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The costs of services and employment outcomes achieved by adults with autism in the US

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ABSTRACT This article examines the cost of services and employment outcomes obtained by adults with autism within the United States vocational rehabilitation (VR) system. It found that the number of such individuals has increased by more than 121 percent from 2002 to 2006. Moreover, though adults with autism were employed at higher rates than most disability groups investigated, they tended to work far fewer hours and earn less in wages per week. The study also found that adults with autism were among the most costly individuals to serve.

KEYWORDS *adults; autism; employment; service costs; vocational rehabilitation*

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Autism and other pervasive developmental disorders (PDDs) impact as many as one in 150 individuals, including one in 94 males (CDC, 2007). The PDD category, also commonly referred to as autism spectrum disorders (ASDs), represents one of the fastest-growing disability categories in the world, affecting nearly 1.5 million individuals in the United States alone (CDC, 2007). In fact, the occurrence of autism has prompted the US federal government to include autism as a diagnosis within laws governing the implementation of special education and related services for children in US public schools (Individuals with Disabilities Education Improvement Act, 2004). This legislation empowers education professionals in US public schools to provide an educational label that is separate from the medical or clinical label traditionally given by physicians and doctoral level mental health professionals per the criteria in either the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR: American Psychiatric Association, 2000) or the *International Statistical Classification of Diseases and Related Health Problems, Tenth Edition, Second Revision* (ICD-10: World Health Organization, 2005).

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Regardless of the source of their diagnosis (i.e. whether it is medically or educationally derived), the number of individuals with autism in educational settings continues to rise. Indeed, with an annual increase of 10–17 percent, the US Department of Education (1999) reports that autism is the fastest-growing developmental disability category. This observed annual growth increase in the number of school-aged children with autism extends beyond the US into Europe and other nations (Seigel, 2003).

Because individuals with autism demonstrate a variety of symptoms within and across the diagnostic criteria, each child with autism is unique in his or her specific symptoms, strengths and areas of need. Furthermore, response to early intervention varies and there are few data on how these interventions impact the need for supports as adults (Seigel, 2003). Given the unique characteristics and responsiveness of each child with autism, the provision of effective educational programming for students with autism-related disorders is perhaps one of the greatest challenges of educators to date (Cowan and Allen, 2007).

It appears that early, comprehensive, and intensive behavioral intervention is associated with the most favorable outcomes for children with autism (Jacobson and Mulick, 2000; Maurice et al., 2001; National Research Council, 2001). However, the extensive training and specialization required to deliver such services is extremely expensive for pre-kindergarten service providers and elementary schools. This has prompted school systems to seriously consider the cost-effectiveness of educational programming for this population (Jacobson and Mulick, 2000). Fortunately, researchers have begun to develop models to perform cost–benefit analyses for early intensive behavioral intervention (EIBI: see Jacobson et al., 1998, for a comprehensive article). Unfortunately, even when children are exposed to EIBI, disruptive behaviors and comparatively lower levels of academic functioning may persist across the lifespan into adulthood for some individuals. Furthermore, school-aged children with autism are in need of services and life skills that will help prepare them for the transition into the workforce and/or access post-secondary educational opportunities (Wehman, 2006). This translates into the need for primary and secondary level educators to collaborate with community-based adult service providers to help individuals achieve success as they transition into post-secondary education and employment.

Although the anticipated number of individuals with autism who will possess educational and career-centered needs beyond the scope of elementary and secondary education has prompted some discussion in the field, far less attention has been given to these issues for adults as compared to children (Howlin et al., 2005; Hurlbutt and Chalmers, 2004). Fortunately, there is a small but growing body of literature investigating the needs of

and preliminary outcomes for adults with ASD/PDD. One related line of inquiry has focused on investigating the initial outcomes associated with supported employment programming (García-Villamisar et al., 2002; Hillier et al., 2007; Howlin, 2000; Howlin et al., 2005; Hurlbutt and Chalmers, 2004; Müller et al., 2003). This line of research has helped establish some of the potential benefits of hiring workers with disabilities (Cimera, 2002; 2006; Parent and Kregel, 1996). It has also illuminated some common barriers to positive work experiences for individuals with autism-related disorders (e.g. underutilization of skills, difficulties with social aspects of common employment scenarios, limited range of work experiences, etc.).

