

Effect of Postsecondary Education on the Economic Status of Persons Who Are Deaf or Hard of Hearing

Sara Schley*,¹, Gerard G. Walter¹, Robert R. Weathers II², Jeffrey Hemmeter², John C. Hennessey², Richard V. Burkhauser³

¹National Technical Institute for the Deaf, Rochester Institute of Technology

²Office of Research, Evaluation, and Statistics, Social Security Administration

³Cornell University

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This article examines the effect that postsecondary education has on earnings and the duration of time spent in the Social Security disability programs for young persons who are deaf or hard of hearing. Our hypothesis is that investments in postsecondary training increase the likelihood of employment for persons who are deaf or hard of hearing and thus reduce dependency on disability-related income support programs. A longitudinal data set based upon records from the National Technical Institute for the Deaf and Social Security administrative records is used for this analysis. We find that those who graduate, even those who graduate with vocational degrees, experience significant earnings benefits and reductions in the duration of time spent on federal disability programs when compared with those who do not graduate with a degree. This finding suggests that reductions in the duration of time spent on Social Security programs are not limited to those with the highest level of scholastic aptitude and that investments in post-secondary education can benefit a broad group of deaf and hard-of-hearing persons. In addition, the data show that individuals who attend college, but withdraw before graduation, fair no better economically than individuals who never attended college.

The second half of the 20th century was one of the most active periods in the history for postsecondary education in the United States. During this time, postsecondary education was, without question, a “growth industry.” Smith and Bender (2008) and Goldin and Katz (2008) give a thorough summary of the transformation of higher education in the United States

during the second half of the 20th century. The initial impetus resulted from federal legislation, which enabled large numbers of World War II veterans to attend colleges and universities. Subsequently, the sons and daughters of these same veterans began entering postsecondary institutions in large numbers during the 1960s and early 1970s prompting massive expansion in staffing, facilities, and curricula. Fueled by demand for higher education, community colleges expanded, opening the doors of postsecondary education to large numbers of individuals who would otherwise not have had access to traditional higher education.

Growth during this same period was also fueled by societal changes in attitudes regarding college attendance, largely focused on issues of *access to* and *training in* the technologies. The technological focus was driven by events such as space exploration: there were numerous technological advancements following World War II, preparedness during the Cold War, and the race to put a man on the moon; all resulted in the demand for highly trained specialists in areas such as engineering, mathematics, computer science, and communication technologies (Mikulecky & Kirkley, 1998). The civil rights movement fueled the access focus. Civil rights laws and their impact on education are summarized in a fact sheet published by the U.S. Department of Education (U.S. Department of Education, Office for Civil Rights, 1999). Discrimination based on race, color, and national origin was prohibited legislatively with Title

*Correspondence should be sent to Sara Schley, National Technical Institute for the Deaf, Rochester Institute of Technology, 60 Lomb Memorial Drive, 14-2312, Rochester, NY 14623 (e-mail: sxsdor@rit.edu).

VI of the Civil Rights Act of 1964. Prohibition of sex discrimination was added to the list with Title IX of the Education Amendments of 1972 and age discrimination with the Age Discrimination Act of 1975. Title II of the Americans with Disabilities Act of 1990 added prohibition of disability discrimination.

From a 2007 U.S. Census Report looking at the population of those 25 years and older in the United States in the American Community Survey (Crissey, 2009), 84% of all adults reported having completed at least high school and 27% reported having attained at least a bachelor's degree. In contrast, over 20 years earlier in 1983, comparable estimates were 78% with a high school degree and 19% with a 4-year college degree (Stoops, 2004). In 1947, estimates were that 32% of the population over the age of 25 years were high school graduates, and 8% had college degrees. Average earnings varied substantially based on educational attainment: In 2007, high school graduates earned an average of \$26,894 annually; those with some college or an associate's degree earned \$32,874 on average annually, and those with a bachelor's degree earned \$46,805 on average annually (Crissey, 2009).

Access to postsecondary education and choice of school by individuals initially centered on the issue of college opportunities for children from low-income families but extended to disabled individuals with the passage, in 1973, of Section 504 of the Vocational Rehabilitation Act.

No otherwise qualified handicapped individual in the United States ... Shall, solely by reason of his handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal assistance. (Public Law 93-112: Section 504)

This provision was extended by passage of the Americans with Disability Act of 1990.

No qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity, or be subjected to discrimination by any such entity.

(American with Disabilities Act of 1990, Section 202)

Efforts at the state and federal levels in support of these acts have taken a variety of forms, including financial support for the elaborate network of community colleges and expanded state university systems. In addition, increased financial aid to students has improved access, while contributing to the ability to choose one's school, although these increases have not necessarily kept pace with the rising costs of postsecondary education (Wolanin, 2005).

