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What is This?

Predictors of Employment and Postsecondary Education of Youth With Autism

Alberto Migliore[1], Jaimie Timmons[1], John Butterworth[1], and Jaime Lugas[1]

Abstract

Using logistic and multiple regressions, the authors investigated predictors of employment and postsecondary education outcomes of youth with autism in the Vocational Rehabilitation Program. Data were obtained from the RSA911 data set, fiscal year 2008. Findings showed that the odds of gaining employment were greater for youth who received job placement services, yet only 48% of youth received this service. In addition, postsecondary education was among the strongest predictors of better earnings, yet only 10% of youth received college services. The authors recommended providing job placement services and college services to more youth with autism. At the same time, due to the relatively moderate effect sizes of these regression models, they recommend investigating additional variables currently not included in the RSA911 data set.

Keywords

employment, vocational rehabilitation, postsecondary education, transition, autism, RSA911

More than three decades have passed since the passage of the Individuals With Disabilities Education Act (IDEA), which promised students in the United States a "free and appropriate public education." A critical component of this endeavor was transition planning for the student's life beyond high school, including postsecondary education and employment. In spite of these promises, research shows that the majority of adults with intellectual and/or developmental disabilities are being served in either facility-based work or community-based nonwork programs (Butterworth et al., 2011; Taylor & Seltzer, 2011). For the minority who work in community businesses, employment entails part-time positions in entry-level jobs. This results in low income, limited access to benefits such as health care, and dependence on public welfare (Boeltzig, Timmons, & Butterworth, 2008).

Another area of concern is postsecondary education attainment. Students with disabilities and their families increasingly plan for participation in postsecondary education because of its potential as an intermediate step toward employment (Camarena, 2009; Newman, Wagner, Cameto, & Knokey, 2009). In response to this need, more colleges and universities are offering services specifically designed to assist students with disabilities. According to a recent national survey, more than 150 such programs operate in the nation (Grigal & Hart, 2010). The importance of postsecondary education for youth

with disabilities is also demonstrated by the several regulations introduced in the past decades to meet the support needs of this group of students (Stodden & Mruzek, 2010). Despite this effort, the availability of programs and participation of youth with intellectual disabilities in postsecondary education remains an issue (Grigal & Hart, 2010; Newman et al., 2009).

Employment and postsecondary education outcomes of youth with autism are also a concern because they are weaker than those of youth with other disabilities (Barnhill, 2007; Howlin, Goode, Hutton, & Rutter, 2004). Although transition outcomes of this group remain bleak, the demand for services, especially vocational rehabilitation (VR) services, is increasing (Cimera & Cowan, 2009). Within the group of people with developmental disabilities, the percentage of people with autism seeking VR services tripled from 1% to 3% between 1995 and 2005 (Migliore & Butterworth, 2008).

This increase in the number of youth with autism seeking rehabilitation services has prompted an increased interest in research about predictors of transition outcomes for this

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population (Dew & Alan, 2007; Lawer, Brusilovskiy, Salzer, & Mandell, 2009; Schaller & Yang, 2005). For example, using the RSA911 data set, two studies found that better employment outcomes for adults with autism are associated with being male, being White, having a higher level of educational attainment, and being older (Lawer et al., 2009; Schaller & Yang, 2005). Other studies focus on various disability groups and have found that receiving disability benefits—such as Supplemental Security Income (SSI), Social Security Disability Insurance (SSDI), Medicaid, and Medicare–is negatively associated with employment outcomes (Hayward & Schmidt-Davis, 2003a; Jung, Schaller, & Bellini, 2010). One study, however, reported no relationships between demographic characteristics and employment outcomes (Moore, Feist-Price, & Alston, 2002).

