addition, the odds of Hispanic respondents expressing interest in educational programming was .48 times that of white respondents, although this finding should be interpreted with caution. In this model, neither literacy nor numeracy scores significantly predicted interest in education programming. This is most likely due to the fact that the average scores of literacy and numeracy cognitive domain levels were highly correlated. The correlation between the average plausible value scores for literacy numeracy in the study sample was .822 with a standard error of .014. This value indicates that there is a very strong, positive correlation between literacy and numeracy scores. As such, including both may have posed problems to the model.

The pseudo R² of the regression analyses were approximately the same for each of the four models and were somewhat low: with about 16 to 17 percent of the variance in the dependent variable explained by each. These small changes indicate that the new variables clarify the factors at work in predicting interest in education. By adding cognitive skills, the demographic variables lost some of their explanatory power, indicating that some of the size of these odds-ratios were in fact a result of other contributing factors. For example, cognitive skills may improve with age.

Table 3. Results of the Logistic Regression of Interest in Educational Programs on Participant Demographics and Cognitive Domain Skill Levels

	Model 1	Model 2	Model 3	Model 4
Variable	Exp(B) (S.E.)	Exp(B) (S.E.)	Exp(B) (S.E.)	Exp(B) (S.E.)
Gender				
Female [^]	.9400 (.2162)	.9177 (.2091)	.9077 (.2084)	.9093 (.2076)
Age				
Below 25 years [^]	‡	‡	‡	‡
35-44 [^]	1.7943*** (.3141)	1.7686*** (.3123)	1.7605*** (.3144)	1.7612** (.3132)
45-54 [^]	2.9804*** (.6522)	2.7618*** (.6143)	2.7147*** (.6086)	2.7087*** (.6066)
Above 54 [^]	7.9475!*** (1.5927)	7.5797!*** (1.5434)	7.4198!*** (1.5273)	7.4491!*** (1.5241)
Race				
Black [^]	.9262 (.1599)	.8369 (.1503)	.8132 (.1485)	.8137 (.1482)
Hispanic [^]	.5409!** (.1076)	.4911!*** (.1001)	.4848!*** (.1002)	.4817!*** (.0991)
Other [^]	‡	‡	‡	‡
Personal Education Level				
Below high school [^]	.9478 (.2428)	.7757 (.2075)	.7448 (.2078)	.7394 (.2604)
High school diploma/equivalent [^]	.7719 (.1805)	.7188 (.1696)	.7101 (.1654)	.7074 (.1664)
Parental Education Level				

	Model 1	Model 2	Model 3	Model 4
Variable	Exp(B) (S.E.)	Exp(B) (S.E.)	Exp(B) (S.E.)	Exp(B) (S.E.)
Neither parent completed high school [^]	1.4988 (.3773)	1.3857 (.3334)	1.4142 (.3421)	1.3853 (.3343)
At least one parent completed high school and some postsecondary education [^]	1.0842 (.2209)	1.0605 (.2115)	1.0744 (.2124)	1.0645 (.2122)
Unknown [^]	1.5221 (.3738)	1.4819 (.3570)	1.4900 (.3593)	1.4800 (.3563)
Cognitive Domains				
Literacy	--	1.0045** (.0020)	--	1.0027 (.0033)
Numeracy	--	--	1.0040** (.0016)	1.0021 (.0027)
				--
Constant	.1475* (.1201)	.0889** (.0759)	.1265* (.1050)	.1005** (.0844)
Pseudo R ²	.159	.167	.167	.169

Note: * $p < .05$, ** $p < .01$, *** $p < .001$; [^] denotes dummy coded variable. ! denotes interpret data with caution -- the sample size for this estimate is between 30 and 61 cases. ‡ denotes reporting standards not met. Regarding the use of dummy variables in this analysis, in each of the four models, the following categories in each of these variables were omitted from the analysis and served as the reference groups in the regression analyses: Gender: *Male*; Age: *25-34*; Race/Ethnicity: *White*; Personal education level: *Beyond high school*; Parental education level: *At least one parent attained a tertiary level of education*.