These societal efforts to provide access to higher education have markedly influenced the numbers of deaf and hard-of-hearing persons seeking postsecondary education and the access services they receive. A 1999 study by the National Center on Education Statistics (U.S. Department of Education, 1999) estimated that, in 1997–98, 48% of the nation's 5,040 2-year and 4-year postsecondary education institutions enrolled deaf and hard-of-hearing students. The total number of students reported was 23,860, not including the 2,500 enrolled that year at Gallaudet University and the National Technical Institute for the Deaf (NTID). Assuming continued growth in enrollments of deaf and hard-of-hearing persons in postsecondary education, and adding the students currently enrolled at Gallaudet and NTID, there are probably more than 30,000 enrolled today.

Nationally, the educational attainment levels of severe to profoundly deaf individuals are lower than that of hearing individuals. Blanchfield, Feldman, Dunbar, and Gardner (2001) used three nationally representative data sets to estimate the prevalence of severe to profound deafness and summarize educational and employment demographics: The National Health Interview Survey (NHIS) and its hearing supplements from 1990 and 1991, the NHIS from 1994 and 1995, and the National Health and Nutrition Examination Study III from 1988 to 1994. Although 18.7% of the U.S. population had not graduated from high school, 44.4% of the severely to profoundly deaf or hard-of-hearing population had not graduated from high school. For those who had received a high school diploma but no further education, the discrepancy was 59.3% (hearing) and 45.8% (severely to profoundly

deaf/hard of hearing). For college graduates, the percentages were 12.8% of the hearing population and 5.1% of the deaf or hard-of-hearing population and for post-college education—9.2% of the hearing population and 4.8% of the deaf or hard-of-hearing population. Clearly, there are lower educational rates of those who are severely to profoundly deaf or hard of hearing.

Blanchfield et al. (2001) also estimated the percentage of hearing and severely to profoundly deaf or hard-of-hearing individuals in the labor force. Group differences were equally striking. For the 18- to 44-year-old age group, 82% of the U.S. hearing population were in the labor force, and only 58% of the severely to profoundly deaf or hard-of-hearing population. For the 45- to 64-year-old age group, 73% of the hearing population was in the labor force and 46% of the deaf or hard-of-hearing population.

The difference is even more striking when evaluating differences by severity of hearing loss. McNeil (2000) looked at data from the Survey of Income and Program Participation between 1992 and 1997 and compared the employment rate of the U.S. population and the population of those who have “difficulty hearing” and those who have “severe difficulty hearing.” For the general U.S. population, employment rates ranged from about 75% to 78% during these 5 years. For those with “difficulty” hearing, rates ranged from about 62% to 65%. For those with “severe hearing problems,” rates ranged from 48% to 59% during these 5 years.

Blanchfield et al. (2001) looked at family income sorted by the general U.S. population and the severely to profoundly deaf or hard-of-hearing population. Whereas 26% of hearing families earned between \$10,000 and \$24,999 annually, 28% of deaf or hard-of-hearing families earned incomes in that range. By contrast, 29% of hearing families earned \$50,000 or more, whereas only 14% of deaf or hard-of-hearing families earned in this range.

Although these national demographics point to inequities in education, employment, and earnings for deaf and hard-of-hearing individuals, we have little information to date on looking at these factors conjointly and longitudinally. Certainly, the door to postsecondary education has been opened for deaf

and hard-of-hearing persons in the United States. But what impact has this access to higher education had on the lives of those who choose to attend college? This historical perspective sets the stage for the topics discussed in this article, namely the effect of college on improving the employment and earnings of deaf and hard-of-hearing persons and reducing dependence on Supplemental Security Income (SSI) and Social Security Disability Insurance (SSDI).

The effect of college on improving the economic status of graduates has been well documented in the literature (Bowen, 1980; Grubb, 1997; Haskins, Holzer, & Lerman, 2009; Kane & Rouse, 1995; Pascarella & Terenzini, 1991, chap. 11; Taubman & Wales, 1974; Williams & Swail, 2005; Witmer, 1978). Certainly, profit motives are not the only goal of higher education as there are numerous other benefits including factors such as prestige, emotional development, and numerous social and individual considerations (Bowen, 1977; Pascarella & Terenzini, 1991, chap. 11). However, many studies of nondisabled college graduates focus on personal returns on investment and ask the question, “Do incremental earnings justify the initial investment in tuition and fees and foregone earnings?” In other words, will a college education provide enough of an earnings premium over what could be earned by a high school graduate without a college degree to warrant such an investment? Most studies referenced above suggest that the personal return on investment is between 8% and 15%.

Another related set of findings suggests that the higher a degree the greater the gap between the earnings of college graduates and high school graduates. In today’s economy, a person with an associate degree can expect to earn 30% more than a high school graduate, and a bachelor’s graduate can expect to earn 60% more than a high school graduate (Lamison-White, 1997; U.S. Department of Education, 1999). Similar results have been reported for deaf and hard-of-hearing college graduates. Welsh and MacLeod-Gallinger (1992) report a 34% difference between sub-bachelor graduates and college dropouts and an 80% difference between bachelor graduates and college dropouts, using self-reported NTID alumni survey data. In a more recent study,

Schroedel & Geyer (2000a, 2000b, 2001) report differences of 26% between associate and bachelor graduates from a national longitudinal survey study of deaf and hard-of-hearing college alumni.

