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A DISCRIMINANT FUNCTION ANALYSIS OF PRODUCTIVITY-RELATED  
VARIABLES FOLLOWING SPINAL CORD INJURY

by

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B. Sc., University of Toronto, 1982

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THESIS SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF  
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, of

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A Discriminant Function Analysis of Productivity-Related

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## ABSTRACT

Trieschmann's model of adjustment after a spinal cord injury indicates adjustment is a balance of three major influences: personal or psychosocial resources, our organic state and the environment.

The present study included variables represented by her model not included in any previous analysis with respect to "productivity" outcome. In particular, some of the environmental variables have been added.

Outcome for the present study was defined as: paid employment, volunteer work, homemaking, schooling, indoor and outdoor leisure. Eighty-seven spinal cord injured subjects were retained given missing values. All were former patients of the G. F. Strong Centre (the provincial rehabilitation unit in British Columbia) between the ages of 20 and 60, who were discharged from the facility between 1979 and 1986. Data were analyzed using a series of discriminant function analyses.

Of the 15 predictor variables used, those most influential in discriminating the employed from the unemployed were (in order of importance): willingness to work despite financial disincentives, motivation to return to work, degree of functional dependence, current level of education, the number of hours of personal care attendants, ability to drive one's own vehicle, and number of medical complications. The overall classification rate for the derived discriminant function was 69.06% (which is acceptably accurate at  $p < .02$ ).

For volunteer work the most influential predictor variables were: current level of education, the year of the injury, and age. The discriminant function generated was able to correctly classify 71.94% of the cases in the cross-validation procedure. However, this represents a classification accuracy that is little better than chance, and these results must be viewed with caution.

In discriminating "homemakers" from "non-homemakers" the most important variables were: ability to drive one's own car or van, the average number of hours of personal care attendants, the degree of social support, and age. This represents an overall hit rate of 86.3%, and acceptable accuracy at  $p < .02$ .

The discriminant functions generated for schooling, and leisure were not significant.

Limitations and conclusions are discussed in the body of the thesis.

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## CHAPTER 1

### INTRODUCTION

Each year, it is estimated, 1200 Canadians suffer spinal cord injuries, and as a result 800 will be left permanently disabled. As Trieschmann (1988) puts it: "...spinal cord injury can happen to any one of us. It occurs primarily to people like you and me in the prime of our lives and in the midst of mapping out a course of action for the future." Research undertaken by Griffin (1981) in British Columbia indicated that at least half of the spinal cord injured individuals sampled were under 25 years old, and that most were males. At the time of their injury, they were students or employed, but less than half returned to the workforce post-injury. Certainly, living with a physical disability is demanding, emotionally frustrating, and financially depleting, yet the majority of these individuals will live long lives. Presumably many of those not working are instead involved in activities such as volunteer work, education, homemaking or recreation. According to Trieschmann (1988) living with a disability reduces one's options and limits choices. To what degree depends on the environment and the personal resources which one brings to the disability experience.

This view forms part of a model of adjustment developed by Trieschmann (1980), which is explained in more detail below. Her model forms the basis for determining the factors to be included in the present analysis which investigates those factors that differentiate those who are productive (as defined by paid employment, volunteer work, homemaking, school and recreation) from those who are not. In particular the focus will be on factors outside the individual's control, namely the situational or environmental factors. Addressing this issue may provide guidelines for enhancing the effectiveness of vocational

rehabilitation programs, and therefore the lives of those affected by spinal cord injuries.

### Trieschmann's Model

In a recent publication entitled Aging With A Disability, Trieschmann (1987) described adjustment as an "evolutionary process"; in other words, we are always in the process of adjusting to our internal and external environments. Thus, as Trieschmann (1987) described it, adjustment is "synonymous with the balancing act we perform every day as we seek equilibrium among our emotional state (P), our bodily condition (O), and the environment (E) in which we live, the P, O, E system. *We humans, are P, O, E systems, and all of our behaviour, everything that we do and feel, are reflections of this P, O, E system.*" This model, according to Trieschmann (1987), can be summarized as :

$$B = f (P \times O \times E)$$

Behaviour (adjustment) is a function (f) of the interaction of person variables (P), organic variables (O), and environmental variables (E). Person variables would include habits, locus of control, methods of coping with stress, preferences, rewards, self-image and creativity [and former history of work activity]. Organic variables would include level of injury, age, medical complications, strength, and endurance. Environmental variables would include hospital milieu; stigma value of the disability; family and interpersonal support; financial security; cultural and ethnic influences; access to medical attention, access to equipment and repair, recreational and educational opportunities; architectural barriers; and transportation. This model, according to Treischmann (1987, personal communication), applies to all aspects of

adjustment of the spinal cord injured person (SCI), including vocational rehabilitation. As such, adjustment to spinal cord injury should address each component of this system. Modern rehabilitation centres, such as G. F. Strong Centre, accomplish this in the form of the "educational model of rehabilitation" or the learning approach.

Rehabilitation (of which vocational rehabilitation is one aspect) has traditionally been expressed as a process designed to enable the injured person to "resume a satisfying life as a part of the community". Certainly in our society there has always been a heavy emphasis on gainful employment. Being employed provides economic, social, and psychological benefits which, according to Herr and Cramer (1984) may include: evidence of success, gratification of wants and needs, potential friendships, social status, a feeling of being valued, self-esteem, identity, a feeling of competence, and so on. According to Trieschmann (1980) this view has been incorporated in the criterion held by some SCI vocational rehabilitation departments that rehabilitation is judged "successful" if the individual has been employed full-time for at least 60 consecutive days. However, if we use this "60 day criterion" as our definition of success we will have to come to the conclusion, states Trieschmann (1980), that we have not been very successful. Studies suggest that only 13% to perhaps 48% of persons with a spinal cord injury become involved in competitive employment (see Goldberg and Freed, 1976, Kemp and Vash, 1971, and Devivo et. al. 1982, 1983).

Trieschmann (1980) proposed the thesis that a successful life consists of many types of behaviours, and that employment is only one of these. Rather, it is more appropriate and realistic to talk about productivity in all of its dimensions (i.e. work as a homemaker, student, or volunteer), rather than to focus exclusively on paid employment as the only important rehabilitation outcome

for an individual with SCI. Furthermore, many persons with spinal injury would like to express themselves through work but find that there are too many obstacles preventing them from doing so (e.g. architectural barriers, financial disincentives, or employer attitudes).

### **Rationale**

This research focused on the importance of environmental variables in determining vocational and avocational outcome after a spinal cord injury. Rehabilitation must be more than person-oriented, as environmental factors are important considerations in rehabilitation if people are to receive the best possible services. It is important to remind health professionals of the importance of the environment in determining outcome after a spinal cord injury.

In addition, it is likely that the results will illustrate that the majority of respondents are not in competitive employment. This may further substantiate the thesis that successful rehabilitation should not be judged on the basis of competitive employment as the only important outcome. Other activities such as homemaking, schooling, volunteer work and leisure pursuits should be considered in evaluation of rehabilitation outcome.

To date, Devivo and Fine (1982), Devivo et. al. (1987), Goldberg and Freed (1982), and Dejong et. al. (1984) are the only authors who have addressed the combined impact of a number of variables, and have tried to separate them according to their degree of predictive validity with respect to employment or productivity outcome. However, there are variables in Trieschmann's (1980, 1987) educational model of rehabilitation that have not been included in any previous attempt at a multivariate analysis with respect to

outcome. In particular, some of the environmental variables posited by Trieschmann have not been included in previous studies.