Research Question 2: Cross Tabulation and Chi-Square Test of Independence between Interest in Postsecondary Education and the Co-Variates and Independent Variables

In addition to understanding the relationship between interest in enrolling in any education program while in prison and the demographic, socio-economic, and literacy and numeracy cognitive domains discussed above, we are particularly interested in better understanding the U.S. prison population's interest in or aspiration for *postsecondary* education in relation to these same factors. Because the data did not meet the requirements to complete a logistic regression, we pursued this research question using a cross tabulation to assess the distribution of the independent variables and the dependent variable. Notably, these results show a distribution that is similar to the regression analysis. The results indicate that in all but one of the covariates, substantially greater percentages of respondents (75.1 to 99.1 percent) expressed interest in postsecondary education than not. Further, this analysis shows that average literacy and numeracy cognitive domain scores among those who state interest in postsecondary education were higher than those who did not (literacy of 259.6 vs. 221.6 among those aspiring to lower levels of education, and 232.2 compared to 183.9 in numeracy among those aspiring to

lower levels of education). Finally, the one co-variate that had a majority (64 percent) that aspired to lower than postsecondary education were those who had not yet attained a high school credential.

Table 4. *Weighted Crosstabs Frequencies of Dependent Variable (P_Q080) by the Independent Variables within the Analytic Sample, U.S. PIAAC Prison Study, 2014*

Variable	Interest in Postsecondary Education Percent (S.E.)	Interest in Education Other than Postsecondary Percent (S.E.)
Gender		
Female	78.0 (3.46)	22.0! (3.46)
Male	81.3 (1.76)	18.8 (1.76)
Age		
Below 25	75.8 (4.71)	‡
25-34	82.5 (2.26)	17.5! (2.26)
35-44	78.6 (3.14)	21.4 (3.14)
45-54	83.9! (3.92)	‡
Above 54	88.3! (4.89)	‡
Race/Ethnicity		
Black	79.6 (3.26)	20.4 (3.26)
Hispanic	76.2 (3.75)	23.8! (3.75)
White	85.9 (2.80)	14.1 (2.80)
Other	82.8 (5.01)	17.2 (5.01)
Personal Education Level		
Below high school	36.6 (3.61)	63.5 (3.61)
High school diploma/equivalent	98.2 (.07)	‡
Beyond high school	99.1 (.92)	‡
Parental Education Level		

Variable	Interest in Postsecondary Education Percent (S.E.)	Interest in Education Other than Postsecondary Percent (S.E.)
Neither parent completed high school	81.2 (3.07)	‡
At least one parent completed high school and some postsecondary education	80.8 (2.25)	19.2 (2.25)
At least one parent completed a postsecondary degree	86.5 (2.35)	‡
Unknown	75.1 (3.41)	24.9! (3.41)
Cognitive Domains	Mean Score	Mean Score
	(S.D)	(S.D.)
Literacy	259.6 (41.54)	221.6 (43.23)
Numeracy	232.2 (49.85)	183.9 (48.75)

Note: ! denotes interpret data with caution -- the sample size for this estimate is between 30 and 61 cases. ‡ denotes reporting standards not met.

We next completed a chi-square test of independence to examine the significance of the relationships between the dependent variable and the co-variates. Because chi-square is not among the statistical techniques that the IDB Analyzer can perform, it was not possible to conduct a chi-square analysis using the weighted sample. Instead, the chi-square analysis was carried out using SPSS 24 using the unweighted survey data, and therefore, does not include an analysis of the literacy nor the numeracy cognitive domain scores.

As Table 5 below illustrates, there are significant correlations between the independent variable and two of the five co-variates – personal education level and parental education level. These results indicate that completion of the high school credential in prison moves incarcerated people towards aspirations for postsecondary education. As shown in the table below, 97.9 and 99.1 percent of high school completers and those with some college were interested in enrolling in postsecondary education, while 64 percent of those who had not completed high school aspired to postsecondary study. The aspirations of respondents increased according to the level of education attained by parents, ranging from 79.8, to 81.1, to 87 percent for those whose parents had not completed high school, those with high school and/or some college, and those who had at least one parent who had completed college.

Table 5. *Unweighted Chi-Square Test of Independence of Dependent Variable (P_Q080) by the Independent Variables within the Analytic Sample, U.S. PIAAC Prison Study, 2014*

Co-variates	Co-variate Values	Interest in Postsecondary Education Percent	No Interest in Postsecondary Education Percent	χ^2	t	df
Gender	Female	77.4	22.6	1.588	.208	1
	Male	80.9	18.2			
Age	Below 25	75.8	24.2	4.857	.302	4
	25-34	82.6	17.4			
	35-44	78.2	21.8			
	45-54	84.1	15.9			
	Above 54	85.0	15.0			
Race/ Ethnicity	Black	79.2	20.8	5.649	.130	3
	Hispanic	76.6	23.4			
	White	84.7	15.3			
	Other	81.8	18.2			
Personal Education Level	Below high school	36.0*	64.0*	412.387	.000	2
	High school diploma/ equivalent	97.9*	2.1*			
	Beyond high school	99.1*	0.9*			
Parental Education Level	Neither parent completed high school	79.8*	20.2*	10.295	.016	3
	At least one parent completed high school and some postsecondary education	81.1*	18.9*			
	At least one parent completed a postsecondary degree	87.0*	13.0*			
	Unknown	73.8*	26.2*			

