

# Predictors of Postschool Employment Outcomes for Young Adults With Severe Disabilities

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## Abstract

Although entry into the world of work is a prominent marker of postschool success in the United States, students with severe disabilities often leave high school without the skills, experiences, and supports that lead to meaningful employment. The authors examined the extent to which an array of student, family, and school factors was associated with employment during the 2 years following high school. Having held a paid, community-based job while still in high school was strongly correlated with postschool employment success. In addition, being male and having more independence in self-care, higher social skills, more household responsibilities during adolescence, and higher parent expectations related to future work were all associated with increased odds of employment after school for young adults with severe disabilities. Implications for transition policy and practice are presented along with recommendations for future research addressing the career development of youth with intellectual disabilities, multiple disabilities, and autism.

## Keywords

transition, intellectual disability, multiple disabilities, autism, employment, postschool outcomes, career development, high school

Expanding access to meaningful employment has been a long-standing emphasis of policy and legislative initiatives focused on transition-age youth and young adults with disabilities (National Council on Disability, 2008; Phelps & Hanley-Maxwell, 1997; President's Commission on Excellence in Special Education, 2002). Indeed, improving employment outcomes was a prominent element within early conceptualizations of transition education (Halpern, 1985; Will, 1984). Although frameworks for high-quality transition services and supports have evolved over the last 25 years, equipping youth to secure meaningful work after high school or college has endured as an essential outcome of education in the United States. This abiding accent is apparent within the Individuals With Disabilities Education Improvement Act (IDEA) of 2004, which states that a central purpose of special education is to "prepare [students with disabilities] for further education, employment, and independent living" as part of a national policy aimed at "ensuring equality of opportunity, full participation, independent living, and economic self-sufficiency for individuals with disabilities" (Public Law 108–442).

The exigency to better prepare students with disabilities for future careers is especially apparent when considering the current outcomes encountered by adults with severe disabilities.

Most available indicators suggest that a relatively small proportion of adults with severe intellectual disabilities, autism, or multiple disabilities access paid work experiences in their local communities (Boeltzig, Timmons, & Butterworth, 2008; Butterworth, Smith, Hall, Migliore, & Winsor, 2010; Cimera & Cowan, 2009; National Organization on Disability, 2010; Rusch & Braddock, 2004; Verdonshot, De Witte, Reichrath, Buntinx, & Curfs, 2009). Moreover, many work experiences—when they do occur—involve low wages, provide few hours, and take place within segregated settings. As Rusch, Hughes, Agran, Martin, and Johnson (2009) implied, the prevailing transition bridge could be readily characterized as a "bridge to nowhere" for substantial numbers of youth with severe disabilities. As a result, researchers, policy makers, practitioners, and other advocates are calling for renewed emphasis on improving the quality of transition preparation provided to youth and young adults with severe

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disabilities (Carter, Ditchman, et al., 2010; Certo et al., 2008; O'Day & Stapleton, 2009; Test, 2008).

One promising avenue for informing the design and delivery of transition education and employment preparation for youth with severe disabilities involves examining factors associated with improved early postschool outcomes. The extent to which students with severe disabilities enter the workforce after exiting high school can provide an important metric for gauging the impact of existing transition services and supports. At the same time, identifying strong correlates of favorable adult employment outcomes can provide critical insights into the various factors that may shape the career paths of graduates during early adulthood (Test, Mazzotti, et al., 2009). Although there have been almost 100 follow-up or follow-along research studies addressing the employment outcomes of young adults with disabilities (Alverson, Naranjo, Yamamoto, & Unruh, 2010), very few studies have focused specifically on the experiences of individuals with severe disabilities. Rather, much of what is known about predictors of postschool employment comes from studies primarily involving students with high-incidence disabilities or heterogeneous samples (e.g., Benz, Lindstrom, & Yovanoff, 2000; Shandra & Hogan, 2008). Given the often complex and multifaceted service and support needs of transition-age youth with severe disabilities, additional research is needed that identifies factors that may individually or collectively impact the employment prospects of these youth.

Four broad categories of factors may be especially salient to consider in longitudinal analyses of postschool employment experiences. First, prior research suggests that demographic variables such as gender, race/ethnicity, and disability category may be associated with differential work outcomes (Boeltzig, Timmons, & Butterworth, 2009; Newman, Wagner, Cameto, & Knokey, 2009). However, the extent to which employment outcomes also vary substantively among graduates with severe disabilities is not well documented. Second, the specific competencies youth with severe disabilities possess may also impact their prospects for future employment (Test, Mazzotti, et al., 2009). Interpersonal, communication, self-determination, and self-care skills—if strongly associated with work outcomes—represent potential foci of instructional efforts while students are still in secondary school. Third, the resources and expectations of families may also influence postschool employment (Blacher, Kraemer, & Howell, 2010; Emerson, 2007). Yet, relatively little research has addressed the ways in which parents might impact the career trajectories of youth with severe disabilities (e.g., Lindstrom, Doren, Metheny, Johnson, & Zane, 2007). Fourth, most transition frameworks emphasize the importance of youth accessing an array of career development experiences and supports offered through (e.g., vocational coursework and career assessments) or outside (e.g., work study, after-school jobs) the school (Kohler & Field, 2003; National Collaborative on Workforce and Disability for Youth, 2009).

Understanding whether and how these experiences contribute to later employment can provide insights into the types of opportunities that should be provided while students are still in high school.

