

ORIGINAL ARTICLE

Barriers and facilitators to employment after spinal cord injury: underlying dimensions and their relationship to labor force participation

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Study design: Cross-sectional survey.

Objective: To identify barriers and facilitators to employment after spinal cord injury (SCI) and their relationship with labor force participation.

Methods: Participants were initially identified through specialty hospitals in the Midwest and Southeastern United States of America. 781 adults with traumatic SCI, at least 1 year post-injury, and between the ages of 18–64, participated. A 30-item instrument on barriers and facilitators to employment was administered. Analyses included exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and comparisons of scores as a function of employment status.

Results: EFA indicated six primary themes (root mean square error of approximation (RMSEA) = 0.040), including: (a) resources, (b) health status, (c) disability considerations, (d) lack of importance, (e) disincentives and (f) motivation. CFA indicated an acceptable fit (RMSEA = 0.078). Univariate analyses indicated each item and factor was significantly different as a function of labor force participation. After controlling for biographical and injury factors, multinomial logistic regression indicated three factors significantly differentiated those never employed, those currently unemployed but had worked since injury and those currently employed. Those employed reported higher scores for resources and motivation and lower scores for lack of importance.

Conclusions: Barriers and facilitators were consistently related to labor force participation, with facilitators more highly related to labor force participation than barriers. Although loss of financial and medical benefits (disincentives) as well as health status have been reported as barriers to employment, they were not as highly correlated with labor force participation as were other factors.

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Introduction

Employment rates after spinal cord injury (SCI) continue to fall well below that of pre-injury rates and those of the general population.^{1–2} Participation in the labor force is important to adult life, and lower employment rates after SCI are indicative of diminished labor force participation. This should be of concern to rehabilitation professionals as labor force participation is highly correlated with both quality of life and life expectancy after SCI.^{1,3–4}

A large body of research has identified predictors of employment using mostly biographic, injury and educational characteristics. Recent reviews have been conducted. For instance, Anderson *et al.*⁵ identified 14 factors related to

employment after SCI including: age, sex, marital status, race, injury severity, time since injury, vocational counseling, employer's attitudes, employment type, education, social support, medical problems, psychological state and environment. Despite this body of research, relatively few studies have specifically focused on barriers and facilitators to employment.

Kewman and Forchheimer⁶ asked unemployed participants why they felt they were not working. The most common barriers related to injury severity (70%), disincentives (55%) and needs for greater assistance (55%). Similar results were reported in a second study,⁷ as declining health was related to an increase in barriers to employment. The largest number of barriers was reported by those with the highest number of years post-injury and those with the oldest age at injury. Krause and Anson⁸ also found physical limitations were related to unemployment, with inability to perform the same type of work being a major barrier.

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Krause and Picklesimer⁹ conducted a longitudinal study of 343 unemployed participants to determine what portion were employed at follow-up. Participants were administered a 30-item checklist of barriers to employment and two items regarding future work intentions. At 5 years after the baseline assessments, just over 10% were working. The two primary perspective predictors of employment at follow-up were maintaining hope for employment and actively seeking employment. Health limitation barriers at baseline (pressure ulcers, poor health and not being physically capable to work) were the most significant barriers to employment at follow-up. Disincentives and lack of resources were not significantly correlated with employment 5 years later.

Our purpose was twofold: (a) identify the underlying dimensions of a 30-item measure of barriers and facilitators to employment, and (b) identify the relationship of barriers and facilitators with labor force participation. *The unique contribution of this study is the inclusion of both employed and unemployed participants and the direct comparison of barriers and facilitators as a function of current and post-injury employment status.*

Methods

Participants

All participants were identified from outpatient records of hospitals in the Midwestern and Southeastern USA. This longitudinal study was initiated in 1973, with new participant cohorts added approximately every 10 years. There were three inclusion criteria: (1) traumatic SCI, (2) minimum 1-year post-SCI onset and (3) minimum age of 18 years. There were 952 participants during the current data collection (61.7% overall response rate). All those over the traditional retirement age of 65 were excluded, leaving a final sample of 781. Although participants were enrolled dating back to 1973, all data were collected during the most recent follow-up (2008–2010).

