Developmental Disabilities Network Journal

Volume 1 | Issue 1 Article 5

2020

# Cognitive Disability and Postsecondary Education: A National Study on Earnings

John M. Andresen
*Indiana University - Bloomington*

Derek Nord
*Indiana University - Bloomington*



## Recommended Citation

Andresen, John M. and Nord, Derek (2020) "Cognitive Disability and Postsecondary Education: A National Study on Earnings," *Developmental Disabilities Network Journal*: Vol. 1 : Iss. 1 , Article 5.
DOI: https://doi.org/10.26077/bs8g-m969
Available at: https://digitalcommons.usu.edu/ddnj/vol1/iss1/5

# Cognitive Disability and Postsecondary Education: A National Study on Earnings

## Cover Page Footnote

This publication is supported by grant CFDA #90-DD0708 from the Administration on Intellectual and Developmental Disabilities, U.S. Department of Health and Human Services.

# Cognitive Disability and Postsecondary Education: A National Study on Earnings[1]

John M. Andresen and Derek Nord
Indiana University – Bloomington

**Plain Language Summary**

*Higher education helps people learn new skills. It increases their chances of getting a job after graduation. Opportunities for individuals with disabilities to take part in higher education are increasing. More and more people with disabilities are enrolling in colleges and universities. They are earning degrees in a wide variety of areas. A college or university degree helps students with disabilities be more competitive when looking for a job. Students who graduate from college earn more money than those who begin to work right after high school. This study shows that a student with an intellectual disability who earns a bachelors' degree may earn 68% more than a student who did not go to college. This means that a college degree may help students with disabilities get better jobs. This article may help students with disabilities or their family members to make decisions about going to college. The authors suggest that colleges and universities should provide more opportunities for students with intellectual disabilities in the future.*

Postsecondary education presents an opportunity for increasing the economic potential of individuals in the labor force. Employers' expectations of postsecondary education and training continue to expand with a 10% increase in average number of schooling years in the first 15 years of the 21st century globally (Psacharopoulos & Patrinos, 2018). Additionally, research has estimated that in 2020, 65% of all jobs will require postsecondary education or training, an increase from 28% of jobs in 1973 (Carnevale et al., 2013).

Research in economics traditionally invokes a rational-behavioral model to describe the process of postsecondary attendance, suggesting that individuals utilize a form of cost-benefit analysis to determine whether the economic and time costs of education outweigh the education, skills, experience, and economic returns expected after graduation (Brand & Xie, 2010). With economic returns 10 times over for women and even greater for men (Hout, 2012), the number of individuals accessing higher education continues to increase (McFarland et al., 2018). For example, an individual with a bachelor's degree will earn $24,600 more annually than their peers without a postsecondary degree (Ma et al., 2016).

However, it remains important to disaggregate the impacts of postsecondary education while accounting for the demographic make-up of the society. For example, when accounting for gender, increases in annual earnings are different for male and female postsecondary attendees;

[1] This publication is supported by grant CFDA #90-DD0708 from the Administration on Intellectual and Developmental Disabilities, U.S. Department of Health and Human Services.

Correspondence concerning this article should be addressed to John Andresen at Jnmandres@gmail.com

a $23,200 increase for women and $26,200 for men (Ma et al., 2016). Postsecondary education additionally provides noticeable earnings improvements in the early career years as well, specifically for individuals between the ages of 25-34. For these young adults, median annual salary for an individual who earned a bachelor's degree was 57% higher than a high school completer. Even those individuals who earned an associate's degree had work earnings 19% higher than individuals who only completed high school (McFarland et al., 2018). Research on the impacts of postsecondary education disaggregated by race provides similar findings, with roughly a $6,000 increase in yearly income for Black and Hispanic bachelor's degree recipients (Perna, 2005). Positive impacts of postsecondary attendance for individuals of low socioeconomic status (SES) has highlighted close to a $5,000 increase for individuals in the lowest quartile of SES (Perna, 2005). While research has identified a variety of demographic subpopulations in the literature, disability is often overlooked.

**Disability in Postsecondary Education**

Research has indicated that postsecondary education can provide the opportunity to increase individuals' earnings potential, but research in postsecondary education does not often identify individuals with disabilities. For a period of time, the limited research base could be attributed to the lack of individuals with disabilities on campuses, as faculty often believed that educating students with disabilities would not be worth the effort (Nugent, 1978). While opinions have changed and more individuals with disabilities are included on campuses today, there is still limited research into this minority group on college campuses. In a recent study that examined 906 articles in higher education journals, Leake and Stodden (2014) found that only 11 of the articles (1.2%) focused on students with disabilities.

While it is recognized that individuals with disabilities could benefit from postsecondary education, determining how many individuals with disabilities are pursuing postsecondary education can be challenging (Evans et al., 2017). The shortage of research can be attributed to the difficulties in defining this minority group. Disabilities can differ by severity, they can present at any point in life, and the prevalence of disability can vary according to the diagnostic measures used, or the concepts, methods and system of reporting on the student population (Fujiura & Rutkowski-Kmitta, 2001; Stroman, 2003). Researchers and practitioners have found it difficult to determine exactly what constitutes the vast category of individuals with disabilities, and these students in postsecondary education provide another difficult-to-define population (Evans et al., 2017; Madaus, 2000).

