EFFECT OF SUPPORTED EMPLOYMENT ON THE VOCATIONAL OUTCOMES OF PERSONS WITH TRAUMATIC BRAIN INJURY

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This paper reports the job placement of 5 males with severe traumatic brain injury. An individual placement model of supported employment was used. All individuals were placed in competitive employment and received staggered intervention over time by trained employment specialists. A multiple baseline design across persons was used to evaluate results. All individuals had been unable to work consistently or at all in competitive work environments. The range of wages was \$4.25 to \$5.00 per hour with an average of 339 hours of employment specialist intervention time required per case. The major problems experienced by employment specialists were insubordinate and disruptive behaviors as well as other inappropriate social behaviors displayed at the job site.

DESCRIPTORS: head injury, supported employment, vocational rehabilitation, severe disabilities

In recent years there has been a marked increase in the number of persons surviving severe head injuries (Levin, Benton, & Grossman, 1982). Emergency evacuation procedures, improvements in neurosurgical intervention, and pharmacological advancements have resulted in many more people surviving traumatic brain injuries (e.g., in motor vehicle accidents). Levin et al. (1982) estimate that approximately 200 traumatic brain injuries (TBI) occur per 100,000 population, roughly similar to that of cerebral vascular accidents. The medical costs for persons following TBI are substantial, with some estimates ranging up to 6 billion dollars of direct costs and 22 billion dollars of indirect costs (e.g., lost work time) annually (Stonnington, 1987). Furthermore, the stress and psychological damage associated with traumatic brain injury are very high (Livingston & Brooks, 1988).

Given that over 60% of TBI victims are males under 35 years of age, it is not surprising that

recent attention has focused upon the vocational outcomes associated with this population (Brooks, McKinlay, Symington, Beattie, & Campsie, 1987; Fraser, 1988; Prigatano, 1986; Stapleton, 1986; Wehman et al., 1988). This is a group of people who can and should be productive workers for many years. Most persons with traumatic brain injury, however, exhibit some degree of impaired cognitive functioning in areas such as short-term memory, processing, planning, judgment, and sequencing (Kreutzer, Gordon, & Wehman, 1989; Wehman et al., in press). Often there are concomitant deficits in psychosocial behavior, educational abilities, and physical competence (Kreutzer & Wehman, in press; Rosen & Gerring, 1986; Ylvisaker, 1985). These problems are frequently presented as the individual tries to return to work, either to the same job or to other competitive employment (Kreutzer & Wehman, in press; Wehman & Kreutzer, in press).

Few people return to work following severe head injuries, as noted by Kay, Ezrachi, and Cavallo (1986). For example, Peck, Fulton, Cohen, Warren, and Antonello (1984) investigated vocational outcome in a group of 60 severely head-injured patients from the Richmond, Virginia, metropolitan area. Patients were a mean of 3.5 years post-injury, all were initially admitted in a comatose state, and 82% were between 16 and 40 years of

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age. Only 13% of the sample had returned to preinjury vocational levels, whereas 35% were employed in less demanding or sheltered workshop settings, and 52% were unemployed. Factors most strongly related to vocational adjustment included physical status, thinking efficiency, concentration ability, and motor coordination. Problems with remote memory, depression, and seizures were reported by 88%, 78%, and 15%, respectively. Furthermore, 56% reported that they relied on their spouse or other family member as a primary source of income. Disability compensation was received by 27% of the sample. The authors concluded that diminished vocational status is a common finding, even years after the injury, and suggested a need for supplementary rehabilitation programs to reduce symptoms related to reduced vocational status.

In another study Burke, Wesolowski, and Guth (1988) found that, when a comprehensive 24-hr residential approach to rehabilitation was taken, approximately 50% of the 34 clients were employed at 3 to 12 months follow-up. These data are similar to the outcome data presented by Ben-Yishay, Silver, Piasetsky, and Rattock (1987) and Prigatano (1986), both of whom indicated about 50% retention with their patients. In the Wehman *et al.* (1988) paper, preliminary data indicate that 11 of 15 (73.3%) persons with severe head injury were competitively employed with job coach support after a 6-month follow-up.