The majority of studies referenced above report only on earnings of graduates who are in the workforce. But the effects of college should also be assessed in terms of employment rates, and, in the case of disabled individuals, the effect on reducing long-term dependence on public assistance in the form of SSI and SSDI. Although the added value in terms of increased salaries between deaf and hard-of-hearing college graduates and nongraduates appears to be of a magnitude similar to statistics for the general population, the value of this difference must be tempered if larger numbers of the disabled graduates do not participate in the labor force and receive long-term federal financial assistance through the SSI and SSDI programs. Schroedel and Geyer (2001) indicate that 85% of the college graduates in their study were in the workforce, in contrast to 90% of college graduates without disabilities (Hale, Hayghe, & McNiel, 1998).

Findings by Walter, Clarcq, and Thompson (2002) indicate that graduation from college results in major economic benefits for deaf and hard-of-hearing persons. They estimated that deaf baccalaureate graduates will earn about 68% more over their working lives than students who attended but withdraw without a degree. Sub-baccalaureate graduates will earn 29% more than those who withdraw. These figures are in keeping with national statistics for the general population. These authors also report that college reduces dependence on federal subsidies such as SSI and SSDI.

Furthermore, Weathers et al. (2007) report that deaf postsecondary degree earners who participated in the SSI program while children (due to low-income levels of their families) subsequently rely on the SSI program as adults to a lesser extent than their peers who do not earn postsecondary degrees. This means that earning a college degree reduces the reliance on such programs for even those who were in families in low economic brackets as children.

The purpose of this article is to document the economic outcomes of graduating from college, specifically the NTID, by reporting on the results of

a study conducted in collaboration with the Social Security Administration in 2006. NTID is one of two postsecondary institutions in the country for deaf and hard-of-hearing students. Gallaudet University, in Washington DC, is a liberal arts college with an enrollment of approximately 1,000 deaf and hard-of-hearing students in Fall 2009 (Gallaudet University, 2009). NTID is one of eight colleges at the Rochester Institute of Technology (RIT), with a Fall 2009 undergraduate deaf and hard-of-hearing enrollment of approximately 1,200 students (National Technical Institute for the Deaf, 2009, p. 48).

Our hypothesis is that investments in postsecondary training increase the likelihood of employment for persons who are deaf or hard of hearing and thus reduce dependency on disability-related income support programs. This study examined the economic condition of deaf and hard-of-hearing individuals who exited from NTID between 1970 and 2006, looking at postsecondary educational attainment, income, employment levels, and the transition into and out of U.S. Social Security Administration (SSA) disability programs.

This paper will examine the following questions:

- How does completion of postsecondary education influence participation in the labor force?
- How does completion of postsecondary education influence lifetime earnings of deaf and hard-of-hearing persons?
- How does completion of postsecondary education affect the timing of transitions off of the SSI and SSDI programs?

The literature review suggests that the economic handicapping effects of severe-to-profound deafness are somewhat reduced as one achieves higher levels of education beyond high school. What this study adds to the field is a comprehensive case study of the population of individuals who apply to attend a college geared toward high-quality technology-orientated training for individuals who are deaf or hard of hearing, by conducting a secondary analysis of institutional data, matched with federal reports of income, earnings and SSI and SSDI participation rates. The next section of this paper explores the impact of postsecondary education by considering data from a recent study conducted at NTID.

Study Methodology

To gather data about earnings and numbers of alumni reporting earnings, NTID negotiated a contract with the SSA. Under this contract, NTID provided the SSA with detailed data about the education, dB levels, demographics and family background of individual alumni, and the SSA merged this information with earnings and employment histories up to 2006, and SSDI and SSI histories as well up to 2006. Subsequently, the SSA returned tabular information about NTID alumni.

Life history files were constructed. Individuals were followed over time, with detailed longitudinal information about their employment, income, and SSI and SSDI participation levels. The tabular information returned to NTID consisted of demographically sorted tables; for example, all male graduates with a 4-year degree, and their employment levels across the range of ages between when they dropped into the sample until either 2006 or their age when they dropped out of the sample (e.g., due to death). Thus, for example, regardless of whether someone was 18 years old in the year 1968 or the year 2006 or anywhere in between, their employment level is reported when they were 18 (as well as for every other year of age where they were part of the datafile). Certainly, growth modeling (Singer & Willett, 2003; Willett, Singer, & Martin, 1998) could be used to track the individual growth of our outcome variables. For this study, we focused on a descriptive picture of growth across age: outcome levels are reported for everyone when they were 18, 19, 20, and on up until age 50 (or whatever lower and upper age each individual had in 2006), regardless of the year of data collection for that value. What this means is that age was controlled for in this study, but chronological time (year of data collection) was not a control variable. See Singer and Willett (2003) for a detailed discussion of this design. Graphs included in the results section of this paper are thus longitudinal with data of individuals over time, grouped across different age levels in 1-year increments.