Another key predictor of employment outcomes is the range of services provided by the VR program. Two studies that focused on adults with autism found that employment outcomes are positively correlated with services that include job finding, job placement, job maintenance, and on-the-job supports (Lawer et al., 2009; Schaller & Yang, 2005). In addition, Lawer et al. (2009) reported that higher expenditure for services is associated with greater instances of positive employment outcomes of youth with autism. Most studies that focused on varied disability groups confirmed that placement services are predictors of employment outcomes (Bolton, Bellini, & Brookings, 2000; Hayward & Schmidt-Davis, 2003b; Jung et al., 2010; Moore et al., 2002). Other services positively correlated with employment outcomes include rehabilitation counseling and guidance (Gamble & Moore, 2003), supported employment, business vocational training (Hayward & Schmidt-Davis, 2003b), and college services (Gamble & Moore, 2003; Hayward & Schmidt-Davis, 2003b). Finally, the literature indicates that outcomes are negatively associated with longer time in the VR program (Bolton et al., 2000; Jung et al., 2010). Overall, these studies seem to confirm that VR services are better predictors of employment outcomes compared with the demographic characteristics of job seekers (Bolton et al., 2000; Jung et al., 2010).

Unfortunately, fewer studies have examined the quality of employment outcomes such as earnings and work hours. Of the studies examined, most report that earnings at VR closure are positively correlated with receipt of job placement services (Hayward & Schmidt-Davis, 2003b; Schonbrun, Sales, & Kampfe, 2007). Other services positively correlated with earnings include supported employment, on-the-job training, business vocational training (Hayward & Schmidt-Davis, 2003b), work adjustment (Gamble & Moore, 2003), and diagnosis and treatment (Schonbrun et al., 2007). In contrast, Moore et al. (2002) reported no correlation between services and earnings. We are not aware of any studies that focused on predictors of

postsecondary education outcomes for adults with disabilities in the VR program.

As this review of literature showed, research about predictors of transition outcomes of youth with autism is limited. The purpose of this article is to increase our understanding about predictors of transition outcomes of youth with autism. This article addresses the following research questions:

1. *Research Question 1:* What demographic characteristics and VR services predict closures in integrated employment?
2. *Research Question 2:* What demographic characteristics and VR services predict higher hourly earnings and weekly work hours?
3. *Research Question 3:* What demographic characteristics and VR services predict improving youth's postsecondary education?

Method

In this study, we used logistic regressions and multiple regressions to test the relationship between predictor variables and transition outcomes of youth with autism who received VR services. We used data from the RSA911 database fiscal year 2008, an administrative data set developed by the Rehabilitation Services Administration to monitor rehabilitation services and outcomes of state VR programs. Any person with a disability is eligible for services from state VR programs, unless it is demonstrated that he or she is not capable of benefiting from these services with an employment outcome.

Participants

Participants in this study consisted of 2,913 youth with autism who met the following criteria: (a) had autism as either a primary or secondary disability, (b) were 16 to 26 years old at application, (c) did not have integrated employment at application, and (d) received VR services. Youth who had autism as a secondary disability (5%) were included because the distinction between primary and secondary disability in the RSA911 data set is not based on a diagnosis. We examined the possibility that primary and secondary disability refer to people with a similar level of autism. This was confirmed by data showing that the gender profile of youth with autism as a secondary disability was similar to the gender profile of youth who had autism as a primary disability. In addition, we excluded youth who had integrated employment at application (12%) because integrated employment was an outcome variable that we intended to predict. Finally, we excluded youth who did not receive VR services (39%) because people who do not

receive VR services automatically exit the program without employment. The 2,913 youth who met the above criteria represented 46% of the 6,294 people with autism who exited the VR program with or without employment in fiscal year 2008. They represented 1% of the total number of people who exited the VR program in fiscal year 2008 ($n = 618,054$).

Outcomes and Predictor Variables

We investigated four outcome variables: gaining integrated employment, hourly earnings, weekly work hours, and postsecondary education improvement. _Integrated employment_ was defined as work performed for a wage and lasting at least 90 days. It did not include, however, self-employment or work performed in settings such as community rehabilitation programs and sheltered, industrial, or occupational workshops. The variables _earnings_ and _work hours_ referred to hourly wages and weekly work hours in integrated employment. Finally, _postsecondary education improvement_ was defined as entering the VR program with a high school diploma/certificate or lower education attainment and exiting the VR program after participation in postsecondary education, with or without degree.