Numerous other studies (Jellinek, Torkelson, & Harvey, 1982; Weddell, Oddy, & Jenkins, 1980; Brooks *et al.*, 1987) strongly support the inability of persons with traumatic brain injury to return to competitive work in North America or the United Kingdom (Brooks *et al.*, 1987). McMordie, Barker, and Paolo (*in press*) report that only 19% of 177 head-injured cases in Iowa returned to competitive employment.

Examination of the data from each of these studies yields a number of conclusions. First, the severity and type of head injury are clearly determinants of post injury employment potential. Patients with more severe injuries and correspondingly more severe physical, emotional, and cognitive problems are less likely to return to work.

Second, it is reasonable to conclude that fewer than one third of patients with severe head injuries, as determined by duration of unconsciousness or posttraumatic amnesia, are likely to be competitively employed. The likelihood of returning to work at preinjury levels is considerably smaller, and there are long delays for those who do return to work.

Third, the length of the postinjury period seems to have no bearing on eventual return to work (Brooks *et al.*, 1987). Finally, as noted earlier, head injury is a phenomenon that primarily affects young men, typically primary wage earners with relatively normal life expectancies. Unfortunately, the responsibility of caring for these unemployed individuals often falls on spouses and parents. Families undergo considerable stress, and, in many cases, family members sacrifice their own employment to care for the head-injured person at home.

In an effort to study more closely the return-to-work problems encountered by TBI survivors, a supported employment program was initiated. Supported employment is a model of rehabilitation intervention that has received considerable attention in the past 5 years (Rusch, 1986; Wehman & Moon, 1988). This approach focuses primarily on people with severe disabilities by providing vocational intervention at the point of placement through use of an employment specialist or job coach. Although there are several types of group supported employment models, such as work crews or enclaves, we used the individual placement model of supported competitive employment (Rusch, 1986; Wehman & Kreutzer, *in press*). Hallmarks of a supported employment model are pay for real work, employment in integrated work settings, and access to long-term, permanent follow-along support during the person's job tenure.

Therefore, the purpose of the present study was to examine the effects of an individual placement model of supported employment on the wages and hourly work outcomes of 5 TBI survivors who have consistently been unable to gain competitive employment and/or hold employment. Competitive employment was defined as earning at least the federal minimum wage of \$3.35 per hour and

Table 1
Demographic and Occupational Profile

Subject	Age at injury	Current age	Length of coma (days)	Educational level	Work history			
					Preinjury ^a		Postinjury ^b	
					M hourly wage	M hours/week	M hourly wage	M hours/week
1	23	31	233	Some high school	3.60	38.5	1.40	37
2	9	20	138	High school graduate	NA	NA	3.78	21.3
3	27	29	59	High school graduate	5.67	40	2.19	18.4
4	20	33	153	College graduate	2.81	40	NA	NA
5	16	37	10	Attended college	NA	NA	3.42	27
M =	19	30	118.6		4.03	39.5	2.70	25.9

^a Participants whose injuries occurred prior to their 20th birthday were coded NA and not included in mean computation.

^b Participant who had no postinjury employment history was coded NA and not included in mean computation.

working in integrated work environments in business or industry.

METHOD

Subjects

Five clients, 20 to 37 years old, were selected in early 1988 from the group of referrals to the supported employment program. Referrals were made by parents, private and public rehabilitation counselors, physicians, local hospitals, and insurance providers. All subjects were injured in motor vehicle accidents and, as the mean duration of unconsciousness (118.6 days) indicates, were very severely injured. Selection criteria included (a) a Glasgow Coma Score on initial admission of less than 10, (b) a record of posttraumatic amnesia exceeding 24 hr, and (c) a minimum age of 17. Table 1 lists the demographic characteristics of the 5 subjects, including the major presenting vocational problems.

The frequency of specific somatic, cognitive, behavioral, communication, and social deficits was assessed by project staff in interviews with each client's family. Clients or family members responded to 105 items relating to problem behaviors that the client was experiencing. These data are presented in Table 2 and demonstrate the multidimensional nature of problems experienced by each case. All cases reported a large number of problems,

with especially high frequencies in the thinking and behavior areas. All clients measured below the 50th percentile on a battery of standardized neuropsychological tests.