The SSA followed strict confidentiality guidelines in providing NTID with information. No data about individuals who made up the pool of subjects were reported. NTID made no requests of individuals to furnish any information and no personal information on in-

dividuals by way of name or address was used in data analysis.¹ The SSA makes disclosure of grouped information to RIT under authority found in the Privacy Act of 1974 as amended by U.S.C. Section 552a (b)(5):

Section 552a (b)(5) states that disclosures may be made to a recipient who has provide the agency with advance adequate written assurance that the record will be used solely as a statistical and reporting record, and the record is to be transferred in a form that is not individually identifiable.

In January 2007, NTID forwarded a data file to the SSA from which they matched the records for 14,106 individuals. After detailed verification and matching processes were completed by the SSA, 13,477 individuals remained in the database: 1,509 who had been denied admission to NTID, 5,527 who had entered but withdrew, 2,046 who had been admitted but had chosen not to attend, and 5,024 who had graduated. The file contained the following variables for each case: Social Security number, year of exit (1970–2006), gender, degree attainment, and birthdate. The degree attainment variable defined four groups of deaf or hard-of-hearing participants: (a) graduates who completed a bachelor's degree from RIT (Bachelor, $n = 1,363$); (b) sub-bachelor's graduates from NTID ($n = 1,507$ terminal Associate degrees and 1,638 Associate degrees with transfer options to Bachelor's programs); (c) individuals who attended NTID but withdrew prior to receiving a degree (Withdrawn); and (d) applicants to NTID who were denied admission (Rejected). Graduates with certificates or diplomas (less than 2-year degree programs) or with master's degrees were not included in this analysis due to small sample size (223 certificates and diplomas and 213 master's degrees).

In total, 56% of the cases were male and 44% female. The number and percentage of male participants exceeded female participants at all age levels. Enrollment at the Rochester Institute of Technology as a whole has included more men than women—although the difference is larger than at NTID: For the last 5 years, the annual percent of female students has ranged from 29.8% to 32.6% (Rochester Institute of Technology, 2009).

SSA matched the cases with historical files they maintain² and created life history files of earnings,

employment, and SSI and SSDI participation from the time that individuals applied to NTID until 2006. From the extracted data about individuals, the SSA created tables summarizing the numbers of individuals reporting earnings, the average annual earnings of these individuals, and the participation rates in SSI and/or SSDI programs. All tables were presented by degree level and age. These data provided the basis for the analyses reported in this article. The graphs in this article present growth over time, grouped by age in years, where age is controlled for but chronological time is not. This means we explicitly did not pay attention to chronological cohort differences in this study; instead, we were interested in what happens to people as they age in the work force specifically with respect to their income, employment level, and participation in SSI and SSDI federal disability programs.

The deaf participants in this study represent the universe of individuals exiting NTID from 1970 to the spring quarter of 2006, as well as those who applied but who either were not admitted or who chose not to attend. This sample was retrieved from the RIT Student Record System and thus is not intended to be representative of deaf and hard-of-hearing persons in the United States. Because this represents popula-

tion data, and because the number of individuals in the study is so large, significance testing is not appropriate; any difference between groups would result in being statistically significant (even at an alpha level of .01). Thus, the results stand on their own descriptively.

Results

Employment of Graduates

NTID has, as its highest priority, facilitating employment of its graduates. For the purposes of this study, income reported to the Internal Revenue Service that qualifies for the social security tax deduction (Federal Insurance Contributions Act [FICA]) is assumed to be evidence of employment. The SSA provided information about the numbers of participants reporting qualifying earnings each year since their application to NTID. Figure 1 summarizes the information obtained from the SSA in the form of percentages of the participants reporting income, classified by age and degree level.

The effects of graduation from NTID on employment are substantial. Graduates report earnings at rates substantially higher than nongraduates (withdrawals or rejects). At age 30, approximately 85% of graduates

