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Author:

Margaret Becker Patterson

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Author Contact:

Research Allies for Lifelong Learning

Margaret Becker Patterson

at margaret@researchallies.org

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Margaret Becker Patterson

Research Allies for Lifelong Learning

Vienna, VA

Abstract

Incarcerated men and women in state and federal prisons face multiple educational and economic challenges. Disabilities and health concerns of incarcerated adults exceed that of the general population. Despite widespread availability of correctional education programs in prisons, only a small proportion of prisoners completes them. Employing quantitative data from the Programme for the International Assessment of Adult Competencies (PIAAC) Prison Study (2014), this paper investigates the characteristics and assessed skill levels of incarcerated adults with less than high school education attainment. It considers how characteristics and assessed skill levels differ by gender and from the general population, as well as the role of current and future learning in the lives of incarcerated adults with low skills. Findings include educational and health vulnerabilities for men and women that may be heightened in already-stressed, impoverished communities. Adults in correctional education programs cite future jobs after release and gaining knowledge as reasons to attend; the same reasons are prominent as motivations for future learning. Even so, the proportion of adults completing these programs and gaining credentials is even lower than earlier research reported.

Keywords: incarcerated adults, state and federal prisons, gender, adult learners, high school equivalence, basic skills, PIAAC assessment, correctional education, prison education

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Literature Review

Characteristics and Education Backgrounds of Incarcerated Adults

Incarcerated adults described in this report served sentences in state and federal prisons. Large-scale federal decennial surveys and assessments of incarcerated adults provide substantial background information on the adult prison population. The Programme for the International Assessment of Adult Competencies (PIAAC) Prison Study (2014) is the third such study since 1990. Prison inmates tend to be predominantly male and young. Eighty-one percent of prisoners participating in 1992's National Adult Literacy Survey (NALS) and 68% of prisoners in 2003's National Assessment of Adult Literacy (NAAL) were under 40 (Greenberg, Dunleavy, & Kutner, 2007). Nearly all (94%) inmates in both survey programs were men.

Incarcerated men and women alike face staggering educational and economic barriers, both before and after serving a prison sentence. Incarcerated adults are described in the literature as less well educated and having fewer job skills and opportunities than the general population (Brazzell, et al., 2009; Gaes, 2008; Wilson, Gallagher, & MacKenzie, 2000; MacKenzie, 2006). MacKenzie (2006) noted low rates of literacy among incarcerated individuals, with an average reading level of fifth-grade equivalency. In 1992, nearly half of prisoners (49%) participating in NALS had left high school early, as had 35% of their parents. The corresponding NAAL percentages in 2003 were 37% incarcerated adults and 26% of their parents left high school without graduating (Greenberg, Dunleavy, & Kutner, 2007).

Another potential background variable of interest is region of the United States (Northeast, South, Midwest, or West). In the general population, the proportion of adult not participating in education from Southern United States was high (Patterson, 2018). Residence density of nonparticipants in the general population also varied regionally, with half of nonparticipants in the Midwest and 40% of nonparticipants in the South living in rural areas (Patterson, 2018). Geographic relationships of incarceration and participation in education are seldom considered on a national basis.

Disabilities and health concerns of incarcerated adults equal or exceed that of the general population. Since learning is positively associated with health and social outcomes (Patterson & Paulson, 2016; OECD, 2013), examining health-related data is important. Health challenges are

one of the obstacles re-entering incarcerated adults face (Lattimore, et al., 2012). In 2003, 15% of both general and incarcerated populations of adults reported fair or poor health (Greenberg, Dunleavy, & Kutner, 2007). Adults reporting diagnoses of learning disabilities are overrepresented in prisons (with estimates ranging up to 26%), much higher than in the general population (Brazzell, et al., 2009). Among incarcerated adults identified as having low skills in correctional education programs, 50% report being told they have a learning disability or recall receiving special education services in school (Weisel, Toops, & Schwarz, 2005).

Once released, many incarcerated adults return to some of the most impoverished – and stressed – communities in the USA (Brazzell, et al., 2009), such as neighborhoods in Detroit, Michigan, and Washington, DC. For example, in a Detroit study, researchers (Hatzenbuehler, Keyes, Hamilton, Uddin, & Galea, 2015) found negative effects from widespread incarceration of adults that also extend to non-incarcerated members. Community members who hadn't been incarcerated experienced overall health and mental health challenges simply by living in impoverished neighborhood with high rates of incarceration. Incarcerated adults return to neighborhoods in which anxiety, tension, and hypervigilance are prevalent and beneficial social relationships are limited.

Re-entering adults also face stigma and may experience low social trust (Hatzenbuehler et al., 2015). These factors can relate to employability. Gellar, Garfinkel, and Western (2006) found lower employment rates for formerly incarcerated men than for men in the general population. Numerous employers were reluctant to hire adults after release. If they got jobs, those who had been incarcerated also experienced a 14% to 26% decline in hourly wages.

