

The Sense of Well-Being Inventory as a Quality of Life Measure for People With Spinal Cord Injury

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The purpose of this study was to validate the *Sense of Well-Being Inventory* (SWBI), a quality of life measure, for people with spinal cord injury. Four hundred and five participants were recruited from the Canadian Paraplegia Association for this study. The participants were asked to complete a research packet containing a demographic questionnaire, the SWBI, the *Rosenberg Self-Esteem Scale*, and the *Acceptance of Disability Scale*. Exploratory and confirmatory factor analyses of the SWBI and correlational analyses of the SWBI factors with other psychosocial variables were conducted. Exploratory and confirmatory factor analyses validated a four-factor structure (financial, family and social, psychological, and physical wellbeing) for the SWBI. SWBI factors are positively related to self-esteem and disability acceptance. With continuing research to document reliability and validity, the SWBI appears to have great potential as a vocational rehabilitation outcome measurement for people with spinal cord injury.

Keywords: sense of wellbeing, quality of life, rehabilitation, spinal cord injury

Quality of Life (QOL) has become an increasingly essential framework used as a health outcome measurement to assess the efficacy of interventions and services of rehabilitation programming (Chan, Rubin, Lee, Miller, & Chen, 2003; Chapin, Miller, Ferrin, Chan, & Rubin, 2004). In general, QOL is conceptualised as a multidimensional construct that encompasses a number of objective and subjective life domains. Objective indicators of QOL consist of measurable, externally manifested items such as income, employment, and physical functioning (Chapin et al., 2004). Conversely, subjective measures include the concept of self-report attitudes, perceptions, and aspirations (Frank-Stromborg, 1988).

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In rehabilitation and disability-related studies, there have been concerns regarding heavy emphasis on the use of objective indicators to measure QOL for people with chronic illness and disability. Dijkers (1997) found that when objective indicators were used, people with disabilities tended to have a lower QOL than people without disabilities. This disproportion has been attributed, in part, to the restrictions on functioning, activities, and independence that may result from a physical, mental, or emotional impairment. Additionally, objective measures often reflect the educational, employment, community participation, and income disparities that exist between persons with disabilities and individuals without disabilities. Consequently, people with disabilities are generally classified as having a poorer quality of life using these objective indicators.

Research has shown that when subjective measures of QOL are used, people with disabilities report a higher level of life satisfaction than objective indicators would suggest (Dijkers, 1997; Weinberg, 1984). For instance, research findings show that the majority of people with disabilities generally rate their QOL as *Good* to *Excellent*, and no significant differences have been revealed on subjective QOL measures (Eisenberg & Saltz, 1991; Stensman, 1985). In addition, several studies indicate that people with 'severe' physical disabilities, such as spinal cord injury (SCI), express greater life satisfaction than do those with less disabling conditions (Bach & Tilton, 1994; Whiteneck et al., 1985). As a result, recently in the field of rehabilitation, much attention has been paid to subjective measurement of QOL (Bishop, Chapin, & Miller, 2008; Chan et al., 2003; Chapin et al., 2004; Cummins, 2002).

In order to support the claim that objective indicators somewhat fail to provide adequate representation of QOL for people with disabilities (Biswas-Diener & Diener, 2001; Marmot, 1999), it is essential to accurately identify and measure subjective indicators of wellbeing, including individuals' judgments about their own state and satisfaction with life, social relationships, work, health, future goals, and person achievements (Diener, 2000; Diener & Suh, 1997; Veenhoven, 2002). Subjective measures, therefore, can accurately indicate an individual's level of satisfaction with his or her life. Moreover, these measures allow individuals to assess their own lives instead of relying on judgments made by professionals about the quality of their lives based predominantly on external characteristics and values (Phillips, 2006). It is within this context that Felce (1997) suggested QOL can be conceptualised as a three-element model in which personal values, life conditions, and subjective wellbeing/personal satisfaction interact to determine quality of life. Subjective wellbeing, personal satisfaction with life conditions, can be readily ascertained by asking an individual to indicate his or her satisfaction in life domain areas related to QOL (e.g., physical wellbeing, material wellbeing, and social wellbeing; Felce, 1997). Studies suggest that a severe disease, or the onset of a disability, often causes physical and psychosocial distress that may have a negative impact on an individual's subjective feeling of wellbeing (Williamson & Shaffer, 2000). Therefore, subjective measures could provide a more precise understanding of an individual's level of satisfaction than would objective measures, particularly for individuals with disabilities. Multidimensional subjective measures of QOL may lead to greater insight about what individuals consider to be most important to their life satisfaction and the specific aspects with which they are most and least satisfied (Bishop & Feist-Price, 2001).