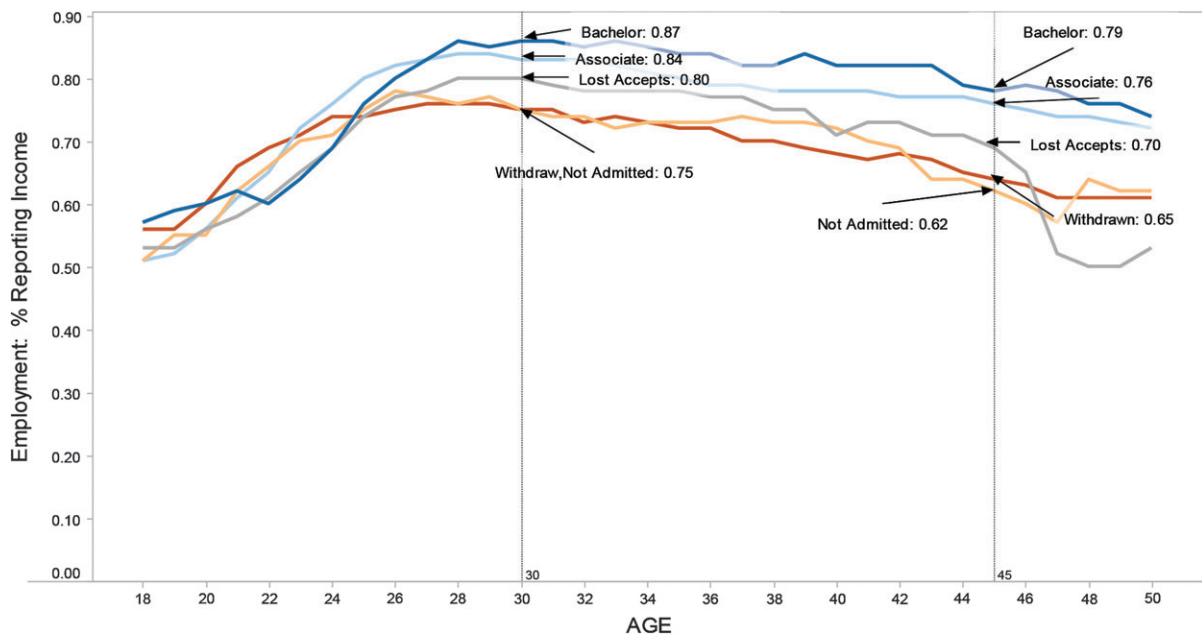


Figure 1 Percent of participants reporting earnings by age, degree attainment (ages 20 through 50).

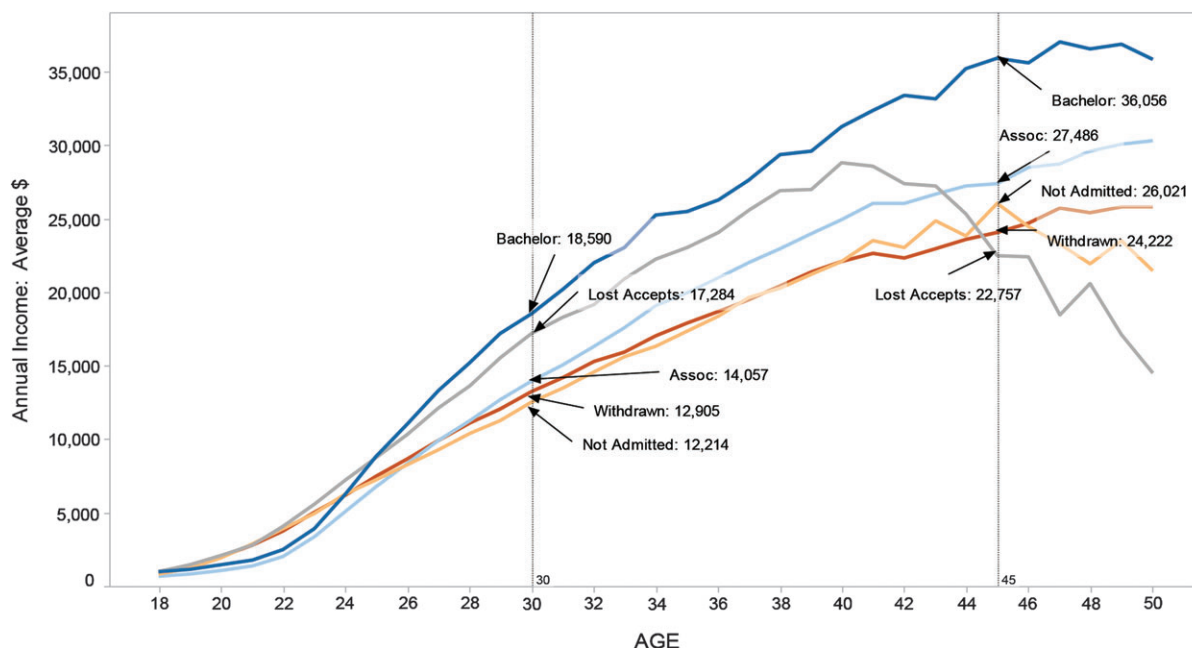


Figure 2 Earnings of participants by age, degree attainment (ages 20 through 50).

(both bachelor and associate) report having earnings from work. For nongraduates (withdrawals and rejects), about 75% report earnings at age 30. By age 50, 74% of bachelor and 72% of associate graduates reported earnings, whereas only 61% of withdrawals and 62% of rejected students reported earnings. Remarkably, of those who were admitted but who chose to not attend (referred to as “lost accepts” in figures), only 53% were employed at the age of 50. All things being equal, a degree from NTID/RIT substantially increases labor force participation rates (as measured by those reporting income) for individuals who graduate over those who do not graduate. Noticeably, those who were accepted to NTID but who chose not to attend show a higher employment rate than those who did not graduate (withdrawals and rejects) through their late 40s but a lower employment rate than that of NTID graduates.

Earnings of Graduates

In the previous section, it was indicated that substantially more graduates reported earnings than individuals who had withdrawn or been denied admission to NTID. The analysis that follows is based only on the

earnings of individuals who reported some income during the years covered by the study and does not factor in zero dollars for individuals not reporting earnings. These results are presented in Figure 2.