This phenomenon is aggravated by the complexity with which disability data are collected, with definitions often being too broad or not broad enough to encapsulate the variability within the population of individuals with disabilities (Stroman, 2003). By defining disability with strict diagnostic criteria, the medical model of disability utilizes a fixed conceptualization of disability. The social model of disability is generally more suited to provide disability definitions in postsecondary education. For example, the American with Disabilities Act (ADA) defines disability not simply as an impairment that substantially limits the activities of an individual, but also recognizes disability as "a record of such an impairment; or being regarded

as having such an impairment" (ADA , 1990). For the purposes of studying the economic impacts of postsecondary education on earnings potential, the social model of disability provides the opportunity for the analysis of individuals and their interactions with possible barriers created by the surrounding environments (Stroman, 2003). In the current research, the social model of disability allows for the recognition of a range of disabilities that could impact the ability of a student to interact in a postsecondary environment and their earning potential in the future.

**Intersections of Cognitive Disability, Postsecondary Education, and Earnings**

Cognitive disabilities constitute a subsection of the broad population of individuals with disabilities in higher education. Individuals with cognitive disabilities may have difficulty interacting with the academic environment of postsecondary education. The American Community Survey (ACS) defines a cognitive disability as a "physical, mental, or emotional condition lasting six months or more that results in difficulty learning, remembering, or concentrating" (U.S. Census Bureau, 2010). This definition includes a variety of disabilities that are commonly identified in secondary settings, such as mental illness, traumatic brain injuries, intellectual and developmental disabilities, and other neurological impairments. Research on this large category of postsecondary attendees may prove vital as employment struggles are common in this population.

Unemployment figures of individuals with disabilities confirm the extent of the issue. Utilizing data from the ACS, it is estimated that 35.4% of individuals with a disability are employed, in comparison with 74.3% of those without a disability (Winsor et al., 2017). When accounting for specific disability groups, research depicts significantly poorer outcomes for individuals with cognitive disabilities. Only 25.7% of those with cognitive disabilities are employed (Winsor et al., 2017). Additionally, those with cognitive disabilities are more likely to be unemployed than those without disabilities and even those with physical disabilities, leading to more opportunity for reliance on social support systems throughout the U.S. Likewise, even those individuals who are employed are unlikely to keep their employment throughout the year, with only 52.7% of individuals with cognitive disabilities indicating that they have been employed throughout the entirety of the last year (Winsor et al., 2017). Variable unemployment has impacts on an individuals' financial security. Individuals with cognitive disabilities are more likely to live under the poverty line than those without disabilities; 16% of individuals with cognitive disabilities live under the federal poverty line (Winsor et al., 2017).

Initial research has indicated that postsecondary education could be impactful for the employment prospects of individuals whose cognitive functioning is impaired. For example, individuals with disabilities who attend postsecondary school of any kind are more likely to be competitively employed in the workforce. In a study utilizing the National Longitudinal Transition Survey – 2 (NLTS-2), researchers found that individuals with disabilities who attended some form of postsecondary education were significantly more likely to be employed in a competitive work setting (Wehman et al., 2015).

Postsecondary education can also impact earnings potential. Multiple studies have

identified that people with cognitive disabilities who received postsecondary education in the Vocational Rehabilitation (VR) services system tended to have higher earnings (Gilmore et al., 2001; Miller et al., 2019). As far back as 2001, Gilmore et al. found that people with cognitive disabilities who received funding from the VR system for postsecondary supports earned $16,900 per year, annually, compared to $12,376 for those without support (Gilmore et al., 2001).

More recently, Miller et al. (2019) found that individuals with IDD who advanced into postsecondary certificate or degree completion earned $17,839.12 each year in comparison with $10,245.56 of those who did not. While the findings from Miller et al. are beneficial for the field, there remains a need to disaggregate the various levels of postsecondary education and their effects on the earnings potential of individuals with cognitive disabilities. For example, is there a considerable difference in earnings potential increase for an individual who pursues an associate's degree instead of a bachelor's? Current research has not identified the benefits of the various postsecondary options for students, including those students who attend postsecondary education but do not receive a degree. In addition to disaggregating degree types, research is needed that is not reliant on specific disability service providers. For example, Miller et al. utilized only data found from the VR system in California. Research is needed on whether these impacts are found throughout the U.S., regardless of affiliations with service providers.

**Purpose**

Improving occupational outcomes for individuals with cognitive disabilities has long been difficult because of poor funding, low expectations from faculty members and parents, prerequisite tests, procedural issues, and many other barriers (Baker et al., 2012; Bruder & Mogro-Wilson, 2010; Hart et al., 2004). With the expansion of postsecondary education options for individuals with cognitive disabilities, colleges and universities present another option for ameliorating the poor occupational outcomes faced by this population. Thus far, there is a lack of a national perspective that uses population level data to determine how postsecondary education can improve the economic lives of individuals with cognitive disabilities. Therefore, the purpose of this study is to determine the extent to which postsecondary education can improve the earnings potential of individuals with cognitive disabilities across the U.S. The research questions are as follows.