Procedures

Cover letters were sent to describe the study and alert participants materials were forthcoming. The survey itself was sent ~4–6 weeks later. There was a second mailing to all non-respondents, followed by a phone call for those who had known numbers. Some participants had lost or discarded materials and requested an additional packet of materials be sent. Participants received \$30 remuneration.

Measure

We used a 30-item self-report measure of barriers and facilitators to employment. Each item is measured on a 5-point likert scale ranging from strongly disagree to strongly agree. The items were adapted from a checklist administered to unemployed participants in a previous study.¹⁰ There is no data on test-retest reliability.

Analysis

Data were analyzed using a combination of SPSS¹¹ and Mplus.¹² The first set of analyses (using SPSS) was descriptive

in nature. Second, we compared respondents and non-respondents on demographic and injury related items to better understand the nature of attrition. We then compared item responses as a function of employment status utilizing three categories: (a) currently employed; (b) unemployed but worked previously and (c) chronically unemployed (never employed after SCI). One-way analysis of variance was used to identify differences between the three groups on responses to each item.

The participant sample was randomly divided into two groups for factor analysis (60/40% split). We used exploratory factor analysis (EFA) with maximum likelihood extraction.¹³ The χ^2 and root mean square error of approximation (RMSEA) were used to evaluate model fit. RMSEA reflects the discrepancy per degrees of freedom, with <0.05 representing an excellent fit and 0.05–0.08 representing good fit.¹⁴ We used a Promax rotation (Varimax followed by Procrustean targets) so the resultant factors could have a simple structure and be correlated.¹⁵ We looked at multiple indicators of fit, including eigenvalues, RMSEA and a minimum number of factors with loadings from only two items.

Confirmatory factor analysis (CFA) was run on the second subsample. When using CFA, the items and factors are specified *a priori* based on findings from previous analyses. This represents a more rigorous test of the stability of the factor structure across subsamples. Whereas factor loadings of 0.35 and higher were maintained from the EFA, only those with loadings of 0.40 and higher were retained following the CFA. RMSEA was used as the criterion for fit. Alpha coefficients were generated for each factor. Analysis of variance was used to identify the relationship of the factors with labor force participation.

Last, we used multinomial logistic regression to identify the optimal predictors of labor force participation. Those chronically unemployed were used as the reference group. Odds ratios with confidence intervals were reported between the three groups. The predictor variables included age, race, gender, years since injury, injury severity, years of education and the (six) scales identified from the factor analysis of barriers and facilitators. The referent groups were white (race), male (gender) and ambulatory (injury severity). Ambulatory participants were grouped regardless of neurological level and the other three groups were broken down according to neurological level as follows: C1–C4, C5–C8 and non-cervical.

Statement of ethics

We certify all applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during the course of this research.

Results

Comparison of responders and non-responders

Those with the most severe SCI (C1–C4, non-motor functional) were less likely to respond to follow-up (47% compared with 61–63%), χ^2 (3, $n = 1461$) = 14.5, $P < 0.01$. Respondents also had more education (13.0, 14.0), were

younger at injury (28.1, 31.1), and had more years post-injury (14.4, 16.2). Gender, race and current age were not significant.

Descriptive

Most participants were male (77.1%) and white (77.1%). Motor vehicle crash was the primary etiology (53.0%). Cervical injuries were reported by 51.5%. The average age was 47.3 years, and the average number of years since SCI onset was 21.7 (average age at injury onset was 25.6). Participants averaged 14.3 years of education. In all, 39% were gainfully employed; another 29% were unemployed but had worked previously since SCI onset and the remaining 32% were chronically unemployed. Table 1 summarizes the pattern of agreement with the items.

Measurement model

Six factors were derived using EFA with an excellent fit (RMSEA = 0.040; Table 2) and eigenvalues of >1.0. Therefore, six factors were retained in the final solution. One factor was measured by only two items. The CFA for the 6-factor solution indicated an acceptable fit (RMSEA = 0.078). We considered a 5-factor solution, as it also had an excellent fit with the EFA (RMSEA = 0.049) and would have circumvented the issue of having a factor with less than three items loading. However, it did not produce an acceptable fit upon CFA (RMSEA = 0.083).