For alumni, the effects of college graduation on increasing earning power is dramatic. In 2005 dollars, between the ages of 25 and 50, bachelor's graduates will earn, on average, approximately \$15,000 per year more than students rejected for admission and \$12,000 more than those who attend but withdraw without a degree. Associate degree graduates will earn about \$7,000 less per year than bachelor graduates but approximately \$8,000 more per year more than students who were denied admission and \$5,000 more than students who withdrew without a degree. These differences demonstrate that not only are graduates employed at higher rates but they also earn significantly more than individuals who withdrew or were denied admission to NTID.

In percentage terms, the incremental benefit on earnings of completing college is significant when compared to nongraduates. On average, between the ages of 25 and 50, bachelor's graduates earned 66% more, and sub-bachelor's graduates 34% more than individuals who were denied admission. Subjects who dropout of college without completing a degree

report earnings that differ only slightly (18%) from students who were denied admission and thus never attended NTID. These data present further evidence of the importance of completing a college degree. If a student attends college and drops out without a degree, the economic impact of attendance is minimal in terms of increased earnings.

Participation in SSI and SSDI

The federal government provides two income-support programs targeted toward disabled individuals: SSI and SSDI. SSI is a federal entitlement program established in 1972 and is intended to provide income support for disabled individuals with little or limited resources. Disability eligibility for SSI funds includes having “a medically determinable physical or mental impairment that results in marked and severe functional limitation(s), and which can be expected to result in death, or has lasted or can be expected to last for a continuous period of not less than 12 months” (Social Security Handbook, 2010, chap. 21, p. 12). To be eligible for SSI, a disabled person must be a U.S. citizen or legal resident with limited resources.

SSDI is a federal social insurance program established in 1956 for disabled workers who are eligible for

Social Security coverage. “Social Security pays benefits to people who cannot work because they have a medical condition that is expected to last for at least a year ...” (Social Security Administration, 2010, p. 4). SSDI is intended to be a temporary means of support while an individual is recovering from some disabling condition. In practice, however, fewer than 10% of individuals receiving benefits leave the SSDI rolls (Mashaw, Reno, Burkhauser, & Berkowitz, 1996). To be eligible for SSDI, a disabled person must have worked or had been working but earning less than the Substantial Gainful Activity level (\$830/month in 2005) and paid FICA tax for enough years to be covered under Social Security.

Figure 3 presents information about the percentage of participants who collected SSI benefits by age and education level. Age has a significant impact on receipt of SSI payments for NTID alumni. From the graph, it is clear that the percentage of participants collecting SSI declines sharply from about 60% of cases in the early 20s until the mid-30s when the rate of participation averages about 2% for graduates (both bachelor and associate) and 10% for individuals who have withdrawn or were denied admission. Although rates decline significantly for all groups the rate of decline is slower for nongraduates and remains about

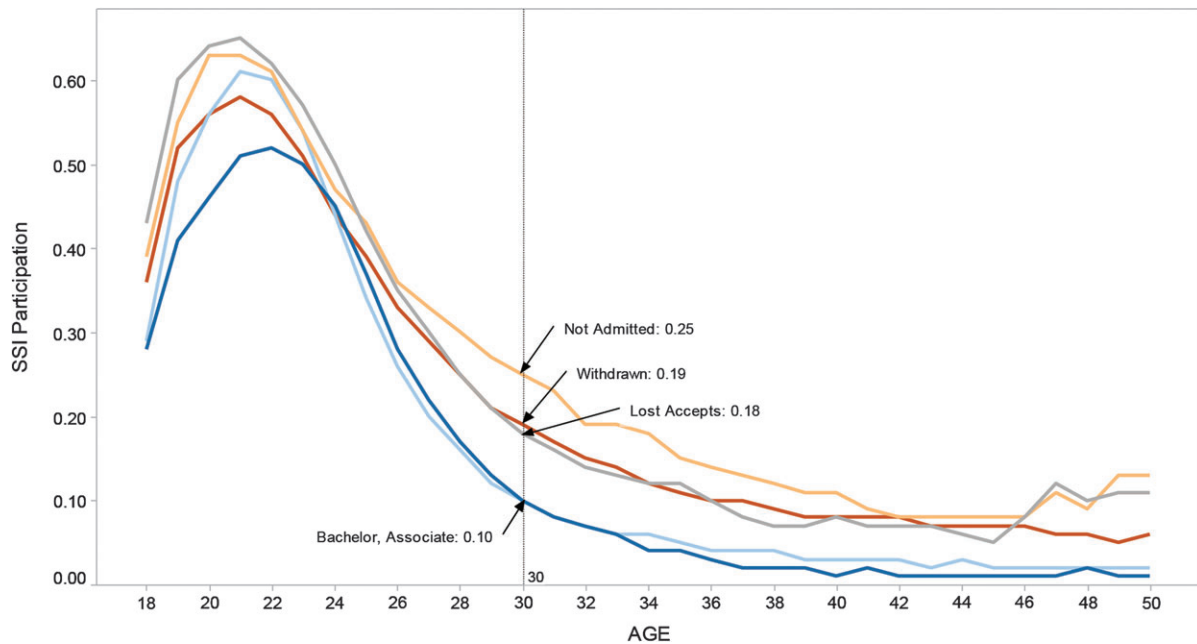


Figure 3 Percentage of participants participating in SSI by age, degree attainment (ages 20 through 50).