1. What percent of the population of working Americans with cognitive limitations completed various levels of postsecondary education?

2. What proportion of the variability in work earnings is attributable to postsecondary education for working Americans with cognitive limitations?

3. What are the comparative financial benefits of different levels of postsecondary education for working Americans with cognitive limitations?

## Method

This study utilized extant data analysis on U.S. population-level data to provide a national picture of postsecondary and employment experiences of working Americans with cognitive limitations. Data utilized were from the 2017 ACS program, a project by the U.S. Census Bureau. The ACS is an ongoing survey that provides yearly updates about the citizens of the U.S. The U.S. government utilizes ACS data to determine how federal and state funds are distributed. Respondents answer questions covering a variety of topics, including ancestry, disability status, home heating, number of occupants per household, educational attainment, rent, fertility rates, among many others. The Integrated Public Use Microdata Series (IPUMS) data were utilized to locate and refine the data set for this research (Ruggles et al., 2019).

### Sample and Inclusion Criteria

This study seeks to build knowledge about employment outcomes among people with cognitive limitations, a broad term that is intended to include various disability categories under a single classification based on an individuals' measure of their intellectual ability (Cohen, 2014). The selection of the participants in this study is focused on a functional limitation that impacts access to postsecondary education. In the ACS, cognitive disabilities are defined as a "physical, mental, or emotional condition lasting six months or more that results in difficulty learning, remembering, or concentrating" (U.S. Census Bureau, 2010). The ACS definition can include disabilities related to mental illness, traumatic brain injuries, intellectual and developmental disabilities, and other neurological impairments. The ACS Subcommittee on Disability Measurement created this measure to identify certain aspects of disability in order to investigate how identified populations experience restrictions in community participation because of institutional barriers (Brault, 2009).

Participants for this study were chosen who were of working age (18-65) and who had identified themselves as experiencing a cognitive limitation. Additionally, since the study's focus was to understand the relationship between postsecondary education and earnings, participants were selected who indicated active employment for the year 2017. The IPUMS system was able to isolate and retrieve the maximum number of participants who satisfied both categories. This sample returned 26,095 participants. Of the participants selected for inclusion in the study, 1,529 individuals received no yearly income or wages—indicating that their work hours were unpaid time. These individuals were excluded from the study, as they do not quality as individuals with cognitive limitations who are employed for the economic benefits. Data cleaning and assessing assumptions further limited the sample to 21,544 participants. In order to calculate a sufficient sample size, the formula proposed by (Green, 1991; $N \geq 50 + 8m$; $m$ = number of independent variables) was used to determine a sufficient sample size for estimation. After analysis, 21,544 participants constituted a sufficiently large sample size for use in the analysis.

## Variables for Analysis

### *Work Earnings*

The dependent variable for analysis was annual work earnings, a continuous measure of one's pre-tax wages and salary. Upon assessing the distribution, it was found that work earnings did not meet normality assumption because of a positive skew. As such, logarithmic transformation was applied to the outcome variable to reach normality. The logarithmical transformation of work earnings ($\bar{M}$ = 4.18, skew = -0.58, kurtosis = 0.11) proved the assumptions tenable, unlike the work earnings untransformed ($\bar{M}$ = 28,289.34, skew = 6.05, kurtosis = 61.93).

### *Demographic*

Age was identified in the data set as a continuous variable and was measured in years. Sex was a dichotomous variable and was coded 1 to indicate female and 0 to indicate male. Race was dummy-coded to indicate 1 as being a member of the race and 0 as being not a member of the race; the categories included were White, Black, and other. Ethnicity was coded to indicate Hispanic as 1 and non-Hispanic as 0. These four variables were included to identify the impacts of multiple social identities on individuals with cognitive limitations, which is often absent from the literature in higher education and disability (Evans et al., 2017).

### *Income Supports*

Income support was constructed to indicate whether an individual receives any income supports including supplemental security income, social security income, or welfare. In the original data set, there were dollar amounts indicated for each of the three categories of income supports. In this study, the three categories were collapsed into one to determine whether an individual received any income supports in the previous year. To ensure that assumptions were met, the categories of Supplemental Security Income, Social Security, and welfare were combined into one variable by adding all three values together to create a new variable of income supports. The variable was then coded as 0 for no supports and 1 to indicate the receipt of money from any of the three programs.

### *Employment*

Employment variables were the participant's report of the usual number of hours worked each week over the previous year and the number of weeks worked over the previous year. The construction of the weekly hours worked variable was continuous and measured in whole hours. The number of weeks worked in the previous year was constructed to be an ordinal variable with the following coding scheme: 1-13 weeks was coded as 1, 14-26 weeks was coded as 2, 27-39 weeks was coded as 3, 40-47 weeks was coded as 4, 48-49 weeks was coded as 5, and 50-52 weeks was coded as 6.