Predictor variables included youths' demographic characteristics, such as gender, race, ethnicity, age, receiving public support at application (SSI/SSDI or Medicaid/Medicare), and postsecondary participation. _Postsecondary participation_ was defined as having attended a postsecondary education program, whether or not a degree was awarded. Other predictor variables included receipt of the following VR services as a binary (yes/no) variable: assessment, counseling and guidance, job readiness training, job search, job placement, on-the-job supports, college, miscellaneous training, and "other services." Assessment services included those used to determine an individual's eligibility for VR services, the assignment of a priority category to the individual—if applicable—and those actions that are needed to determine what will be in an individual's Individualized Plan for Employment. VR counseling and guidance are specific services provided to an individual that are necessary for him or her to achieve an employment outcome. Examples include vocational counseling and counseling that addresses issues in an individual's life. Job readiness training prepares an individual for the work environment, including instruction regarding punctuality and appropriate work behaviors. Job search and job placement services are services provided to help a person find work—such as résumé preparation and the development of interview skills. The goal of on-the-job support services is to increase retention of people who have gained jobs. College services referred to financial support for full- or part-time postsecondary education. Finally, "other services" included miscellaneous services not recorded under the previous categories.

The choice of which predictors to use in the regressions was based on whether the predictors were meaningful in relation to the outcomes investigated. For example, we did not use the variable "on-the-job support" to predict integrated employment because on-the-job support is provided only to people who are already employed. We used this variable, however, in the regression for predicting earnings and work hours, because this analysis clearly focuses only on youth who were employed. Finally, we did not use employment-related services (e.g., job search and job placement) in the regression of postsecondary education outcomes because from a theoretical perspective they were not meaningful predictors of this outcome. However, we did use days between application and closure as predictors for all outcomes. Finally, we used the outcome variable of postsecondary education improvement as a predictor of employment outcomes.

Data Analysis

We performed descriptive analyses—frequencies and means—to provide overall information about predictor and outcome variables. Then we ran stepwise backward binary logistic regression to test the relationships between the predictors and the outcomes that were measured as categorical variables—integrated employment and postsecondary education improvement. We chose the stepwise method of regression because this method is recommended in exploratory studies, which is the type of study that we carried out. This method selects the variables to be included in the predictive model based on the magnitude of the variables' contributions to the predictive model. Moreover, we adopted the backward approach, instead of the forward approach, because it reduces the risk of discarding suppressor variables (Field, 2009; Tabachnick & Fidell, 2001). Finally, we ran two linear multiple regressions to test the relationships between predictors and outcomes that were measured as continuous variables—earnings and work hours. Similar to the logistic regression analysis, and for the same reasons, we adopted a stepwise backward technique.

Results

This section is organized in three parts that describe predictors, outcomes, and the relationships between predictors and outcomes.

Predictors

Participants' ages ranged between 16 and 26 years, with a mean of 19 years ($SD = 2.4$, $N = 2,913$). As Table 1 shows,

Table 1. Participant Characteristics at Application and Services Provided

Characteristic/service	n	%
Gender		
Male	2,455	84
Female	458	16
Total	2,913	100
Race		
White	2,361	81
Other	552	19
Total	2,913	100
Significant disability		
Yes	2,895	99
No	18	1
Total	2,913	100
SSI/SSDI recipient		
Yes	1,165	40
No	1,748	60
Total	2,913	100
Medicaid or Medicare recipient		
Yes	1,132	39
No	1,770	61
Total	2,902	100
Living arrangement		
Private residence	2,768	95
Other	145	5
Total	2,913	100
Education		
High school or less	2,670	92
Postsecondary education participation	243	8
Total	2,913	100
Services provided (N = 2,913)		
Assessment	2,069	71
Rehabilitation counseling and guidance	1,834	63
Job placement	1,393	48
On-the-job supports	1,303	45
Job search	995	34
Other services	728	25
Job readiness training	667	23
Miscellaneous training	455	16
College services	282	10
On-the-job training	194	7

Note: SSI = Supplemental Security Income; SSDI = Social Security Disability Insurance.

the large majority of participants were White (*n* = 2,361; 81%) and most were males (*n* = 2,455; 84%). Almost all participants had significant disabilities, but only a little less than half of them received public support in the forms of SSI, SSDI, Medicaid, or Medicare insurance at the time of application. Most participants lived in private residences, and most reported that high school was their highest level of education at the time of application.