Discussion

In relation to our first research question, which sought to examine the relationship between demographic, socio-economic, and cognitive skill factors to aspirations for enrolling in education programs, our logistic regression indicates that people in prison who are older and those who have stronger cognitive skills in the literacy and numeracy domains are more likely to have an interest in education programs. These findings also indicate that the odds of Hispanics being interested in education are about .50 times that of whites. Finally, our initial comparison between the analytic and larger US prison study sample showed many similarities across respondents. This suggests these findings may be generalizable beyond our analytic sample and into the broader US prison population. Note that this discussion does not focus on the findings related to age or Hispanic ethnic identity because of the very small number of cases from which these findings were drawn. Instead, we recommend that more detailed analysis with a larger sample size be conducted to explore these findings.

In interpreting the results, this analysis may offer more insight into interest in education when examining what was not significant than what was found to be significant. Despite widespread evidence of overrepresentation of black Americans in prison as compared to whites, and a well-documented achievement gap between black and white children, interest in education programs was not significantly different between these groups (Western, 2007; Entwisle et al, 2000; Carter, 2003; Downey, 2008; Harris, 2006; Ogbu, 2003). This is interesting given that recent research has suggested different paths to prison for black and white Americans, including the possibility that black people in prison are more likely to have dropped out of school and experienced difficulty securing mainstream employment prior to prison, as compared to whites (Western, 2018). Similar to race, despite disproportionate representation of men in prison and research that indicates that women's paths to prison are marked by different events and experiences than men, there was no significant difference between indicated interest in education between men and women (Swavola et al, 2016; Lynch et al, 2012, Bloom et al, 2002). Getting an education may be a unifying aspiration among people in prison.

In addition, parental level of educational attainment had no significance for predicting respondents' own interest in education. This is interesting given the research that has shown parental education to be influential in determining both the wealth of the individual and the family, and the educational attainment of children (Attewell and Lavin, 2007). Studies that control for wealth and academic achievement suggest that the black/white achievement gap is explained primarily by differences in the relative wealth (rather than household income) of students (Downey, 2008). The fact that the prison population is primarily composed of low-skilled men suggests that incarcerated people may be more similar to each other in wealth than are students in the household population (Western, 2007). Notably, our analysis did not include any indicators of wealth, leaving level of parental education as our sole (and weak) proxy for socioeconomic status. While its lack of significance is interesting, without a more specific measurement of wealth, we can draw few conclusions from this finding.

Educational attainment, which is often taken as a proxy for cognitive skill, had no significance for predicting interest in educational programs in prison. However, direct measures of achievement, (i.e. literacy and numeracy scores) did predict interest. The literature tells us that completion of high school equivalency may not indicate the same levels of skills among incarcerated people as among the household population - literacy skills may be stronger among GED holders in prison – suggesting that educational attainment may be an especially weak

indication of skill for people in (Harlow et al, 2010). Most importantly, skills are dynamic and can be enhanced in prison (Reed, 2015; Meyer, 2010; DiMambro, 2007). In addition, increases in skills can increase educational aspirations (Meyer, 2010). If higher skills are associated with higher educational aspirations and skills can be enhanced in prison, more skill-building programs may enhance the educational aspirations of incarcerated people, motivating more students to enroll in more advanced education programs.

In terms of goodness of fit, pseudo R^2 measures are limited in their effectiveness at explaining variance in logistic regression models – while this statistic is reported in the regression, its relative size (16 percent) is not necessarily meaningful. The low value of the pseudo R^2 may also be explained by the small number of significant variables in the models. The models also have other limitations. First, the relatively small number of respondents who completed the prison survey led us to drop from our model a number of independent variable categories that did not have an adequate amount of cases to provide any valid findings in the initial stages of the research. Even among the co-variables and independent variables we included, our findings should in places be interpreted with caution. For example, interpreting the significance of Hispanic respondents being less interested in education compared to whites is difficult due to the less-than-ideal number of cases in the regression analysis. Finally, the changes in the odds-ratios were small when new variables were added to the model, suggesting that variables not included in our model may be important predictors of educational aspirations. The non-significance of several of the variables included in our analysis enhance this uncertainty, leave us to ponder the many unknown factors that might predict education aspirations among people in prison.