### *Postsecondary Attainment*

The ACS provides number of years of schooling, high school diploma, associate's degree, etc. For the purposes of this study, these variables were recoded into five categories. The five categories were high school (HS) degree (which included HS equivalent degrees or less), some college with no degree, associate's degree, bachelor's degree, and advanced degrees. The advanced degree category consisted of both masters and doctoral degrees, and was collapsed because of low sample sizes in both categories separately. The categories were dummy coded and "High School" served as the reference category.

## Analysis

Multiple regression analysis was performed on the dependent variable of logarithmic-transformed yearly work earnings (*Y*), entering variables in four blocks. The sequencing of the blocks was utilized to partition the variance to determine the amount of variability that is accounted for by each category of variables. The initial block assessed the effects of demographic characteristics, block two accounted for the variance attributed to income support programs, and block three accounted for the variance attributed to employment-related variables. The final block incorporates postsecondary education in addition to all preceding blocks (see Table 1). The analysis was performed using IBM SPSS 26. The null hypothesis being tested was $H^0$: $R = 0$, which denotes that there is no relationship between the reported yearly work earnings and the six explanatory variables.

**Table 1**

*Four Linear Regression Blocks for Analysis*

| Block | *Y'* | $X_1$ | $X_2$ | $X_3$ | $X_4$ | $X_5$ | $X_6$ | $X_7$ | $X_8$ |
|---|---|---|---|---|---|---|---|---|---|
| Demographics | Earnings | Age | Sex | Race | Ethnicity | | | | |
| Income supports | Earnings | Age | Sex | Race | Ethnicity | Income supports | | | |
| Workplace | Earnings | Age | Sex | Race | Ethnicity | Income supports | Hours worked | Weeks worked | |
| Degree | Earnings | Age | Sex | Race | Ethnicity | Income supports | Hours worked | Weeks worked | Degree |

## Results

Table 2 presents the weighted and unweighted sample characteristics of working Americans with cognitive limitations aged 18 to 65 in the 2017 ACS. Utilizing the weighted sample characteristics, the majority of the individuals in the study were male (53.2%), White (76.8%) and non-Hispanic (86.5%). Of the sample, a majority of individuals did not receive an income support in the previous year (83.1%) and the majority of individuals were employed between 50-52 weeks in the previous year (70.0%).

**Table 2**

*Sample Characteristics, Working Americans with Cognitive Limitations, Age 18-65, 2017 American Community Survey*

| Variables | Weighted (%) (*N* = 2,237,27) | Unweighted (%) (*N* = 21,544) |
|---|---|---|
| Gender | | |
| Male | 53.2 | 52.1 |
| Female | 46.8 | 47.9 |
| Race | | |
| White | 76.8 | 79.3 |
| Black | 11.9 | 10.1 |
| Other | 11.3 | 10.6 |
| Ethnicity | | |
| Hispanic | 13.5 | 11.6 |
| Not Hispanic | 86.5 | 88.4 |
| Income supports | | |
| Support | 16.9 | 18.5 |
| No support | 83.1 | 81.5 |
| Weeks worked last year | | |
| 1-13 Weeks | 5.8 | 5.8 |
| 14-26 Weeks | 6.2 | 6.1 |
| 27-39 Weeks | 7.8 | 7.7 |
| 40-47 Weeks | 7.5 | 7.6 |
| 48-49 Weeks | 2.8 | 2.7 |
| 50-52 Weeks | 70.0 | 70.2 |
| Postsecondary education | | |
| HS or GED | 47.6 | 47.1 |
| Some college, no degree | 27.9 | 27.8 |
| Associates | 8.3 | 8.5 |
| Bachelors | 12.7 | 12.8 |
| Advanced | 3.5 | 3.8 |

According to the weighted characteristics, in 2017 there were 2,237,207 working Americans with cognitive disabilities in the workforce. Of the weighted sample, 47.6% of the population were in the category of high school degree, GED, or less, which indicated that over half of the population had attended some form of postsecondary education. The most common postsecondary degree was a bachelor's degree (12.3%), and over half of the individuals who attended postsecondary education did not receive a degree (27.9%). Advanced degrees (masters and doctoral) and an associate's degree were the least common forms of postsecondary education, with 8.3% of the sample receiving an associate's degree and 3.5% of the sample

receiving advanced degrees. However, these figures could potentially be impacted by the number of individuals who were actively attending college while employed.

Table 3 depicts the means and frequency distributions of dependent and independent variables as well as the Pearson correlation coefficients for all variables included in the final block of analysis. Across the sample, the mean age of individuals in the study was 39.16 years of age. Additionally, the mean number of hours worked by those individuals was 33.67 hours, and the mean work earnings were $28,289.34. In terms of income support programs, 2,134 individuals received social security income, 1,779 individuals received supplementary security income, and 633 individuals received welfare income in the prior year. The mean amount received through each income support program varied, where individuals receiving social security income, supplemental security income, and welfare income received $9,504.48, $7,643.78, and $2,074.11, respectively.