Goldberg and Freed (1982) used factor analysis to reduce 15 measures of educational and vocational development to three factors: rehabilitation outlook, vocational plans and interests, and severity of the disability. However, their sample size was quite small ( $n=24$ ), although their composite factors explained 57.8% of the variance. The authors concluded that "since [their] study consisted of a small number of subjects and a large number of independent variables associated with employment, any inferences drawn beyond [their] series of studies should be exercised with caution."

However, Devivo, et. al. (1987) overcame many of these methodological concerns. They utilized a stepwise discriminant analysis with data from a 7-year follow-up of 154 spinal cord injured persons. Statistical analysis indicated that the unemployed sample was more likely to be older, black, less educated, more severely injured, and poorly motivated to return to work. They also had lower IQs and fewer outside sources of financial support such as private health insurance, Worker's Compensation, veterans' benefits, or vocational rehabilitation benefits. Homemakers, on the other hand, were all female, had children, had lower IQs, severe dependence in terms of activities of daily living, were not students at time of injury, and had pre-injury incomes below \$10,000. Devivo, et. al. (1987) employed a stepwise discriminant analysis to develop a predictive model of outcome, defined as: continuous unemployment, homemaking, schooling, or competitive employment post-discharge. The seven predictor variables were: gender, motivation to work, whether the patient's last job required ambulation, race, educational level, a functional ability score (the Barthel Index, a measure of ability to perform activities of personal care and mobility), and whether the patient had children.



This 1987 study confirmed and extended earlier work by Devivo and Fine (1982) conducted with SCI patients treated at their Model Centre between 1973 and 1976. The sample included 361 persons, of which 13% (47) were "employed" which was defined as competitive employment, self-employment, homemaking, education, on-the-job training or sheltered work. A random sampling of 47 individuals not employed, according to the above definition, were then selected. A comparative analysis of these 2 groups revealed that those employed were significantly younger at time of injury and predominantly white.

However, Devivo and Fine (1982) and Devivo et. al. (1987) failed to include a number of important variables associated with the educational model of rehabilitation, including: transportation, architectural barriers, or financial security.

Aware of the need to study environmental factors, DeJong et. al. (1984) undertook a multivariate analysis (stepwise multiple regression) which revealed that 6 of their 22 possible independent variables explained 60.7% of the variance in productivity outcomes. Those variables were: transportation barriers, presence of economic disincentives, education, the Barthel score, the number of vocational rehabilitation services received (i.e. persons who received more vocational rehabilitation services were generally more productive), and age (younger persons tended to be more productive than older persons). Despite their much needed focus on environmental variables, their sample size of 75 was inadequate for an analysis of 22 variables, given the rule of thumb that 10 subjects are required for each independent variable in the analysis. Therefore, the reader must exercise caution when interpreting these results.

## Proposal

In short, the purpose of the present study was to:

1. overcome the methodological problems associated with the above studies with a larger population;
2. include in the analysis variables considered important in light of more recent research or expert opinion, in particular the environmental variables;
3. estimate the impact of environmental variables (at least as they are perceived or experienced by the individual) on vocational and avocational outcome.

Three hypotheses were tested:

1. Environmental variables will be at least as important as personal or organic variables in influencing outcome (as defined by employment, volunteer work, schooling, homemaking or leisure/recreation). In other words, environmental variables will be at least as important in discriminating those who are employed from the unemployed, and so on;
2. Holland-based Interests (as defined later) will be shown to have a significant influence on employment outcome; and
3. The majority of SCI subjects will be engaged in activities other than paid employment.

## Definitions Of Terms

### Impairment

The World Health Organization (1980) defines an impairment as a loss or abnormality of psychological, physiological, or anatomical structure or function. An impairment may be permanent or transitory.

**Disability**

A disability is any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner, or within the range considered normal. Disability is concerned with abilities that are generally accepted as essential components of everyday life such as personal care, other activities of daily living and locomotor activities such as walking.

**Handicap**

A handicap is the disadvantage resulting from an impairment or a disability, that limits or prevents the fulfillment of a role that is normal depending on age and cultural factors.

**Paraplegia**

Paraplegia is the paralysis of the lower half of the body with involvement of both legs usually due to disease or injury of the spinal cord. Traumatic paraplegia is that resulting from an injury.

**Quadriplegia**

The term applied when the paralysis involves both upper and lower extremities; usually due to disease or injury of the spinal cord.

**Lesion**

The term used to refer to any pathologic or traumatic injury to the spinal cord.

**Complete Lesion**

A spinal cord injury with no motor or sensory function below the zone of cord injury.

**Incomplete Lesion**

A spinal cord injury with some sensation or motor control existing below the lesion; some nerve pathways remain intact.

## CHAPTER 2

### LITERATURE REVIEW

Based on Trieschmann's (1980, 1987) Personal, Organic, Environmental (P, O, E), model, it is clear that a large number of factors may be important in predicting or influencing vocational and avocational outcome after discharge from a rehabilitation program. Indeed, the literature contains references to many of these factors as predictors of vocational or avocational outcome. This chapter outlines the results of previous work, and is organized on the basis of Trieschmann's (1980, 1987) model (i.e. the personal (P), organic (O) and environmental categories (E)).

It should be noted that the information provided by many of the older studies may no longer be valid. Much has changed in the past twenty years in the area of vocational rehabilitation and support for the disabled. Today there is more personal care support, homemaking services, medical and technical advances, and improvements in transportation all of which expand the prospects for productive work for people with a spinal cord injury (SCI).

It should also be noted that literature cited is American unless otherwise indicated.

#### Personal Variables (P)

##### Demographics

Geisler, Jousee and Wynne Jones (1966) reported on a Canadian sample of 1204 individuals with paraplegia and quadriplegia due to disease or injury. They found that becoming disabled prior to age 40 and more education

were factors associated with higher employment rates. This finding was particularly true for the quadriplegics in their study.

El Ghatit and Hanson (1978) reported that male spinal injured veterans most likely to have obtained employment included those: injured prior to age 30, injured for at least 5 years, paraplegic rather than quadriplegic, married, educated and trained beyond high school, able to drive an automobile, and able to care for own bladder and bowel. Of course, some persons who did not meet these qualifications did find work. However, the best predictor of obtaining employment was simply whether or not the person had actively sought employment. In other words, "motivation" was the critical factor in differentiating the employed from unemployed.

Trieschmann (1980) noted that a college education and predisability employment stability were associated with employment following spinal injury. Felton and Litman (1965) in a study of 222 veterans with SCI, found that the unemployed had the lowest educational level and the smallest mean difference between pre-disability and post-disability level of education. In addition, they found that for paraplegic men, in general, there were strong indications that predisability occupation was not significantly related to post-disability employment, unless it was coupled with an educational level of a high school diploma or better. Among their employed group, 48% had received vocational training, whereas only 27% of the unemployed had such training (although few of the employed group were working in jobs for which they were trained). Thus, the authors concluded that vocational training induced a sense of worth by teaching persons with SCI that they do have skills and abilities. These results must be viewed with caution, according to the authors, due to self-selection by the subjects.