In relation to our second research question, which examined how aspirations to enroll in *postsecondary* education while in prison was correlated to demographic and socio-economic factors, our cross-tabulation of the weighted analytic sample showed that a large majority (75.1 to 99.1 percent) in every co-variate category but one aspired to postsecondary education. We also found that those who expressed interest in postsecondary education had higher cognitive skills scores in both literacy and numeracy than those who expressed interest in educational programs below the postsecondary level. The one co-variate that had a majority (64 percent) that aspired to lower than postsecondary education were those who had not yet attained a high school credential. This makes logical sense, as a high school credential is a necessary barrier to other types of education programs in prison. However, this means that 36 percent of people in prison without a high school credential are aspiring beyond their next level of attainment to postsecondary education. It is important to note, however, that the weighted analytic sample was not tested for statistical significance and so the significance of these findings are unknown.

In order to complete the chi-square test for significance, we had to remove the sample weights and complete the analysis in SPSS24. Here we found that those who have completed higher levels of education (high school or beyond) are disproportionately likely to aspire to postsecondary education, as were those at every level of reported parental educational attainment. These results are interesting, but not necessarily very helpful in understanding the larger prison population. This analysis had to be completed using the unweighted sample, which restricts us from drawing statistical inference from our findings here. The findings then refer only to the novel sample of individuals who participated in the survey and may overstate distinctions between them due to the sampling methods used and how they were corrected for by developing the survey weights. We were also unable to include the cognitive skill domains in

this analysis. More than anything, these findings point to the responsibility researchers have to understand and apply sample weights to the data with which they work.

These findings have implications for policy and practice. One of the most important findings is actually within the summary statistics: the fact that 70 percent of people in prison would like to enroll in an education program. Given that educational attainment in prison is lower than among adults in the community, this finding alone is meaningful. Our finding that the vast majority of these would like to enroll in education beyond high school suggest that aspirations in prison outstrip opportunities. High school is the highest level of educational programming that is consistently available in prison (Rampey et al, 2016). Among incarcerated people, educational attainment may not be as strong a predictor of interest in education as assessed cognitive skill. This suggests that building on interest in education with a focus on skill-building may then spur more interest for more schooling. Skill-building could be accomplished through offering challenging adult basic education courses and college preparatory work even where college programs do not yet exist (Delaney et al, 2016). Other ways to enhance cognitive skills could include offering work assignments that build math or literacy skills in prison or encouraging self-study through making time and space for book clubs or math clubs.

The opportunity this interest presents to engage incarcerated people in adult learning programs should not be ignored. About 95 percent of incarcerated people will eventually leave prison and return home (Hughes and Wilson, 2002). As discussed above, education is likely to reduce returns to prison among those who participate and increase their likelihood of employment after release (Davis et al, 2013; Bozick et al, 2018). These findings suggest incarcerated people may be willing students. Given the intergenerational effect of educational attainment, educating people in prison may raise the educational achievement of their children (Attewell and Lavin, 2007). A relatively small investment during a prison term could yield significant returns in the short-term as well, if earnings patterns for higher levels of education found in studies of the household population hold true for formerly incarcerated people (Attewell and Lavin, 2007).

These findings also offer some suggestions for new directions for research on education programs generally and postsecondary education programs specifically in prison and the outcomes of students who participate in them. Other examinations of the relationship between skills and aspirations could significantly strengthen the findings in this analysis. In addition, more research is needed on achievement in prison and its relationship to research on achievement among students in the community. While those developing education programs for prison may assume similarities between incarcerated and non-incarcerated adult learners, we do not know whether those assumptions are supported by the data. In addition, the prison institution itself may affect cognition and more research may be needed to determine whether and how the disadvantages imposed by the setting can be overcome in education programs (Piccone, 2006). In addition, skills offer a new dimension for understanding the similarities and differences between those who elect to pursue more education in prison and those who do not. This has implications for evaluations of all types of education programs, including postsecondary programs. This data may not be difficult to obtain: many departments of corrections assess the skills of incarcerated people through the Test for Adult Basic Education and other similar tests and may have these measures available for researchers evaluating education programs (Reed, 2015).

Finally, some 2.2 million people may pursue their educations while incarcerated in the United States (Travis et al, 2014). Education researchers should begin to look at prisons as a

legitimate and important site of learning in American society. Interest from researchers familiar with educational theories, statistics, policies, and histories specific to low-income Americans of color would add richness and depth to the field's knowledge of education that occurs in prison. This could have implications for the types of programs that receive funding and support, the strategies used to teach and cultivate learning, and the students that program administrators seek to recruit. While the field appears near consensus on the recidivism reducing benefits of educational programs in prison, this measure alone is a thin valuation of the human potential of incarcerated Americans. At the same time, research on this topic appears to have reached the ears of policymakers. It may be time to expand the messages that they hear.