**Table 3**

*Means, Standard Deviations, and Pearson Correlation Coefficients for Continuous Variables*

| Variable | *N* | *M* | *SD* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|
| Earnings | 21,544 | 28,289.34 | 37,608.39 | - | - | - | - | - |
| Log-transformed earnings | 21,544 | 4.18 | 0.54 | .240** | -.184** | -.235* | -.058** | .684** |
| Predictor variable | | | | | | | | |
| 1. Age | 21,544 | 39.16 | 13.63 | - | .177** | .020** | -.007 | .124** |
| 2. Social security | 2,134 | 9,504.48 | 5,752.72 | | - | .019** | -.003 | -.234** |
| 3. Supplementary security | 1,779 | 7,643.78 | 3,913.64 | | | - | .053** | -.259** |
| 4. Welfare | 633 | 2,074.11 | 2,992.411 | | | | - | -.045** |
| 5. Usual hours worked | 21,544 | 33.67 | 13.43 | | | | | - |

*Note.* (*N* = 21,544).
*$p < .05$.
**$p < .01$.

## Regression Analysis

Analysis of the residuals plots to assess assumptions of homogeneity of variance and independence determined that all assumptions were met. Assumptions of normality were met after the logarithmic transformation of salary and deletion of outliers at both the high and low ends of the distribution of the salary variable. Issues of collinearity were not evident in the regression, and variance inflation factor values for each variable can be found in Table 4.

### *Explained Variance*

The first regression block was calculated to predict the logarithmically transformed work earnings based on age, sex, race, and ethnicity. A significant equation was found (F[5, 21538] =

321.289, $p < .000$) with an $R^2$ of .069, which indicates that roughly 6.9% of the variance in earnings is attributable to demographic factors. Block two added income supports to the model and was found to explain a significant amount of variance ($F$[6, 21537] = 988.120, $p < .000$) with an $R^2$ of .216 ($\Delta R^2$ = .147). Block three accounted for employment variables, which were hours worked weekly, and weeks worked. A significant equation was found ($F$[8, 21535] = 4281.157, p < .000) with an $R^2$ of .614 ($\Delta R^2$ = .398). Finally, block four included postsecondary education. After holding all else equal, postsecondary explained a significant amount of model variance ($F$[12, 21531] = 3179.620, $p < .000$) with an $R^2$ of .639 ($\Delta R^2$ = .025).

**Table 4**

*Linear Regression Blocks' $R^2$ and Predictors of Logarithmic Transformation of Work Earnings*

| | Logarithmic transformation of work earnings | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Block 1 | Block 2 | Block 3 | Block 4 | | | | |
| Variable | *B* | *B* | *B* | *B* | *SE B* | β | *t* | *VIF* |
| Constant | 3.860* | 3.901* | 2.776* | 2.754* | .011 | - | 258.954 | |
| Age | 0.010* | 0.011* | 0.005* | 0.005* | .000 | 0.132 | 30.854 | 1.088 |
| Sex | -0.107* | -0.112* | -0.029* | -0.046* | .004 | -0.043 | -10.243 | 1.037 |
| Black | -0.061* | -0.060* | -0.041* | -0.012 | .007 | -0.007 | -1.664 | 1.032 |
| Other | 0.004 | -0.024 | 0.000 | 0.009 | .007 | 0.005 | 1.160 | 1.080 |
| Hispanic | 0.029 | -0.011 | -0.023 | 0.007 | .007 | 0.004 | .912 | 1.067 |
| Income supports | | -0.536* | -0.221* | -0.185* | .006 | -0.133 | -26.845 | 1.274 |
| Hours worked | | | 0.020* | 0.019* | .000 | 0.474 | 98.944 | 1.370 |
| Weeks worked | | | 0.115* | 0.113* | .001 | 0.336 | 76.959 | 1.136 |
| Some college, no degree | | | | 0.060* | .005 | 0.050 | 11.140 | 1.210 |
| Associates | | | | 0.133* | .008 | 0.069 | 15.894 | 1.119 |
| Bachelors | | | | 0.226* | .007 | 0.141 | 31.769 | 1.168 |
| Advanced | | | | 0.314* | .012 | 0.112 | 26.036 | 1.097 |
| $R^2$ | .069 | .216 | .614 | .639 | | | | |

*$p < .001$.

### *Covariate Effects*

Table 4 includes each block's R2, and the unstandardized coefficient and statistical significance, along with standardized regression coefficients, and the standard error of the estimate. Because the outcome variable is log-transformed, strict interpretation of the regression coefficients is inappropriate. Therefore, the formula (10B – 1)*100 is utilized to determine the percentage change in Y that can be expected with an increase in one unit of the predictor variable.

Demographic, income support, and employment variables were included as control variables for the final model. However, the regression coefficients provide an opportunity for analysis. After holding all else constant, the model predicts a 1.158% increase in salary for each year of age. Additionally, the model predicts that a female can anticipate 10.050% less yearly earnings than a male individual with all other variables held constant. Race and ethnicity variables were not statistically significant and, therefore, interpretation is inappropriate.