In contrast to the above reported studies, the results of a study by Kemp and Vash (1971) indicated no association between productivity and pre-injury level of education, pre-injury employment, level of injury, sex, age at onset, or material resources.

Goldberg and Freed (1973) assessed the pre and post-discharge vocational plans of 21 individuals who were 1 to 2 years post-injury. They showed that individuals with more work-related interests (as tested) were more motivated to obtain or return to work. As well, persons with less severe disabilities tended to be more realistic in their interests, whereas persons with complete quadriplegia either tended to have more fantasies about what they could do or had reduced their interests in work following disability. Also, older persons were more realistic as to what a job required and their ability to do a job than were younger persons, and further, older persons were a bit more optimistic in their outlook. Thus, previous experience with the world of work and level of education were definite assets following spinal injury.

Later, Goldberg and Freed (1982) followed up the same sample to assess outcome. They reported that those who had formulated concrete plans to accomplish a vocational objective tended to obtain full-time employment or to be enrolled in school full time. Persons who had formulated educational plans that were concrete, specific, and related to vocational goals had fewer difficulties in obtaining work after discharge from rehabilitation. Those with less severe disabilities were more optimistic and had a greater motivation to return to work consistent with their abilities and interests. However, severity of disability per se was not associated with later productivity. Timing was an issue. Those who had experienced the disability for a longer period of time had higher work values; that is, work was more important to them. As found in other studies, preinjury level of education was associated with post-disability

employment. Educational attainment, educational plans made before injury, and origin of interest in work were the three factors which best predicted vocational outcomes. Other predictors of employment were the responsibility for a large number of children, more school training, and fewer functional limitations. Marital status per se was not associated with employment in this study. However, this finding is not supported by some other research articles (e.g. El Ghatit and Hanson, 1975; and Crewe and Krause, 1987).

Goldberg and Freed's results were confirmed by Alfred et. al (1987) in a study of the vocational development of 33 spinal cord injured persons (studied from shortly after injury to two years post-discharge). Vocational development was monitored with the use of the Goldberg Scale of Vocational Development, GSVD (a guide for rating responses given during a structured interview of current and previous vocational status). The authors found that the best predictors of successful vocational outcome were: pre-injury level of education, educational plans made prior to injury and the origin or development of interests in work. Long-range vocational planning, motivation, and the desire to work do not change significantly over time. Long-range planning remained at a low level throughout the two-year period, suggesting that subjects were not long-range planners or that distant plans were too difficult to envision. Motivation remained high throughout the two-year period, indicating subjects' steadfast desire to return to work.

Alfred and his associates stated that vocational development after injury is markedly depressed during inpatient rehabilitation and for six months after discharge. As survival and medical needs recede, vocational development proceeds as progress is made in personal and social adjustment to disability. However, two years after discharge, the level of vocational development is



lower than before injury, suggesting continuing uncertainty about vocational issues.

In summary, paraplegics are more likely to return to work than quadriplegics (Deyoe, 1972; El Ghatit and Hanson, 1978; and Felton and Litman, 1965), younger persons are more likely to return to work than older ones (Devivo, et. al, 1982; El Ghatit and Hanson, 1978, Goldberg and Freed, 1973; etc.), and these same authors note that better educated persons are more likely to return to work than their less well-educated counterparts.

### **Interpersonal/Social Support**

Assistance and support from family and friends is an important personal (P) variable in the adjustment process; as described in the literature reviewed below this support or caring may greatly influence "productivity" outcome.

In a sample of 50 cases, Kemp and Vash (1971) found interpersonal support was an important determinant of productivity for those with quadriplegia (subjects were at least five years post-injury). Productivity was defined as various activities in addition to employment.

In their study, four independent variables (of the 16 examined) accounted for more than 70% of the variance in ratings of productivity. Those variables were: interpersonal support, the number and type of goals expressed, the attention paid to physical or "greatest loss", and a creative thinking measure. In other words, the more productive individuals expressed more goals in the vocational, social and family areas. Less productive persons focused their goals on regaining bodily function, materialistic goods and avocational pursuits.

Employment, as such, may be an outcome of improvements in well-being (and associated with good interpersonal or social support). Decker (1982) undertook to investigate the relationship among social support, and various

indices of adjustment (e.g. health status, psychological well-being and life satisfaction). She interviewed one hundred spinal cord injured persons ranging in age from 40 to 73, and showed that persons reporting high levels of well-being: viewed their disability more favorably, tended to have higher incomes, more education, to be employed, and to be more religious than those indicating lower levels of well-being. Support may foster the injured individual's perception of self-control by helping him/her to appraise the situation as less threatening and one that can be coped with, or by promoting the realignment of his or her values in accordance with remaining assets.

In a follow-up study of these same subjects, Decker and Schulz (1985) examined the role of social support in facilitating long-term adjustment. The authors used a Social Support Scale composed of 11 Likert-type items measuring: instrumental support (i.e. tangible aid, such as financial assistance, transportation, or help in carrying out activities of daily living), cognitive support (i.e. "how to" information), and affective support (i.e. receiving feedback that the person is loved, respected, and belongs). In keeping with the results of Decker's (1982) earlier work, those reporting higher levels of well-being viewed their disability more favorably, tended to have more education, were employed, and required less assistance with activities of daily living.

### **Locus Of Control**

In Rotter's (1966) model, individuals who assume that they can influence their own fate are said to have an "internal locus of control". The opposite assumption about life, that we are controlled by luck, fate, and other uncontrollable outside forces, is known as an "external locus of control".

A correlation between productivity and locus of control was demonstrated in a follow-up study by Swenson (1976) in which productivity was one of three

outcome variables studied. He found that internals spent less time in the hospital as the result of nonhygienic behaviours; were more satisfied with life; and were more involved in work activities in the home, in paid employment, in educational activities, and in activities outside of their home, like community work.

Decker and Schultz (1985), highlight the importance of control in the adjustment process, productivity being one aspect of adjustment. The authors state,

"...it might be expected that spinal cord-injured people would perceive dependence on others and lack of control over their lives. But this was not true for their sample in general; however, among people experiencing the most severe injuries (quadriplegia, complete), the perception of control was lower".

In addition, Athelstan and Crewe (1979) suggested that psychological adjustment to spinal cord injury is related to the manner of onset of the disability, and that people who had more control or responsibility for their accidents were more likely to have better adjustments to their disabilities than those who felt little or no responsibility for the condition.

## **Interests**

Rohe and Athelstan (1985) administered the Strong Campbell Interest Inventory to a sample of SCI males and females. Subjects completed the inventory once according to the standard instructions (resulting in Present Day interests, P-D), and on another occasion when asked to recall their interests from before their injury (Recalled interests, R). Occupational Scales showing the greatest R to P-D increases were: Social Worker, Speech Pathologist, Librarian, Priest, and Psychologist. This, it is speculated, may be due to increased contact that SCI people have with several of these occupations and

activities after their injury. In general, increased positive endorsement was given to activities that are more sedentary, mental, less physically active, and safer.