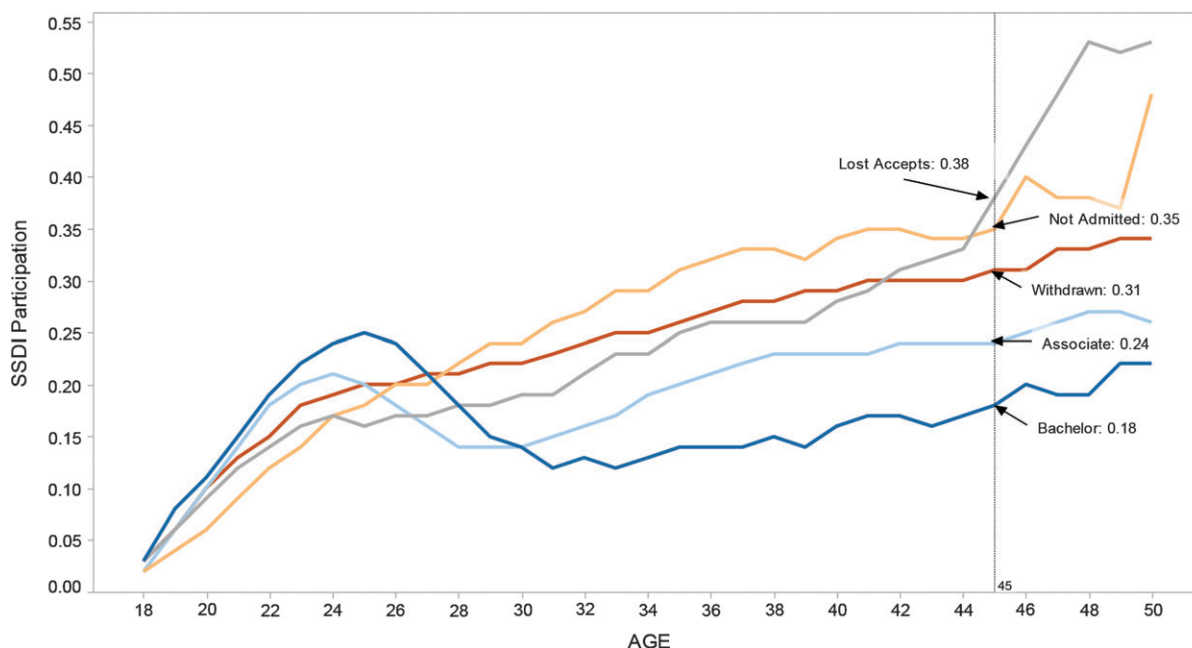


Figure 4 Percentage of participants participating in SSDI by age, degree attainment (ages 20 through 50).

8% higher throughout the middle-age years. Again, college graduates participate in the SSI program at lower rates than nongraduates.

Figure 4 graphically presents information about participants' participation in the SSDI program. Overall, the percentage of individuals collecting SSDI who withdrew or were denied admission was greater than for individuals who graduated. The percentage of graduates collecting SSDI increases until the mid-20s (although students are completing school and looking for work) and then declines sharply until about age 30 when only about 10% of graduates collect SSDI. After about age 30, there begins a slow increase in participation until at age 50 about one quarter of graduates are collecting benefits. The rates for graduates contrast greatly with the nongraduates whose rates of participation increase continuously from about 10% at age 20 to more than 35% by age 50. When compared with nongraduates, a degree from NTID substantially reduces dependency on SSDI.

Discussion

Graduation from college results in major economic benefits for deaf and hard-of-hearing persons. Baccalaureate graduates in this study will earn about 66%

more over their working lives than students who were rejected for admission. Sub-baccalaureate graduates will earn 34% more than those who were denied admission. With respect to labor force participation, about twice as many nongraduates report no earnings than do graduates.

Although 60% of students who attend NTID receive benefits through the SSI program while enrolled (Clarq & Walter, 1998), by age 40 nearly all who graduate have ceased drawing benefits. Yet, 5–10% of students who withdraw or were denied admission continued to receive benefits at age 40. In addition, graduates access SSDI (fundamentally an unemployment benefit) at far lower rates than withdrawals or students denied admission. For the participants of this study, withdrawals or those denied admission were found to be far more likely to participate in the SSI or SSDI programs than were graduates, especially during the prime working years between 25 and 50. It is abundantly clear that a significant number of individuals who do not complete a college degree continue to depend heavily on the federal government for basic income support throughout their lives.

These data show very clearly the benefits of acquiring a college degree. They speak poignantly about increased employment rates, increased earnings and

resulting increased taxes and decreased dependency on federal income support programs.