The Sense of Well-Being Inventory (SWBI) was developed by Rubin, Chan, Bishop and Miller (2003) and consists of 36 items that measure the wellbeing of people with

disabilities in several life domain areas related to quality of life. Unlike other subjective measures of quality of life, this instrument was specifically developed for people with disabilities in vocational rehabilitation. A comprehensive review of the literature, focus groups, and a Delphi process (an iterative, systematic decision-making and consensus process based on expert opinion) involving counsellors and consumers of vocational rehabilitation services were used in designing the instrument. The SWBI was then further refined in three instrument-refinement workshops attended by state and private rehabilitation administrators, managers and service providers. The instrument was initially administered to 149 rehabilitation clients. Exploratory factor analysis results provided empirical evidence for the factorial structure of the SWBI, indicating a five-factor structure: (a) physical wellbeing, (b) family, (c) family and social wellbeing, (d) economic security, and (e) medical care (Rubin et al., 2003). Unlike most QOL measures, the SWBI's economic security dimension can be used more appropriately as an outcome measure for people with disabilities receiving vocational rehabilitation services.

Chapin et al. (2004) extended and refined the SWBI with a community sample of Canadians with spinal cord injury using exploratory factor analysis. Chapin et al.'s study generally supported the factorial validity of the SWBI, finding four interpretable factors (financial, family and social, psychological, and physical wellbeing). These factors were found to correlate in the predicted direction with several external variables such as employment status, years since injury, marital status, education, and perceived socio-economic status suggesting that the SWBI can be a useful measure of wellbeing that indicates subjective aspects of quality of life for people with spinal cord injury.

The SWBI, as a brief, reliable and valid measure of subjective quality of life has the potential to be used to evaluate vocational rehabilitation outcome of people with disabilities. Both the Rubin et al. (2003) and Chapin et al. (2004) studies, only conducted exploratory factor analyses. Confirmatory factor analysis for the SWBI has not been yet studied, thus the main purpose of this study was to examine the factorial structure of the SWBI with a large sample of Canadians with spinal cord injury using both exploratory and confirmatory strategies. It was expected that the SWBI would be multidimensional, consisting of similar factors reported by Rubin et al. (2003) and Chapin et al. (2004), and that these factors could be substantiated using confirmatory factor analysis. In addition, correlations with variables that have been shown to be associated with subjective quality of life, including acceptance of disability (Bishop, 2005; Livneh, Lott, & Antonak, 2004; Livneh, Martz, & Bodner, 2006), self-esteem (Marini, Rogers, Slate, & Vines, 1995; Tzonichaki & Kleftaras, 2002), and subjective happiness (Brulde, 2007; Deci & Ryan, 2008; Vella-Brodrick, Park, & Petson, 2009) will provide further empirical support for the use of this tool with individuals with spinal cord injury.

Method

A quantitative descriptive research design employing exploratory factor analysis, confirmatory factor analysis, and correlational analysis was used in this study. Exploratory factor analysis seeks to uncover the factor structure of measured variables, while confirmatory factor analysis seeks to determine whether the data set can conform to pre-theoretically established factor structures. By using the combination of both techniques, it was attempted to identify the factor structure of the SWBI,

followed by an examination of the stability of the factorial structure obtained from exploratory factor analysis. Correlation analysis was performed to establish the construct validity of the SWBI.

Participants

Data for this study were extracted from two psychosocial research studies conducted with members of the Canadian Paraplegia Association (Catalano, 2006; Ferrin, 2002). For both studies, upon receiving appropriate Institutional Review Board (IRB) approval, research packets containing a cover letter from the investigator and from the CPA director, a demographic information form, research questionnaire, and a pre-addressed stamped envelope to the primary investigator were shipped to participating CPA associations. In order to protect the confidentiality of participants, CPA prepared the individual mailing labels and mailed the packets to potential participants who met eligibility requirements. To be eligible to participate, individuals were required to (a) have an acquired spinal cord injury, (b) at least 18 years of age, and (c) read and understand English. Response rates for the studies were 33% and 27%, respectively.

The sample for the current study was composed of 413 individuals with spinal cord injury (see Table 1). The mean age of participants was 46.41 years ($SD = 14.09$), 71% were men, and 86% were white (6% of aboriginal, 5% of non-white, and 3% of others). Forty-four per cent of the participants indicated that they were either engaged or married. Eighty per cent had completed high school, including 48% with some post-secondary education or training. Average duration since injury was 29.30 months ($SD = 14.45$), with a range of 1 to 77 months. At the time of the survey, 30% were employed full-time. The sample was divided randomly into approximately two halves; the first half was used to conduct an exploratory factor analysis and the second group was used to cross-validate the factorial structure of the SWBI using confirmatory factor analysis.