Assessment and rehabilitation counseling/guidance were the two services most often provided to participants, with 71% (*n* = 2,069) and 63% (*n* = 1,834) of people receiving them, respectively. Less than a quarter of participants received job readiness training, college services, on-the-job training, or miscellaneous training. Finally, participants took an average of 2 years and 3 months to exit the program with or without employment, with 75% of youth exiting 1 year and 1 month after application or later (minimum = 7 days, maximum = 2,702 days, *SD* = 552 days).

Outcomes

The majority of youth in this study (60%) exited the VR program with jobs in integrated employment (*n* = 1,762). These youth worked an average of 23 hr per week, with only the top 25% working more than 30 hr (*SD* = 10, *n* = 1,762). On average, youth earned US$7.91 an hour with only the top 25% earning more than US$8.33 an hour (*SD* = US$2.35, *n* = 1,762). Only 13% (*n* = 353) of the youth participated in postsecondary education. Of these youth, about two thirds (*n* = 243) participated in postsecondary education without obtaining a degree and one third (*n* =110) obtained a degree or diploma.

Relationships of Predictors With Outcomes

A logistic regression tested the relationships of 17 predictors, with the outcome of exiting the VR program with integrated employment. This regression identified 8 predictors that contributed to this outcome. Table 2 shows these predictors sorted from strongest to weakest. Receiving job placement services was the strongest predictor of exiting the VR program with integrated employment. Receiving job placement services increased the odds ratio of exiting the program with integrated employment by 4 times. The weakest predictor was the Medicare or Medicaid status at application. Not receiving Medicaid or Medicare increased the odds ratio of exiting the program with integrated employment by 1.29 times. The statistical software dropped the 9 predictors listed in the footnote of Table 2 because these variables were not contributing to the explanation of an employment outcome.

The model was a good fit of the data as shown by the *Hosmer and Lemeshow test*, $\chi^2(8, N = 2,913) = 7.5$, $p = .48$, and the standardized residuals, with less than 5% of them being greater than 1.96 and less than 1% greater than 2.58 as recommended in the literature (Field, 2009). The Nagelkerke coefficient was .20, indicating that these predictors contributed, although not to a large extent, to explaining integrated employment outcomes (a coefficient of 1 corresponds to maximum correlation; a coefficient of 0 corresponds to no correlation). These predictors correctly classified 68% of the employment outcome, an 8%

Table 2. Predictors of Integrated Employment Outcomes (*n* = 2,810)

Predictor	Wald	Odds ratio	95% CI odds ratio		*p*
			Lower	Upper	
Constant	0.01	1.01	0.00	0.00	
Job placement provided	232.39	4.08	3.41	4.89	**
Postsecondary education improved	13.97	1.73	1.30	2.30	**
Below-the-median number of days to closure	25.18	1.54	1.30	1.83	**
Miscellaneous training provided	12.45	1.54	1.21	1.96	**
College services *not* provided	7.45	1.53	1.13	2.08	*
Male	13.92	1.53	1.22	1.91	**
Job search provided	15.01	1.47	1.21	1.78	**
Not a Medicaid/Medicare recipient	8.67	1.29	1.09	1.52	**

Note: CI = confidence interval. Negelkerke = .20; Hosmer and Lemeshow χ^2(8, *n* = 2,810) = 7.50, *p* = .48. Stepwise iterations excluded the following variables: race, ethnicity, age, Supplemental Security Income/Social Security Disability Insurance status, assessment, rehabilitation counseling and guidance, job readiness training, other services, postsecondary participation.
*p < .05, two-tailed. **p < .01, two-tailed.

Table 3. Predictors of Hourly Earnings (*n* = 1,758)

Predictor	B	SE	95% CI		*p*
			Lower	Upper	
Constant	6.23	0.52	5.21	7.25	**
College services	1.22	0.21	0.80	1.64	**
Postsecondary participation	0.83	0.14	0.55	1.12	**
On-the-job supports	−0.54	0.11	−0.75	−0.33	**
Job readiness training	−0.40	0.12	−0.64	−0.16	**
SSI or SSDI at application	−0.38	0.14	−0.65	−0.10	*
Being White	0.30	0.14	0.02	0.57	*
Being male	0.29	0.15	−0.59	0.01	
Medicaid/Medicare at application	−0.24	0.14	−0.51	0.02	
Age at application	0.08	0.02	0.03	0.13	**

Note: CI = confidence interval; SSI = Supplemental Security Income; SSDI = Social Security Disability Insurance. R^2 adjusted = 13.6%. Stepwise iterations excluded the following variables: ethnicity, postsecondary education improvement, assessment, rehabilitation counseling and guidance, job search, on-the-job training, miscellaneous training, cost of purchased services, days from application to closure, job placement, and other services.
*p < .05, two-tailed. **p < .01, two-tailed.

improvement from 60% of correct classifications without predictors.