In the literature, a connection among educational attainment, earnings, and criminal activity was made: with increases in education levels and earnings, the option of committing a crime could be less alluring (Brazos & Hausman, 2004; Brazzell, et al., 2009). Receiving a high school equivalency (HSE) credential in prison signals positive messages to an employer about the adult's ability and achievements (Brazzell, et al., 2009; Gaes, 2008). The flip side of this connection is that those released prison inmates who did not see increases in education levels and earnings might recidivate.

Assessed Skills of Incarcerated Adults

Baseline information on assessed skills of incarcerated adults with low skills nationally began with the NALS assessment in 1992. According to Greenberg, Dunleavy, and Kutner (2007), assessed NALS skill levels of incarcerated adults who left school before entering high school were 205 for prose literacy and 184 for quantitative literacy on a 500-point scale for each domain. The corresponding scores for early high school leavers were 228 for prose literacy and 215 for quantitative literacy.

In the early 2000's a separate study reported on adults incarcerated in three states. Steurer and Smith (2003) reported that at least 62% of participants in their three-state correctional education study did not complete high school. These participating prisoners were tested as having reading, math, and language skills at a pre-high school level, on average.

In 2003, adults incarcerated in state and federal prisons across the USA were assessed with the NAAL assessment. Adult state and federal prisoners with GED[®] credentials or high school diplomas scored much higher on measures of literacy and numeracy in 2003, an average 273 in prose literacy and 266 in quantitative literacy, than did those without credentials, an average 228 in prose literacy and 217 in quantitative literacy (Greenberg, Dunleavy, & Kutner, 2008). Even though measured average skill levels tended to improve for prison inmates from 1992 to 2003, incarcerated adults continued to experience skills gaps compared with the general population of adults (Brazzell, et al., 2009).

Participation of Incarcerated Adults with Low Skills in Correctional Education

The extent to which incarcerated adults have access to and participate in correctional education programs is an important question. Approximately 87% of all state and federal correctional facilities have an education program, and more than 75% have adult basic and secondary education programs (Wilson, Gallagher, & MacKenzie, 2000; MacKenzie, 2006). As of 2005, 98% of federal prisons offered adult education, 66% of state prisons offered ABE, and 76% of state prisons offered ASE (Brazzell, et al., 2009).

Despite widespread availability of correctional education programs, only a small proportion of prisoners participates in programming (Brazzell, et al., 2009; Cullen, Jonson, & Eck, 2012; May & Brown, 2011). The reach of these programs is limited in proportion to the

need and has not kept pace with expanding prison populations; approximately 2% of state and federal prisoners participate in adult basic education (ABE) and an estimated 20% in adult secondary education (ASE; Brazzell, et al., 2009). Kutner, Greenberg, and Dunleavy (2008) found that among prison inmates in 2003, some 19% had earned a GED/HSE certificate during their current incarceration, and an additional 5% were then enrolled in academic classes.

Evidence that participation in correctional education reduces recidivism is growing. In early meta-analyses, participants in adult basic education and HSE preparation programs were 1.44 times as likely to experience reduced recidivism compared with non-participants (41% of program participants vs. 50% of comparison group recidivating; Wilson, Gallagher, & MacKenzie, 2000; MacKenzie, 2006). A later re-entry study (Lattimore et al., 2012) found that adult male prisoners who participated in HSE preparation classes generally saw positive outcomes related to recidivism. The most recent findings complement what the earlier meta-analyses found, with slightly higher effects. Those participating in adult secondary programs while incarcerated had 30% lower odds of recidivating (Davis, et al., 2013). If they participated in correctional education, incarcerated adults had an 8% increase in odds of getting a job after release than if they didn't participate in academic programming (Davis, et al., 2013).

What, then, explains low participation in programs? The reasons are complex and varied. Although adults with low skills in the general population generally report liking to learn, they often struggle with relating new ideas to real life (Patterson, 2018). In the prison setting, some incarcerated adults may simply lack interest in correctional education or do not see its connection to employment or other aspects of re-entry into society, especially if they have a lengthy sentence. Other reasons range from lack of funding to lack of awareness of the programs (Davis, et al., 2013). Furthermore, in many prisons, “the warden and educational administrators... decide which educational programs will be supported, how the educational programs will be funded, who will serve as the teaching personnel, and which inmates will have an opportunity to attend the educational programs” (Messemer, 2006, p. 6). Messemer noted that some correctional officers perceived education as threatening to their power over inmates. In addition, “many correctional officers serve the function of planning the daily routine of the inmates, which includes their education schedule. To some extent, the correctional officers can determine which

inmates can attend class on a particular day and which inmates cannot due to some disciplinary infraction” (Messemer, 2006, p. 6).

A final point about participation is the scope of HSE testing in correctional facilities. Among three major U.S. HSE testing providers (GED[®], HiSET[®], and TASC[™]), to date GED Testing Service reported publicly on recent correctional testing. In 2011, GED Testing Service reported that nearly 75,000 incarcerated individuals took the GED[®] test in 1,730 correctional facilities the previous year (not limited to state and federal prisons). Of incarcerated 2010 test-takers, 62% were tested in state facilities and 14% in federal prisons (Patterson & Song, 2011). Following the GED program’s merger with Pearson, as of 2016 more than 48,000 incarcerated adults took GED tests in more than 1,100 correctional facilities (Bledsoe, 2017).