Materials

The Sense of Well-Being Inventory (SWBI) was used for both exploratory and confirmatory factor analysis. Further, three additional measures, including Acceptance of Disability Scale (ADS), Rosenberg Self-Esteem Scale (RSES), and the Subjective Happiness Scale (SHS), were used to establish the construct validity of the scale. In the history of rehabilitation psychology, the acceptance of disability theory in the mid-1950s, initially described by Dembo, Leviton, and Wright (1956) and further elaborated by Wright (1960, 1983), triggered efforts to develop meaningful measures of QOL for people with disabilities. This theory centered on changes within the value system in response to the perceived losses associated with the onset of disability. As a result, acceptance of disability has been viewed as the dynamic process of changes in personal values that (a) culminates in more positive psychosocial adjustment (Livneh, Lott, & Antonak, 2004), (b) further relates to quality of life (Ferrin, 2003), and (c) is associated with higher self-esteem (Li & Moore, 1998).

The Sense of Well-Being Inventory (SWBI). The SWBI was originally developed by Rubin et al. (2003) to operationalise the construct of quality of life for vocational rehabilitation clients. The SWBI was further validated by Chapin et al. (2004) in a community sample of Canadians with spinal cord injury. The SWBI is composed of 36 items (e.g., 'I get frustrated about my disability', 'I can afford the medical services I need') with five subscales: physical wellbeing and associated feelings about self,

TABLE 1
Descriptive Statistics of Demographic Information

Variables	M	SD	Percentage
Age	46.41	14.09	
Duration since injury	29.30/Mos.	14.45/Mos.	
Ethnicity			
White			86%
Non-white			5%
Aboriginal			6%
Others			3%
Marital Status			
Single			36%
Engaged or married			44%
Education			
High school completed			80%
Postsecondary or training			48%

psychological wellbeing, family and social wellbeing, financial wellbeing, and medical care. Rehabilitation clients were asked to indicate the extent to which the SWBI items were descriptive of them, using a four-point Likert type rating scale (Rating: 1 = *Strongly disagree*, 2 = *Disagree*, 3 = *Agree*, 4 = *Strongly agree*). The internal consistency reliability coefficients (Cronbach's alpha) for the five SWBI factors were reported by Rubin et al. (2003) to be .88, .83, .79, .72, and .62, respectively. The Cronbach's alpha coefficients ranged from .79 to .88 in the Chapin et al. study.

Acceptance of Disability Scale (ADS). The ADS was developed by Linkowski (1971) to operationalise Wright's (1983) four value changes related to disability acceptance (i.e., enlarging the scope of values, containing the effects of disability, subordinating physique relative to other values, and transforming comparative-status values into asset values). It is composed of 50 items (e.g., 'There are many things a person with my disability is able to do') rated on a 6-point Likert scale ranging from 1 to 6 (*I disagree very much* to *I agree very much*). Scores range from 50 to 300, with greater acceptance of disability being indicated by higher scores. Linkowski reported a Spearman-Brown reliability of .93 for the full scale. The Cronbach's alpha internal consistency reliability coefficient for the current study was computed to be .94.

Rosenberg Self-Esteem Scale (RSES). The RSES was developed by Rosenberg (1965) to measure self-esteem. It is composed of 10 items reflecting attitudes about themselves (e.g., 'I take a positive attitude toward myself', 'I am able to do things as well as most other people', and 'I feel that I have a number of good qualities') rated on a 4-point Likert scale ranging from 1 to 4 (*Strongly agree* to *Strongly disagree*). Scores range from 10 to 40, with higher scores indicative of higher self-esteem. A score of less than 25 identifies clinically, significantly low self-esteem. Studies using the RSES report test-retest reliabilities that range from .72 to .90 (Robins, Heiden, & Trzesniewski, 2001) and Cronbach's alpha between .77 and .88 (Blascovich & Tomaka, 1993). Cronbach's alpha was computed to be .91 for the present study.

Subjective Happiness Scale (SHS). The SHS was developed by Lyubomirsky and Lepper (1997) to operationalise the concept of subjective happiness. The unidimensional instrument is composed of four items (e.g., ‘Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterisation describe you?’). The respondents rate themselves on a 7-point Likert-type scale ranging from 1 (*Not a very happy person, or Not at all*) to 7 (*A very happy person, or A great deal*). A total score of happiness is obtained by computing the mean of the scores with high scores reflecting a high level of happiness. The reported internal consistency estimate reported by Lyubomirsky and Lepper for this instrument range from .79 to .94 ($M = .86$) and test–retest reliability coefficients were found to range from .55 to .90 ($M = .72$). The Cronbach’s alpha internal consistency reliability coefficient for the current study was computed to be .87.