Another related line of inquiry has begun to demonstrate the need for a better understanding of both the costs associated with as well as the skills necessary to support the provision of services for adults with autism (Järbrink et al., 2007). To date, the limitations of these related lines of inquiry include both small sample sizes and restricted population ranges (i.e. they tend to focus on either individuals with low-functioning autism or individuals with high-functioning autism). Clearly, there is a need to better understand the rate of growth in this population at the adult level. Furthermore, there is a need to investigate the costs associated with the provision of services for adults with autism. It is anticipated that studies with larger population samples will likely yield a more accurate picture of employment outcomes for individuals with autism.

The purpose of this article is to explore both (a) the costs associated with services received by adult individuals with autism, and (b) the outcomes they achieve in light of such costs. The first issue addressed is whether the rate of autism is increasing in the population served by vocational rehabilitation (VR) programs. Given the rise in incidence reported by the CDC and other sources (cf. Hillier et al., 2007), it is anticipated that there has been an observed increase in the number of individuals with autism served by the VR system. Next, this study investigated the level of costs associated with the services these individuals receive, as compared to other disability categories. This study also compares the costs accrued by adults with autism and other conditions, such as individuals with autism and mental retardation versus individuals with autism and sensory impairments. Finally, outcomes associated with these services (i.e. rates of employment, hours worked, wages earned) are described. The findings associated with this investigation are discussed within the context of developing a greater understanding of the need to develop a means of continuing to monitor the costs of services provided to adults with autism. The article concludes with a discussion of the implications for research and practice.

Method

Data source

The data analyzed for the present study originated from the Rehabilitation Services Administration's (RSA) '911' database. RSA is a federal organization that funds and regulates state VR programs throughout the United States. Their 911 database comprises 43 fields (e.g. the individual's disability, the services they obtained, the total costs of these services, the employment outcomes achieved, etc.) and contains information on every person who has applied for services from VR throughout the US and its territories (e.g. Puerto Rico, Northern Marianas, American Samoa).

Data are entered into the database by specially trained vocational rehabilitation counselors employed by VR agencies throughout each state and are cross-checked by two computer programs for discrepancies and abnormalities (Rehabilitation Services Administration, 2004). Data for the present analyses were collected between the years 2002 and 2006 and contain information on *all* individuals who stopped receiving services from VR during this period.

Participants

From 2002 to 2006, 3,182,126 individuals had their cases closed by VR (e.g. consumers became successfully employed, failed to comply with their program, wished to stop receiving services, etc.). Of these, 11,569 were diagnosed as having autism. Table 1 presents demographic information on these individuals as well as the entire VR consumer population.

Variables

Analyses contained within this study involved the following variables which were acquired directly from RSA's 911 database.

Disability When individuals applied for services from VR, case counselors categorized their primary disability as falling into one of 19 types of impairments (e.g. sensory impairments, communicative impairments, physical impairments, mental impairments). Each individual's impairment was then assigned one of 37 'cause codes', including cause unknown, accident or injury, autism, learning disability, stroke, schizophrenia, cancer, and so forth. Thus, if an individual had autism, their impairment might be categorized as being a 'mental impairment' caused by 'autism'.

For the purposes of the present study, the various combinations resulting from the 19 impairment and 37 cause codes were collapsed into nine disability categories. These included: (a) autism (including all conditions in the autism spectrum); (b) physical and mobility impairments (e.g.

Table 1 **Demographics of consumers with autism and the overall VR population**

	Individuals with autism	*Overall VR population*
N	11,569	3,182,126
Male (%)	80.3	54.6
Female (%)	19.7	45.4
Average age	28.8 years	39.3 years
White (%)	82.6	72.0
Black (%)	13.7	23.5
Asian (%)	2.6	1.1
Pacific Islander (%)	0.6	0.4
Native American (%)	0.9	1.6
Hispanic (%)	4.2	9.6
Have secondary conditions	59.9%	45.1%
Source of referral (%)		
Elementary-secondary school	42.3	15.6
Post-secondary school	2.8	2.6
Medical personnel	4.9	11.2
Welfare agency	1.2	2.9
Rehabilitation program	9.5	7.2
Social security administration	0.7	1.9
Employment center	0.9	3.4
Self-referral	15.6	30.0
Other source	22.2	25.1