Research Questions

After review of the literature on characteristics, assessed skills, and participation of incarcerated individuals, the following research questions were developed for analysis using PIAAC Prison Study (2014) data:

1. What are the demographic and background characteristics and assessed skill levels of incarcerated adults with less than high school education attainment?
2. How do those characteristics and assessed skill levels differ by gender and from the general population?
3. What role does learning currently play in the lives of incarcerated men and women?
4. What are the future learning goals of incarcerated men and women?

Methods

Sample

PIAAC data collection relied on a complex sampling design to ensure representativeness of the population (Hogan, et al., 2016). According to Rampey, et al. (2016), the target population of the PIAAC Prison Study (2014) was inmates age 16 to 74 from U.S. state, federal, and private prisons. A two-stage, stratified sample was selected from 80 prisons housing men only (or coed) and 20 prisons housing women only. The full prison sample consisted of 1,319 incarcerated adults with Background Questionnaires and 1,270 with assessments. Data were collected in private rooms and offices in prisons using interviewer laptops, and Prison Study participants

typically completed the Background Questionnaire and assessments in about two hours. Initially, base weights were created to account for the selection probabilities at the prison level and at the inmate level. Weights were further adjusted for nonresponse to the background questionnaire and to align with prison population proportions derived from 2013 estimated totals provided by the Bureau of Justice Statistics (Rampey, et al., 2016). Since the current paper focused on adults with low skills, the sample was further limited to 400 incarcerated adults at ISCED level 2 or below (i.e., those with less than a high school education).

Assessment Levels

Scores in Literacy, Numeracy, and PSTRE ranged from 0 to 500 and were classified into one of five levels. Levels for literacy and numeracy skills assessed in PIAAC were: below Level 1 (0-175), Level 1 (176-225), Level 2 (226-275), Level 3 (276-325), and Levels 4 / 5 (326-500). At Literacy Level 1, for example, an adult would be expected to do the following: read relatively short texts to locate a single piece of information which is very close to the information given in the question or directive. Knowledge and skill in recognizing basic vocabulary, evaluating the meaning of sentences, and reading of paragraph text is expected (OECD, 2013).

Level 1 Numeracy tasks require the adult to carry out basic mathematical processes in common, concrete contexts. Tasks usually require simple one-step or two-step processes involving, for example, performing basic arithmetic operations; understanding simple percentages; or identifying and using elements of simple or common graphical or spatial representations (OECD, 2013). More detail on sampling, weighting, background questionnaire administration, and assessments is available in the most recent PIAAC Technical Report (Hogan, et al., 2016).

Data

Variables used for analyses came from the Background Questionnaire (BQ) and the assessed skill domains, each of which had 10 plausible values available for use in calculating means and standard errors of scores. BQ items for demographic and background characteristics included: age in 10 year increments (AGEG10LFSEXT), male or female gender (GENDER_R), employment status before incarceration (C_Q07USP), northeast, Midwest, south, or western region of the USA (REGION_US), marital status (P_Q440), highest education level attained (B_Q01A), age highest education level was finished (B_Q01C1_C), incomplete degree level

started (B_Q03A), level of incomplete education (B_Q03BUS_C), reason for stopping education before prison (P_Q050), highest grade completed (YRSQUAL), mother's and father's highest levels of education attained (J_Q06BUS and (J_Q07BUS, respectively), health status ranging from excellent to poor (I_Q08), vision difficulty (I_Q08USX1), hearing difficulty (I_Q08USX2), reported diagnosis of learning disability (I_Q08USX3), and two questions on levels of social trust (I_Q07A and I_Q07B).

Variables on current participation include: current study for formal degree (B_Q02A), current basic skills preparation (B_Q27AUSP), GED preparation (B_Q27BUSP), other HSE preparation (B_Q27CUSP), highest current education level while incarcerated (P_Q120_ISCED11), location of current course of study (P_Q130), reason for attending current classes (P_Q150), current attendance in employment readiness classes (P_Q190A), reason for attending current employment readiness classes (P_Q190A_2), current attendance in parenting classes (P_Q190B), current attendance in life skills classes (P_Q190C), current access to library services (P_Q360), frequency of library use (P_Q370), location of basic skills preparation in the 12 months before PIAAC participation (P_Q030), reason for participating in basic skills preparation in the 12 months before PIAAC participation (P_Q040), extent of use of learning strategies on relating new ideas to real life (I_Q04B), and extent of liking to learn new things (I_Q04D). Future goals for learning are identified from analysis of the following variables: wanting to enroll in classes (P_Q060), degree program wanting to enroll in (P_Q080), reason wanting to enroll (P_Q090), and reason they would not want to enroll in classes (P_Q100).