The first factor appeared to represent availability of resources with items regarding sufficiency of education/training, transportation and other resources. The second factor related to health status, with prominent concerns about stamina, endurance and fatigue. Disability considerations reflected concerns about working with SCI (inaccessibility, employer bias, knowledge of appropriate jobs). Lack of importance included no interest in working, having had a large settlement, family influence and doing other important activities. The fifth factor was financial and medical benefit disincentives. Last, motivation had loadings from items reflecting value placed on working and confidence in ability to work. Alpha coefficients ranged from a low of 0.68 for lack of importance to a high of 0.87 for health status. The average coefficient was 0.79.

Univariate analysis

All items were statistically significant between the three labor force participation groups, with only three items not significant at the $P < 0.001$ level (Table 3). When comparing the six scales among the three groups, all scales were statistically significant. Post hoc contrasts differentiated all groups for all items, except disincentives (there were no differences between those chronically unemployed and those who were unemployed but had worked since SCI onset).

Table 1 Percentage of endorsement of each item

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I have the proper education and/or training to work.	5.9	8.24	13.2	28.5	44.1
I have all the necessary resources to maintain a regular job (transportation, assistants, so on).	13.4	17.0	10.9	24.0	34.8
I cannot do the same types of jobs that I did before my injury.	10.1	6.4	9.3	24.0	50.1
The types of jobs that I can do now just do not interest me.	29.5	28.7	23.1	12.0	6.6
I have children at home and that makes working difficult.	51.1	20.9	17.4	6.1	4.5
My health, stamina or endurance is too poor to maintain a regular job.	28.3	21.3	13.8	18.3	18.4
Most of my time and energy is used to take care of my SCI needs.	22.6	31.2	16.6	17.4	12.2
Most jobs that I am trained for are not accessible to people in wheelchairs.	27.0	26.0	17.0	16.0	14.0
The types of jobs I can do now do not pay enough money to be worthwhile.	27.3	20.6	21.6	18.7	11.8
Needing attendant help makes working difficult for me.	32.6	20.2	19.4	16.0	11.9
I do not know much about jobs available to people with disabilities.	22.6	20.7	18.0	25.3	13.4
My family prefers that I stay home rather than work.	41.2	24.1	21.0	8.2	5.5
Most employers will not hire me because of my disability.	22.7	20.4	23.7	20.3	12.9
Loss of financial benefits is a barrier to work for me.	24.9	16.1	20.6	25.1	13.3
I received a large settlement from my injury and do not need money from work.	66.3	18.7	8.7	3.6	2.8
I am confident in my ability to work.	6.0	9.9	18.1	27.8	38.2
Working at a job is important to me.	3.9	8.6	23.0	29.1	35.5
Work is not that important to me because I do other important activities, such as volunteering, homemaking or travel.	29.4	30.8	24.4	10.9	4.5
Pressure ulcers make working difficult or impossible for me to maintain a job.	34.8	28.2	15.3	13.8	7.8
I prefer not to work.	34.9	30.0	20.1	10.3	4.8
My transportation is not sufficient to maintain a job and be a reliable employee.	38.4	27.6	11.7	12.7	9.6
I am physically capable of working.	11.0	13.5	15.4	29.0	31.0
Working is worth the effort to me.	4.7	9.2	25.2	32.2	28.7
I am concerned that working is too stressful.	18.9	36.2	22.0	18.0	4.9
I get fatigued easily and this makes maintaining a job difficult.	19.6	28.2	18.8	22.0	11.5
Loss of medical benefits is a barrier to work for me.	24.1	22.8	17.3	20.4	15.4
Jobs that require long distance travel (airplane, train) make working difficult.	13.2	11.9	18.0	28.8	28.1
Government programs are available to help me to get a job or have helped me to get a job.	16.1	20.7	33.6	21.1	8.5
Even if I am able to get a job (or already have a job), keeping a job would be (is) difficult.	22.4	22.9	19.0	23.5	12.3
Government programs are more helpful in getting a job rather than keeping a job.	8.5	12.5	54.4	17.3	7.4