Some individuals identified themselves as members of multiple ethnic backgrounds. Consequently, the combined percentages of the population exceed 100%.

cerebral palsy, amputations, spinal cord injuries); (c) learning disabilities; (d) traumatic brain injuries (TBI); (e) sensory impairments (e.g. blindness, hearing impairments, deaf-blind); (f) mental illnesses (e.g. schizophrenia, depression, anxiety disorders); (g) communication disorders not caused by sensory impairments or mental retardation (e.g. expressive and receptive disorders); (h) other health impairments not included in other categories (e.g. cancer, asthma, blood disorders); and (i) other learning difficulties not included in other categories (e.g. specific learning disabilities, ADHD).

Cost of services Also included within the 911 database are the total amount that VR paid vendors for furnishing services to each consumer. Costs of services provided directly by the VR counselor (e.g. vocational counseling) were not included in this variable.

Changes in wages earned and hours worked When an individual applied for VR services, case counselors recorded the average number of hours each person worked and the amount of wages they earned per week.

They did the same when the case was officially closed. By subtracting data obtained at application from data obtained at case closure, changes in wages earned and hours worked can be calculated (i.e. wages after service minus wages prior to service equals change in wages resulting from services).

Successfully and unsuccessfully employed Finally, when an individual's case was officially closed, VR counselors recorded the reason why. Fourteen options were possible, including: unable to locate, non-compliant, and achieved employment outcome. For the purposes of the present research, a 'successfully employed' was defined as a case being closed because an employment outcome within an integrated setting had been obtained. All other reasons for closure (e.g. individual was institutionalized, individual refused services, death) were coded as an 'unsuccessfully employed'.

Conversion of dollar values

Because the value of currency changes over time (e.g. a US dollar in 2002 does not equal a US dollar in 2005), the costs of services analyzed for this study had to be first converted to a common denomination (i.e. US dollars in 2006). This was done by multiplying the cost of services by the consumer price index (CPI) of the base year (i.e. 2006) and then dividing the resulting product by the CPI of the year that the dollar value was originally designated (Layard and Glaister, 1994). The CPIs that were utilized for these computations were annual averages obtained from the US Bureau of Labor Statistics (2007).

Research questions

The presented research revolved around three primary questions:

1 Is the rate of autism increasing in the population of individuals served by vocational rehabilitation?
2 What are the costs of services that individuals with autism receive from vocational rehabilitation?
3 What vocational outcomes do individuals with autism achieve as the result of vocational rehabilitation?

The costs of services and outcomes achieved by individuals with autism were compared to the other disability groups described above as well as the VR population as a whole. Comparisons were also made within the autism population by their secondary conditions (e.g. the costs generated by individuals with autism and learning disabilities were compared to individuals with autism and sensory impairments). This research received Institutional Review Board approval from Kent State University.

Results

The number of individuals with autism who were served by VR in the United States increased substantially each year from 2002 to 2006. In 2002, VR provided services to 1534 individuals with autism. This comprised roughly 0.2 percent of the overall VR population (i.e. 643,415). By 2006, the number of people with autism increased by 121 percent to 3397, or roughly 0.6 percent of the overall population (i.e. 617,149) (see Table 2).

As Table 3 indicates, in 2002 individuals with autism obtained services costing VR $3282 per person. By 2006, these per capita costs had decreased by 9 percent to $2992. In comparison, the costs generated by the overall VR population increased 3 percent from $2263 to $2336 during the same period.

When examined in relation to wages earned, in 2002 individuals with autism received services that cost VR $26.74 per dollar of increased wages. That is, for every dollar in wages that individuals with autism earned, VR paid $26.74 in services. In 2006, this ratio was $19.19 – a decrease of 28 percent. The general VR population, however, had cost–wage ratios of $12.01 and $9.73 in 2002 and 2006, respectively (i.e. a decrease of 19 percent). Similar cost trends were identified for costs per hours worked (see Table 3).