Analyses

Sample and replicate weights were applied in all analyses in this paper. Plausible values were calculated using IDB Analyzer and SPSS 24 software for estimates of scores in Literacy, Numeracy, and Problem Solving in Technology-Rich Environments (PSTRE). To determine if group differences in cross tabulations were practically meaningful, effect sizes were calculated with a 95% confidence threshold of twice the standard error for percentage differences. Means estimating the prison population were compared by gender, with *d* as an effect size representing the magnitude of the difference. Where available, response rates of LHS incarcerated adults were compared descriptively with response rates of LHS adults in the general population who did not participate in formal or non-formal education in the year before PIAAC, or with LHS Learners

for current learning, as reported in Patterson and Paulson (2016). All analyses in this paper were descriptive, and causality should not be inferred.

Findings

The first two research questions deal with demographic and background characteristics and assessed skill levels of incarcerated adults with less than a high school (LHS) education, in the aggregate and by gender. The percentage of LHS incarcerated men is 92.4% (see Table 1). The median age group for all LHS incarcerated adults and for men is 25-34 years. LHS incarcerated women tend to be older; the median age for these women is 35-44 years. The range for age is 18-74 years.

Nearly half of LHS incarcerated adults (49.4%) come from the southern USA, a much higher proportion than the rate (36.9%) in the general population, $X^2 = 24.3$, $p < .001$ (Patterson & Paulson, 2016). As displayed in Table 1, LHS incarcerated women are significantly less often from the northeastern USA compared with LHS incarcerated men. Although nearly three-fourths of the general population is employed (Patterson & Paulson, 2016), only 3 in 5 LHS incarcerated adults and men and 1 in 3 women had an income or wages from work before incarceration. Women were significantly less frequently employed full time than men (see Table 1). Men and women tended to have worked the same average length of time before prison (10 years) yet experienced high proportions of underemployment or unemployment, 38% for men, 95% CI [33.6, 42.4] and 53.5% for women, 95% CI [29.5, 67.5]. Compared with employment in the general population, incarcerated adults had higher rates of unemployment and underemployment, $X^2 = 33.3$, $p < .001$. Both genders were predominantly single. Two-thirds of LHS incarcerated men and half of LHS incarcerated women had never married, unlike the general population, in which most were married, $X^2 = 228.2$, $p < .001$ (Patterson & Paulson, 2016).

Table 1. Demographic Characteristics of LHS Incarcerated Adults, Aggregate and by Gender

Characteristic	All LHS Incarcerated Adults (%) [95% CI]	Male (%) [95% CI]	Female (%) [95% CI]
Gender	100.0	92.4 [91.0, 93.8]	7.6 [6.2, 9.0]
Age			
16-24 years	19.5 [15.9, 23.1]	19.9 [16.1, 23.7]	13.7 [5.3, 22.1]
25-34 years	35.7 [30.7, 40.7]	35.8 [30.4, 41.2]	34.6 [24.2, 45.0]
35-44 years	22.6 [17.6, 27.6]	21.9 [16.7, 27.1]	31.1 [18.5, 43.7]
45-74 years	22.3 [18.1, 26.4]	22.3 [17.9, 26.7]	20.6 [14.2, 27.0]
Region of USA			
Northeast	9.4 [7.4, 11.4]	10.0 [7.8, 12.2]	2.3* [0, 6.7]
Midwest	17.6 [12.6, 22.6]	17.3 [11.9, 22.7]	21.4 [12.4, 30.4]
South	49.4 [44.2, 54.6]	49.1 [43.7, 54.5]	52.5 [42.1, 62.6]
West	23.6 [19.4, 27.8]	23.6 [19.0, 28.2]	23.8 [19.6, 28.0]
Employed FT	44.8 [40.0, 49.6]	46.7* [41.5, 51.9]	21.7 [12.7, 30.7]
Employed PT	14.8 [11.2, 18.4]	14.4 [10.6, 18.2]	19.7 [5.7, 33.7]
Unemployed	23.5 [19.3, 27.7]	22.6 [18.2, 27.0]	33.8 [23.8, 43.8]
Never / Previously Married	85.6 [81.8, 89.4]	86.0 [82.0, 90.0]	80.1 [67.7, 92.5]
Married	14.4 [10.8, 18.0]	14.0 [10.2, 17.8]	19.9 [11.7, 28.1]

Source: PIAAC Prison Study (2014), National Center for Education Statistics. Note: * designates practically significant gender difference.

Education Background

Another component of LHS incarcerated adult characteristics is education background. As shown in Table 2, most LHS incarcerated adults complete at least the early grades of a secondary education or begin high school. Women tend to complete ninth grade, on average, a grade higher on average than men ($d = 0.27$). Nearly all adults of either gender complete the schooling they do have by their upper teen years (age 19). However, approximately 2 in 5 LHS incarcerated adults leave school by the age of 15 (see Table 2).

When asked if they ever started a degree without completing it, 3 in 10 of all LHS incarcerated adults (29.8%) say yes. Of those saying yes, 88.8% refer to not completing high school, and 11.2% to not completing a short-term postsecondary degree. Differences by gender in level of education left without completing are not significant. For both genders, external situations (3 in 5) more often than school-related reasons (2 in 5) motivated adults to leave school early (see Table 2). LHS incarcerated adults frequently differed by gender in external reasons for leaving school, $X^2 = 91.1$, $p < .001$, though their school-related reasons were proportionately similar. Women's top reasons for leaving school (in order) were

pregnancy/illness/disability (26.7%), not liking school (20.7%), and family illness or death (11.5%). Men’s top reasons for leaving school (in order) were incarceration (18.5%), not liking school (17.8%), and wanting to work (17.4%). For both genders, approximately 1 in 10 each did not do well in school or were asked to leave school.