Results

Exploratory Factor Analysis

Exploratory factor analysis is the most common form of factor analysis that uncovers the underlying structure of a relatively large set of variables. Each factor represents an underlying construct. The 36×36 correlation matrix of the SWBI scale was subjected to a principal axis factor analysis. The Kaiser-Meyer-Olkin (KMO) resulted in a measure of sampling adequacy of .91 (greater than .50) and the Bartlett’s test of sphericity, $\chi^2(630, N = 202) = 3893.01, p < .001$, indicated that it was appropriate to proceed with exploratory factor analysis. Cattell’s (1966) scree test is provided in

Scree Plot

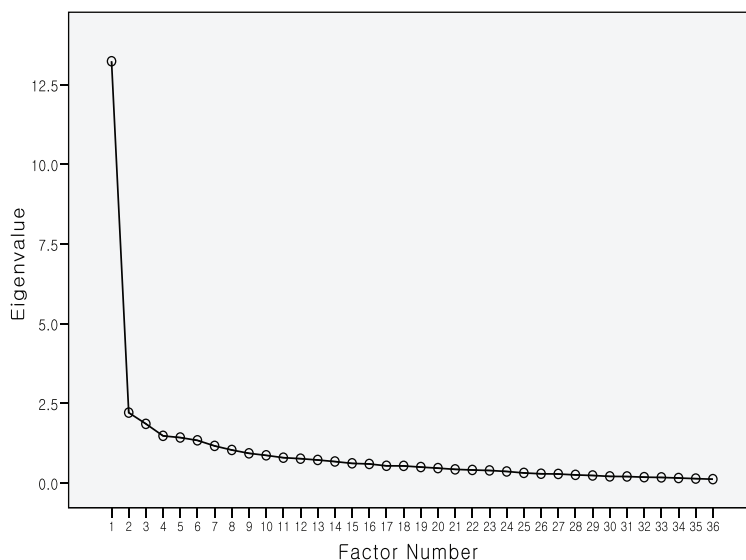


FIGURE 1

Scree test showing eigenvalue by principal factor.

Figure 1, and maximum interpretability was considered to determine the number of factors to be retained. A four-factor solution was finally chosen, with eigenvalues for the four factors of 12.287 (34% of variance), 2.410 (6.7% of variance), 1.730 (4.8% of variance), and 1.182 (3.28% of variance), respectively. Since items were moderately or highly correlated with each other statistically and theoretically, these factors were rotated to simple structure using a promax rotation. The four-factor solution (which accounted for 49% of the total variance) was found to be parsimonious and had good simple structure. The rotated pattern matrix is presented in Table 2. Items with factor loadings greater than .40 in one factor and less than .30 in other factors were retained, resulting in a 20-item quality of life instrument.

Factor 1 — Financial Wellbeing. This factor consists of five items represented primarily by financial security related items (e.g., 'I feel good about my financial future'). The coefficient alpha computed was .81, indicating moderately high internal consistency of the items constituting this factor. The mean wellbeing rating for this factor was 2.93 ($SD = 0.70$).

Factor 2 — Family and Social Wellbeing. This factor consists of five items represented primarily by social support (e.g., 'I have friends who care about me') and family support items (e.g., 'I receive emotional support from my family'). The coefficient alpha computed was .85, indicating moderately high internal consistency of the items constituting this factor. The mean wellbeing rating for this factor was 3.22 ($SD = 0.60$).

Factor 3 — Psychological Wellbeing. This factor consists of six items. Four items are worded to represent psychological distress (e.g., 'I frequently feel down' and 'I frequently feel nervous'). Two items are worded positively to represent psychological adjustment (e.g., 'I feel good about myself'). The central theme of this factor is focused on psychological adjustment. The negative items are reversed scored so that a high score in this subscale will reflect positive psychological adjustment. The coefficient alpha computed was .82, indicating moderately high internal consistency of the items constituting this factor. The mean wellbeing rating for this factor was 2.75 ($SD = 0.61$).

Factor 4 — Physical Wellbeing. This factor consists of four items represented primarily by physical health (e.g., 'I feel good about my physical stamina and good energy level'). The coefficient alpha computed was .81, indicating moderately high internal consistency of the items constituting this factor. The mean wellbeing rating for this factor was 2.82 ($SD = 0.63$).