Table 2 Six factors from the EFA (RMSEA = 0.040)

Alpha	1	2	3	4	5	6
	0.76	0.87	0.80	0.68	0.81	0.82
I have the proper education and/or training to work.	(0.63)	-0.02	0.06	-0.02	0.09	0.14
I have all the necessary resources to maintain a regular job (transportation, assistants, so on).	(0.74)	0.21	-0.18	-0.08	-0.06	0.16
My transportation is <i>not</i> sufficient to maintain a job and be a reliable employee.	(-0.66)	-0.14	0.14	-0.06	0.11	0.05
My health, stamina or endurance is too poor to maintain a regular job.	0.03	(-0.70)	-0.04	0.02	-0.02	-0.21
Most of my time and energy is used to take care of my SCI needs.	-0.10	(-0.66)	-0.06	0.05	-0.08	-0.09
Needing attendant help makes working difficult for me.	-0.24	(-0.36)	-0.17	0.08	0.04	0.03
Pressure ulcers make working difficult or impossible for me to maintain a job.	-0.08	(-0.59)	0.06	0.00	0.03	0.04
I am concerned that working is too stressful.	-0.04	(-0.57)	0.02	-0.14	-0.10	-0.14
I get fatigued easily and this makes maintaining a job difficult.	0.13	(-0.69)	0.02	-0.10	0.03	-0.19
Jobs that require long distance travel (airplane, train) make working difficult.	-0.05	(-0.43)	-0.02	0.07	0.12	0.04
Even if I am able to get a job (or already have a job), keeping a job would be (is) difficult.	-0.02	(-0.76)	-0.04	-0.05	0.02	-0.06
Government programs are more helpful in getting a job rather than keeping a job.	-0.05	(-0.43)	0.09	0.03	0.01	0.16
The types of jobs that I can do now just do <i>not</i> interest me.	-0.04	-0.04	(-0.37)	-0.13	0.07	-0.18
Most jobs that I am trained for are not accessible to people in wheelchairs.	0.05	-0.01	(-0.95)	-0.02	-0.11	0.02
The types of jobs I can do now do not pay enough money to be worthwhile.	-0.16	-0.04	(-0.36)	-0.12	0.28	-0.01
I do not know much about jobs available to people with disabilities.	-0.34	-0.06	(-0.38)	-0.13	-0.03	0.14
Most employers will <i>not</i> hire me because of my disability.	-0.15	-0.07	(-0.39)	0.14	0.29	0.03
I have children at home and that makes working difficult.	-0.01	-0.09	-0.04	(-0.37)	-0.08	0.10
My family prefers that I stay home rather than work.	0.04	-0.19	-0.15	(-0.35)	0.11	-0.22
I received a large settlement from my injury and do not need money from work.	-0.07	-0.04	-0.06	(-0.40)	-0.08	0.09
Work is <i>not</i> that important to me because I do other important activities, such as volunteering, homemaking or travel.	0.10	0.05	0.12	(-0.66)	0.12	-0.21
I prefer <i>not</i> to work.	-0.04	0.02	-0.09	(-0.55)	-0.04	-0.31
Loss of financial benefits is a barrier to work for me.	-0.06	-0.05	0.07	-0.01	(0.86)	-0.04
Loss of medical benefits is a barrier to work for me.	-0.06	-0.18	0.08	-0.10	(0.66)	0.09
I am confident in my ability to work.	0.19	0.13	0.04	-0.03	0.05	(0.59)
Working at a job is important to me.	0.08	-0.06	-0.10	0.28	-0.01	(0.72)
I am physically capable of working.	0.04	0.32	0.10	-0.15	0.02	(0.53)
Working is worth the effort to me.	0.02	0.11	-0.07	0.27	-0.01	(0.63)
I <i>cannot</i> do the same types of jobs that I did before my injury.	0.15	-0.13	-0.17	0.06	0.18	-0.17
Government programs are available to help me to get a job or have helped me to get a job.	0.27	-0.29	0.13	-0.01	-0.01	0.07