The postschool employment of young adults with disabilities is likely shaped by multiple factors that coalesce in complex ways. In this study, we focused our analyses on the contributions of four sets of factors—student demographic, student skill, family, and school—to the early postschool employment outcomes of young adults with severe disabilities. We drew on the National Longitudinal Transition Study–2 (NLTS-2) to address the following research questions: What are the post–high school work experiences of young adults with severe disabilities? To what extent are student demographics, student skills (e.g., social, communication, and self-care), family factors (e.g., family resources and parent expectations), and high school career development programming associated with employment after high school?

## Method

### NLTS-2

The NLTS-2 was designed to provide nationally representative information about students receiving special education services as they transition from secondary school to adulthood. Data were gathered over a 10-year period (2000–2010) from parents, youth, teachers, and schools in a series of five waves (every 2 years). The NLTS-2 included more than 11,000 youth who were aged 13 to 16 years (as of December 1, 2000) and received special education services. Youth were selected in a two-stage sampling process. First, a stratified random sample of more than 500 school districts and almost 40 special schools was selected, with stratification based on geographic region, district size, and community wealth. Second, students were randomly selected from each of the federally designated special education disability categories. Sampled youth were weighted to create a nationally representative sample of all students receiving special education services in public schools (of >100 total student population) or state-operated special schools, by disability category, and at each of the ages within the 13- to 16-year-old age range. As of early 2010, data were released for the first four of five waves; data from these first four waves were analyzed for this study.

Data were collected from multiple sources using a variety of different instruments. In this analysis, we used data from the *Parent Interview* (PI) or *Parent–Youth Interview* (PYI), *Student's School Program Survey* (SPS), and the *School Characteristics Survey* (SCS). In Wave 1, the PI was conducted by telephone with a parent or guardian (hereafter referred to as parent); when a parent could not be reached by telephone, selected questions were asked via a mail survey.

The response rate for combined parent data sources was 82.1%. In Waves 2 to 4, the PI was replaced with the PYI. Parents continued to respond to interview questions regarding family and youth characteristics and expectations. In addition, youth were interviewed (either by phone or mail) regarding work, extracurricular activities, postsecondary school, and other experiences. If youth were unable to respond to the interview questions, parents continued to respond to key questions. For this analysis, parent and youth responses to the same questions were combined, with the youth response chosen when available. Response rates for the PYI were 61.1%, 50.4%, and 50.1% in Waves 2, 3, and 4, respectively. The SPS was completed by school personnel who were most familiar with the student's school program in Waves 1 and 2 (response rates were 53.1% and 52.2%, respectively). The SCS was completed by the school principal or other administrator regarding the school as a whole in Wave 1 (response rate = 56.6%).

### Longitudinal Sample

In a previous NLTS-2 analysis examining employment experiences while students were still in school, we developed criteria to identify students with severe disabilities (see Carter, Austin, & Trainor, 2011). Students were first selected from within the primary disability categories of intellectual disability,<sup>1</sup> multiple disabilities, or autism, and considered for inclusion if they were enrolled in school or receiving instruction in a nonschool setting. From this sample, students were considered to have "severe disabilities" if they were reported on the SPS to be eligible for an alternative assessment in their school district during the year of the survey. Specifically, respondents on the SPS were asked whether the student would participate in an alternative assessment in place of any mandated standardized test during the current school year. If an alternative assessment eligibility was not indicated (i.e., not scheduled for an assessment that year or data not provided), a student was included in the sample if a parent reported he or she had functional cognitive skill deficits (i.e., performs *not at all well* or *not very well*) in two or more of the following areas: reading and understanding common signs, telling time on a clock with hands, counting change, or looking up phone numbers and using the telephone. This resulted in a sample of 1,510 students<sup>2</sup> with severe disabilities in Wave 1. Students were selected for the current analysis if they met the following criteria: (a) met the criteria of severe disability in Wave 1, (b) were enrolled in school in Wave 2 or Wave 3 and out of school during the subsequent wave, and (c) data were available for their current work status. This resulted in a total sample of 450 youth, 130 of whom had left school by Wave 3 and 320 who had left school by Wave 4. In most cases, variables from Wave 1 were used as baseline predictors if students were out of school in Wave 3 and variables from Wave 2 were

used if students were out of school in Wave 4. A few questions (e.g., self-care status) asked in Wave 1 were not asked or were only asked of a few parents in Wave 2. For these questions, we used Wave 1 responses or a combination of Wave 1 and Wave 2 responses as predictors for students who were out of school by Wave 4.

### Employment Outcome Variable

We considered several job outcomes, including current employment, any employment in the previous 2 years, and competitive employment (defined as a job that pays greater than or equal to minimum wage and where employees with disabilities were not in the majority). We chose current employment status (reported by the student and/or parent if student info was unavailable) as the most relevant outcome for the regression analysis. Specifically, young adults or their parents were asked, "[Do you/does youth] have a paid job now, other than work around the house or a school-sponsored job?" Information about types of jobs, transportation to work, hours worked, and hourly pay is also reported.

### Predictor Variables

We examined groups of variables previously associated with employment outcomes for young people with disabilities, including student demographics and primary disability, prior work experience, student skills, family characteristics and expectations, and school program characteristics (Carter, Ditchman, et al., 2010; Test, Mazzotti, et al., 2009). For questions with more than two response levels, levels were combined if fewer than 10% of respondents chose a response, if few or no participants had post-high school employment at that response level, and/or if the relationship of adjacent levels to the response were very similar. Details of which levels were combined are provided in Tables 3 to 5.