Table 2 also displays information about the parental education background of LHS incarcerated adults. Nearly all of their parents (85.2% of mothers and 90.4% of fathers) had no more than a high school education. Approximately 2 in 5 of their parents left high school early. No significant differences in parental education by LHS incarcerated adult gender occurred.

Table 2. Education Background of LHS Incarcerated Adults, Aggregate and by Gender

Background Characteristic	All LHS Incarcerated Adults (%) [95% CI]	Male (%) [95% CI]	Female (%) [95% CI]
Highest Grade Completed			
None to Grade 6	11.2 [7.8, 14.6]	11.8 [8.0, 15.6]	4.4 [0, 9.2]
Grade 7 to 9	88.8 [85.0, 92.6]	88.2 [84.0, 92.4]	95.6 [90.6, 100]
Grade Completed (Mean)	8.8	8.6	8.9*
Age of Highest Education Level			
Up to Age 15	40.8 [34.4, 47.2]	41.2 [34.4, 48.0]	36.5 [29.5, 43.5]
16 to 19 Years	55.8 [49.2, 62.4]	55.4 [48.4, 62.4]	60.7 [46.9, 74.5]
Top Reasons for Leaving School			
Did Not Like School	18.1 [14.3, 21.9]	17.8 [13.8, 21.8]	20.7 [13.1, 28.3]
Did Not Do Well in School	9.4 [6.4, 12.4]	9.4 [6.2, 12.6]	9.7 [3.7, 15.7]
Asked to Leave School	11.7 [8.4, 14.9]	11.9 [8.5, 15.3]	9.0 [2.6, 15.4]
Wanted to Work	16.6 [13.0, 20.2]	17.4* [13.4, 21.4]	6.9 [1.9, 11.9]
Pregnancy / Illness / Disability	2.6 [1.6, 3.6]	0.6 [0, 1.4]	26.7* [17.9, 35.5]
Incarceration	17.5 [12.9, 22.1]	18.5* [13.5, 23.5]	5.5 [0.3, 10.7]
Family Death or Illness	6.1 [2.9, 9.3]	6.1 [2.9, 9.3]	11.5 [4.1, 18.9]
Mother’s Highest Education			
Less Than High School	38.0 [32.4, 43.6]	37.7 [31.7, 43.7]	41.6 [28.0, 55.2]
High School	47.2 [42.6, 51.8]	47.3 [42.5, 52.1]	46.2 [31.6, 59.8]
College Degree	14.8 [10.6, 19.0]	15.0 [10.4, 19.6]	12.2 [3.4, 21.0]
Father’s Highest Education			
Less Than High School	40.6 [33.6, 47.6]	40.5 [32.9, 48.1]	41.9 [26.9, 56.9]
High School	49.8 [42.2, 57.4]	50.3 [42.1, 58.5]	43.7 [27.1, 60.3]
College Degree	9.6 [6.0, 13.2]	9.2 [5.4, 13.0]	14.4 [6.6, 22.2]

Source: PIAAC Prison Study (2014), National Center for Education Statistics. Note: * designates practically significant gender difference.

Health and Social Trust

The final components of LHS incarcerated adult characteristics analyzed are health and social trust. In the aggregate about half endorse excellent or very good health and one fourth good health. More than a fourth (27.7%) reports having fair or poor health, 95% CI [24.1, 31.3]. However, LHS incarcerated men and women differ significantly in health status, $X^2 = 10.5$, $p < .05$. Two fifths of women report fair or poor health (39.2%), 95% CI [31.8, 46.6], significantly higher than the 26.8% of men doing so, 95% CI [23.0, 30.6]. Aggregate rates for vision difficulties are 20.4%, 95% CI [16.6, 24.2] and 15.2% for hearing difficulties, 95% CI [10.6, 19.8]. These rates are nearly twice the rates, 11.4% for vision and 8.7% for hearing, of the general population, $X^2 = 49.8$, $p < .001$ and $X^2 = 29.7$, $p < .001$, respectively (Patterson & Paulson, 2016). More than a third of LHS incarcerated adults report diagnoses of learning disabilities (37.1%), 95% CI [31.6, 42.5], which is four times the rate of the general population, 8%, $X^2 = 324.5$, $p < .001$ (Patterson & Paulson, 2016). No significant differences in disability-related rates occur by gender for LHS incarcerated adults.

Two measures of social trust allow incarcerated adults to agree or disagree that they trust only a few people completely or that people take advantage of them if they are not careful. Results indicate rates of social trust among LHS incarcerated adults are very low. The vast majority of LHS incarcerated adults (84.0%) agree or strongly agree that they trust only a few people completely, 95% CI [78.0, 90.0]. Similarly, 86.1% of LHS incarcerated adults agree or strongly agree with the statement that people take advantage of them, 95% CI [79.9, 92.3]. Men and women do not differ significantly in their rates of agreement on social trust items.