Predictors of labor force participation

The multinomial logistic regression differentiated those who were chronically unemployed (the referent group) with those who were unemployed but had worked post-injury (Table 4, part 1) and those currently employed (Table 4, part 2). Years of education, years post-injury and a less severe SCI were associated with a greater likelihood of having worked since SCI onset. Those who had been employed since SCI onset reported higher levels of motivation and resources and lower scores for lack of importance compared with those chronically unemployed. Gender, race, age and the three other types of barriers and facilitators were not statistically significant in the regression analysis.

A similar, but not identical, pattern of differences was observed between those who were currently employed and those chronically unemployed. Years of education and years since injury were associated with current employment. Compared with those who were ambulatory, those with cervical non-motor functional injuries had significantly greater odds of being unemployed (C1-C4: 6.42, C5-C8: 4.12). Whites had 6.54 greater odds of current employment. Levels of motivation, resources and placing a greater importance on employment were associated with current employment. Age, gender, disability considerations, health and disincentives did not differentiate between the two groups.

Discussion

This study builds upon previous research on factors related to labor force participation after SCI⁶⁻⁹ by identifying: (a) endorsement rates of barriers and facilitators, (b) underlying themes for barriers and facilitators and (c) the relationship between barriers and facilitators with labor force participation after SCI. The findings will help rehabilitation professionals to understand factors that limit and facilitate labor force participation after SCI and provide improved services to promote better outcomes.

Item endorsements suggest the majority of those with SCI who are within the normal working ages (between 18-64) feel capable of working, are motivated to work, and do not see disincentives as significant barriers to employment. First, over 70% of the participants felt they had sufficient education or training to be employed, and 55% reported they had all the necessary resources to maintain a regular job (transportation, assistants, so on). Education is widely acknowledged to be a primary facilitator of labor force participation after SCI.^{1,16-19} Similarly, the majority of participants reported they indeed felt capable of working and were motivated to work. For instance, 60% of the participants agreed with the statements that they were capable of working and that work was worth the effort. Although disincentives have been described as a prominent

Table 3 One-way ANOVA of scales and items with 1 = currently employed, 2 = unemployed but worked previously, 3 = chronically unemployed