**Student demographic factors.** Demographic variables included student age in years at the baseline interview, gender, race/ethnicity (i.e., White, African American, and other<sup>3</sup>), and disability category. Demographics for the entire sample, as well as employment and graduation status, are displayed in Table 1.

**Work history.** Several baseline work history variables were examined as predictors of current employment. They included whether students had paid or unpaid work-study experience, had paid employment outside school, and worked during the summer, school year, or both (see Table 2).

**Student skill factors.** Ratings of student skills and abilities were obtained from the PI or PYI and SPS. Parents rated students' communication skills, ability to understand others, self-care skills (i.e., feeding and dressing independently), ability to get to places outside the home independently, and social skills. As reflected in Table 3, some response levels were combined. Parents rated their child's social skills on 11

**Table 1.** Descriptive Statistics for Sample Characteristics

Variable	<i>n</i> <sup>a</sup>	%
Gender		
Female	140	31
Male	310	69
Race/ethnicity		
White	280	62
African American	110	23
Other	60	14
Primary disability category		
Autism	160	36
Intellectual disability	120	26
Multiple disabilities	170	38
School-leaving status		
Graduated	280	68
Tested to receive diploma or certificate	40	8
Left voluntarily/dropped out	50	11
Aged out	50	11
Other	10	2
Currently attending postsecondary school		
Yes	70	16
No	370	84
Currently employed		
Yes	120	26
No	330	74

<sup>a</sup>Rounded to nearest 10.

**Table 2.** Summary of Logistic Regression Model of Previous Work Experience Predicting Current Employment

Variable	<i>n</i> <sup>a</sup>	OR [95% CI] <sup>b</sup>
Previous work experience		
No work experience	240	— <sup>c</sup>
Unpaid work-study	70	1.01 [0.53–1.93]
Paid work-study	60	2.63 [1.40–4.94]**
Community employment	50	2.29 [1.18–4.45]*
Paid work <sup>d</sup>		
No	310	—
Yes	110	2.46 [1.52–3.98]***

Note: OR = odds ratio; CI = confidence interval.

<sup>a</sup>Cell sizes rounded to nearest 10.

<sup>b</sup>Derived from separate models, each adjusted for age, sex, primary disability, and race/ethnicity.

<sup>c</sup>Reference level.

<sup>d</sup>Paid work combines work experience as follows: No = no work experience or unpaid work-study; Yes = paid work-study or community employment.

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

items (e.g., makes friends easily, seems self-confident in social situation, starts conversations rather than waiting for others to start, and receives criticism well), 9 of which were from the standardized Social Skills Rating System

(Gresham & Elliott, 1990). Parents indicated the frequency with which children demonstrated these behaviors (*never* = 0, *sometimes* = 1, and *always* = 2) with scores reversed for negatively worded items, and ratings were summed to form a Social Skills Scale. Consistent with Wagner, Kutash, Duchnowski, Epstein, and Sumi (2005), we considered scores one standard deviation (*SD*) below the mean (0–10) of the NLTS-2 sample *low* social skills, within one *SD* of the mean (11–16) *medium* social skills, and greater than one *SD* (17–22) *high* social skills.

Teachers' ratings of students' classroom behaviors and skills were obtained from the SPS. Ratings from special education and vocational classes were combined, with the special education classroom rating selected if both were available. A Classroom Social Scale (three items) was derived from teacher ratings of the student's ability to get along with peers, to follow directions, and to act appropriately in class (1 = *not at all well*, 2 = *not very well*, 3 = *pretty well*, and 4 = *very well*). If a single variable was missing, its value was imputed using the mean of the other two items. A sum of 3.0–7.0 was considered low ability, 7.1–9.0 was considered medium ability, and 9.1–12.0 was considered high ability. A Classroom Behavior Scale (four items) was derived from teacher responses to how frequently (1 = *rarely*, 2 = *sometimes*, 3 = *usually*, and 4 = *almost always*) the student completes homework on time, participates in class discussions, stays focused on his or her work, and withdraws from social contacts or class activities (with scores reversed for the negatively worded item). Scores of 4.0–9.0 were considered *low*, 9.1–13.0 *medium*, and 13.1–16.0 *high*. Self-advocacy was based on teacher ratings of one item on how well the student asked for what he or she needed to do his or her best in class (1 = *not at all well*, 2 = *not very well*, 3 = *pretty well*, and 4 = *very well*).

**Family factors.** Head of household's education and employment status, poverty status, and difficulty with transportation were examined as family factors. Because parent expectations may impact youth employment, we examined parent ratings (given while youth were in high school) of whether they expected the student to ever have a paying job or to be self-supporting (*definitely will not*, *probably will not*, *probably will*, and *definitely will*). As shown in Table 4, some levels were combined. A household responsibilities scale was created based on the sum of ratings of how frequently (1 = *never*, 2 = *sometimes*, 3 = *usually*, and 4 = *always*) the student fixes his or her own breakfast, does laundry, cleans his or her room, and picks up a few things at the store. Scores of 4 to 8 were considered *low* and were compared to *moderate* to *high* scores of 9 to 16.