When individuals with autism were compared to persons with other disabling conditions, it was found that, on a per capita basis, individuals with autism were among the most costly of the nine disability groups investigated. Only participants with sensory impairments obtained services that cost more (i.e. $3213 versus $4210, respectively). When cost per wages earned was compared, all other disability groups were less costly to serve than individuals with autism (see Table 4).

Finally, when costs were compared within the autism population (e.g. individuals whose only diagnosis was autism versus individuals who had autism and some other condition), it was found that individuals who only had autism received services costing VR $3002. Only individuals with autism and learning disabilities and autism and sensory impairments generated higher costs ($3077 and $6141, respectively). Individuals with

Table 2 **Number of individuals served by VR from 2002 to 2006**

	2002	*2003*	*2004*	*2005*	*2006*
Total individuals served by VR	643,415	650,643	654,037	616,879	617,149
Individuals with autism	1534	1749	2236	2653	3397
% of VR population with autism	0.24%	0.27%	0.34%	0.43%	0.55%

Table 3 **Costs and employment outcomes of the entire VR population and individuals with autism**

	Fiscal year				
	2002	*2003*	*2004*	*2005*	*2006*
Individuals with autism					
N	1940	2178	2775	3360	4125
Cost of services for population	$3282	$3077	$3128	$3250	$2992
Cost per hours worked	$209.58	$115.24	$149.03	$168.08	$153.20
Cost per wages earned	$26.74	$15.70	$19.93	$22.24	$19.19
% successfully employed	41.8%	39.1%	40.6%	39.8%	39.9%
Cost of successfully employed	$5405	$5677	$5272	$5679	$5207
Cost of unsuccessfully employed	$1758	$1409	$1661	$1646	$1519
All VR participants					
N	643,415	650,643	654,037	616,879	617,149
Cost of services for population	$2263	$2254	$2257	$2350	$2336
Cost per hours worked	$116.23	$100.58	$98.77	$101.38	$100.26
Cost per wages earned	$12.01	$10.38	$10.09	$10.17	$9.73
% successfully employed	34.4%	33.4%	32.6%	33.5%	33.3%
Cost of successfully employed	$4379	$4391	$4365	$4591	$4633
Cost of unsuccessfully employed	$1155	$1180	$1236	$1221	$1186

All costs are presented in 2006 US dollars.

Table 4 **Average cost of service by disability and employment outcome from 2002 to 2006**

	N (% of VR population)	*Cost of services*	*Cost per hour worked*	*Cost per wages earned*	*Cost of employed*	*Cost of unemployed*
No disability[a]	172,648 (5.4%)	$107 ($356)	N/A	N/A	N/A	N/A
Other learning difficulties	741,127 (23.3%)	$1599 ($3820)	$63.48 (8.87)	$6.99 (117.85)	$2948 ($4924)	$731 ($2182)
Mental illnesses	658,474 (20.7%)	$1870 ($3968)	$84.46 (8.93)	$8.94 (119.06)	$3501 ($4995)	$1034 ($2675)
Communication disorders	17,839 (0.6%)	$2153 ($4670)	$104.01 (10.30)	$10.44 (169.31)	$3675 ($5397)	$970 ($3260)
Other health impairments	367,231 (11.5%)	$2417 ($5605)	$111.79 (10.46)	$10.45 (163.29)	$4393 ($6720)	$1131 ($3624)
TBI	35,461 (1.1%)	$2679 ($5957)	$126.25 (9.24)	$12.14 (155.43)	$4672 ($7212)	$1485 ($4254)
Learning disabilities	249,258 (7.8%)	$2811 ($5309)	$152.77 (8.34)	$22.13 (67.35)	$4122 ($5526)	$1529 ($4249)
Physical/mobility	595,726 (18.7%)	$3182 ($8769	$141.17 (10.19)	$12.56 (174.68)	$5743 ($10,633)	$1566 ($5860)
Autism	11,569 (0.4%)	$3213 ($6409)	$193.09 (8.11)	$25.62 (77.17)	$5171 ($7272)	$1484 ($4092)
Sensory impairment	332,790 (10.5%)	$4210 ($10,013)	$329.68 (13.72)	$20.30 (243.09)	$4920 (9564)	$2352 ($7850)

[a] Individuals who were found not to have a disability did not qualify for VR. Costs generated by these individuals are attributed mainly to the assessment process.

autism and TBI and autism and physical/mobility impairments were the least expensive to serve ($751 and $1823, respectively) (see Table 5).