	Total mean (s.d.) N = 774	1 N = 301	2 N = 223	3 N = 250	One-way ANOVA	Contrast Scheffe P ≤ 0.001
<i>Scales</i>						
Resources	11.24 (3.25)	13.34 (2.12)	10.88 (3.02)	8.82 (2.88)	191.98***	2, 3 < 1; 3 < 2
Health status	21.76 (7.70)	17.18 (6.30)	23.09 (7.58)	26.46 (5.99)	123.33***	1, 2 < 3; 1 < 2
Disability considerations (transportation, assistants, so on)	10.93 (4.29)	8.39 (3.72)	11.47 (3.81)	13.74 (3.40)	139.80***	1, 2 < 3; 1 < 2
Lack of importance	6.62 (2.73)	5.11 (2.08)	7.01 (2.68)	8.18 (2.51)	107.74***	1, 2 < 3; 1 < 2
Disincentives	5.63 (2.57)	4.34 (2.45)	6.21 (2.41)	6.81 (2.05)	77.99***	1 < 2, 3
Motivation	14.97 (3.87)	17.75 (2.46)	14.26 (3.31)	11.95 (3.30)	242.98***	2, 3 < 1; 3 < 2
<i>Items</i>						
I have the proper education and/or training to work.	3.97 (1.20)	4.54 (0.80)	3.91 (1.11)	3.30 (1.31)	87.66***	2, 3 < 1; 3 < 2
I have all the necessary resources to maintain a regular job (transportation, assistants, so on).	3.50 (1.45)	4.42 (0.92)	3.30 (1.37)	2.52 (1.34)	170.28***	2, 3 < 1; 3 < 2
I cannot do the same types of jobs that I did before my injury.	3.97 (1.33)	3.69 (1.43)	4.03 (1.26)	4.27 (1.19)	13.10***	1 < 3
The types of jobs that I can do now just do not interest me.	2.37 (1.21)	1.80 (0.97)	2.50 (1.12)	2.96 (1.23)	73.77***	1 < 2, 3; 2 < 3
I have children at home and that makes working difficult.	1.92 (1.15)	1.74 (1.00)	2.00 (1.24)	2.09 (1.30)	6.54**	
My health, stamina or endurance is too poor to maintain a regular job.	2.77 (1.50)	1.92 (1.20)	3.15 (1.46)	3.51 (1.30)	108.57***	1 < 2, 3
Most of my time and energy is used to take care of my SCI needs.	2.66 (1.33)	1.99 (1.07)	2.80 (1.28)	3.38 (1.26)	91.41***	1 < 2, 3; 2 < 3
Most jobs that I am trained for are not accessible to people in wheelchairs.	2.64 (1.40)	2.01 (1.18)	2.62 (1.30)	3.45 (1.31)	86.06***	1 < 2, 3; 2 < 3
The types of jobs I can do now do not pay enough money to be worthwhile.	2.66 (1.36)	1.88 (1.12)	3.00 (1.32)	3.37 (1.18)	109.12***	1 < 2, 3
Needing attendant help makes working difficult for me.	2.54 (1.40)	1.96 (1.17)	2.44 (1.33)	3.36 (1.29)	82.05***	1 < 2, 3; 2 < 3
I do not know much about jobs available to people with disabilities.	2.86 (1.37)	2.29 (1.32)	2.95 (1.33)	3.51 (1.16)	61.28***	1 < 2, 3; 2 < 3
My family prefers that I stay home rather than work.	2.13 (1.20)	1.49 (0.85)	2.30 (1.20)	2.78 (1.17)	100.17***	1 < 2, 3; 2 < 3
Most employers will not hire me because of my disability.	2.80 (1.34)	2.23 (1.25)	2.91 (1.31)	3.43 (1.17)	60.93***	1 < 2, 3; 2 < 3
Loss of financial benefits is a barrier to work for me.	2.85 (1.39)	2.16 (1.31)	3.13 (1.33)	3.48 (1.12)	76.89***	1 < 2, 3
I received a large settlement from my injury and do not need money from work.	1.58 (0.98)	1.41 (0.80)	1.56 (0.96)	1.82 (1.16)	11.62***	1 < 3
I am confident in my ability to work.	3.82 (1.21)	4.51 (0.79)	3.69 (1.15)	3.05 (1.22)	129.15***	2, 3 < 1; 3 < 2
Working at a job is important to me.	3.84 (1.12)	4.48 (0.76)	3.71 (1.03)	3.14 (1.13)	128.02***	2, 3 < 1; 3 < 2
Work is not that important to me because I do other important activities, such as volunteering, homemaking or travel.	2.30 (1.13)	1.92 (0.95)	2.49 (1.20)	2.61 (1.16)	30.47***	1 < 2, 3
Pressure ulcers make working difficult or impossible for me to maintain a job.	2.31 (1.29)	1.86 (1.06)	2.47 (1.36)	2.74 (1.32)	34.62***	1 < 2, 3
I prefer not to work.	2.20 (1.16)	1.70 (0.94)	2.23 (1.14)	2.81 (1.14)	71.51***	1 < 2, 3; 2 < 3
My transportation is not sufficient to maintain a job and be a reliable employee.	2.27 (1.34)	1.62 (0.95)	2.34 (1.35)	3.07 (1.32)	96.06***	1 < 2, 3; 2 < 3
I am physically capable of working.	3.55 (1.35)	4.41 (0.85)	3.32 (1.29)	2.69 (1.27)	160.52***	2, 3 < 1; 3 < 2
Working is worth the effort to me.	3.71 (1.12)	4.34 (0.88)	3.54 (1.08)	3.05 (0.99)	116.48***	2, 3 < 1; 3 < 2
I am concerned that working is too stressful.	2.54 (1.13)	2.18 (1.07)	2.63 (1.16)	2.91 (1.05)	30.90***	1 < 2, 3
I get fatigued easily and this makes maintaining a job difficult.	2.78 (1.30)	2.26 (1.23)	2.95 (1.28)	3.29 (1.18)	48.67***	1 < 2, 3
Loss of medical benefits is a barrier to work for me.	2.80 (1.41)	2.19 (1.30)	3.07 (1.37)	3.32 (1.28)	53.13***	1 < 2, 3
Jobs that require long distance travel (airplane, train) make working difficult.	3.47 (1.36)	3.02 (1.37)	3.65 (1.30)	3.87 (1.24)	30.90***	1 < 2, 3
Government programs are available to help me to get a job or have helped me to get a job.	2.85 (1.18)	3.01 (1.26)	2.83 (1.16)	2.68 (1.06)	5.28**	
Even if I am able to get a job (or already have a job), keeping a job would be (is) difficult.	2.80 (1.35)	2.06 (1.17)	3.10 (1.28)	3.47 (1.16)	100.78***	1 < 2, 3
Government programs are more helpful in getting a job rather than keeping a job.	3.03 (0.97)	2.88 (0.99)	3.06 (0.98)	3.19 (0.89)	6.80**	