**School program.** The SPS included information on school programs that could prepare students for work and future careers, including information about students' participation in prevocational or vocational classes, in-school work experience, Individualized Education Program (IEP) prevocational

**Table 3.** Summary of Logistic Regression Models of Student Skills and Prior Work Experience Predicting Current Employment

Variable	Single-variable models		Combined model	
	<i>n</i> <sup>a</sup>	OR [95% CI] <sup>b</sup>	<i>n</i> <sup>c</sup>	OR [95% CI] <sup>d</sup>
Communicating				
Lot of trouble/does not communicate	120	— <sup>e</sup>		NI
Little trouble	220	2.83 [1.53–5.22] <sup>***</sup>		NI
No trouble	110	3.79 [1.91–7.55] <sup>***</sup>		NI
Understanding				
Lot of trouble/does not understand	80	—		NI
Little trouble	250	1.90 [1.01–3.55] <sup>*</sup>		NI
No trouble	110	1.71 [0.83–3.55]		NI
Feeds/dresses self-independently				
Not at all well/not very/well/pretty well	220	—	120	—
Very well	240	2.38 [1.50–3.78] <sup>***</sup>	150	2.65 [1.34–5.24] <sup>**</sup>
Gets places outside the home				
Not at all well	170	—		NI
Not allowed/not very well	100	1.56 [0.82–2.96]		NI
Pretty well/very well	180	3.26 [1.90–5.58] <sup>***</sup>		NI
Social skills scale				
Low (0–10)	140	—		NI
Medium (11–16)	210	1.66 [1.0–2.78]		NI
High (17–22)	70	1.12 [0.56–2.23]		NI
Classroom social scale				
Low (3–7)	70	—	70	—
Medium (7–9)	140	1.42 [0.68–2.93]	130	1.54 [0.70–3.40]
High (9–12)	70	2.26 [1.01–5.04] <sup>*</sup>	60	2.49 [1.03–6.01] <sup>*</sup>
Classroom behavior scale				
Low (4–9)	60	—		NI
Medium (9–13)	140	1.59 [0.75–3.38]		NI
High (13–16)	50	2.56 [1.03–6.34] <sup>*</sup>		NI
Self-advocacy				
Not at all well	60	—		NI
Not very well	100	1.75 [0.70–4.39]		NI
Well/very well	130	3.58 [1.50–8.54] <sup>***</sup>		NI
Paid work				
No		NI	190	—
Yes		NI	70	2.70 [1.41–5.18] <sup>**</sup>

Note: OR = odds ratio; CI = confidence interval; NI = not included in this model.

<sup>a</sup>Cell sizes for single-variable models rounded to nearest 10.

<sup>b</sup>Derived from logistic regression models of each variable and demographics predicting current employment.

<sup>c</sup>Cell sizes for combined model rounded to nearest 10.

<sup>d</sup>Derived from final backward elimination model that began with all variables that had significant ( $p < .05$ ) single-variable odds ratios, demographic characteristics, and paid work. See text.

<sup>e</sup>Reference level.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

or vocational goals, and a variety of job-related and career experiences and supports (see Table 5).

Four programs had very low participation in this data set (i.e., internship, tech-prep, and entrepreneurship programs as well as placement support) and were not considered in this analysis.

### Data Analysis

Our primary aim was to examine the relationship of baseline predictors to current employment status within 2 years following high school. To capture the post-high school work experiences of young adults with disabilities, we used

**Table 4.** Summary of Logistic Regression Models of Family Factors and Prior Work Experience Predicting Current Employment

Variable	Single-variable models		Combined model	
	<i>n</i> <sup>a</sup>	OR [95% CI] <sup>b</sup>	<i>n</i> <sup>c</sup>	OR [95% CI] <sup>d</sup>
Head of household education				
Less than high school	80	0.62 [0.30–1.31]		NI
High school/General Educational Development (GED)	130	0.87 [0.48–1.57]		NI
Some college	100	0.74 [0.39–1.39]		NI
College degree	120	—		NI
Head of household employment status				
Not employed	110	—		NI
Part-time	40	1.58 [0.68–3.66]		NI
Full-time	260	1.29 [0.74–2.26]		NI
Income				
Below poverty level	100	—		NI
Above poverty level	310	1.13 [0.65–1.99]		NI
Transportation				
Very difficult/somewhat difficult	100	—		NI
Somewhat easy	50	0.58 [0.25–1.34]		NI
Very easy	120	0.58 [0.31–1.10]		NI
Expect student to get a paying job				
Definitely will not/probably will not	100	—	100	—
Probably will	140	2.72 [1.28–5.78]**	130	2.42 [1.07–5.47]*
Definitely will	190	5.12 [2.53–10.34]***	170	3.58 [1.58–8.09]**
Expect student to eventually be self-supporting				
Definitely will not	150	—	140	—
Probably will not	200	2.11 [1.23–3.62]**	180	2.04 [1.13–3.68]*
Probably will/definitely will	80	3.58 [1.84–6.97]***	80	2.02 [0.97–4.22]
Household responsibilities score				
Low (score 4–8)	300	—	260	—
Moderate/high (score 9–16)	150	2.35 [1.48–3.75]***	140	1.72 [1.00–2.95]*
Paid work				
No		NI	300	—
Yes		NI	100	1.43 [0.83–2.46]

Note: OR = odds ratio; CI = confidence interval; NI = not included in this model.

<sup>a</sup>Cell sizes for single-variable models rounded to nearest 10.