As indicated in Table 6, 40.8 percent of individuals with autism were employed by the time their cases were officially closed by VR. Only individuals with sensory impairments (57.2%) and learning disabilities (41.8%) had higher rates of employment. Individuals with autism, however, worked far fewer hours (mean = 18.65) and earned lower wages (mean = $146.65) per week than most of the groups studied.

When individuals with autism were examined by their secondary conditions, it was found that individuals with autism and learning disabilities were employed at the highest rate (53.0%), but worked among the fewest hours (mean = 16.00) and earned the least in weekly pay (mean = $101.16) Conversely, individuals with autism and other health impairments (e.g. blood disorders, asthma, etc.) had the lowest rate of employment (27.2%), yet were among the highest paid (mean = $194.97) and the most hours worked (mean = 23.00) (see Table 7).

Discussion

Four salient points arise from the analysis described above. First, as with school-age populations, the number of individuals with autism who are served by VR increased substantially during each of the years investigated. From 2002 to 2006, the number of individuals with autism more than doubled from 1534 to 3397 (i.e. an increase of 121.4%) while the overall population served by VR decreased 4.1 percent from 643,415 to 617,149. This study appears to be the first to confirm this increase in observed cases of autism in the adult population served by VR using a relatively large US sample size.

Second, the costs of services acquired by adults with autism were higher than most of the other populations served by VR. Specifically, from 2002 to 2006, individuals with autism obtained services that cost VR an average of $3213. Only individuals with sensory impairments were more expensive (i.e. $4210) to serve. Further, when costs were considered within the context of wages earned and hours worked per week, individuals with autism remained one of the most costly groups examined. Clearly, more research is needed to explore solutions as to how to increase the cost-efficiency of the provision of services for adults as well as how to inexpensively train existing service providers (Müller et al., 2003). These issues are similar to those described for the provision of services for pre-kindergarten and elementary-school-aged children with autism, as reported by Jacobson and colleagues who found that children with autism were more costly to

Table 5 **Average cost of service and employment outcome from 2002 to 2006 for individuals with autism and secondary conditions**

	N (% of autism population)	*Cost of services*	*Cost per hour worked*	*Cost per wages earned*	*Cost of employed*	*Cost of unemployed*
Only autism	4731 (40.1%)	$3002	$148.39	$19.59	$5048	$1566
And sensory impairments	442 (3.8%)	$6141	$385.26	$39.01	$7494	$4146
And physical/mobility impairments	246 (2.1%)	$1823	$91.15	$10.22	$5534	$913
And learning disabilities	2514 (22.5%)	$3077	$192.31	$30.42	$5439	$1315
And traumatic brain injury	8 (0.2%)	$751	$25.20	$2.78	$4409	$230
And mental illness	1030 (8.9%)	$2315	$104.33	$12.75	$5607	$917
And communication disorders	1142 (9.9%)	$2288	$102.60	$12.42	$3776	$1465
And other health impairments	268 (2.3%)	$2408	$104.70	$12.35	$3500	$2557
And other learning difficulties	1179 (10.2%)	$2766	$113.36	$13.27	$4909	$864

Table 6 **Percent employed, hours worked and wages earned per week by disability**

	% employed	*Hours worked (SD)*	*Wages earned (SD)*
Sensory impairment	57.2%	10.83 (17.24)	$127.89 ($236.10)
Learning disabilities	41.8%	21.10 (14.28)	$148.86 ($112.52)
Autism	40.8%	18.65 (13.43)	$146.65 ($125.14)
Communication disorders	37.9%	22.08 (16.58)	$222.62 ($228.68)
Other health impairments	33.9%	21.81 (17.76)	$249.04 ($256.12)
Other learning disabilities	32.8%	28.43 (14.98)	$277.72 ($188.55)
Physical/mobility impairments	32.3%	23.98 (17.55)	$277.02 ($263.51)
TBI	31.6%	23.92 (15.60)	$258.00 ($253.25)
Mental illnesses	28.4%	24.86 (15.26)	$246.59 ($199.36)

serve in the school setting than children with other conditions (Jacobson and Mulick, 2000; Jacobson et al., 1998).