All subjects had experienced long-term chronic unemployment or periodic work in sheltered workshops. Three subjects exhibited serious alcohol or substance abuse problems and disruptive behaviors and were viewed as being too much at risk for employment by vocational rehabilitation counselors as well as family members and physicians.

Job placement was based on factors such as client interest, job compatibility, job availability, avail-

Table 2
Frequency of Problems Indicated on Checklist of Client Characteristics

Subject	Problems				
	Somatic ^a	Thinking ^a	Behavior ^b	Communication ^c	Social ^d
1	6 (20) ^e	1 (3)	5 (17)	4 (40)	1 (17)
2	2 (7)	21 (70)	12 (41)	7 (70)	1 (17)
3	7 (23)	12 (40)	12 (41)	6 (60)	1 (17)
4	5 (17)	23 (77)	27 (93)	6 (60)	5 (83)
5	5 (17)	18 (60)	21 (72)	7 (70)	4 (67)

^a 30 items.

^b 29 items.

^c 10 items.

^d 6 items.

^e Numbers in parentheses represent the percentage of problem items within a category.

Table 3
Checklist of Activities in Supported Work Approach to Competitive Employment

Program Component I	Job development and job placement	<ul style="list-style-type: none">●Structured efforts at finding jobs for client and matching client strengths to job needs●Planning of transportation arrangements and/or travel training●Active involvement with parents on identifying appropriate job for client●Communication with Social Security Administration
Program Component II	Job site training and advocacy	<ul style="list-style-type: none">●Trained staff provides behavior skill training aimed at improving client work performance●Trained staff provides necessary social skill training at job site●Staff works with employers/co-workers in helping client●Staff helps client and co-workers adjust to each other
Program Component III	Ongoing assessment	<ul style="list-style-type: none">●Provides for regular written feedback from employer on client progress●Utilizes behavioral data related to client work speed, proficiency, need for staff assistance, etc.●Implements periodic client and/or parent satisfaction questionnaires
Program Component IV	Follow-up and retention	<ul style="list-style-type: none">●Implements planned effort at reducing staff intervention on job site●Provides follow-up to employer in form of phone calls and/or visits to job sites as needed●Communicates with employer regarding staff accessibility as needed●Helps client relocate or find new job if necessary

Note: Taken from Wehman and Kregel (1985).

ability of transportation services, and family support. Most important was strong client interest in going to work and keeping a job. The subject's skill level was less important, because the supported employment approach is designed to overcome whatever deficits are present.

Setting

The program was based in central Virginia at a large university medical center. All placements were in competitive employment with co-workers who were predominantly nonhandicapped.

Supported Employment Intervention

The supported employment model emphasizes vocational intervention directly at the job site after the person is hired. This approach requires the use of skilled professionals who can provide specialized job placement and training support. As noted in Table 3, the major components in this model in-

clude (a) job placement, (b) job site training, (c) ongoing assessment, and (d) permanent follow-along throughout the subject's employment (Wehman & Kregel, 1985). Major differences from traditional job placement practices include the placement of individuals who are not "job ready," as well as the presence of an on-site employment specialist or job coach to provide training and advocacy support. The employment specialist begins with intensive one-to-one support and fades this support as the individual gains independence on the job. A training curriculum describing specific elements of the model in more depth can be found in Moon, Goodall, Barcus, and Brooke (1986).

This model was modified for TBI clients by emphasizing development of cognitive compensatory strategies at the job site and, when appropriate, physical modifications of the work environment. The employment specialists spent a much greater amount of time away from the work site in coun-

selling activities and community resource coordination (e.g., substance abuse counseling or residential help). Because short-term memory and planning are major deficits of most TBI clients, these problems had to be resolved at the job site by the employment specialists.

After a client was placed, the job coach provided daily on-site training, support, and advocacy until the client showed increased independence. This independence was assessed by biweekly data (see Table 5) and measures of on-task performance when necessary. Usually, acquisition of new skills was not a problem, but generalization and retention were. Specific compensatory strategies, such as notebook and individualized cueing devices, often had to be introduced. When clients required only 20% staff time on-site, they were considered stabilized, although the job coach continued to work on reducing time on-site (Hill, 1988).