<sup>b</sup>Derived from logistic regression models of each variable and demographics predicting current employment.

<sup>c</sup>Cell sizes for combined model rounded to nearest 10.

<sup>d</sup>Derived from final backward elimination model that began with all variables that had significant ( $p < .05$ ) single-variable odds ratios, demographic characteristics, and paid work. See text.

<sup>e</sup>Reference level.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

descriptive statistics to summarize demographic variables, current work status, and each group of predictor variables. Because we used a small subsample from multiple waves, we did not use sampling weights in this analysis. Therefore, this analysis cannot be used to make predictions about the population of special education students as a whole but can instead inform the field about associations between baseline variables and employment outcomes. As required by the Institute of Education Sciences, all group sizes are rounded to the nearest 10 youth for presentation purposes.

For most variables, frequencies for all response levels are reported. For school program data, many variables had only two response levels (yes or no); hence, only the percentage of affirmative responses is reported. Sample sizes for each group of variables vary because different surveys produced different response rates. Imputation for missing data was generally not used, except for with the few variables described previously.

To explore how the extent to which each of the four sets of factors (i.e., student demographics, student skills, family factors, and school program factors) were associated

**Table 5.** Summary of Logistic Regression Models of School Programs and Prior Work Experience Predicting Current Employment

Variable <sup>a</sup>	Single-variable models		Combined model	
	<i>n</i> <sup>b</sup>	OR [95% CI] <sup>c</sup>	<i>n</i> <sup>d</sup>	OR [95% CI] <sup>e</sup>
Prevocational classes <sup>f</sup>	210	0.73 [0.41–1.32]		NI
Vocational classes <sup>f</sup>	190	1.26 [0.71–2.24]		NI
IEP primary goal: prevocational skills <sup>f</sup>	150	0.76 [0.45–1.29]		NI
IEP primary goal: vocational skills <sup>f</sup>	140	1.74 [1.00–3.04]*		NI
Career skills assessment <sup>g</sup>	80	1.59 [0.82–3.10]		NI
Career counseling <sup>g</sup>	40	1.63 [0.75–3.58]		NI
Job readiness training <sup>g</sup>	120	1.14 [0.58–2.23]		NI
Job search instruction <sup>g</sup>	70	1.98 [1.00–3.92]*		NI
Job skills training <sup>g</sup>	80	0.89 [0.46–1.74]		NI
Job shadowing <sup>g</sup>	60	1.05 [0.51–2.18]		NI
Job coach <sup>g</sup>	60	1.15 [0.54–2.47]		NI
Outside-school work-study				
0% of school day	150	— <sup>h</sup>		NI
1–24% of school day	70	0.89 [0.44–1.80]		NI
≥25% of school day	60	2.07 [1.04–4.14]*		NI
Within-school work-study				
0% of school day	120	—		NI
1–24% of school day	100	0.80 [0.43–1.48]		NI
≥25% of school day	60	0.66 [0.31–1.40]		NI
Paid work				
No	NI		130	—
Yes	NI		50	2.92 [1.35–6.31]**

Note: OR = odds ratio; CI = confidence interval; NI = not included in this model; IEP = Individualized Education Program.

<sup>a</sup>For the first 11 variables, *n* indicates frequencies of “yes” responses only; reference group for odds ratios are “no” responses.

<sup>b</sup>Cell sizes for single-variable models, rounded to nearest 10.

<sup>c</sup>Derived from logistic regression models of each variable and demographics predicting current employment.

<sup>d</sup>Cell sizes for combined model rounded to nearest 10.

<sup>e</sup>Derived from final backward elimination model that began with all variables that had significant ( $p < .05$ ) single-variable odds ratios, demographic characteristics, and paid work.

<sup>f</sup>Sample size = 290 rounded to nearest 10.

<sup>g</sup>Sample size = 200 rounded to nearest 10.

<sup>h</sup>Reference level.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

with the primary outcome (i.e., current employment status), we used logistic regression modeling. Modeling proceeded in several stages. First, a logistic model was fit for each variable in a group with adjustment for demographic variables (age, sex, race/ethnicity, and disability group). Two-way interactions of the variable of interest and all demographic variables were examined. Only interactions that were significant at an alpha level of .01 were considered. In the second stage, all variables that had a significant ( $p < .05$ ) association with current employment in Stage 1 were combined with a variable reflecting prior work experience (paid work). Models were simplified using backward elimination to produce a combined model for each group of predictors. As a final check, variables reflecting when the youth had finished school, graduation status, and whether they were

currently attending postsecondary school were added to the models to see if they contributed to the explanatory model or changed any relationships.

## Results

### *What Are the Post-High School Work Experiences of Young Adults With Severe Disabilities?*

Overall, 26% of young adults with severe disabilities were currently working when contacted up to 2 years after leaving high school. Among the approximately 120 employed young adults, the five most frequently occurring jobs were categorized as production (28%), building and grounds

cleaning and maintenance (16%), food preparation and serving (15%), office and administrative support (14%), and retail and other sales (6%). Fewer than 5% of young adults participated in any other single job category. Study participants worked an average of 21 hr/week (interquartile range = 9–30) and were paid an average of \$6.15/hr (interquartile range = 3.54–7.50). Forty-three percent of employed young adults were reported to work in jobs where most of the other workers also had a disability. The most common form of transportation was getting a ride from a family member or friend/coworker (35%), followed by using agency or van transportation (28%), using public transportation (22%), or walking, biking, or driving themselves (12%).