P < 0.01; *P < 0.001.

barrier to labor force participation, < 40% of the participants agreed with such statements. Responses to these items suggest that disincentives were not a barrier to employment for the majority of the sample.

The factor analysis identified six stable factors that were retained after the CFA based on reasonable model fit and

acceptable internal consistency. The factors appear to be meaningful in terms of their explanatory value in summarizing the themes underlying barriers and facilitators of employment. The themes themselves reflect a combination of personal factors, such as interest in working and confidence and motivation to work, availability of appro-

Table 4 Multinomial logistic regression

	B	Std. error	Wald	Sig.	Exp(B)	95% CI for Exp(B)	
						Lower	Upper
<i>Comparison of those chronically unemployed to those currently unemployed, but previously employed post-SCI^a</i>							
Intercept	-7.29	1.72	18.04	0.00			
Age	0.01	0.02	0.09	0.77	1.01	0.97	1.04
Years since injury	0.07	0.02	15.16	0.00	1.08	1.04	1.12
Years of education	0.16	0.06	7.07	0.01	1.17	1.04	1.32
Male (vs female)	-0.03	0.29	0.01	0.93	0.97	0.55	1.73
White (vs non-White)	0.49	0.29	2.81	0.09	1.64	0.92	2.91
<i>Injury severity (vs motor functional any level)</i>							
C1-C4, non-motor functional	1.74	0.57	9.44	0.00	5.68	1.88	17.20
C5-C8, non-motor functional	1.70	0.56	9.17	0.00	5.47	1.82	16.44
Non-cervical, non-motor functional	1.36	0.56	5.91	0.02	3.90	1.30	11.70
<i>Employment scales</i>							
Motivation	0.20	0.05	14.51	0.00	1.22	1.10	1.35
Health Status	0.01	0.03	0.19	0.67	1.01	0.96	1.07
Disability considerations	-0.03	0.05	0.45	0.50	0.97	0.89	1.06
Lack of importance	-0.14	0.06	6.12	0.01	0.87	0.77	0.97
Resources	0.20	0.05	13.71	0.00	1.22	1.10	1.35
Disincentives	0.02	0.07	0.09	0.76	1.02	0.89	1.17
<i>Comparison of those chronically unemployed to those currently employed^a</i>							
Intercept	-12.35	2.16	32.56	0.00			
Age	0.00	0.02	0.05	0.83	1.00	0.97	1.04
Years since injury	0.07	0.02	10.55	0.00	1.07	1.03	1.12
Years of education	0.19	0.07	6.50	0.01	1.21	1.04	1.39
Male (vs female)	0.35	0.36	0.94	0.33	1.42	0.70	2.87
White (vs non-White)	1.88	0.41	21.49	0.00	6.54	2.96	14.47
<i>Injury severity (vs motor functional any level)</i>							
C1-C4, non-motor functional	1.86	0.67	7.63	0.01	6.42	1.72	23.98
C5-C8, non-motor functional	1.42	0.67	4.46	0.04	4.12	1.11	15.36
Non-cervical, non-motor functional	1.15	0.66	3.02	0.08	3.17	0.86	11.63
<i>Employment scales</i>							
Motivation	0.43	0.07	42.02	0.00	1.54	1.35	1.75
Health status	0.02	0.03	0.42	0.52	1.02	0.96	1.09
Disability considerations	-0.08	0.06	2.04	0.15	0.92	0.82	1.03
Lack of importance	-0.27	0.07	12.92	0.00	0.77	0.66	0.89
Resources	0.34	0.07	25.10	0.00	1.41	1.23	1.61
Disincentives	-0.11	0.08	1.75	0.19	0.90	0.77	1.05