A question not answered by this study is how NTID deaf students and applicants compare to hearing students from the same institution. Despite the advantage of education, deaf individuals are still probably paid less than hearing individuals on average. A gap between earnings of deaf and hearing individuals has been well documented at the national level (see Crissey, 2009), as well as internationally: A body of work on the employment of deaf and hard-of-hearing postsecondary degree earners in Australia shows a persistent gap compared to the income earning levels of hearing Australian postsecondary degree earners (see Winn, 2007 for a comprehensive review). Nationally in the United States, bachelor's degree college graduates earned an average of \$46,805 in 2007 (Crissey, 2009; Jones, 2004). In our study, because we controlled for age but not for chronological year, a similar figure is not available; however, on average, NTID graduates with a 4-year degree earned \$38,328 in 2005 dollars. What will be included in a future iteration of this study is a matched group of hearing graduates from other colleges of RIT. Undoubtedly, there is a split between earnings of deaf and hearing graduates of RIT colleges. Certainly, a college education does much to mitigate long-term self-sufficiency outcomes for individuals with disabilities and deaf and hard-of-hearing individuals in particular. However, other social factors are additionally at play.

A question that must be raised concerns the disincentives introduced by having SSI and SSDI benefits available to deaf college graduates. Although qualifying disabled individuals (including deaf and hard-of-hearing) have a right to collect these benefits, results of this study raise an issue of competing federal policies. On one hand, the federal government requires funded programs such as NTID to report evidence of student outcomes related to labor force participation and job growth. Data from this study show that graduates obtain jobs immediately after graduation and earn incomes considerably in excess of their nongraduating peers. Further, graduating from NTID eliminates long-term dependency on SSI. On the other hand, a percentage of graduates collect SSDI after graduation, and the decision to

apply for benefits does not appear to be influenced by educational level. This finding leads to the inference that the collection of SSDI payments by participants in this study is not so much based on need or a disability which restricts ability to work, but on the fact that SSDI is a benefit based solely on the hearing disability. Some argue that Americans with Disabilities Act requirements and SSDI and SSI benefits have in fact resulted in a drop in employment of deaf workers (Houston, Lammers, & Svorny, 2010).

From the results presented, and the literature concerning work disincentives created by SSDI (Mashaw, Reno, Burkhauser, & Berkowitz, 1996), it is expected that few individuals receiving SSDI will ever reenter the workforce (although it is an employment-related benefit, in that it depends upon having had a work and income history). As a result, although the short-term outcomes for NTID are positive, longer term outcomes are tempered by disincentives to work resulting from availability of SSDI benefits to NTID graduates. This is not a unique phenomenon to deaf and hard-of-hearing individuals receiving SSDI benefits: whether using longitudinal or cross-sectional data, it is relatively rare for SSDI beneficiaries to find work and leave the rolls (Liu & Stapleton, 2010). However, what are not addressed here are the larger policy implications behind this possible disincentive: during the 1990s, all categories of people with disabilities experienced greater eligibility for the program as well as declining employment rates (Burkhauser & Stapleton, 2003; Goodman & Waidmann, 2003). This is an area for future research. Another area of future research would be to extend this analysis to looking at differences between men and women in this population, as well as to differences amongst specific degree programs. MacLeod-Gallinger (1992) conducted a study of female graduates from NTID and found some discrepancies in area-of-study choices, and later career outcomes.

This report summarizes a rather phenomenal case study: That of the entire population of applicants to the college of NTID. It would be valuable to extend this work in the future to other institutions of postsecondary education. We do not know whether those who apply but who choose not to come to NTID attend another institution nor do we know

whether those who withdraw from NTID choose to complete a degree elsewhere. Future work includes plans on extending this beyond the case of NTID. This finding could be similar across institutions or it could be that there's something unique about an education from RIT/NTID that helps graduates succeed in the workforce. It is possible that the technical focus of programs at NTID and RIT have a positive impact on the employment, income, and disability insurance program participation levels. Although there is no single answer regarding whether a liberal arts education versus a technical undergraduate education has a better impact on life-long earnings and employment (and other factors certainly have a large impact, such as specific areas of study, part-time job experiences while in school, etc.; see Pascarella & Terenzini, 1991, chap. 11), by extending this study, we hope to shed light on the issue.

Certainly, the results of this study suggest a substantial economic benefit for those who persist to graduation. However, for those who gain access but dropout before graduation the economic effects are minimal, and differ little from individuals who never gained access to NTID. This finding demonstrates the importance of, once admitted, gaining a college credential through graduation.

Notes

1. The Privacy Act of 1974 as amended by U.S.C. Section 552a (b)(5) states that disclosures may be made to a recipient who has provided the agency with advance adequate written assurance that the record will be used solely as a statistical and reporting record, and the record is to be transferred in a form that is not individually identifiable.

2. Files include the Master Beneficiary Record files (MBR, 2006), Numident records (Office of the Inspector General, Social Security Administration, 2005), the Master Earnings File (Olsen & Hudson, 2009), and the Supplemental Security Record Longitudinal files (Pickett & Scott, 1996).

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Conflicts of Interest

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