Client Outcome

Three dependent variables were measured:

Wages earned per week. Wages earned per week was computed by multiplying the wages earned per hour by the number of hours worked per week.

Hours worked per week. Hours worked per week was computed by having employment specialists check with the client and then with the employer each Friday to verify accuracy of the total.

Costs. Staff intervention hours and costs of the program were collected weekly and monitored. During baseline, data concerning each subject's weekly wages and weekly hours of employment were gathered through interviews with each subject and his parent/guardian and/or employer. These data checks were then corroborated by conferring with the client's employer semimonthly to verify the number of hours worked and the hourly rate. During the intervention phase by employment specialists, data were collected using the data management system developed at the Rehabilitation Research and Training Center at Virginia Commonwealth University (Hill, 1988). The employment specialist also tracked total staff intervention time beginning with job development activities and ending with ongoing follow-up and on-site con-

sumer advocacy. These data were also collected for purposes of evaluating costs associated with placement of these clients.

Staff Intervention Time

Total intervention time included all hours staff spent in (a) job development, (b) consumer assessment, (c) job site analysis, (d) direct job site training activities (i.e., actual hands-on training and direct observation of subject performance), and (e) indirect job site training activities (e.g., travel/transport, writing behavioral programs, and advocacy).

Reliability

The accuracy of the wages accumulated and the hours worked was computed monthly by having two or more job coaches collect these data independently and then corroborate the accuracy of this information with the employer. There was 100% agreement each time this was done.

The accuracy of the staff intervention data was checked every other week by a senior research staff person against the data submitted by the employment specialists. There was also 100% agreement for this measure.

Experimental Design

A multiple baseline design across subjects was used (Hersen & Barlow, 1976). In this design the wages earned and hours worked by the 5 subjects were identified and measured over time. These baselines were then used to compare the effects of supported competitive employment training for each individual as well as across individuals.

Baseline Assessment

During the baseline phase each subject's earning power and hours were assessed before supported employment services were initiated. The baseline phase extended from January 1987 to January 1988 for all 5 subjects. Baseline levels of wages earned and hours worked per week were assessed retroactively through extensive interviews with each subject, his parent or guardian, vocational rehabil-

itation counselor, and, when possible, his employer(s).

RESULTS

The data in Table 4 and Figure 1 indicate that each subject was able to be placed into competitive employment. Figure 1 shows the lengthy period of unemployment or unstable employment each of these individuals experienced before supported employment. With the intervention of a supported employment specialist, meaningful competitive work was located and on-site training and support were provided. The wages ranged from \$4.25 to \$5.00 per hour. The range of hours worked weekly varied from 15 to 40, as displayed in Figure 2. Subject 2 was receiving Social Security Disability Income, and he and his mother were greatly concerned about jeopardizing these payments. Although more hours could have been made available, he chose to work only 15 hours per week.

The employment specialist intervention hours ranged from 210 to 451, with a mean of approximately 339 (see Table 4). At a rate of \$25 per contact hour (the average rate in Virginia for rehabilitation service providers) the cost per consumer averaged \$8,641. Subject 4 never attained stabilization; he was laid off from his first position, replaced, and subsequently terminated from the second position. For the remaining 4 cases, the mean amount of intervention time to stabilization (i.e., until staff time on the case had been reduced to 20% or less of a client's work hours) was 256 hours. Therefore, the average cost for initial job site training was \$6,400. For the 4 persons who were stabilized in employment, ongoing support services averaged \$50 per week.

Supervisor evaluation data are presented in Table 5. These data represent the average ratings obtained from the supervisor across time for each subject and indicate that employers were generally satisfied to very satisfied. Subject 2's supervisor was the least satisfied. The comments associated with his evaluations indicated general improvement across time, with the major problem being performance consistency. The most satisfied supervisor worked with

Figure 1. Number of hours per week worked by subjects.

Figure 2. Subjects' gross earnings per week.