^aThe reference category is chronically unemployed.

Note: DF = 1 for all comparisons.

priate resources required to work, specific disability related factors related to work, disincentives and health factors.

Comparisons of items and factor scores as a function of labor force participation indicated that virtually all variables differentiated between those who were currently employed, those unemployed but previously employed since SCI onset, and those who have never been employed since SCI onset. This is powerful evidence for the importance of diverse barriers and facilitators to employment. However, the regression analysis provides greater insight as to the relative importance of the barriers and facilitators and highlights the most important factors after controlling for demographic, injury and educational characteristics.

In sum, the majority of participants perceived themselves capable and motivated to work. In all, 68% of participants had worked since SCI onset. The remaining 32%, who were chronically unemployed, reported significant barriers. Individuals who have worked post-injury but are currently

unemployed may be the best candidates for interventions to promote employment since they report fewer barriers and more facilitators than those who are chronically unemployed. Those who are both chronically unemployed and who report significant barriers to employment are the most challenging cases with little likelihood of return to employment.

Limitations

There are several noteworthy study limitations. First, all data are self-report, and this type of data is prone to recall bias. In the current study, such bias would be limited to reporting of actual employment history, as data on barriers, by definition, relate to perceptions by the individual. Second, as with all self-report studies, participation is selective. Our response rate was acceptable (61.7%, a portion of non-response was because of mortality), but must be kept in mind when

interpreting the percentage of participants reporting they were employed or reporting a specific barrier or facilitator. The relative frequencies of reported barriers or facilitators and the comparisons between those who are employed and unemployed are more valid than absolute interpretations of the frequencies themselves (that is, they are not population data). Third, participants were selected from two regions—the Midwest and Southeast USA. Barriers and facilitators may vary by geographic location both within the USA and around the globe, so the findings need to be validated in other geographic areas. Fourth, the study focused only on SCI, although this type of analysis would be important with participants who have other disabling conditions. Fifth, there is no data on temporal stability. Sixth, participant attributions may be biased when taken as indicators of objective barriers or facilitators. For example, two individuals may face the same disincentives, yet may perceive the disincentives differently in terms of the extent to which they represent a barrier to employment.

Future research

Additional studies are needed expanding the scope of the study population. Will the same pattern of barriers and facilitators be observed among other cohorts with different disabling conditions, demographic profiles or geographic locations? Another need is for longitudinal research identifying the association of endorsement of barriers and facilitators with future labor force participation. Will endorsement patterns change among those whose labor force participation changes? Will the endorsement patterns be useful in predicting future labor force participation? These questions have to do with the predictive value of current barriers and facilitators. One would expect those who report fewer barriers and identify more facilitators would be more likely to begin labor force participation. This is an empirical question. Last, research is needed utilizing this information to design interventions to limit barriers and promote facilitators to labor force participation. It is most likely that those who either have been employed at some time since SCI onset but are currently unemployed and those who report fewer barriers will be better candidates for intervention. It is only through steadfast research that we will be able to improve the labor force participation outcomes of those with SCI and other disabling conditions.

Conflict of interest

The contents of this paper do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government. The authors declare no conflict of interest.

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