However, the SCI men, in general, showed no significant shift away from interests that might be considered physically impossible. There was no decrease in liking for amusements of an athletic nature, nor did the Athletics Scale decline. Second, SCI subjects showed significantly more changes in item response percentages from R to P-D testing than the control group (26% vs. 15%), mainly due to decreased disliking for many items. Such a changed response pattern suggests that in some cases SCI men may become less judgmental and rigid about what does not interest them. Thus, they may be more open to new experiences and interests. Finally, a distinctive characteristic of the SCI group was the failure of the Adventure Scale to decline with age. Interests associated with physical risk-taking may be a more enduring characteristic of SCI males than of the general population. A major change in physical capabilities does not appear to produce change in measured interest; rather, the interests that are present before injury remain. Changes that do occur are similar to those found in non-disabled samples and appear to be a function mainly of age.

Stability of interests after injury may help explain the extremely low rates of employment of SCI men. Lack of change in interests away from "Realistic" activities would maintain the disparity between interests and physical capabilities that Rohe and Athelstan (1982) found earlier; thus lack of change may contribute to difficulties in vocational rehabilitation. Interests remain for those activities that are no longer physically possible (i.e. primarily Realistic-type interests such as hands-on, physical, and outdoors activities) which negatively influences employment outcome.

## Organic Variables (O)

A number of researchers have indicated that factors associated with biological/medical functioning may also play a role in adjustment and/or productivity after a spinal cord injury. In particular, level of injury, length of time since disability, and medical complications have been studied in terms of productivity or adjustment.

### Level Of Injury

Based on work by Kemp and Vash (1971), it would appear that level of injury is not associated with productivity. As well, no correlation was found between level of injury and employment in research by Goldberg and Freed (1973).

However, other researchers dispute these claims. For example, recall that El Ghatit and Hanson (1978) found that veterans in their sample who were paraplegic, rather than quadriplegic were more likely to have obtained employment. This was also the case for those who were able to manage their own bowel and bladder.

According to Felton and Litman (1965), the extent of the disability does not appear to be a significant factor in determining the percentage of the group that was currently employed. Rather it was related to the amount of difficulty experienced in obtaining employment, as quadriplegic men experienced by far the greatest number of job rejections.

The severity of a person's disability, according to Dunn (1987), has been considered a critical element in independent living outcomes, with productivity being one aspect of independent living.

### **Time since injury**

In the above mentioned research by Goldberg and Freed (1973) there was no demonstrated rise in employment with increasing time post-discharge. On the other hand, Wilson et. al. (1984) showed that employment rates increase over time in a group that received fairly optimal rehabilitation. Their results indicated that rate of employment was highest for those injured 8-10 years. And Felton and Litman's (1965) results indicated that the unemployed paraplegic man is characterized by a shorter duration of disability than one who is employed.

It is difficult to determine if these variables influence productivity or employment because of the lack of consensus between the articles cited above. The reasons for the problem, according to Trieschmann (1988), lie with a number of methodological concerns such as variations in subject populations based on self-selection, degree of vocational training, age range, and type of injury.

### **Medical Complications**

Many health concerns may impinge on an individual's independence post-discharge. Guttman (1979) stated that the most common late health deviation in SCI results from bladder infection. Recurrences of pressure sores are also relatively common late complications, necessitating re-admission to hospital for treatment. Anderson and Andberg (1979) suggested that those who are unemployed and who have unmet needs for help with skin care are more likely to develop pressure sores, and require re-hospitalization. Young, et. al. (1982) reported that about 30 to 35% of those with spinal injury will be hospitalized with pressure sores in their first five years post-discharge. While

Mayer and Andrews' (1981) research indicated that those in the "negative change group" post-injury had a common concern about physical problems.

The relationship between proper self care and subsequent productivity is expressed by Hallin (1968):

"Once a patient has been discharged, his fluid intake, his bowel and bladder needs, and the health of his skin are his responsibility, and he will accept this responsibility only if he accepts his disabled body and values himself and his remaining function enough to avoid preventable complications. With it, he not only can avoid regressing, but can proceed with education, work, or whatever avenues of living are open to him."

Therefore psychological adjustment, rather than the level of injury, is a precursor to proper self care management and subsequent productivity post-discharge.

DeJong (1981) noted that if the individual requires less intensive medical treatment, he or she is more likely to be productive and living independently.

Richards (1986) used the Handicap Problems Inventory (which measures four dimensions of adjustment to physical disability: personal, familial, social, and vocational), the Beck Depression Inventory, and the Wiggins Hostility Scale as outcome measures in a study of adjustment to SCI in the first year following hospital discharge. Thirty-six individuals with SCI were involved, as were 29 able-bodied controls, and these instruments were administered 3 weeks, 3 months and 1 year post-discharge. A repeated measures ANOVA was used to assess changes in the outcome measures over the year and to examine effects of sex, age, race, neurologic extent (complete or incomplete), and SCI category (paraplegic, quadriplegic, or normal). The analysis suggests that both paraplegics and quadriplegics find coping with SCI equally and increasingly less difficult over time (NB. there were no statistically significant differences on any of the outcome measures related to sex, race, age, or neurologic extent of injury).

Richards (1986), therefore, concluded that people with a SCI are

"not substantially more hostile or depressed than their able-bodied peers, nor do they necessarily experience diminished self-esteem or increased dissatisfaction with life. They are able to adjust to their limitations in a way suggesting that quality of life is, in fact, possible."

DeLoach and Greer (1981) suggested that the way in which a person interprets a disability influences adjustment to the negative event. In particular, they concluded that people who are severely disabled do not necessarily experience lower life satisfaction than do able-bodied people because they can redefine situations and adopt a value system that allows them to feel good about themselves.

### **Environmental Variables (E)**

Trieschmann (1987, personal communication) holds the view that environmental factors are at least as important as person or organic variables in influencing productivity after a spinal cord injury. Such factors as perceived or experienced negative/unrealistic employer attitudes, architectural barriers in the home or workplace, transportation, attendant care issues or financial disincentives may all greatly influence productivity.

According to Trieschmann (1988), the costs of daily living for the disabled can be significantly greater than for the non-disabled person and, therefore, many disabled persons require a relatively high salary from employment efforts in order to be able to afford to give up the various benefits to which they are entitled (under some social programs). Tanaka (1977) pointed out the potential costs of: hiring someone for assistance with cleaning, cooking, and laundry; the cost of transportation (a special modified car or van), and the cost of equipment repair (wheelchairs, etc.); supplies and medication.



In addition, architectural barriers, if not a problem in the home, are still of concern in the community. As Guttman (1979) stated it,

"...although great improvements have been made in adjusting houses by the building of ramps and hand-rails, by widening doorways, by adjusting toilets and bathrooms, public buildings, such as libraries, post offices, banks, shops, still all too often present insurmountable barriers to the severely disabled person, particularly one in a wheelchair."

El Ghatit and Hanson (1978) and Trieschmann (1980) highlighted the importance of being able to drive a car in terms of employment outcome. Brown et. al. (1987) suggested that access to a vehicle will directly affect return to work, and activity patterns, such as getting out of the house for recreation. They found that even at one year post-injury, having access to a private vehicle raised the probability of being employed from 0% to 50% for a group of 55 SCI persons who reflected broad heterogeneity in terms of age, gender and household income.

DeJong (1981) and DeJong et. al. (1984) undertook a multivariate analysis of factors associated with productivity as part of their study of independent living. In their analysis, independent living was defined by living arrangement, productivity, and overall independent living measures.