Exploratory factor analysis found evidence for a four-factor structure for people with SCI that is similar to the Chapin et al. (2004) study, with minor relocation and elimination of some items. Item 35 under *Physical Wellbeing* ('I have job advancement opportunities') was removed, and item 36 ('I have good medical services') was moved to the *Financial Wellbeing* domain. Item 12 ('I accepted the positives and negatives associated with my disability') was added under the *Physical Wellbeing* domain. Regarding *Psychological Wellbeing* domain, item 2 ('I feel lonely') and item 30 ('I am satisfied with my physical appearance') were removed, and item 9 ('I am well adjusted to my disability') was added. In the *Family and Social Support* domain, item 16 ('People take advantage of me') and item 18 ('People like being with me') was removed from the original SWBI and item 33 ('I am happy with my social life') was added. Item 5 ('I am happy with my employment situation'), item 14 ('I am happy with my job skills'), item 8 ('I am happy with my job choices') and item 13 ('I am in control of my

TABLE 2
Pattern Matrix of the SWBI

Item	Factor			
	1	2	3	4
Financial Well-Being				
6. I can afford the medical services I need.	.89	.17	-.29	.01
7. I can afford to go to the movies or out to eat.	.85	.18	-.15	-.06
8. I am happy with my job choices.	.65	-.16	.40	-.11
19. I feel good about my financial future.	.65	.14	-.01	.09
5. I am happy with my employment situation.	.59	-.15	.41	-.21
36. I have good medical services.	.57	.08	-.19	.19
14. I am happy with my job skills.	.46	-.20	.36	.09
35. I have job advancement opportunities.	.45	-.34	.32	.10
15. My housing situation is satisfactory.	.41	.33	-.19	.16
10. I frequently worry about money.	.40	.24	.05	-.19
Family and Social Well-Being				
31. I receive emotional support from my family.	.06	.82	.04	-.15
32. I have friends who care about me.	-.12	.70	-.00	.13
23. I have someone that I can talk to about my problem.	.15	.69	-.08	.02
4. I am an important member of my family.	.10	.65	.11	-.17
16. People take advantage of me.	.10	.44	.33	-.26
33. I am happy with my social life.	-.04	-.44	.24	.22
18. People like being with me.	-.17	.43	.35	.15
20. Employer doesn't want to hire me.	.20	-.25	.23	.23
Psychological Well-Being				
2. I feel lonely.	-.07	.35	.69	-.15
11. I feel people view me differently because of my disability.	-.15	.03	.61	-.09
3. I frequently feel down.	.11	.19	.61	-.07
29. I feel good about myself.	-.09	.21	.61	.18
9. I am well adjusted to my disability.	.15	.02	.55	.05
1. I get frustrated about my disability.	.03	-.02	.54	.08
17. I frequently feel nervous.	.11	.11	.46	.03
27. I have a positive outlook on life.	.00	.31	.41	.24
22. I enjoy life.	.18	.22	.39	.16
28. I have a positive influence on others.	-.01	.31	.34	.25
25. I feel awkward in social situations.	-.13	.19	.33	.08
Physical Well-Being				
24. I feel good about my physical stamina.	-.13	-.18	.06	.94
34. I have adequate energy.	-.06	-.07	.00	.83
26. My health is good.	.21	.04	-.22	.72
12. I accept the positives and negatives associated with my disability.	.04	.16	.04	.49
30. I am satisfied with my physical appearance.	-.06	.17	.21	.36
13. I am in control of my life.	.27	.17	.19	.33
21. I can work.	.24	-.17	.27	.31

life') were removed from the original SWBI. Finally, item 36 ('I have good medical services') was added under the *Financial Wellbeing* domain.

Confirmatory Factor Analysis (CFA)

The primary purpose of the confirmatory factor analysis was to examine the replicability of the factor structure obtained in exploratory factor analysis. A secondary

purpose was to provide further evidence to confirm that the construct of SWBI is not unidimensional but multidimensional. Confirmatory factor analysis was computed using the AMOS Graphics statistical program to validate the measurement structure of the SWBI.

To avoid estimating a large number of parameters (i.e., factor loadings and error terms) in fitting the model to the data and to decrease the likelihood of obtaining distorted results due to idiosyncratic characteristics of individual items, we organised the items in each factor into two parcels before subjecting the scale to confirmatory factor analysis. The advantages and disadvantages of using item parcels in confirmatory factor analysis have been discussed extensively in the structural equation modelling literature (Meade & Kroustalis, 2006; Thompson & Melancon, 1996). For example, if item-by-item tests of measurement invariance are the focus of the CFA, use of item parcels in CFA can be problematic. The use of item parcels is also acceptable if the focus of the CFA is to improve model estimation and fit. For the purpose of this study, our interest was primarily in model estimation and fit of the SWBI in a sample of individuals with spinal cord injury. Because of a moderate sample size we wanted to avoid a large number of parameters. Therefore, we opted to use item parcels in our CFA.