Assessed Skill Levels

LHS incarcerated adults' scores in literacy and numeracy are compared by gender (PSTRE scores are not compared because of the extent of missing data for this technology assessment in the prison setting). Mean literacy scores for men and women are virtually identical. Men average 224 (SD = 42), and women average 225 (SD= 36). These average scores place both groups at the upper end of Level 1 for literacy skills. As described in the Methods section, at this level, adults read relatively short texts to locate a single piece of information, recognize basic vocabulary, and evaluate the meaning of sentences.

In numeracy, scores for men and women are at the lower end of Level 1; again, the men's average of 187 (SD = 50) is very close to the women's average of 188 (SD = 43). As explained in the Methods section, numeracy tasks at Level 1 usually involve one- or two-step processes requiring basic arithmetic or employing simple graphs. Mean numeracy scores of LHS incarcerated adults are even lower than average literacy scores.

Role of Current Learning

Current learning of LHS incarcerated adults is the topic for the third research question. One-third of adults indicate pursuing a formal education program while in prison, as displayed in Table 3; rates of participation do not differ significantly by gender. Only a small proportion achieves HSE or postsecondary education (PSE) credentials during the current incarceration, however. Of those LHS incarcerated adults pursuing formal education, about 45% participate in basic skills instruction and nearly 56% in GED preparation activities. Men participate in basic skills instruction and GED preparation at similar rates as women participate. Less than 5% of LHS incarcerated adults participate in other HSE instruction.

LHS incarcerated adults endorse three top reasons for taking basic skills (see Table 3): getting a job post-release, increasing knowledge, or meeting a requirement. Approximately 1 in 6 men and 1 in 5 women are required to participate in basic skills. Table 3 also presents the top three reasons for LHS incarcerated adults participating in any current learning. The highest ranked reason is to increase skills or knowledge; approximately 1 in 3 adults select that reason for current learning. About 1 in 5 incarcerated adults learn currently to boost their chances of a job after release. Rankings do not differ significantly by gender.

Numerous incarcerated adults, irrespective of gender, participate in employment readiness, parenting, and life skills classes or access prison library services. Approximately 18.7% of LHS incarcerated adults attend employment readiness classes, 95% CI [14.9, 22.5]; half (51.2%) do so for reasons of self-improvement, 95% CI [40.2, 62.2]. Another 1 in 5 participate in life skills classes (19.6%, 95% CI [15.4, 23.8]). A smaller percentage attend parenting classes (10.8%, 95% CI [7.8, 13.8]).

Another opportunity for learning in prisons is in a library setting. The vast majority of LHS incarcerated adults (82.1%) have access to library services, 95% CI [77.1, 87.1]. Two in

five incarcerated adults (41.3%) access the library weekly, 95% CI [36.1, 46.5], while 28.1% never do so, 95% CI [23.0, 33.8]. The types of library services are not specified in PIAAC data, however.

A last factor in the role of current learning is extent of use of two learning strategies identified as associated with non-participation in education in the general population (Patterson, 2018): liking to learn new things and relating new ideas to real life. Almost 4 in 5 of both incarcerated men and women (78.9%) report liking to learn new things to a high or very high extent, 95% CI [72.7, 85.1]. On the other hand, only 29.3% of LHS incarcerated adults, 95% CI [27.1, 31.5], can relate new ideas they learn to real life to a high or very high extent. This finding indicates that 7 in 10 prisoners struggle with connecting new concepts with what they experience in daily life. This finding may reflect, at least in part, lack of opportunity to apply what they learn in a restricted prison setting. Differences in use of these learning strategies are not significant by gender.

Table 3. Current Learning of LHS Incarcerated Adults, Aggregate and by Gender

Current Learning	All LHS Incarcerated Adults (%) [95% CI]	Male (%) [95% CI]	Female (%) [95% CI]
Currently Pursuing Formal Education	36.4 [31.4, 41.4]	35.7 [30.3, 41.1]	45.3 [40.3, 50.3]
Basic Skills Tutor or Class	45.4 [40.0, 50.8]	45.5 [39.3, 51.3]	44.3 [31.7, 56.9]
GED Preparation	55.9 [50.9, 60.9]	55.6 [50.2, 61.0]	59.8 [48.4, 71.2]
Other HSE	4.7 [1.1, 8.3]	±	±
Gained HSE Credential in Prison	5.4 [2.6, 8.2]	±	±
Awarded PSE Certificate or Diploma	2.2 [0.8, 3.6]	±	±
Top Reasons for Learning Basic Skills			
To increase job chances post-release	29.8 [23.3, 35.4]	30.6 [24.6, 36.6]	19.8 [7.8, 31.8]
Increase knowledge and skills	26.7 [21.3, 32.1]	26.4 [20.8, 32.2]	30.4 [16.8, 44.0]
Required to participate	17.8 [12.4, 23.2]	17.6 [11.8, 23.4]	20.5 [5.9, 35.1]
Top Reasons for Any Current Learning			
To increase job chances post-release	20.4 [12.8, 28.0]	±	±
Increase knowledge and skills	32.9 [24.9, 40.9]	±	±
Required to participate	16.4 [8.4, 24.4]	±	±

Source: PIAAC Prison Study (2014), National Center for Education Statistics. Note: ± designates insufficient participation for credible analysis.