For an individual who receives income supports, consisting of one or more of social security income, supplemental security income, and welfare, the model predicts a 34.687% decrease in expected salary in comparison with an individual with all other constants held similar except for income supports. Similarly, for each hour worked, the model anticipates a 4.472% increase in annual earnings; for each category of weeks worked, the model predicts a 29.718% increase in earnings throughout the year.

### *Effects of Postsecondary Education*

After holding all else constant, an individual who attended postsecondary education but did not graduate averaged 14.815% higher earnings than the reference group—individuals who received a high school degree or less. Even greater earnings increases were experienced by those with higher levels of postsecondary education. Compared to the reference group, average annual earnings increased 35.831% for those with associate's degrees, 68.267% for those with bachelor's degrees, and 106.063% for those with advanced degrees.

Based on the regression coefficients for a 25-year-old White male with a cognitive disability, without income supports, working 40 hours a week year-round, the predicted annual earnings by educational attainment was: $20,749.14 - HS diploma or less, $23,823.19 - some college, no degree, $28.183.83 - associate's degree, $34,914.03 - bachelor's degree, and $42,756.29 - advanced degree.

## Discussion

The purpose of this study was to determine whether individuals with cognitive disabilities are entering into postsecondary education and receiving degrees, and whether or not there is a relationship between postsecondary attendance and student's earnings after attendance. As this study demonstrates, there is a significant proportion of individuals with cognitive disabilities who are electing to attend some form of postsecondary education. Additionally, there is a positive financial impact for those individuals who elect to attend, regardless of whether individuals receive a degree or not.

As evidenced in the analysis, individuals with cognitive disabilities are attending postsecondary education and receiving a variety of different degree types. A majority of individuals with cognitive disabilities are attending some form of postsecondary education, with 52.4% of individuals indicating they have attended some form of postsecondary program. Additionally, 12.7% of individuals earned a bachelor's degree or more while attending

postsecondary education, indicating that many public and private 4-year institutions need to account for how they are identifying and accommodating individuals with cognitive disabilities in their classrooms. This additional training is critically important for individuals with cognitive disabilities employment prospects, considering that 65% of jobs in the modern economy require some form of postsecondary training (Carnevale et al., 2013). Continuing to increase postsecondary educational access for individuals with cognitive disabilities will prove valuable. Continued research on supports and services that the education system can provide to increase attendance would prove beneficial for the field. For example, Test et al. (2009) completed a systematic review that identified predictors of positive post-school employment outcomes. These predictors included access to occupational courses, community experiences, and parental involvement in the program, among many others (Test et al., 2009). Universities would be well suited to pursue these activities to ensure greater employment outcomes for individuals with cognitive disabilities.

Postsecondary education accounted for a limited amount of the total variability (2.5%) in yearly earnings based on the predictor variables. For example, individuals' employment hours and weeks (39.8%), and whether or not individuals received public supports (14.7%), had significantly more impact on predictive validity. Additionally, demographic variables accounted for more than double the proportion of variance (6.9%). While previous research has indicated that a significant proportion of the increase in wage inequality can be attributed to the disparity between those who can attend postsecondary education and those who cannot (Lemieux, 2006), it is unsurprising that the other factors included in the analysis accounted for greater variability. For example, the number of hours worked each week and weeks worked each year directly impacts earnings potential; whereas, the training received in postsecondary education is an indirect relation and, therefore, may not provide for as clear of a relationship with earnings. While the proportion of variance may be lower than other blocks, the finding does provide evidence that postsecondary education shares a relationship with earnings and can have positive effects on employment outcomes. Findings from regression coefficients strengthen this case.

This study provides evidence that postsecondary education can be economically advantageous for a broader range of individuals than were currently represented by the literature. Regression coefficients from block 4 indicate an increase in earnings for attending postsecondary education without a credential (14.815% increase), an associate's degree (35.831% increase), a bachelor's degree (68.267% increase), and advanced degrees (106.063% increase) all indicate substantial financial benefits of postsecondary education for individuals with cognitive disabilities. It has been established that individuals' earnings can be positively impacted by postsecondary education (Hout, 2012; Ma et al., 2016; McFarland et al., 2018; Perna, 2005); however, this is the first study to definitively show that the relationship is similar for individuals with cognitive disabilities.

Related to work, it is known that public perceptions of disability continue to broadly impact the employment prospects of individuals with disabilities. Service providers and teachers sometimes underestimate the ability of an individual with a disability and restrict access to well-paying jobs in the community (Cimera et al., 2014; Pickens & Dymond, 2015). However,

postsecondary education may provide an opportunity to increase access to a variety of occupations through the demonstration of a variety of competencies. There remains a need for more education professionals and service providers to provide postsecondary education as an option upon graduation from secondary school.