We divided the 20 items from the four SWBI factors including financial, family and social, psychological, and physical into 8 item parcels with two parcels for each factor. Specifically, four principal component analyses were conducted to create the item parcels. In each factor analysis, the items were fit into a one-factor model. Then, guided by the factor loadings, the item with the highest loading was paired with the item with the lowest loading and allocated to parcel A. The second highest–lowest loading pairs were placed into parcel B. The process was repeated until all items were assigned to either parcel A or B. These A and B parcels had the effect of collapsing the items into two empirically balanced measures (Landis, Beal, & Tesluk, 2000). Because the numbers of items in some of the parcels were unequal, we used the average scores (rather than the sum) of each item to form each parcel.

Following the guidelines suggested by Hoyle and Panter (1995), Browne and Cudeck (1992), and Hu and Bentler (1995), the goodness of fit of the confirmatory factor models was assessed using the chi-square goodness-of-fit test, χ^2/df ratio, the Goodness of Fit Index (GFI), and the Comparative Fit Index (CFI). A non-significant chi-square, a relative chi-square (χ^2/df) in the range of 2 to 1, and values greater than .90 for the GFI and CFI, are considered acceptable model fit, and values of .95 or higher for the CFI as excellent fit. In addition, the Root Mean Square Error of Approximation (RMSEA) with 90% confidence intervals (90%CI) was reported, where a value less than 0.05 indicates close fit and values up to 0.08 indicating reasonable errors of approximation in the population (Byrne, 2001).

Three confirmatory factor models were tested: (1) one-factor model; (2) four-factor intercorrelated model; and (3) four-factor hierarchical model. The AMOS 4.0 computer program was used to estimate the goodness-of-fit of these models. The results from confirmatory factor analysis indicated a marginal fit for the one-factor model: $\chi^2(20, N = 202) = 90.86, p < .05; \chi^2/df = 4.54; GFI = .90; CFI = .90; RMSEA = .13$. Conversely, the data fits the four-factor intercorrelated model extremely well, as indicated by the following indices: $\chi^2(14, N = 202) = 23.69, n.s.; \chi^2/df = 1.69; GFI = .97; CFI = .99; RMSEA = .06$. In addition, all factor loadings were significant at the $p < .01$ level (ranging from .68 to .86), suggesting that the four factors were relatively

well constructed by the parcels. We also fit a second-order hierarchical factor model with the second-order factor (i.e., QOL) having direct effects on each first-order factor (Financial, Family and Social, Psychological, and Physical Wellbeing). The analysis generated the following fit indices: $\chi^2(16, N = 202) = 24.94, n.s.$; $\chi^2/df = 1.56$; GFI = .97; CFI = .96; RMSEA = .05. The results indicate excellent fit between the data and the model. All factor loadings were significant at the $p < .01$ level, suggesting satisfactory convergent validity for the first-order factors.

In summary, the results indicated that the data did not fit the single factor model. The model fit for the four-factor intercorrelated and the four-factor hierarchical factor models were excellent. The four-factor intercorrelated model represents a significantly better explanation of the data than the single factor model ($\chi^2_{diff} = 77.17, df_{diff} = 6, p < .01$). There is no difference between the four-factor intercorrelated model and the second order four-factor hierarchical model ($\chi^2_{diff} = 1.25, df_{diff} = 2, n.s.$). It can be concluded that the SWBI is not a unidimensional scale but a multidimensional scale, and the four wellbeing factors represent underlying dimensions of subjective aspects of the quality of life construct (see Figure 2). The means and standard deviations for the SWBI factors are as follows: Financial ($M = 2.93, SD = 0.70$), Social and Family ($M = 3.22, SD = 0.60$), Psychological ($M = 2.75, SD = 0.61$), and Physical ($M = 2.82, SD = 0.63$), indicating that people with SCI in this study rated themselves as having pretty good social and family wellbeing but moderate in other wellbeing factors.

Correlational Analysis

The construct validity of the SWBI was established by correlating it with other measures including a happiness scale, disability acceptance scale, and self-esteem scale (see Table 3). SWBI financial wellbeing is positively related to happiness ($r = .45, p < .01$), disability acceptance ($r = .37, p < .01$), and self-esteem ($r = .42, p < .01$). Psychological wellbeing is positively related to happiness ($r = .72, p < .01$), disability acceptance ($r = .59, p < .01$), and self-esteem ($r = .76, p < .01$). Social and family wellbeing is positively related to happiness ($r = .58, p < .01$), disability acceptance ($r = .44, p < .01$), and self-esteem ($r = .49, p < .01$). Physical wellbeing is positively related to happiness ($r = .46, p < .01$), disability acceptance ($r = .50, p < .01$), and self-esteem ($r = .49, p < .01$).