Table 4
Outcomes of Supported Employment

Subject	Type of placement	Type of company	Consecutive weeks employed	Wages accumulated	Staff intervention hours		Supported employment costs	
					To stabilization ^a	Total	To stabilization	Total
1	Maintenance worker	Children's retail outlet	76	\$12,708.00	299:20	367:00	\$ 7,482.50	\$ 9,175.00
2	Activities assistant	Child service center	66	4,140.00	183:05	265:00	4,577.50	6,625.00
3	Price ticket changer	Children's retail outlet	59	8,794.20	125:30	210:10	3,137.50	5,253.75
4	Stock clerk	Drug retail outlet	12	1,104.00	138:49	138:49	3,470.00	3,470.00
	Sales associate	Children's retail outlet	19	1,728.00	295:50	295:50	7,395.00	7,395.00
5	Assistant cook	Nursing home	25	4,473.00	417:25	451:05	10,435.00	11,277.50

^a As defined by the Virginia Department of Rehabilitative Services, stabilization occurs when staff intervention time required for job maintenance remains at or below 20% of the client's work time for a period of 30 consecutive days.

^b Stabilization did not occur for either of these placements.

Table 5
Mean Supervisor Ratings of Subjects

	Subject				
	1	2	3	4	5
How satisfied are you with this employee's timeliness of arrival and departure from work?	4.0	3.3	4.0	4.0	4.5
How satisfied are you with this employee's attendance?	4.8	4.0	4.0	4.5	4.5
How satisfied are you with this employee's timeliness of breaks and lunch?	4.5	3.3	3.8	3.0	4.5
How satisfied are you with this employee's appearance?	4.0	3.0	4.2	4.5	3.5
How satisfied are you with this employee's general performance <u>as compared to other workers?</u>	4.8	2.8	3.6	3.0	3.5
How satisfied are you with this employee's communication skills?	4.0	3.0	3.6	3.0	3.0
How satisfied are you with this employee's consistency in task performance?	4.0	2.5	3.4	2.0	3.5
How satisfied are you with this employee's work speed?	3.8	3.0	3.0	2.5	3.0
How satisfied are you with this employee's quality of work?	4.8	3.0	3.2	3.0	4.0
How satisfied are you with this employee's overall proficiency at this time?	4.3	3.0	3.6	3.0	3.5
<i>M</i>	4.3	3.1	3.6	3.3	3.8

Note: Ratings are on a 5-point scale with 1 indicating extreme dissatisfaction and 5 indicating extreme satisfaction.

Subject 1. This subject's supervisor commented that his work performance, attitude, and initiative made him one of the best employees in the store.

DISCUSSION

The data presented in this study suggest that a supported employment intervention program resulted in placement into competitive employment for persons who have been unable to gain or maintain jobs following their injury. Limited success was achieved for a group of clients who presented a wide array of problems. Three subjects were unable to find competitive work by themselves or with the help of family members or professional counselors due to the severity of their disability. Subjects 1 and 3 had been able to obtain only periodic work in sheltered workshops. Subjects 4 and 5 had been unable to hold any employment for more than 4 to 6 weeks at a time. In fact, Subject 5 reportedly had held 18 jobs over the past 6 years.

Subjects 3, 4, and 5 were exceptionally difficult cases to maintain in competitive employment even with the use of the job coach. Subject 4, for example, displayed insubordination to the supervisor, bad judgment with customers, and temper outbursts. These problems contributed to the company's being unwilling to continue his employment.

The job coach had used a variety of different reinforcement programs including a form of token economy (Hegel, 1988) and was able to attain some, but not sufficient, success. Subject 4 then found a job on his own but eventually quit. He is now awaiting re-placement.

Subject 3 resigned his position due to possession of marijuana and prosecution by the local authorities. He had also been charged with a similar crime previously. The company chose not to retain him as an employee, and he is awaiting re-placement. This problem clearly was outside of the jurisdiction of the employment specialist.

Subject 5 chose to resign due to behavior problems at the job site (swearing and temper outbursts) alcohol abuse. He worked much longer than he had been able to in several months but still was unable to be satisfied with the job. He has since been placed in a different job as a maintenance worker.

All 3 of these subjects have received varying degrees of treatment and care by a psychiatrist during the past year. Each of them continues, however, to express substantial dissatisfaction with his present status, not only vocationally but residentially, financially, and socially. Such dissatisfaction is a major contributing factor to problems in retention of any job.