Additionally, for individuals with cognitive disabilities who attended postsecondary education without attaining a degree, there was a statistically significant, though modest, increase in income for this population. This finding may be related to research which indicates that more jobs today require some form of postsecondary education (Carnevale et al., 2013), and the inclusion of postsecondary education results in higher earnings (Hout, 2012; Ma et al., 2016; McFarland et al., 2018; Perna, 2005). The research indicates that oftentimes individuals with disabilities lack access to well-paying jobs or have a difficult time finding a job at all (Winsor et al., 2017), so additional access to postsecondary education may provide broader access to higher paying jobs for individual with cognitive disabilities.

In comparison to the general population, the predicted increase in work earnings for a bachelor's degree earner with a cognitive limitation (68.267% increase) is higher than individuals without disabilities (57% increase; McFarland et al., 2018). This finding provides evidence that individuals with cognitive limitations may receive larger personal financial gains from postsecondary education when compared to the general population. This finding suggests that the income inequality experienced by people with cognitive limitations may be tempered by way of greater access and inclusion in higher education opportunities that can lead to quality employment.

Additionally, this finding provides further indications of the results of Ashenfelter and Rouse (1999), who suggested that further schooling is an opportunity to increase the financial health of individuals and decrease inequalities. Increasing educational access has the potential to decrease the income inequality that is felt by individuals with cognitive limitations in contrast with the general population. Policymakers and practitioners can consider increasing access and supports that individuals with cognitive limitations need to succeed at postsecondary institutions, potentially increasing personal economic gains, decreasing reliance on income supports, and increasing the number of tax payers throughout the U.S.

**Future Research**

In considering future research, practice, and policy reform, several areas are worth reflection. This study can provide individuals with cognitive limitations and their families with evidence of the potential economic implications of attending postsecondary education. These results could be considered in contrast with the personal and financial costs of attending postsecondary school. Additionally, further research identifying the causal factors that underlie the correlation between postsecondary attendance and increased earnings would be beneficial for the field. Potential research includes identification of the skills learned in postsecondary education as well as considering whether personal privilege has impacts on postsecondary enrollment, and whether this explains some of the correlation between postsecondary education

and increased work earnings. Furthermore, policymakers should consider legislation that removes barriers to postsecondary education for individuals with cognitive limitations, such as mandatory prerequisite courses and the impacts that low expectations can have on admissions (Hart et al., 2004). This study provides evidence of the value that postsecondary education has for working Americans with cognitive limitations, which could provide society wide benefits such as increasing the taxpayer base and decreasing the reliance on income support systems. Further research is necessary.

### Limitations

This research presents a variety of limitations. The ACS data set defines the category of cognitive difficulty as a very broad term that does not provide an easily identifiable group of students within the higher education landscape. Likewise, the ACS does not provide information about disability severity or standardized assessments of intellectual ability, which would have provided a useful variable to control for portions of the variance. Similarly, the variable that codified the weeks worked by the individual was not continuous, which makes interpretation difficult outside of full-time employment versus variable unemployment.

The research is also limited because the data were extracted after decisions were made about occupations and postsecondary attendance. The study would be strengthened by use of longitudinal data that includes aspects of the decision-making process for working Americans with cognitive limitations. Also, because the ACS provides data for one specific year, causal inference is not possible. This study provides correlational findings.

## Conclusion

As this study establishes, postsecondary education plays an influential role in the determinants of earnings for individuals with cognitive limitations. Across degree types, financial gains were found for postsecondary attendees and degree earners over their high school graduate peers. While the academic threshold of many postsecondary institutions is high, providing a variety of options of technical schools, community colleges, and state schools provides greater economic mobility for individuals with cognitive limitations. While further research is needed to determine the causal mechanisms of this correlation, determining the extent of the increase in work earnings that postsecondary education can provide is an important first step. Individuals involved in postsecondary education will continue to work on advancing the inclusion of individuals with cognitive limitations on their campuses, and now the economic value of these programs for these students is apparent. To continue to decrease the economic inequity felt by individuals with cognitive limitations, policymakers, institutions of higher education, and researchers must continue to pursue promising avenues of economic advancement for this population.

## References


Americans with Disabilities Act of 1990, Pub. L. No. 101-336, 104 Stat. 328 C.F.R. (1990). https://www.govinfo.gov/content/pkg/STATUTE-104/pdf/STATUTE-104-Pg327.pdf

Ashenfelter, O., & Rouse, C. (1999). *Schooling, intelligence, and income in America: Cracks in the bell curve*. Cambridge, MA: National Bureau of Economic Research.

Baker, K. Q., Boland, K., & Nowik, C. M. (2012). Survey of faculty and student perceptions of persons with disabilities. *Journal of Postsecondary Education and Disability, 25*(4), 309-329.

Brand, J. E., & Xie, Y. (2010). Who benefits most from college? Evidence for negative selection in heterogeneous economic returns to higher education. *American Sociological Review, 75*(2), 273-302.

Brault, M. W. (2009). *Review of changes to the measurement of disability in the 2008 American community survey.* Report prepared for U.S. Census Bureau.

Bruder, M. B., & Mogro-Wilson, C. (2010). Student and faculty awareness and attitudes about students with disabilities. *Review of Disability Studies, 6*(2), 3-13.