Discussion

This study used exploratory and confirmatory factor analyses to examine the factorial structure of the SWBI. The results of the study support the four-factor model of the SWBI (financial, family and social, psychological, and physical wellbeing), which is consistent with other psychometric validation studies of the instrument (e.g., Chapin et al., 2004; Keegan, Lin, Zheng, Allen, & Chan, 2009). Exploratory factor analysis resulted in minor relocation and elimination of some items, reducing the instrument to 20 items. The coefficient alpha of each domain derived from exploratory factor analysis indicates a moderate and higher internal consistency of the items constituting these factors than were found in the Rubin et al. (2003) and the Chapin et al. (2004) studies. Using confirmatory factor analysis, this study provided cross-validation of the instrument on a community sample of Canadians with spinal cord injury. The GFI, CFI, and RMSEA values for the four-factor intercorrelated model and the four-factor hierarchical models were both very high, indicating a good fit between the model and the data. Correlational analysis found the SWBI to be related to constructs

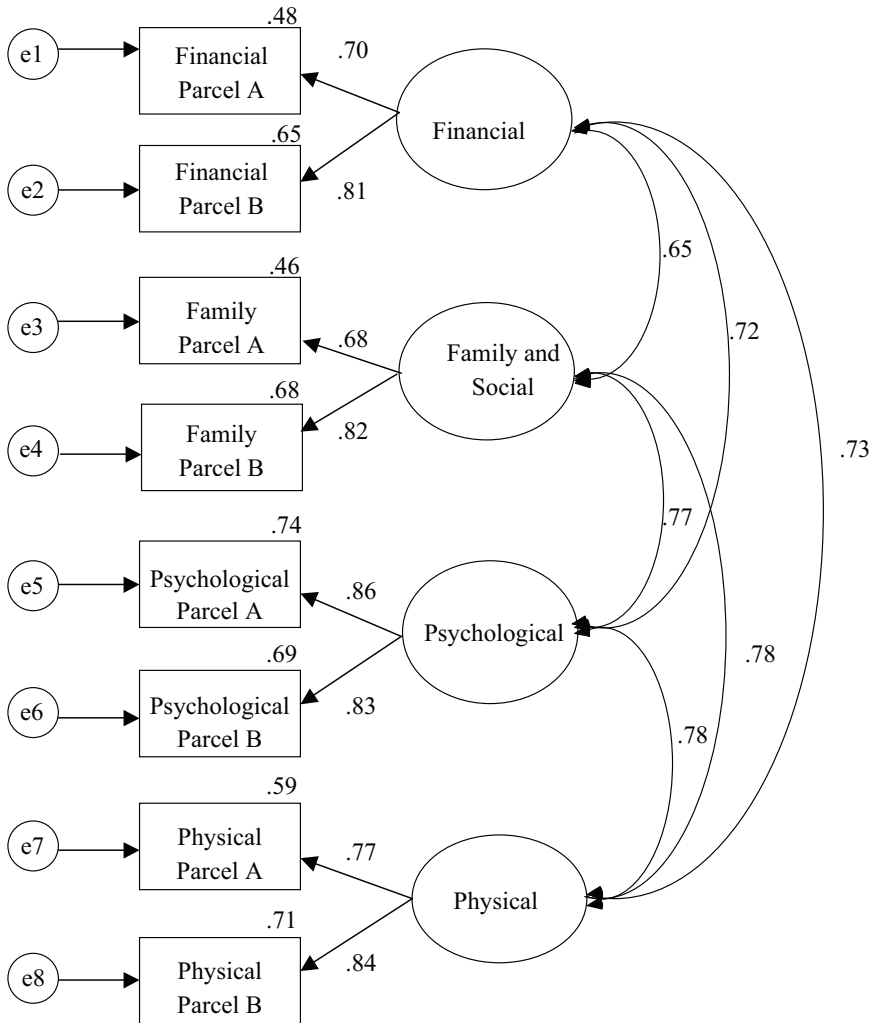


FIGURE 2
Four-factor model of SWBI (standardised estimates).