Future Learning

In the fourth research question, the aspirations and reasons for future learning of LHS incarcerated adults are addressed. Seven of 10 incarcerated adults (69.7%) want to enroll in education programming in the future, 95% CI (63.3, 76.1). Of those who want to enroll, 3 in 5 aspire to an HSE credential (60.9%, 95% CI [53.5, 68.3]) and 1 in 4 (26.8%, 95% CI [22.4, 31.2]) to a PSE credential. Only 1 in 10 aspires to an associate or higher degree (9.7%, 95% CI [6.7, 12.7]). Aspirations for learning do not differ significantly by gender. The main reasons incarcerated adults give for wanting to learn are to increase their chances of getting a job after release (40.4%, 95% CI [34.4, 46.4]) or to increase knowledge or skills (35.0%, 95% CI [28.2, 41.8]). Differences associated with reasons for future enrollment are not significant by gender.

Discussion

Gender Differences

Several meaningful differences by gender are noted in this analysis of PIAAC Prison Study (2014) data that indicate potential vulnerabilities for LHS incarcerated adults following release. While in prison women report higher rates of fair or poor health (39.2%) than do men (26.8%), and the rate for both genders (27.7%) is substantially higher than the 15% Greenberg, Dunleavy, and Kutner (2007) found 10 years earlier. While cross-sectional PIAAC data do not permit a review of trends, these data do indicate that health challenges for LHS adults may be even more prominent than they were a decade ago. Compared with men, women have a greater tendency to deal with health issues stemming from as far back as secondary school. Correctional educators in prisons need to be aware of potential health issues among adults in their programs that may require either referral to health services or special supports for instruction. Re-entry services need to make health screenings available and assist re-entering adults with finding and accessing healthcare.

External situations (i.e., reasons related to situations outside of school) explain LHS incarcerated adults leaving school early more often than school-related circumstances do. Adults differ by gender in external reasons for leaving school, though not in school-related reasons. Men leaving school tend to be pulled away from the home environment, whereas women leaving school show signs of being drawn closer to home. The top external reasons for LHS incarcerated men leaving school early are incarceration (18.5%) or wanting to work (17.4%), but for LHS

incarcerated women the top external reasons are pregnancy, illness, or disability (26.7%) or family illness or death (11.5%). Without at least a high school education, both genders are left educationally vulnerable, both before and after incarceration. This vulnerability is heightened in impoverished communities already experiencing anxiety, tension, and hypervigilance (Hatzenbuehler et al., 2015). When adults re-enter society after completing a sentence, re-entry service providers must be prepared to respond to adults' external, family, and community circumstances as they seek basic education and employment.

Two-fifths of LHS incarcerated adults leaving school before mid-teens points to interrupted education at early ages. Men complete less education, on average, than women but both genders average pre-high school dropout, which leaves them educationally vulnerable. These figures indicate a sizable population of incarcerated adults without basic literacy and numeracy skills, not counting those who may have completed higher grades or left at later ages yet whose skills were years behind those of their peers (MacKenzie, 2006).

The findings on participation in basic skills instruction and other formal education programming while in prison do not include significant differences by gender yet are mixed. Participation in basic skills instruction and GED preparation is higher than that found in Brazzell, et al. (2009). Adults in these programs cite future jobs after release and gaining knowledge as reasons to attend; the same reasons are prominent as motivation for future learning. This finding supports Brazzell, et al's (2009) assertion: "By expanding students' general abilities and providing specific skills, education can make it easier for returning prisoners to find stable, well-paying jobs." Even so, the proportion of adults completing these programs and gaining credentials is even lower than a decade earlier (Kutner, Greenberg, and Dunleavy, 2008) and continues to need improvement. Prison officials have an opportunity to review adult participation in basic skills and HSE preparation in their local settings and to identify ways more incarcerated adults can participate in this programming to reduce recidivism after release.

Compared with involvement in basic skills instruction and GED preparation, participation in employment readiness classes, lifeskills classes, and parenting classes is low. LHS incarcerated adults participate in lifeskills and parenting classes proportionately less than May and Brown (2011) found for state prisoners in their study (35% and 22%, respectively).

Reasons for adults not taking part in instruction in these areas are unknown but likely multi-faceted (Davis, et al, 2013).

Differences from the General Population

Rampey et al. (2016) wrote that characteristics of incarcerated adults overall were significantly different from the general population in almost every demographic comparison they made. Major demographic differences are apparent for LHS incarcerated adults as well. Compared with the general USA population (Patterson, & Paulson, 2016), the southern region is overrepresented among LHS incarcerated adults. With regard to employment, LHS incarcerated adults were much less frequently employed before incarceration than occurred in the general population (Patterson & Paulson, 2016). Unlike the general population, in which most were married (Patterson & Paulson, 2016), LHS incarcerated adults are predominantly currently single or have never married.