Environmental factors considered critical to the well-being of disabled persons in general, and persons with SCI in particular were: timely assistance with in-home needs, appropriate housing, and accessible transportation. Despite this view, DeJong et. al (1984) note that the literature on factors specific to the environment has been noticeably absent. This may have resulted from the view in traditional rehabilitation practice and research that problems associated with disability are primarily individual rather than environmental in character.

In their study, DeJong et. al. (1984) used as their primary data source an exhaustive computer file of 111 persons with SCI who were discharged from 10 medical rehabilitation centers across the United States. Survey participants (n=75) were interviewed approximately two years following discharge, and six instruments were employed. However, it should be noted that not all persons in the study group had been traumatically injured. Independent variables included: sociodemographics, disability-related variables, environmental barriers, and an interface variable to reflect the role of assistive devices needed to bridge the gap between functional limitations and environmental barriers. The authors chose independent variables on the basis of Trieschmann's P, O, E model, and the environmental factors considered were:

1. presence or absence of needed in-home attendant care;
2. number of in-home architectural barriers;
3. availability of accessible public or private transportation;
4. work disincentives as determined by whether persons would lose, or had lost, benefits when becoming gainfully employed;
5. assumption of the patient role as measured by the length of initial and subsequent hospitalizations, and the degree of medical supervision;  
and
6. services received/needed as determined by the number of services received and number of service needs remaining unmet.

The "interface" variable was measured by whether the respondent reported unmet equipment needs. In addition, two other independent variables were considered because of the strength of their correlations with outcome variables. These two variables were (1) the number of vocational rehabilitation services received, and (2) the presence of unmet occupational therapy needs.

Dependent variables included a person's level of productivity, and

measures of the degree of independent living. Productivity outcomes were based on a person's participation in gainful employment, school or training activities, formal (i.e. community) organizations, homemaking, and leisure time activities.

Stepwise multiple regression was the principal multivariate technique used in the study. Six of the 22 possible independent variables explained 60.7% of the variance in productivity outcomes: transportation barriers, age (younger persons tended to be more productive than older persons), presence of economic disincentives, education, the Barthel score (a measure of ability to perform activities of personal care and mobility), and the number of vocational rehabilitation services received (i.e. persons who received more vocational rehabilitation services were generally more productive).

Simply stated, those with more severe functional losses were also more likely to encounter environmental barriers. The interaction between personal and environmental limitations was evident in several instances, but was particularly noticeable in the interaction between the Barthel score and transportation barriers.

The authors concluded that, for the medically stable person with a SCI, there comes a point in the person's "SCI career" when functional capacities can be enhanced only marginally, if at all. At that point, intervention strategies must be increasingly directed to removing and coping with environmental barriers.

## CHAPTER 3

### METHODOLOGY

The main thrust of this research was to determine the relative importance of environmental factors in terms of productivity in a spinal cord injured population. A survey questionnaire was developed for this purpose and is described in detail below.

#### Sample

Subjects chosen for the study were former patients of the G. F. Strong Centre (the provincial rehabilitation unit in British Columbia). Criteria for selection of subjects were:

1. traumatic spinal cord injury;
2. aged between 20 and 60 years; and
3. registered with G. F. Strong Centre not less than 2 years prior to data collection and not more than 8 years prior to this time (i.e. 1979-1986).

Outlined below is the rationale for these criteria:

1. trauma is the major cause of SCI admitted to the Centre. Traumatic SCI results in a relatively stable residual disability. This should be differentiated from non-traumatic spinal cord dysfunction (e.g. polio and multiple sclerosis) as the psychological adjustment process differs for these two groups (Trieschmann, 1980);
2. this age range may help to reduce the effects of aging on the profiles;
3. it is widely believed that it takes 1 to 2 years before the individual is ready to return to work, and it is important to control for variations in the rehabilitation process. At the same time, it is important to have an adequate sample size, and

it may be 7 to 10 years before the individual is ready for employment (Trieschmann, 1987, personal communication).

Respondents who were physically unable to complete the questionnaire were instructed to ask a helper to record the answers as long as this assistant did not include any personal beliefs or biases.

Medical records indicated that 405<sup>7</sup> people met the criteria for inclusion in the sample. Given that this number is too small for random sampling, a census study was conducted. Of the questionnaires originally mailed, many came back marked "return to sender". On follow-up these same individuals could not be contacted by phone. On this basis 161 subjects were considered to be "non-contacts", and of these it was learned that 5 were deceased. Consequently of the 405 questionnaires mailed, only 244 questionnaires were considered valid.

Questionnaires returned (N = 143) were reviewed for missing data, and those who failed to complete the question which assessed the dependent variables were interviewed by phone to complete this section. However, two subjects could not be contacted, and were dropped from the study. In addition, 2 subjects were injured prior to the date required for inclusion, and their responses could not be used. Therefore a total of 139 completed questionnaires formed the sample. Of these, 52 -- 53 could not be used in the final analysis due to missing values. This leaves 86 -- 87 subjects which represents a 36% response rate.

Data were gathered via mail-out questionnaires accompanied by an instruction sheet, and a cover letter/letter of endorsement from G. F. Strong Centre. To maximize the return rate, the instructions indicated a time limit of two weeks for completion and respondents were instructed to use the stamped self-addressed envelope to return the questionnaire. In addition, for those requiring any assistance, a pager number and phone number were provided.

A follow-up letter emphasizing the importance of the research, was mailed out ten to fourteen days after the questionnaire; and after an additional 2 to 3 weeks follow-up phone calls were made.

As patients do not always provide G. F. Strong Centre with updated addresses, the Canadian Paraplegic Association (B. C. Division) also assisted by sending out questionnaires to members with addresses that differed from those provided by the Centre.

### Outcome Variables

The outcome variables assessed were continuous in nature (i.e. reported as average number of hours per week over the previous 6 month period); they included productive activities such as:

1. Homemaking (i.e. home and family) -- which was defined for subjects as taking care of their room, apartment or house; fixing meals or cleaning up after meals; shopping; caring for dependents such as children or aging parents; and laundry or minor house repairs.
2. Attending classes and doing schoolwork -- taking course(s), going to school (day or night classes, lectures, laboratory work); preparing for class, studying in a library or at home; and independent studying, formally or informally.
3. Volunteer work -- unpaid work such as Scouts, Red Cross, social service agencies, neighborhood associations, political parties, and trade unions.
4. Paid employment -- for pay or for profit either on a job or self-employed.
5. Indoor Leisure/recreation -- activities inside such as watching television, reading, relaxing or loafing, and pursuing hobbies.

6. Outdoor Leisure/recreation -- outside activities such as sports, going to movies, theatres, concerts, and being out with family or friends.

### Independent Variables

The criteria for choosing independent variables were:

1. The variable(s) had to be considered important based on related research to date or "expert opinion".
2. The variable(s) had to be easily assessed by a vocational rehabilitation worker (subjectively in an interview setting).
3. The variable(s) had to be readily assessed via a mail-out questionnaire.
4. The variable(s) had not been included in previous models, but were believed to be important determinants of vocational or avocational outcome (especially the environmental variables).

As indicated in the literature review, many variables have been correlated with productivity. However, it is difficult to determine the relative importance of the many factors mentioned because studies tend to vary on a number of important parameters. As Trieschmann (1988) indicated, the subject populations vary in terms of self-selection, the amount of vocational training, the time since onset of injury, and age range. In addition, employment is not always defined the same way and may include homemaking or education.