Conclusion

This study contributes to the research on achievement and educational aspirations in prison. What we found indicates a broad interest in education among incarcerated people that is not specific to gender, educational attainment, race (except perhaps among incarcerated Hispanics), or parental education, that becomes stronger with age and that is predicted by cognitive skill. In addition, we find that a substantial majority of people in prison across all the co-variables and independent variables studied except one (having below high school educational attainment) that aspire to any level of education, indicate that they ultimately seek postsecondary education. In addition, those that aspire to postsecondary education have higher cognitive skill scores than those who seek programs other than postsecondary education. Given the malleability of cognitive skills, this would seem to suggest an opportunity for skill-building programs within prisons that could enhance interest in further educational attainment, perhaps increasing the pool of students motivated to pursue additional education, including postsecondary education in prison or after release. Higher levels of educational attainment could have a significant impact on the quality of life of these individuals, their families, and their communities in the future, in addition to public safety gains (Davis et al, 2013; Attewell and Lavin, 2007). Finally, enhancing cognitive skill-building programs in prison could aid corrections and college program staff in cultivating more interest in education programs, potentially diversifying the pool of applicants to postsecondary programs by increasing interest among underrepresented populations (for example Hispanic people).

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Appendix A

Table A1. List of original and recoded dependent and independent variables

Variable Type	Original Variable Name	Original Variable Label	Original Variable Values	Recoded Variable Name	Recoded Variable Values ⁸
Dependent Variable	P_Q060	Prison - Education - Enrollment	0 = no 1 = yes 96 = Valid skip 97 = Don't know 98 = Refused 99 = Not stated or inferred	P_Q060_recode	0 = No 1 = Education Desire
Independent Variables: Covariates	GENDER_R	Person resolved gender from BQ and QC check (derived)	1 = Male 2 = Female 9 = Not stated or inferred	Male ^{^Y} Female [^]	0 = No 1 = Yes
	AGE10FLSEXT	Age in 10 year bands extended to include ages over 65 (derived)	1 = 24 or less 2 = 25-34 3 = 35-44 4 = 45-54 5 = 55-65 6 = 66 plus 99 = Not stated or inferred	Below24 [^] 25-34 ^{^Y} 35-44 [^] 45-54 [^] 55 plus [^]	0 = No 1 = Yes
	RACETHN_4CAT	Background - race/ethnicity (derived, 4 categories)	1 = Hispanic 2 = White 3 = Black 6 = Other race 9 = Not stated or inferred	Black [^] Hispanic [^] White ^{^Y} Other [^]	0 = No 1 = Yes

⁸ Values of *don't know*, *refused*, and *not stated or inferred* were recoded as zeros for the dummy variables.

Variable Type	Original Variable Name	Original Variable Label	Original Variable Values	Recoded Variable Name	Recoded Variable Values ⁸
	EDCAT6	Highest level of formal education obtained (6 categories - derived)	1=Lower secondary or less (ISCED 1,2, 3C short or less) 2=Upper secondary (ISCED 3A-B, C long) 3=Post-secondary, non-tertiary (ISCED 4A-B-C) 4=Tertiary - professional degree (ISCED 5B) 5=Tertiary - bachelor degree (ISCED 5A) 6=Tertiary -master/research degree (ISCED 5A/6) 7= Tertiary –bachelor/ master/research degree (ISCED 5A/6) 99=Not stated or inferred	BelowHS2 [^] (<i>EDCAT6 variable value 1</i>) HSequivalent [^] (<i>EDCAT6 variable value 2</i>) BeyondHS2 ^{^Y} (<i>EDCAT6 original variable values 3-7</i>)	0 = No 1 = Yes

Variable Type	Original Variable Name	Original Variable Label	Original Variable Values	Recoded Variable Name	Recoded Variable Values ⁸
	PARED	Highest of mother or father's level of education (derived)	1=Neither parent has attained upper secondary 2=At least one parent has attained secondary and post-secondary, non-tertiary 3=At least one parent has attained tertiary 6=Valid skip 7=Don't know 8=Refused 9=Not stated or inferred	NeitherPARENTuppersecondary^ AtLeastOneParentUppersec_postsec^ AtLeastOneParentTertiary^Y PARED_DK^	0 = No 1 = Yes
Independent Variables: Cognitive Domains	PVLIT1-PVLIT10	Literacy Plausible Value	Scale Score (0-500)	n/a	n/a
	PVNUM1-PVNUM10	Numeracy Plausible Value	Scale Score (0-500)	n/a	n/a

Note: ^ denotes dummy coded variable. Y denotes reference group among dummy variables.