Third, though the expenditures associated with serving people with autism were high, they appeared to be decreasing over time. Services obtained in 2006 were 8.8 percent less expensive than those obtained in 2002. During the same time, cost of services obtained by VR participants in general *increased* 3.2 percent (i.e. from $2263 in 2002 to $2336 in 2006).

The final finding of this study involved outcomes achieved as the result of VR's services. Specifically, outcomes are mixed. Of all the groups examined, individuals with autism had the third highest rate of employment (40.8%). Only individuals with sensory impairments and learning disabilities were employed more frequently (57.2 and 41.8%, respectively). Unfortunately, though employed, individuals with autism worked fewer hours and earned lower wages per week than nearly all other groups. These concerns were anticipated by other authors (cf. Howlin, 2000; Howlin et al., 2005; Müller et al., 2003), thus prompting researchers to advocate for

Table 7 **Percent employed, hours worked and wages earned per week for individuals with autism and secondary conditions**

	% employed	*Hours worked (SD)*	*Wages earned (SD)*
Autism only	41.1%	20.23 (8.11)	$153.25 ($62.64)
And sensory impairment	37.2%	15.94 (12.93)	$157.43 ($184.32)
And physical/mobility impairments	31.3%	20.00 (10.58)	$178.44 ($98.29)
And learning disabilities	53.0%	16.00 (7.88)	$101.16 ($40.86)
And TBI	50.0%	29.80 (7.07)	$270.08 ($17.68)
And mental illness	31.8%	22.19 (8.47)	$181.50 ($70.45)
And communication difficulties	36.6%	22.30 (7.74)	$184.26 ($61.65)
Other health impairments	27.2%	23.00 (9.45)	$194.97 ($80.02)
Other learning difficulties	42.7%	24.36 (8.66)	$208.53 ($57.83)

the expansion of the network of supported employment options for individuals with autism. More research is needed to investigate the resolution of these and related limitations associated with employment for individuals with autism.

Taken as a whole, the findings presented above can be interpreted in several ways. For example, it could be said that individuals with autism receive more costly services because of the pervasive nature of their condition. That is to say, individuals with autism on average simply require more services to become employed than nearly all other populations, including individual with various mental illnesses, traumatic brain injuries, and physical limitations. Further, because of nature of their condition, they are unable to work many hours per week or obtain jobs that pay higher wages. This, of course, is pure speculation and no data presented here lend direct support to this interpretation.

Another interpretation as to why costs generated by adults with autism are high, yet decreasing, is that individuals with autism represent a very

small proportion of the overall VR consumer population, especially in 2002 when less than a quarter of a percent of VR's consumers had autism. Given this low incidence, it seems plausible that VR counselors have infrequent exposure to this population and are unfamiliar with their unique needs. Consequently, VR counselors may struggle trying to find appropriate services and job matches for these individuals. Thus, costs are increased because of the 'trial and error' method of providing services.

This second interpretation is based mainly on speculation and requires additional investigation. Yet, the outcomes associated with the present study do seem to suggest that VR counselors are becoming more effective at providing services to this population as the numbers of adults with autism who apply for services from VR increases. As indicated above, from 2002 to 2006, the cost of services obtained by this population decreased while costs to the general VR population increased. In other words, as VR counselors become more exposed to individuals with autism from 2002 to 2006, they appear to have become more cost-effective at addressing their needs. However, additional years of data are needed in order to formulate a better cost trend and to determine whether the costs of adults with autism are actually decreasing over time.

If this second interpretation is valid, further educating VR counselors about the vocational needs of adults with autism should continue to reduce the costs of services that they obtain. Additionally, by gaining a more thorough understanding of autism, VR counselors could become better at identifying positions within the community that match the needs of such consumers. This solution was offered by Müller and colleagues in a related study in 2003. Better job matches may increase the number of hours that these individuals work and the amount of money that they earn.