The nearly doubled rates of vision or hearing difficulties and quadrupled rates of LD (37.1%) among LHS incarcerated adults compared with the general population (Patterson & Paulson, 2016; Rampey, et al., 2016) point to a population with critical health concerns and challenges from disabilities that can affect their learning as well as their chances for successful re-entry after release (Brazzell et al., 2009; Hatzenbuehler, Keyes, Hamilton, Uddin, & Galea, 2015; Lattimore, et al., 2012; OECD, 2013; Patterson & Paulson, 2016). As Weisel, Toops, and Schwarz (2005) noted, these concerns and challenges may go unnoticed and unaccommodated. An incarcerated learner in their study talked about effects on his life: “No one ever said anything to me [about learning challenges]. How could they let me end up in the 11th grade with a second-grade education?... I have been incarcerated 10-15 years of my life because [of] my lack of education.” Acknowledgement of the challenges, along with appropriate accommodations in adult education settings, can support adults as they move forward with learning. Additionally, both correctional education and re-entry education programs need to review the instructional and support services they provide incarcerated or re-entering adults with LD, to ensure those services facilitate learning.

The incarcerated population of LHS adults also differs in skill levels in the domains of literacy and numeracy. Compared with national averages at the upper end of Level 2, that is, 271

for literacy and 255 for numeracy (Rampey et al., 2016), mean scores of LHS incarcerated adults are much lower. Average scores at the upper end of Level 1 for literacy skills and the lower end of Level 1 for numeracy skills signals substantial difficulties in reading and using information and in solving mathematical problems beyond a very basic level. These low skill levels hamper further learning and development of skills that most incarcerated adults report wanting to gain. Correctional and re-entry education programs that serve incarcerated or re-entering adults must fully assess entering learners to determine current skill levels and screen for unmet needs that could hamper or halt learning.

Limitations and Recommendations for Future Research

Because of PIAAC sampling techniques in prison settings, this paper employs a limited portion of available data on incarcerated individuals to focus on those with the least educational attainment. Although the remaining sample was a healthy size and allowed for many meaningful analyses, the small proportion of women compared with men meant that many analyses could only be undertaken in the aggregate (i.e., without respect to gender).

A further limitation is that PIAAC data do not provide any information on the quality of correctional education in prison settings, or how much time incarcerated adults spend in them. Future studies could consider qualitative elements of correctional education programs that serve LHS incarcerated adults, such as what types of instruction are offered, the dosage of instruction, and how programs vary between prisons.

Another caveat to the analyses is that they are all descriptive in nature. Even though important relationships between variables are noted by gender and by population type, causality should not be inferred. Because PIAAC is a cross-sectional survey and significant changes in background questions and assessments occurred since NAAL and NALS, direct comparisons across time are not feasible.

This paper, while informative about the characteristics, backgrounds, skill levels, and current and future learning of incarcerated individuals with low skills, generates many new questions that future researchers may wish to investigate. To begin with, while increased percentages of participation is positive news, the decline in LHS incarcerated adult completing basic skills education programs in prisons and in attaining credentials is a strong concern.

PIAAC data do not capture information on the circumstances surrounding access to and completion of programs. Although the proportion of LHS participation is higher than for incarcerated adults overall, what factors influence the small proportion of prisoners participating in and completing available programming (Brazzell et al., 2009; Cullen, Jonson, & Eck, 2012; May & Brown, 2011)? What components of participation are related to outcomes that incarcerated adults make – or don't make? What factors deter incarcerated adults from program completion? Are the deterrents dispositional or institutional?

Additionally, the findings on health need further investigation so that the connection of health issues with education can be expanded for informing policy and practice. For example, what explains the high rates of fair and poor health among incarcerated adults? Since the data indicate health issues, particularly for women, may have occurred as early as formative school years, what are the long-term trends in health that prisoners experience, and how do those trends relate to their incarceration and re-entry experiences? More investigation of the connections of health factors with learning in correctional settings is also needed.

While some data were collected in PIAAC concerning library access and frequency of library use, more study would be informative to a full understanding of library services in prisons. The library services could range from access to a cart of books to services similar to those of a public library, but more research needs to identify the actual services provided and whether those services are languishing or continually improving. Furthermore, how does access to libraries interact with learning? How does library access relate to gains in skills that prisoners make?

Finally, more needs to be known about assessed skills of LHS incarcerated adults. A detailed review of assessed literacy and numeracy skills was beyond the scope of this paper, but other informative group comparisons beyond gender could be made, such as by age, parental education level, or employment status before incarceration. A third skill domain, digital problem solving, was not analyzed because of extensive missing data. According to Rampey, et al. (2016, p. 3), PIAAC defines this skill domain as “*using digital technology, communication tools, and networks to acquire and evaluate information, communicate with others, and perform practical tasks.*” To what extent are digital problem-solving data missing because of incarcerated adults' lack of access to technology before or during prison? What are the digital problem-solving skill

levels of incarcerated adults with low skills, and how might those skill levels interact with their current and future learning goals? As future scholars investigate these questions, they will add to the knowledge base on incarcerated adults with low skills and add to the potential solutions that support their further learning, both in and after prison.

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