### ***Are Previous Work Experiences Associated With Employment After High School?***

As shown in Table 2, baseline work experience (i.e., during high school) was divided into four categories: no work experience, unpaid school-sponsored work (work-study), paid school-sponsored work, and paid community employment. Both paid school-sponsored work and paid community employment were associated with employment after high school; unpaid school-sponsored work was not. Therefore, we created a single variable called *paid work*, with *yes* indicating that the student had either paid work-study or community employment during high school and *no* indicating the student had either unpaid work-study or no work experience during high school. A likelihood ratio test indicated that the model using *paid work* was not significantly different from the model using four categories of work experience,  $\chi^2 = 0.12$ ,  $df = 2$ ,  $p > .05$ . Working in the summer at baseline was associated with an increased odds of employment after high school (odds ratio [OR] = 2.34, 95% confidence interval [CI] = 1.16–4.72); however, only students who had paid community jobs worked in the summer. Therefore, it was not a significant predictor when combined with *paid work*.

### ***How Are Student Demographic Variables Associated With Employment After High School?***

The average age of the sample was 20.6 years ( $SD = 1.4$  years, range = 17–23 years). The sample was predominantly male (69%) and White (62%), and 16% were currently attending postsecondary school (see Table 1). As shown in the demographics model in Table 6, only gender (i.e., being male) was associated with an increased odds of current employment (OR = 1.92). Both having paid work experience and being male were associated with post-high school employment in the combined model. Baseline age, race/ethnicity, and primary disability were not associated with post-high school employment.

### ***What Student Skills Are Associated With Employment After High School?***

Information regarding student skills is displayed in Table 3. The association of each of these skills to post-high school employment was examined using a series of logistic regression models. In the first series of models, ORs were calculated for each variable of interest adjusted for demographics (i.e., age, sex, race/ethnicity, and primary disability; see single-variable models column). Youth who had little or no trouble communicating with others had almost 3 to 4 times the odds of being employed after high school than youth who had a lot of trouble. Similarly, students who were independent in self-care and were able to get places outside the home independently were more likely to be employed. Students whose teachers rated them highly on classroom social skills, classroom behavior, and self-advocacy during high school were also significantly more likely to be employed after high school.

In the second stage of modeling, variables that had significant relationships to post-high school employment in the first stage were combined with paid work and demographics in a single multivariate logistic model. Backward elimination (keeping demographics and paid work in the model) was used to simplify the model, with results presented in the *combined model* column in Table 3. The purpose of the combined model was to determine which variables had statistically significant relationships to post-high school employment when adjusted for other variables in this group and previous paid work experience. Note that the combined models are exploratory, not definitive: other combinations of variables could explain post-high school employment. In the combined model, independent self-care, high ratings of classroom social skills, and previous paid work experience were associated with 2.49 to 2.70 increased odds of post-high school employment. Communication skills, understanding others, getting places outside the home, classroom behavior ratings, and self-advocacy did not have a significant relationship to post-high school employment when combined with other variables. Because sample sizes varied for the single-variable models and the combined model, direct statistical comparisons of model fit could not be made. Overall, the combined model was a significantly better fit than the intercept alone based on the likelihood ratio test,  $\chi^2 = 35.9$ ,  $df = 10$ ,  $p < .0001$ .

### ***What Family Variables Are Associated With Employment After High School?***

As shown in Table 4, socioeconomic factors such as parental education level, employment, income, and ease of transportation were not associated with youth employment after high school. However, parental expectations at baseline were very strong predictors of student employment after

**Table 6.** Summary of Logistic Regression Model of Demographics and Prior Work Experience Predicting Current Employment

Variable	Demographics model		Combined model	
	<i>n</i> <sup>a</sup>	OR [95% CI] <sup>b</sup>	<i>n</i> <sup>c</sup>	OR [95% CI] <sup>d</sup>
Age (years)	450	1.09 [0.93–1.29]	420	1.11 [0.94–1.31]
Gender				
Female	140	— <sup>e</sup>	130	—
Male	310	1.92 [1.16–3.17]*	290	1.91 [1.13–3.22]*
Race/ethnicity				
White	280	—	260	—
African American	110	0.69 [0.40–1.17]	100	0.76 [0.43–1.32]
Other	60	0.55 [0.28–1.10]	60	0.58 [0.28–1.20]
Disability category				
Autism	160	—	150	—
Intellectual disability	120	1.02 [0.58–1.78]	110	0.98 [0.54–1.76]
Multiple disabilities	170	1.00 [0.60–1.65]	160	0.99 [0.58–1.68]
Paid work				
No		NI	310	—
Yes		NI	110	2.41 [1.50–3.90]***

Note: OR = odds ratio; CI = confidence interval; NI = not included in this model.

<sup>a</sup>Sample size for cells rounded to nearest 10.

<sup>b</sup>Derived from a single logistic regression model of demographic factors predicting current employment.

<sup>c</sup>Sample size for cells for combined model rounded to nearest 10.

<sup>d</sup>Derived from a single logistic regression model of demographic factors and prior work experience (paid work) predicting current employment.

<sup>e</sup>Reference level.

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

high school. As shown in the single-variable models column, parental expectations that a student would definitely get a paying job were associated with a fivefold odds of being employed after high school, whereas expectations that the student would eventually be self-supporting were associated with a more than threefold odds of employment. Having regular household responsibilities were also associated with an increased odds of employment after high school.