To determine which variables to include in the analysis, "experts" in the field of spinal cord injury and vocational rehabilitation were contacted prior to development of the questionnaire.

Frequency distributions were generated for all the predictor variables included in the analysis. The data were surveyed for anomalies/errors and the database was examined for those predictor variables with the largest number of

missing cases. Corrections were made if an obvious error was found, and in one instance this was the case.

The independent variables to be assessed in the questionnaire include:

<u>Personal Variables</u>	<u>Organic Variables</u>	<u>Environmental Variables</u>
Rehabilitation Outlook	Medical Complications	Social Support
Motivation To Return To Work	Level Of Injury	Architectural Barriers
	Time Since Injury	Financial Disincentives
Perception Of Employer Attitudes	Current Age	Attendant Care
		Transportation
Level Of Education		
Holland Code (Interests)		
Functional Dependence		

The justification or rationale for inclusion of specific independent variables is given below. The abbreviation in parentheses was used to refer to the variables in the discriminant function analyses.

### **Personal Variables**

1. Rehabilitation outlook (OUTLOOK) -- (alpha = .660) measured by the extent to which the disability has caused concern about social contacts, job prospects and sexual relationships (using a 5-point Likert scale ranging from "not at all" to "very much"). The question used was partly adapted from a questionnaire used by Decker (1982), and the Goldberg Vocational Development Scale (Goldberg, 1973). Goldberg and Freed (1982)



indicated that rehabilitation outlook, or the impact of the disability on the individual, was one of only three important influences on work patterns.

2. Motivation to return to work (MOTIV) -- (alpha = .831) was assessed using a 5 part question with a 6-item scale ("strongly agree" to "strongly disagree"). This question was partly based on work done by Cook et. al. (1981). Devivo and Fine (1982) and Goldberg and Freed (1982, 1983) both indicated the importance of this variable in predicting productivity.
3. Perception of employer attitudes (DISCRIM) -- (alpha = .760) the respondent were asked to rate the extent to which they agree or disagree with 4 statements concerning employers' attitudes towards the spinal cord injured. The rating scale ranges from strongly agree to strongly disagree. There have not been any multivariate studies, of this nature, that have included this factor. However, employer attitudes are considered important by Trieschmann (1988), and others who believe they warrant closer examination.
4. Level of education (ED-NOW) -- was determined by a question which asks for the respondent's highest level of education (ranging from "8th grade or less" to "post-graduate study"). This question was originally used by McShane (1988, personal communication). This variable has repeatedly been shown to influence productivity, and has been included on that basis. For example, refer to research conducted by Dejong (1981, 1984), Devivo and Fine (1982), Goldberg and Freed (1976), El Ghatit and Hanson (1978) and Alfred et. al (1987).
5. Interests based on Holland types (INTERESTS) -- based on the work of Holland (1973) and Bolles (1986). This question utilizes a graphic representation to display descriptions of the 6 interest types: Realistic (the mechanically-oriented type), Investigative (the problem-solving type), Artistic

(the creative type), Social (the type who enjoys helping, teaching, etc.), Enterprising (the "business" or sales oriented type), and Conventional (the clerical type). The respondent was asked to choose the type he or she would most enjoy spending an extended period with (e.g. 10-20 years) in a work setting. The question as outlined was considered valid by Bradshaw, Rohe and Gorman (1988, personal communication, ). Rohe (1988, personal communication) has indicated that interests based on Holland codes may explain much of the variance in work/productivity patterns. Rohe and Athelstan (1982, 1985), note that interest patterns based on Holland Codes are relatively stable, even after a spinal cord injury, and many SCI load heavily on Holland code R (Realistic). However, for the most part, these individuals are unable to return to the type of employment represented by this category such as physical, mechanical, and hands-on work.

6. Functional dependence (DEPEND) -- (alpha = .931) was based on a question developed by Dunn (1987). This variable is determined by having the respondent rate the degree of assistance required to perform a series of 11 activities of daily living (such as cooking, bathing, and dressing). The 4-point Likert scale ranges from "no assistance" to "complete assistance". Functional dependence is considered to be an important disability-related variable, and has often been associated with productivity (see Dejong, 1981, 1984).

### **Organic Variables**

7. Medical complications (MEDCOMP) -- (alpha = .470) three questions were used to outline this variable. The first question asked respondents if they had been hospitalized or seen by a doctor due to a series of medical complications associated with spinal cord injury and they were to respond

either "yes" or "no" to each medical problem. The second question assessed the possibility of a head injury by asking the respondent if he or she had lost consciousness at the time of injury (yes or no response). The third question determined the presence or absence of handicapping conditions other than those resulting from the spinal cord injury (again using a yes-no response scale). Despite a low reliability rating, it was important that this variable be included based on expert opinion provided by Sterling, Rohe and Vargo (1988, personal communications), and previous research conducted by Anderson and Andberg (1979), although their research focused on pressure sores. No research of this nature has dealt with the issue of head injury, and both Rohe and Vargo (in personal communication) expressed a need for such work

8. Level of Injury (LEVINJ) -- was assessed by asking the respondents to indicate their level of injury: paraplegia -- incomplete or complete lesion, or quadriplegia -- incomplete or complete lesion (similar to a question originally used by Decker (1982)). This variable, although somewhat contentious, has repeatedly been found to an important influencing variable (see Goldberg and Freed, 1982, Devivo and Fine, 1982, El Ghatit and Hanson, 1978, etc.).
9. Time elapsed since the injury (YR INJ) -- based on the month and year of injury as reported by the respondents. This variable is important because those individuals who have been disabled longer have more time to adjust to their new life situation (Dunn, 1987).
10. Current Age (AGE) -- was based on the year of birth. This variable was shown to influence productivity by Devivo, et. al. (1982), El Ghatit and Hanson (1978), and Goldberg and Freed (1973) among others.

## Environmental Variables

11. Social or interpersonal support (SOCSUP) -- ( $\alpha = .887$ ) was assessed by a question that had the respondent think of people who are an important source of help, support, or guidance at this time. The respondent was then asked to determine the extent to which these people assisted in a variety of supportive tasks or in situations when support was needed. This was achieved by using a 5-point Likert scale varying from "not at all" to "very much". This variable was included in the study due to its environmental focus, and the extent to which it has been an important focus of previous work (for example, the work of Kemp and Vash, 1971, Decker, 1892, and Decker and Schultz, 1985). In particular, Dejong (1981) and Dunn (1987) demonstrate that this is an important variable influencing productivity.
12. Architectural barriers in the community (BARRS) -- ( $\alpha = .967$ ) a series of 4 questions in which the respondent rates the level of importance of accessibility of washrooms, elevators, doorways, hallways and ramps or curb cuts for their participation in paid employment, volunteer work, housework, and attending classes (measured separately for each outcome category). The 5-point Likert scale ranges from "not at all" to "very much". This question was developed independently as no adequate questions were found in previous questionnaires. Architectural barriers were included due to their environmental nature, the fact that they have not been included in previous research and their likely influence on productivity after a SCI.
13. Financial disincentives (FINWIL) -- ( $\alpha = .892$ ) this variable was assessed by having respondents indicate how willing they would be to hold a job if income, medical and homecare benefits were reduced as a result of earnings from that job. A 6-point Likert scale ranging from "very unwilling" to "very willing" was used for this purpose. Trieschmann (1988) highlights this

as a key environmental variable influencing productivity and is worthy of further study. It is lacking in previous research, although Dunn (1987) included questions pertaining to it in his questionnaire. His results, unfortunately, did not prove useful due to non-response bias. In DeJong's (1984) analysis this factor was one of only six that explained 60.7% of the variance in productivity outcomes.