None of these subjects earned enough money to live independently. Some help from family and/or other sources will be necessary until they can establish a sufficiently positive work history to move into better paying positions. The significant cognitive and psychiatric impairments presented by these persons raise the questions, however, of how much upward mobility will ever be possible and how much withdrawal of staff support can be achieved. Given the fact that traumatic brain damage is not a static phenomenon and, thus, long-term physiological improvement can occur, steady competitive work may actually be a positive facilitator of neuropsychological improvement.

All 5 clients desired competitive, integrated employment; they were each adamant about not "getting stuck in a workshop," in the words of Subject 5. Hence the challenge to service providers continues to be how to solve these work-related problems and still enable placement into competitive settings.

Although the intervention activities identified for each subject were individualized to the job site and the person's needs, clearly similar problems had to be addressed in every case. For example, getting to work on time, transportation arrangements, inappropriate verbal behavior at the job, planning and sequencing work activities, remembering work tasks, and inappropriate sexual behavior (Kreutzer & Zasler, 1989) at the job site were common problems the employment specialists managed in conjunction with the business supervisors. The challenges to the employment specialist in placing, training, and retaining a person with these complex problems are substantial indeed. A highly experienced or trained counselor is essential.

In this program, the employment specialists had an average of 2 years of experience in direct service of TBI return-to-work programs. Two of the four employment specialists had Master's degrees in a human service area; the others had a Bachelor's degree. Two psychologists in the rehabilitation and neuropsychology area were influential, as were physiatrists (rehabilitation physicians) who worked closely with the staff in problem solving. A viable employment program for this population must be a team effort.

The cost of placing these persons and training them through supported employment was high relative to the costs for persons with mild and moderate mental retardation in similar supported employment programs (Rusch, 1986). Amount of staff intervention ranged from 154 to 451 hr ($M = 321$ hr). Hence the average cost was over \$8,000 per subject.

The financial cost of *not* helping TBI victims return to work is terribly high, however (McMordie & Barker, 1988). These cases are often known as "catastrophic" cases because the victims are usually young males who have their entire life of work ahead of them. Therefore, the monetary reserves required to compensate these TBI victims can run into the millions of dollars for each case. Tens of millions of dollars are also spent by the Social Security Administration on Social Security Disability Income cases. It is not difficult to see how a 25-year-old person who had previously worked as a carpenter with earnings of \$20,000 a year would easily be able to command a minimum of \$750,000 to \$1,000,000 settlement, assuming that a liability or long-term disability insurance policy was in place. Obviously, with settlements this large, a placement cost of even \$10,000 is quite small if and when a client's earned wages can be used to offset the liability exposure incurred by the insurance firm.

The results of the present study, although somewhat disappointing in terms of long-term job retention, have taught us several things. First, this is a population that will need re-placement more often than other disabled adults due to the consistently changing vocational aspirations they demonstrate. This finding is supported by other programs similar to ours (Ellard, in press; Stapleton & Bennett, in press). Second, clients with traumatic brain injury present problems away from the job, such as excessive drinking and suicidal threats, which sharply impair the outlook for positive vocational outcome. These problems strongly suggest the need for a network of case managers providing support over and above the responsibilities of the employment specialist. Third, jobs must be selected that permit intensive behavioral interventions on an ongoing basis. Many of the long-term postacute severe cases

will need highly specialized intervention. Finally, these data support a recent study comparing the vocational outcomes of 20 clients across preinjury, postinjury, and supported employment phases (Wehman *et al.*, 1989). Supported employment helped restore vocational capacity in these clients to preinjury levels.

The present study has shown how supported employment can enable postacute TBI victims to become competitively employed. It focuses on critical employment outcomes such as wages earned, hours worked, and staff intervention hours expended. Future research must look at the role, if any, of preplacement activities such as cognitive retraining, improvements of cognitive ability over time as a function of job placement, and the most efficient mechanisms for making a job match. Additional research must evaluate appropriate methods of staff intervention at the job site for inappropriate behaviors as well as the role of behavior therapy and counseling techniques during employment.

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