Earnings. A multiple regression tested the relationships between 20 predictors and hourly earnings. This regression identified 9 predictors that overall explained 13.6% (adjusted R^2) of the variance of hourly earnings. Table 3 shows these predictors sorted from strongest to weakest. Higher earnings positively correlated with receiving college services and postsecondary participation, and negatively correlated with receiving on-the-job supports, job readiness training, and SSI/SSDI benefits. Race, gender, Medicaid/Medicare status, and age were weaker predictors. The note at the bottom of the table lists the variables eliminated by the stepwise regression because they did not contribute to

predicting hourly earnings. Overall, the effect size (f^2) of the model was medium (Cohen, 1988).

Work hours. A second multiple regression tested the relationships between 20 predictors and hours worked per week. This regression identified 10 predictors that overall explained 11.3% (adjusted R^2) of the variance of weekly work hours. Table 4 shows these predictors sorted from strongest to weakest. The strongest predictors of greater weekly work hours were postsecondary education improvement, receiving college services, not being SSI/SSDI recipients, being male, and not being Medicaid/Medicare recipients. Weaker predictors included not receiving on the job supports, not receiving job placement, receiving job readiness training, receiving rehabilitation counseling and guidance, and being older. The note at the bottom of the table lists the variables eliminated by the stepwise regression because they did not contribute to predicting weekly work hours. Overall, the effect size (f^2) of the model was small.

Postsecondary education. Finally, a logistic regression tested the relationships between 10 predictors and postsecondary education improvement. Table 5 shows these predictors sorted from strongest to weakest. Receiving college services was the strongest predictor. The odds ratio of exiting the program with postsecondary education outcomes increased by almost 14 times for youth who received college services. The weakest predictor was age at application. Younger people had 1.13 times the chances of exiting the program with postsecondary education outcomes compared with older people. Based on the *Hosmer and Lemeshow test*, the model was a good fit of the data, χ^2(8, *N* = 2,913) = 7.6, *p* = .47. The standardized residuals, however, flagged issues with model fit because more than 5% of the residuals were greater than 1.96 (7.57%), more than 1% of the residuals were greater than 2.58 (5.24%), and a relatively large

Table 4. Predictors of Hours Worked Per Week (*n* = 1,758)

Predictor	B	SE	95% CI Lower	Upper	*p*
Constant	19.36	2.24	14.98	23.75	**
Improved postsecondary education	4.51	0.80	2.94	6.09	**
College	3.62	0.96	1.73	5.51	**
SSI or SSDI recipient	−2.94	0.62	−4.15	−1.72	**
Being male	2.28	0.68	−3.61	−0.94	**
Medicaid/Medicare recipient	−2.19	0.60	−3.37	−1.01	**
On-the-job supports	−1.82	0.49	−2.78	−0.87	**
Job placement	−1.21	0.50	−2.19	−0.23	*
Job readiness training	1.01	0.55	−0.07	2.10	
Rehabilitation counseling and guidance	0.92	0.52	−0.09	1.94	
Age at application	0.39	0.11	0.18	0.59	**

Note: CI = confidence interval; SSI = Supplemental Security Income; SSDI = Social Security Disability Insurance. R^2 adjusted = 11.3%. Stepwise iterations excluded the following variables: race, postsecondary participation, ethnicity, assessment, job search, on-the-job training, miscellaneous training, cost of purchased services, days to closure, and other services.
*p < .05, two-tailed. **p < .01, two-tailed.