14. Attendant care (PCA) -- assessed using a question taken from a questionnaire developed by Dunn (1987). Respondents were instructed to calculate the average number of hours per week they receive paid attendant care. Dunn (1987) and DeJong (1984) included this factor in their analysis, and it is considered an important environmental factor by Vargo (1988, personal communication), among others.
15. Transportation (OWN VEH.) -- was determined by instructing respondents to indicate whether or not they use their own vehicle. Research conducted by DeJong (1981, 1984) clearly demonstrates the importance of this environmental factor in influencing productivity, and Trieschmann recommended its inclusion (1988, personal communication).

For the purpose of coding and uniformity all the questions were provided in a structured fill-in-the-blank format. The questions to be used were reviewed by the Director of Vocational Rehabilitation at G. F. Strong Centre prior to their inclusion in the questionnaire. In addition, the questionnaire was assessed for readability by a staff member at G. F. Strong Centre (Jane Andrews, Coordinator of Education). In addition, prior to final revision of the questionnaire, a pretest was undertaken with seven SCI persons meeting the eligibility requirements for inclusion in the research. Those involved in the pretest gave feedback on item construction, the cover letter, and assisted in the detection of typographical errors, ambiguity, or omissions.

### Representativeness of the Sample

The respondents and non-respondents were compared across six demographic factors using a chi-square analysis (see Table 1). The respondents were significantly better educated ( $p < .05$ ) and had a lower level of injury, but were similar across all other variables studied. The implications of this difference, however, are not clear.

Table 1: Comparison of Respondents (n = 139) With Non-respondents (n = 101) Across Demographic Variables

Variable	Value of Chi-Square	Probability
Current Age	.704	.9828
Males	.033	.8549
Females	.112	.7384
Marital Status	4.686	.0961
Education	16.384	.0118*
Level of Injury	13.486	.0037*

\*significant at  $p < .05$

### Analysis

The data were analyzed using a series of discriminant function analyses. These analyses allow one to determine which among the chosen predictor variables were most highly correlated with the discriminant functions representing the separate outcome categories. In other words, to isolate those predictor variables best able to separate those who were employed from the unemployed, or those who were involved in volunteering from those who were

not, and so on. It was therefore possible to determine the relative importance of those factors that were environmental in nature which was an important aspect of this research. In addition, recall that it was hypothesized that Holland-based interests would influence employment outcome. These analyses allowed us to determine if in fact Holland-based interests could be used to differentiate those who were employed from those who were unemployed.

The Statistical Package for the Social Sciences (SPSSx) DISCRIM program was chosen to run these analyses (see Norusis, 1985 for more detail). The method for selecting variables for inclusion in the discriminant analysis was the "direct method". This results in the forced entry of all predictor variables simultaneously (if they satisfy the minimum tolerance level set at .001).

This was considered suitable for the present study because the relative importance of predictor variables (i.e. variable ordering) was of interest. As well, a "stepwise" inclusion method was considered inappropriate for a study in which variable ordering was of interest (see Huberty, 1984).

Cohen and Cohen (1975) indicated that the direct method is most appropriate when: "...there is no logical or theoretical basis for considering any variable to be prior to any other, either in terms of a hypothetical causal structure of the data, or in terms of its relevance to the research goals." The relative importance of environmental factors was a key research focus, but they were not considered more important than personal or organic variables a priori (from a causal or theoretical perspective).

Normally, a major purpose of discriminant function analyses is to predict group membership (e.g. predict if a new case belongs to the employed group or the unemployed group). It should be noted that the analyses herein were for explanatory purposes, and not meant to be applied for predictive purposes. The approach taken may be termed a "descriptive discriminant analysis". It is

useful because the focus herein is on the order of the retained set of predictor variables in terms of their relative contribution to outcome (as previously defined).

The SPSSx DISCRIM analysis was executed using option 8. This results in mean substitution for missing values for the 53 subjects removed from the initial analysis. This occurred prior to inclusion with the analytical sample of 86 or 87 subjects for the classification procedure. This provided a better estimate of classification accuracy than would be the case if only those subjects used to develop the discriminant function were used alone (to be discussed in more detail below). For this reason the original respondent sample (139) was described at the beginning of Chapter 4 rather than just the analytical sample (87).

SPSSx provides for the inclusion of subjects with missing values (option 1). It would therefore be possible to increase the size of the sample for the analyses. However, a test run was executed for the "employment" outcome category. Unfortunately, option 1 was discarded because: (1) the number of subjects used in the analysis only increased to 97 (from 87) and there were no significant differences in the results, (2) the inclusion of subjects with missing values in some areas and not others makes interpretation of the results difficult, and (3) the subject population was not random at the outset so a reduction in sample size of only 10 would not seriously affect the analysis.

### Limitations of the Study

There are a number of methodological concerns with the study. In this section those limitations will be outlined and their influence discussed.



## Sample Size

Many cases had missing values for at least one variable, consequently the actual DISCRIM analysis was based on a reduced sample size (86 or 87 subjects (depending on othe outcome category) as opposed to the original 139). This represents a ratio of 6 subjects for each predictor variable which only allows for an explanation of relationships, and does not allow stable predictions. As well, a 6:1 ratio indicates that the strength of statistical power is low and our confidence in the results is therefore diminished. There is a greater risk of overfitting as there is a greater likelihood of random variance being picked up by the predictor variables.

According to the SPSSx manual (Norusis, 1985), if the cases with missing values differ from those without missing values, the resulting estimates may be biased. Those variables with a large number of missing values were determined by assessing response frequency. Those with many missing values were eliminated from the analysis. However, there was no evidence that missing values were associated with some particular characteristics of the cases, and the aim of the study was explanation rather than prediction. Certainly, a more thorough analysis of predictor variables could be accomplished with a larger sample.

## Cross-validation of the Sample

It is recommended that the discriminant function be validated by applying it to a separate sample to check the classification rate. According to Tabachnick and Fidell (1983), cross-validation is required to test classification rates of discriminant functions. The cross validation sample is used to assess the adequacy of the discriminant function. As Kachigan (1986) stated : "...the true discriminatory power of the function will be found only when it is tested with a

completely separate sample." Although 53 cases were included in the classification that had been left out of the initial analysis, the classification rates would likely be lower if a completely new sample were used.

### **Classification Rate**

For the most part the classification rates were unsatisfactory. This might be due to the violation of assumptions or limitations of the study. For example, there are numerous predictor variables mentioned in the literature. Perhaps there are predictors that explain more variance in the data that were left out of the analysis. Perhaps the criterion for choosing variables was inadequate. In all likelihood, the determinants of outcome are multifaceted. No simple combination of factors is able to adequately determine outcome. According to Kachigan (1986), discriminant function analysis is not very successful in identifying members of a minority group. For example, if 95% of the total sample falls in one criterion group and 5% falls in the other, it is virtually impossible to do better than chance in discriminating between the groups. If the overall discriminant function fails to provide high classification rates with the predictor variables chosen, the predictors do not explain a substantial portion of the between group variability.