In addition to the elevated costs, the present study determined that 40.8 percent of VR consumers with autism become employed. Though this is among the highest rate of employment for all of the groups investigated, the fact that nearly 60 percent of adults with autism do *not* become employed by the time their cases are closed by VR is more than troubling. Employment is the natural extension of school-based programs (Wehman, 2006). It enables adults with and without disabilities to earn wages with which they can support themselves, further their interests, and exercise their abilities to choose how they will live. Gainful employment also enables individuals to make friends, give meaning to their lives, and participate within their community. The nearly 6 out of 10 adults with autism who do not become employed after receiving VR services must rely on friends, family, or governmental subsidies in order to live. Further, they are unable to benefit from the social aspects of being employed. Future research will need to explore this issue.

Finally, while individuals with autism were employed at rates higher than most of VR's other consumers, they worked far fewer hours and for less pay than the average. When examined closer, this trend (i.e. high rate of employment, but low hours worked and weekly pay) was evident elsewhere. For instance, individuals with sensory impairments had the highest rate of employment of all VR's consumers (57.2%), yet the lowest hours worked (mean = 10.83) and wages received (mean = $127.89). The same is true when subgroups of the autism population were compared. Specifically, individuals with autism and learning disabilities had the highest rate of employment (53%), but earned the least in wages (mean = $101.16) and worked the second fewest hours (mean = 8).

Thus, there seems to be an inverse relationship between rate of employment and employment outcomes (i.e. hours worked and wages earned). A potential explanation for this relationship may be that low-paying, part-time jobs require fewer skills than high-paying, full-time jobs. Further, they may be easier for job developers to find. In other words, as jobs increase in hours and pay, they become more competitive and difficult to find.

It might also be that employers are far more forgiving when dealing with employees who fill low-paying, part-time jobs. So inappropriate behaviors or poor performances that are often overlooked when somebody is working a low-paying, part-time job are not tolerated in higher-paying, full-time positions. Additional research will need to explore this potentially significant finding.

Though this study analyzed data from the entire population of adults being served in the United States via VR, it has several shortcomings that must be kept in mind. For example, the costs presented here are only those funded by each state's department of vocational rehabilitation, which usually only pays for initial job placement and training services. Other supports that individuals require to maintain their positions are paid by other agencies, such as departments of mental health or boards of mental retardation and developmental disabilities (MRDDs). Therefore, this study does not present the complete cost of services that adults with autism obtain, but rather the costs from VR's perspective.

Another limitation of the present study is that it placed all individuals with ASD/PDD into one category: autism. This is problematic because individuals across the spectrum vary considerably. Being a heterogeneous group, it is difficult to generalize between people with autism-related diagnoses (Seigel, 2003). Further, it is difficult to generalize between individuals with the same diagnosis within the spectrum. However, the same could be said for individuals with learning disabilities, sensory impairments, brain injuries, or most other conditions.

To mitigate this weakness, this study compared subgroups within the autism population, such as individuals with autism and mental retardation versus individuals with autism and TBI. However, as within the overall autism population, there is considerable variation in abilities within these secondary disabilities. Consequently, generalizations remain elusive.

Finally, this study only presented data on the cost of services. It did not report on people's satisfaction with the services they received or on the outcomes that they achieved. Even though individuals may have become employed, there is no guarantee that these workers enjoyed their jobs or wished to remain in them. In other words, costs of programs are certainly an issue, especially in times of fiscal constraint. However, so too is the satisfaction of people who participate in programs. Both cost and consumer satisfaction thus must be analyzed when evaluating the success of human service programs. Future research is required to explore these nonmonetary issues.

On its surface, this line of inquiry appears to focus mainly on monetary issues. Yet it extends beyond the mere dollars and cents spent on individuals with autism. By examining the costs of programs, research can identify policies and strategies that reduce expenditures while improving the outcomes achieved by program participants. If programmatic costs can be lowered, more individuals can be provided services within the limited funding these programs receive. If more individuals can receive services, individuals with autism will be able to experience the rewards of working in their communities in greater numbers.

Conclusions

Though the cause may be in dispute, there is widespread agreement that the rate of autism and other pervasive developmental disorders is increasing in the school-age population within the United States. As these individuals become adults, the services that they will require will undoubtedly produce a drain on the fiscal resources of agencies that fund them, such as vocational rehabilitation. Unfortunately, very little is known about such monetary matters or the outcomes that adults with autism achieve as a result of their services. This study is the first of a new line of inquiry that will examine these critical issues.

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