Carnevale, A. P., Smith, N., & Strohl, J. (2013). *Recovery: Job growth and education requirements through 2020*. Georgetown University Center on Education and the Workforce.

Cimera, R. E., Burgess, S., Novak, J., & Avellone, L. (2014). Too disabled to work: A crossroad once thought passed. *Research and Practice for Persons with Severe Disabilities, 39*(3), 240-248.

Cohen, P. (2014). Parental age and cognitive disability among children in the United States. *Sociological Science, 1*, 102-110.

Evans, N. J., Broido, E. M., Brown, K. R., & Wilke, A. K. (2017). *Disability in higher education: A social justice approach*. John Wiley & Sons.

Fujiura, G. T., & Rutkowski-Kmitta, V. (2001). Counting disability. In G. L. Albrecht, K. D. Seelman, & M. Bury (Eds.), *Handbook of disability studies* (pp. 69-96). Sage.

Gilmore, D. S., Schuster, J., Zafft, C., & Hart, D. (2001). Postsecondary education services and employment outcomes within the vocational rehabilitation system. *Disability Studies Quarterly, 21*(1), 71-85.

Green, S. B. (1991). How many subjects does it take to do a regression analysis. *Multivariate behavioral research, 26*(3), 499-510.

Hart, D., Mele-McCarthy, J., Pasternack, R. H., Zimbrich, K., & Parker, D. R. (2004). Community college: A pathway to success for youth with learning, cognitive, and intellectual disabilities in secondary settings. *Education and Training in Developmental Disabilities, 39*(1), 54-66.

Hout, M. (2012). Social and economic returns to college education in the United States. *Annual Review of Sociology, 38*, 379-400.

Leake, D. W., & Stodden, R. A. (2014). Higher education and disability: Past and future of underrepresented populations. *Journal of Postsecondary Education and Disability, 27*(4), 399-408.

Lemieux, T. (2006). Postsecondary education and increasing wage inequality. *The American Economic Review, 96*(2), 195-199.

Ma, J., Pender, M., & Welch, M. (2016). *Education pays 2016: The benefits of higher education for individuals and society trends. Trends in Higher Education Series.* New York, New York: College Board. Retrieved from ERIC Database. (ED572548)

Madaus, J. W. (2000). Services for college and university students with disabilities: A historical perspective. *Journal of Postsecondary Education and Disability, 14*(1), 4-21.

McFarland, J., Hussar, B., Wang, X., Zhang, J., Wang, K., Rathbun, A., Barmer, A., Forrest Cataldi, E., and Bullock Mann, F. (2018). The Condition of Education 2018 (NCES 2018-144). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved from https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2018144.

Miller, S. C., Tucker, M. S., & Sax, C. L. (2019). Examining associations between postsecondary education, earnings, and provision of college and university training related to individuals with intellectual and developmental disabilities served by vocational rehabilitation. *Journal of Rehabilitation, 85*(1), 22-34.

Nugent, T. J. (1978). More than ramps and braille. *American Education, 14*(7), 11-18.

Perna, L. W. (2005). The benefits of higher education: Sex, racial/ethnic, and socioeconomic group differences. *The Review of Higher Education, 29*(1), 23-52.

Pickens, J. L., & Dymond, S. K. (2015). Special education directors' views of community-based vocational instruction. *Research and Practice for Persons with Severe Disabilities, 39*, 290-304.

Psacharopoulos, G., & Patrinos, H. A. (2018). Returns to investment in education: A decennial review of the global literature. *Education Economics, 26*(5), 445-458.

Ruggles, S., Flood, S., Goeken, R., Grover, J., Meyer, E., Pacas, J., & Sobek, M. (2019). *IPUMS USA: Version 9.0 [dataset]*. Minneapolis: University of Minnesota, 2019. http://doi.org/10.18128/D010.V9.0

Stroman, D. F. (2003). *The disability rights movement: From deinstitutionalization to self-determination*. University Press of America.

Test, D. W., Mazzotti, V. L., Mustian, A. L., Fowler, C. H., Kortering, L., & Kohler, P. (2009). Evidence-based secondary transition predictors for improving postschool outcomes for students with disabilities. *Career Development for Exceptional Individuals, 32*(3), 160-181.

U.S. Census Bureau. (2010). *Disability among the working age population: 2008 and 2009. American community survey brief*. U.S. Government Printing Office

Wehman, P., Sima, A. P., Ketchum, J., West, M. D., Chan, F., & Luecking, R. (2015). Predictors of successful transition from school to employment for youth with disabilities. *Journal of Occupational Rehabilitation, 25*(2), 323-334.

Winsor, J., Timmons, J., Butterworth, J., Shepard, J., Landa, C., Smith, F., Domin, D., Migliore, A., Bose, J., & Landim, L. (2017). StateData: The national report on employment services and outcomes. Boston, MA: University of Massachusetts Boston, Institute for Community Inclusion. Retrieved from https://www.statedata.info/sites/statedata.info/files/files/statedata_bluebook_2016.pdf