TABLE 3
Bivariate Correlations between Factors and Other Scales

	Happiness	Disability acceptance	Self-esteem
Financial WB	.45*	.37*	.42*
Psychological WB	.72*	.59*	.76*
Family and social WB	.58*	.44*	.49*
Physical WB	.46*	.50*	.49*

Note: * $p < .01$

such as disability acceptance, self-esteem, and subjective happiness in the expected direction. This study offers additional support for the SWBI's four-factor structure and provides evidence of its construct validity. The 20-item SWBI refined from this study was found to be brief, reliable, and valid.

Importantly, this study attempted to confirm the item structure from exploratory factor analysis by using a confirmatory factor analysis technique. Exploratory factor analysis is used to explore data to determine the nature of factors or components that account for the covariance/correlation between variables. It is commonly used for a *priori* study and the result of exploratory factor analysis helps researchers form a hypothesis about the nature of factors underlying the data. Thus, exploratory factor analysis is generally considered a theory-generating procedure (Stevens, 1996). Confirmatory factor analysis, however, is considered a theory-testing model. In confirmatory factor analysis, a hypothesis is developed by the researcher prior to the analysis based on theoretical and/or empirical foundations. Then the hypothesised model is tested in an effort to prove the optimal match between hypothesis and data set. Thus, confirmatory factor analysis allows the researcher to determine the 'goodness of fit' of the predetermined factor structure with empirical data (Stapleton, 1997). One of the common critiques regarding exploratory factor analysis is that it does not generate optimal solutions for the factor structure. Although exploratory factor analysis provides useful hypotheses for further research, it is still difficult to determine the replicability of the results (Mulaik, 1972). This study is unique in that it provides results from both exploratory and confirmatory factor analysis in order to offer two sources of psychometric validation.

QoL is increasingly recognised as the overarching outcome in rehabilitation practice and is often seen as the ultimate rehabilitation goal for individuals with disabilities (e.g., Bishop & Fiest-Price, 2001, 2002; Crewe, 2005; Fabian, 1991; Livneh, 2001). QoL, a multidimensional construct including both objective and subjective dimensions, appears to be an appropriate outcome measure of rehabilitation programming because it incorporates a judgment of both the success an individual has achieved in re-establishing the psychosocial homeostasis that was disrupted by the advent of the disability, and the attainment of person-environment congruence. Objective measures have been found to be a poor measure of life satisfaction among individuals with disabilities due to the higher likelihood of being unemployed, having lower incomes, and participating less in community activities than individuals without disabilities. Chapin and colleagues (2004) suggested that, in regards to individuals with disabilities, 'subjective measures are more likely to provide a more valid picture of the level of satisfaction of the individual with his/her life situation (i.e., quality of life) than would objective measures' (p. 1136).

There are few disabling conditions such as spinal cord injuries that present the survivor and rehabilitation practitioners with such a variety of complex issues (Crewe, 2005). Issues such as depression, financial insecurity, dependency, alcoholism and/or drug addictions, divorce, chronic pain, in addition to the physical demands of trying to maintain an optimal level of health, present a wide array of physical and psychosocial challenges to the injured person with a spinal cord injury and the rehabilitation practitioner. Successful vocational rehabilitation programming involving individuals with spinal cord injury therefore requires rehabilitation practitioners to address multiple domains of the consumer's life (e.g., medical, emotional, social, family, and environmental). A multifaceted assessment of these domains would provide the rehabilitation

practitioner with more meaningful outcome data regarding the effectiveness of rehabilitation interventions and services rather than a short-term objective measure, such as an employment outcome. The SWBI provides rehabilitation practitioners with a reliable and valid instrument by which to efficiently measure the multiple dimensions of subjective wellbeing among individuals with spinal cord injuries and could provide a more accurate measure of the success of rehabilitation efforts.

Limitations of this study include the use of a convenience sample of Canadians with spinal cord injury and the low response rate to the mailed questionnaire. As a result, these conclusions might not be generalisable to other countries, cultures, or disability groups. Additionally, the response rate to the mailed questionnaire (32%) means that 68% of the individuals who received the questionnaire did not participate. Because of the ensured anonymity and confidentiality of the respondents, it is unclear if the characteristics of those who responded might differ from those who did not. Future research using the SWBI could examine persons with other types of disabilities, as well as individuals of different cultural identities, to see if these factors impact sense of wellbeing.

In summary, the present study has confirmed a four-factor interrelated structure that captures important indicator variables reflecting sense of wellbeing and QOL for people with SCI. Because the SWBI was developed specifically for vocational rehabilitation clients by Rubin et al. (2003), it has potential application as an evaluation of vocational rehabilitation outcomes and will likely prove valuable in expanding the definition of successful rehabilitation beyond the use of objective measures only (e.g., employment outcomes).

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