Table 5. Predictors of Postsecondary Education Improvement (*n* = 2,617)

Predictor	Wald	Odds ratio	95% CI odds ratio Lower	Upper	*p*
Constant	0.77	0.53	0.00	0.00	
College services provided	283.80	13.94	10.26	18.94	**
Not a SSI or SSDI recipient	24.12	2.21	1.61	3.03	**
White	6.39	1.64	1.12	2.41	*
Assessment provided	4.68	1.39	1.03	1.87	*
Other services provided	3.59	1.31	0.99	1.73	
Younger age at application	10.03	1.13	1.05	1.21	**

Note: CI = confidence interval; SSI = Supplemental Security Income; SSDI = Social Security Disability Insurance. Negelkerke = .28; Hosmer and Lemeshow $\chi^2(8, n = 2,617) = 7.64, p = .47$. Stepwise iterations excluded the following variables: gender, ethnicity, Medicaid/Medicare status, and miscellaneous training.
*p < .05, two-tailed. **p < .01, two-tailed.

number of residuals were greater than 3 (2.92%). Moreover, the predictors correctly classified 89% of the employment outcome, which was a negligible improvement from 87% of correct classifications without predictors.

Discussion

This study showed that a number of services and some of the job seekers' demographic characteristics contributed to predicting employment outcomes but not postsecondary education outcomes. The next sections discuss these findings, limitations and strengths of this study, and implications.

Integrated Employment Outcomes

The first logistic regression showed that some of the demographic characteristics and VR services contributed to explaining employment outcomes. The correct predictions of employment outcomes increased from 60%—when only the constant was included in the logistic regression—to 68% after including the predictors investigated. The model fit was good. The greatest contributor to predicting employment was the provision of job placement services. The odds of exiting the VR program with integrated employment were 4 times greater for youth who received placement services than for

youth who did not receive placement services. Other important predictors of integrated employment included improved postsecondary education since application, shorter time in the VR program, receiving miscellaneous training, not receiving college services, and being male.

Overall, these findings were consistent with most rehabilitation literature across different disability groups (Hayward & Schmidt-Davis, 2003a; Jung et al., 2010; Schaller & Yang, 2005). In particular, the finding that providing job placement services was strongly associated with greater employment outcomes was consistent with multiple articles (Bolton et al., 2000; Gamble & Moore, 2003; Jung et al., 2010; Moore et al., 2002; Schaller & Yang, 2005). Given this high correlation, it is unclear why only about half of the job seekers in our study received job placement services.

Earnings and Work Hours

The multiple regressions showed that some of the demographic characteristics and VR services contributed to explaining the outcome of hourly earnings. The strongest predictors of higher earnings included receiving college services and participating in postsecondary education. These findings were not consistent with Schonbrun et al. (2007), who reported that earnings of people with traumatic brain injury were negatively associated with job placement services. In our study, job placement did not contribute to explaining earnings. In addition, our findings were not consistent with Hayward and Schmidt (2003b), who reported a positive association between earnings and job placement services and an inverse correlation of earnings with receiving postsecondary education services. Finally, Moore et al. (2002) did not find any correlation between earnings and either demographic characteristics or the VR services that we examined.

These inconsistencies in the literature are difficult to explain. They might be due to a number of reasons, including different disability groups or different definitions of earnings—hourly versus weekly earnings. Another possible reason for these discrepancies is that overall earnings did not vary substantially around the mean. This made it difficult for regression analysis to pick up accurate correlations because correlation is a measure of variation. Inconsistencies can also be explained by the effect size of the model, which was medium. This means that other variables not included in the RSA911 data set play an important role in explaining earnings.

Some of the demographic characteristics and VR services contributed to explaining weekly work hours. In this case, the effect size was small. The strongest predictors of a higher number of work hours included improved postsecondary education, receiving college services, and not receiving

SSI or SSDI benefits. All these predictors displayed coefficients of correlations greater than 3. We were not aware of literature that focused on predictors of work hours that we could use as a comparison standard.

Postsecondary Education Improvement

The second logistic regression did not yield conclusive findings for predicting postsecondary education improvement. The predictor variables were able to increase the correct prediction of postsecondary education improvement only by 2%, from 87% to 89%. A major reason for this limited predictive power can be attributed to a biased sample where the large majority of participants (87%) did not improve their postsecondary status at exit of the program. This high percentage is close to 90%, beyond which logistic regression is not a reliable statistical technique (Stevens, 1996).