In the combined model, parental expectations that the student would get a paying job and eventually be self-supporting as well as household responsibilities remained significant, although the odds ratios were smaller in the combined model. Paid work was no longer a significant predictor of post-high school employment when combined with these variables; however, paid work was itself strongly associated with parental expectations that the student would get a paying job. The likelihood ratio test for the combined model was again highly significant,  $\chi^2 = 53.4$ ,  $df = 12$ ,  $p < .0001$ .

### How Are School Program Elements Associated With Employment After High School?

As shown in Table 5, most young adults had been enrolled in prevocational or vocational classes, but such prior enrollment was not a significant predictor of post-high school employ-

ment. Having vocational skills as a primary IEP goal, job search instruction, and spending more than 25% of the day in outside school work-study were associated with an increased odds of post-high school employment. However, none of these factors were significant predictors when combined in the final model with previous paid work experience.

## Discussion

Although entry into the world of work is a prominent marker of postschool success in the United States, young people with severe disabilities often leave high school without the skills, supports, and connections that lead to meaningful employment. Reinforcing frequently cited concerns (Hendricks & Wehman, 2009; Rusch & Braddock, 2004; Test, 2008), we found that a fairly small proportion of young adults with severe disabilities were working up to 2 years after high school and almost half were working in segregated settings. Although the factors shaping the postschool outcomes of special education students are multiple and interact in complex ways, this study offers important insights into variables that may be associated with the early employment outcomes of young adults with severe disabilities.

First, paid work experiences during high school were strongly associated with postschool work status during students' first 2 years after leaving high school. Although this

relation has been widely documented for youth with high-incidence disabilities (e.g., Baer et al., 2003; Benz et al., 2000; Rabren, Dunn, & Chambers, 2002; Shandra & Hogan, 2008), our analyses suggest that such adolescent vocational experiences hold comparable importance for youth with severe disabilities. These findings bolster recent and long-standing calls to ensure that all youth with severe disabilities accrue community-based work experience while still in high school (Carter, Trainor, Ditchman, Swedeen, & Owens, 2009; Rusch et al., 2009; Rusch & Wolfe, 2008). Moreover, they provide evidence that vocational education policy should emphasize the development of work experiences in natural settings. The most recent iteration of the Carl D. Perkins Career and Technical Education Improvement Act (2006) maintains a strong focus on school-based technical and vocational education and guidance. For example, the policy specifically includes provisions for the use of funding for “information and planning resources” that bridge career and technical education to the goals and expectations of consumers, and “guidance” and “counseling” to aid decision making about “training options and preparation” for employment-related goal setting (Carl D. Perkins Career and Technical Education Improvement Act of 2006). Although these provisions are important, our data add to extant research with youth with high-incidence disabilities, underscoring that the development of actual paid work experiences during high school may better set the stage for paid employment after high school.

However, the particular paths through which these high school work experiences contribute to improved postschool employment outcomes are in need of renewed and closer attention. It has long been acknowledged that off-campus work experiences can provide youth natural contexts for learning and strengthening essential work-related competencies, including interpersonal, self-determination, and occupation-specific skills (Gaylord-Ross, Forte, Storey, Gaylord-Ross, & Jameson, 1987; Nietupski, Hamre-Nietupski, Curtin, & Shrikanth, 1997). However, such jobs also help adolescents make critical connections to local employers that could translate directly into jobs that maintain after graduation (Potts, 2005; Rusch et al., 2009). Furthermore, the accumulation of successful work experiences during high school holds potential to raise expectations among teachers, parents, employers, and youth themselves regarding the ways in which people with severe disabilities can and should participate in the workforce (Chambers, Hughes, & Carter, 2004; Kraemer & Blacher, 2001). Regardless of the mechanisms, prior descriptive research is consistent in its conclusion that access to high-quality early work experiences is fairly limited for high school students with severe disabilities (Carter et al., 2011; Carter, Trainor, Cakiroglu, Swedeen, & Owens, 2010). Increasing early work experiences seems to be an important vehicle for improving postschool employment outcomes.

Second, we identified several student-level factors associated with greater odds of working after high school. Although race/ethnicity and primary disability category were not associated with work status, males had nearly twice the odds of working than females (compared to Boeltzig et al., 2009). This may suggest another indicator of differing opportunities and expectations for females and males (Powers, Hogansen, Geenen, Powers, & Gil-Kashiwabara, 2008). Close examination of the impact of the Rehabilitation Act of 1973 (National Council on Disability, 2008) substantiates a policy implication we identify in these data: Additional research is needed to generate practices that address the employment development of young adults with disabilities who are among the most likely to face additional marginalization associated with discrimination and biases in the workplace. Moreover, most of the skills we examined were associated with greater odds of working when considered individually. In particular, the capacity to complete some self-care skills more independently (as perceived by parents) and social competence (as perceived by teachers) were each associated with greater odds of employment in the final model (compared to Heal & Rusch, 1995; Roessler, Brodin, & Johnson, 1990). Although it is important to remember that our analyses were correlational, these skill domains do constitute malleable factors that can be addressed through systematic instructional efforts. Indeed, there exists an extensive evidence base addressing how to teach an array of functional and social-related skills to students with severe disabilities (Alwell & Cobb, 2009a, 2009b; Test, Fowler, et al., 2009). A necessary requirement of delivering effective and efficient instruction involves conducting age-appropriate transition assessment to identify which skills are most important to address for a particular student (Sitlington & Clark, 2007).

Third, limited prior work has focused on the confluence of family factors that may affect the employment outcomes of youth with severe disabilities. We found that the expectations parents held during high school regarding the capacity of their child to obtain a postschool job or eventually become self-supporting were strongly associated with whether that child was working shortly after exiting the school system. Family members—particularly parents—may play a more prominent role in facilitating early employment opportunities for young adults with severe disabilities, particularly given persistent critiques of the capacity of adult service systems to adequately support the employment of these graduates (Certo et al., 2008; Rusch & Braddock, 2004). Prior research addressing family expectations has been almost entirely descriptive (e.g., Blacher et al., 2010; Olivos, Gallagher, & Aguilar, 2010; Powers, Geenen, & Powers, 2009), providing limited guidance on the most effective avenues for raising expectations. Additional research is needed to explore the ways in which family factors interact with other influences to shape the skills, services, and supports

of transition-age youth with severe disabilities during and after high school. For example, does parental employment status affect their expectations of employment for their children with severe disabilities?

Fourth, we were somewhat surprised by the limited extent to which the school-sponsored career development activities reported in the NLTS-2 database were associated with early postschool work status. Although having a vocational IEP goal, receiving job search instruction, and spending more than one quarter of the day in work-study outside school individually yielded significant odds ratios, they were no longer significant when considered in conjunction with access to paid work experiences. Thus, it was actual, hands-on work experience—rather than preparatory or indirect experiences—that was most prominent in the final model for young people with severe disabilities. These findings diverge somewhat from previous follow-up studies indicating that vocational course taking, career awareness, and job search skills predicted postschool outcomes for youth with high-incidence disabilities (Baer et al., 2003; Shandra & Hogan, 2008). The findings from our analyses should not be interpreted as suggesting that the program elements included on Table 5 are unimportant or extraneous. The NLTS-2 study reported involvement in these activities dichotomously at a particular point in time, rather than capturing their quality and sequencing. It may be that it is the accumulation of career awareness, exploration, preparation, and experiences over time that collectively shape the employment outcomes of graduates with severe disabilities. Current special education policy may provide one way to capture information about the accumulation of an individual's experiences over time through the *summary of performance*. This requires that youth with disabilities leave high school with a document that details both academic and functional performance relative to postschool goals (IDEA, 2004). Such documentation has potential to improve practice through the individualized summation of the functional impact of school-based opportunities. Furthermore, this documentation might also provide data for researchers who are examining the functional impact of these cumulative experiences on job placement.

### Limitations and Future Research

Additional research is needed to address several limitations to this study. First, we limited our analyses to the 2-year window following high school, rather than focusing on employment outcomes up to 8 years after graduation. Because many students with severe disabilities receive educational services until at least 21 years of age, we made this analytic decision in part to provide us with a sufficiently large sample size to conduct our analyses. Future work is needed to model long-term outcomes by drawing on all five waves of the completed

NLTS-2 or mining state's postschool databases (Rabren & Johnson, 2010).

Second, we focused our analyses on students whom we identified as having severe disabilities using a set of items within the database as inclusion criteria. However, the phrase "severe disabilities" is defined in myriad ways within the professional literature and may evoke divergent impressions among different practitioners. Although our intention was to shed light on the employment experiences of young adults who have extensive support needs, readers should refer to our specific screening criteria when considering the relevance of the findings reported in this article. Additional research is needed that explores whether and how the associations described in this article may be specific to students with severe disabilities.

Third, our decision to conduct secondary data analyses meant we were only able to consider variables already included within this existing database. As a result, we are limited in the factors we were able to explore. The transition to adulthood is a complex process shaped by myriad factors. It is quite likely that other variables not addressed within our analyses (e.g., quality of adult service systems, local economic conditions, and quality of high school programs) have an influential role on the career paths of youth with severe disabilities. Additional research is needed to identify salient factors that should be incorporated into ongoing and future follow-up studies of youth with disabilities. Finally, because we did not use sampling weights, these analyses cannot be used to make predictions about the population of special education students as a whole but can instead inform the field about associations between baseline variables and employment outcomes.

### Conclusion

Although the task of pinpointing the most important variables shaping the employment outcomes of young people is replete with challenges, our analyses shed important light on the contributions that student, family, and school factors may have on the employment of youth. High school work experiences have long been a recommended and well-substantiated transition practice (Test, Mazzotti, et al., 2009). The findings reported in this article provide additional empirical support for calls to ensure that all youth with severe disabilities access these critical experiences in school (Certo et al., 2008; Rusch et al., 2009). Examining the ways in which current policies such as the IDEA, the Carl Perkins Act, and The Rehabilitation Act support the development of work experiences in natural settings and how they can be augmented to do so in future reauthorizations or in the development of new policies is an essential next step increasing access for youth with severe disabilities.

## Authors' Notes

The opinions expressed are those of the authors and do not represent views of the U.S. Department of Education.

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## Notes

1. We have chosen to use the term *intellectual disability* when referring to students with mental retardation. This choice reflects changes in terminology advocated since the launch of the National Longitudinal Transition Study-2 (NLTS-2) study.
2. Sample sizes are rounded to the nearest 10. Sums may not add to total due to rounding.
3. We used terms drawn directly from the NLTS-2 study.

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