Limitations and Strengths

This study has some limitations. As a result of the nonexperimental design of this study, the findings do not offer a strong basis for drawing cause-effect conclusions. Moreover, there are concerns about the accuracy of the RSA911 data set because this data set was developed as an administrative tool, not as a research tool. For instance, disability identification in the RSA911 data set is not necessarily based on documented diagnoses. Instead, it may be based on subjective evaluations made by VR counselors at the time of evaluating job seekers' support needs. In addition, counselors may not remember accurately some of the information if they enter data at the time of case closure. Also, outcome data such as earnings may be reported by clients, who may not be willing to disclose their income information accurately.

Another concern with the data was that some of the variables were skewed. For example, only a small minority of youth participated in postsecondary education. Similarly, the great majority of youth were male and they were White. Skewed data might make prediction analysis less accurate. Another limitation was that it was not known when postsecondary education improvement was a goal for the youth. Although employment is clearly a goal for every recipient of VR services, this is not necessarily the case for pursuing postsecondary education.

Despite these limitations, this study has strengths. This article improves our understanding about the role of youth with autism's demographics and VR services in predicting transition outcomes. This is important because in recent decades the population with autism has been growing at a rapid pace. Most of the literature on VR services, however, focuses on other types of disabilities. Moreover, despite the

limitations of the RSA911 data set, this source of data is important because it is the only data set about rehabilitation services that provides a national picture of job seekers' demographic characteristics, services provided to them, and their outcomes. Because data are available for every person exiting the VR program, findings are not affected by sampling errors or estimation errors. As a U.S. Government Accountability Office (GAO, 2005) report highlighted, although the RSA911 measures could be improved, the data set remains a valid source of information.

Implications and Conclusions

The findings of this study have implications for practice and for research. On the basis of these findings, we recommend providing job placement services to a larger number of job seekers and development of approaches that lead to rapid implementation of job placement. Only 48% of youth with autism received job placement services. Yet the odds of exiting the VR program with jobs was 4 times greater for youth who received job placement services compared with youth who did not. We also recommend researching the reasons for the high percentage of youth who exited the VR program without receiving job placement services, and what actions are needed to increase the provision of placement services to youth with autism.

In addition, postsecondary education may be an important intermediate outcome that warrants a stronger emphasis among the array of available VR services. Only 10% of youth received college services, yet our findings suggested that receiving college services and participating in postsecondary education were the two variables that had the highest correlation with better earnings. We recommend researching the reasons for such a low percentage of youth receiving college services and, in addition, investigating what initiatives would help to increase youth with autism's participation in postsecondary education.

Overall, we recommend more research to validate the findings of this study. In particular, we recommend extending the exploration beyond the secondary data available through the RSA911 data set. Our findings show that the predictor variables that we investigated were only a small part of the picture. The logistic regressions were able to increase the correct predictions of employment outcomes only from 60% to 68%. The multiple regressions explained only 13.6% of the variance of earnings and only 11.3% of the variance of work hours. To advance our understanding about how to improve the employment and postsecondary education outcomes of youth with autism, we need additional research that expands the range of predictors to other variables not included in the RSA911 data set.

Examples of predictor variables to be investigated include specific strategies for assessing job seekers' skills and preferences, techniques for job searching, and supports such as work incentive planning designed to protect disability-related benefits from new employment income. A broader set of predictors to investigate would include how the VR program appraises the effectiveness of service providers who subcontract with VR, and the education and qualifications of the support staff who assist job seekers (Hendricks, 2010; Luecking, Fabian, & Tilson, 2004; Test et al., 2009).

The IDEA promised students a "free and appropriate public education," including transition planning that leads to postsecondary education and employment. Continuously monitoring and improving the outcomes of programs like the VR program is a necessary step toward ensuring that the promises of IDEA are fulfilled and all youth with autism can become fully participating members of society.

Authors' Note

John Butterworth (principal investigator) coordinated the proposal of research and supervised the implementation of the study, including manuscript development. Frank Smith, Jaimie Timmons, John Kramer, and Alberto Migliore contributed to developing the proposal of study. Alberto Migliore ran the analyses and led the writing of this manuscript. Jaimie Timmons and John Butterworth assisted with content editing. Jaime Lugas assisted with reviewing the literature, editing, and APA formatting

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