### **Other Limitations**

In the case of indoor and outdoor leisure, group membership could not be reliably predicted from the set of predictor variables present.

Since DISCRIM is typically used to predict membership in groups that are naturally occurring rather than in groups into which the experimenter has randomly assigned cases, questions of causality will typically not be answered.

DISCRIM does not tell us why we can reliably predict group membership, or what causes differential membership.

As well, the results cannot be generalized to other disabled populations nor to populations outside of B. C as hospital care, environmental barriers, and vocational rehabilitation programming differ province to province.

It should be noted that much of the variance in the data remained unexplained by the 15 predictor variables initially chosen. There are likely important factors not considered in the initial analysis which would be of great importance in predicting outcome. For example, variables such as: pending litigation, locus of control, number of dependents, vocational services available, previous employment history, sources or level of income, economic conditions, and alcohol or drug use may all play a role. Further research with a larger sample size than available for the present study would provide for the inclusion of more of these variables. In addition, there are likely variables not yet mentioned in the literature that may play a role in determining outcome after a SCI.

## CHAPTER 4

### RESULTS

The sample used in the analyses initially consisted of 139 individuals who had sustained traumatic spinal cord injuries. In the first part of the chapter a description of these respondents is outlined. Descriptions are based on demographic information obtained from the questionnaires: gender, age, level of injury, current level of education, and Holland-based interests.

The second part of the chapter presents the discriminant function analyses which are outlined separately for each outcome category.

#### Sample Characteristics

##### Gender

The study group of 139 respondents comprised 74.1% (103) males and 25.9% (36) females which is in keeping with the national average of 3 or 4 males for each female injured (Griffin, 1989, personal communication).

##### Age

The subjects ranged in age from 20 to 67 with a mean age of 35.

##### Level of Injury

Of the total of respondents, 45.7% (63) were paraplegics and 54.3% (75) were quadriplegics. 42.9% (27) of the paraplegics had incomplete lesions and 57.1% (36) had complete lesions. 61.3% (46) of the quadriplegics had incomplete lesions and 38.7% (29) had complete lesions. One subject failed to

respond to this question. These percentages are in keeping with national averages (Griffin, 1989, personal communication).

### **Current Level of Education**

Eighteen percent (23 out of 128) of the respondents (7.9% (11) failed to complete this question) never completed high school. Thirteen percent (17) completed high school; Twenty-seven percent (34) had some level of college education and 14% (18) completed their college education.

Fifteen percent (19) had some level of university undergraduate education; 6% (8) had received a bachelor's degree and 7% (9) had continued with post-graduate study.

### **Interests (Holland Type)**

Fifty-eight (41.7%) respondents indicated that their primary Holland interest type was "Realistic". In other words these were individuals who maintained an interest in physical or athletic activities, working with their hands, working with machines or tools and/or working outdoors (See Holland (1973)). The second largest group (26 respondents; 18.7%) chose "Social" as their primary Holland type. This type tends to like dealing with people, helping, teaching, or assisting, and they tend to enjoy working with words. Those with "Investigative" interests represented the third largest group (22 respondents). The remainder fell into the three other Holland interest categories: Artistic, Enterprising, and Conventional.

## **Discriminant function Analyses**

A discriminant function analysis was undertaken separately for each of the outcome variables (i.e. paid employment, volunteer work, schooling, homemaking, indoor and outdoor recreation/leisure). Each of these analyses will be described separately, then comparisons will be outlined.

### **Evaluation of the Assumptions of the Model**

A discriminant function analysis is affected by intercorrelations among predictor variables as may be shown by the pooled within-groups correlation matrix (see Table 2). A slight negative correlation (-.472) between willingness to return to work despite financial disincentives and motivation to return to work can be found. This correlation is not surprising as both predictor variables assess self-reported levels of motivation.

As well, a negative correlation (-.740) exists between driving one's own car or van and an individual's level of dependency. Driving one's own car or van is obviously a function of an individual's level of independence. In addition, there appear to be positive correlations between functional dependence and

- 1) the average number of hours of paid attendant care (.658); and
- 2) level of injury (.609).

No other significant correlations were found. Interdependencies among predictor variables may affect the analysis in that it can influence both the magnitude and sign of the discriminant function coefficients. However, this was resolved by basing much of the interpretation on the pooled within-groups

correlations. According to Klecka (1980), they are simple bivariate correlations so they are not affected by relationships with the other variables.

Means and standard deviations for the independent variables can be found in table 3.

Multicollinearity and heterogeneity of variance-covariance matrices are not considered a threat to the analysis. The samples which make up each of the separate outcome categories should not be homogenous. In addition, normality is not considered of concern due to the robustness of the analysis (see Tabachnick and Fidell, 1983).

The discriminant functions generated were subjected to Bonferroni's adjustment of alpha. This was done because each of the outcome categories is represented by a different discriminant function, but the population used remained the same. If the discriminant functions are to be considered significant, an alpha of .008 (i.e.  $6 \times .05$ ) should be considered rather than .05 for each of the analyses.

In addition, classification rates were provided. A high degree of classification accuracy, according to Huberty (1984), might support a finding of little overlap among the groups in a "descriptive" sense. In order to assess the classification accuracy and overcome the problem of uneven sample sizes for the groups being classified, a "maximum chance criterion" was applied. In addition an "improvement over chance" statistic was computed (see Huberty, 1984).

Table 2. Pooled Within-Groups Correlation Matrix

DISCHIM	MOTIV	DEPLND	FINWIL	CARVAN	SOCSUP	AGE	ATTENDANT	YR INJ	LEV INJ	ED-NOW	MEDCOMP	OUTLOOK	BARRS	INTS
-0.12														
-0.03	0.05													
-0.09	-0.46	-0.09												
0.001	0.06	-0.60	0.30											
-0.10	0.05	0.26	-0.08	-0.18										
0.12	0.03	-0.28	-0.05	0.15	-0.25									
0.10	-0.11	0.51	-0.03	-0.36	0.13	-0.24								
-0.08	0.05	0.07	-0.18	-0.002	0.06	-0.22								
-0.11	-0.003	0.61	0.18	-0.17	0.11	-0.35	0.06							
0.004	-0.21	0.08	0.26	-0.05	-0.10	0.03	0.31	0.04						
0.04	0.08	0.21	-0.39	-0.10	-0.08	0.11	0.13	-0.42	0.08					
0.10	-0.14	0.06	-0.07	-0.01	-0.11	-0.05	0.20	0.28	-0.11	-0.13				
0.17	-0.10	0.06	-0.08	0.02	0.06	-0.12	0.003	0.08	0.12	-0.06	0.20			
-0.04	0.22	-0.25	-0.13	0.22	-0.06	0.07	-0.06	0.23	0.04	-0.16	0.01	0.12		
							-0.26	0.19	-0.09	-0.36	0.04	-0.02	0.04	



Table 3: Means and Standard Deviations For The Independent Variables (n = 139)

Variable	Mean	Standard Deviation
DISCRIM	4.363	1.422
MOTIV	2.667	1.581
DEPEND	8.007	10.015
FINWIL	3.954	2.289
CAR/VAN	.770	0.422
SOCSUP	3.061	0.850
AGE (in 1989)	35.137	10.117
PCA (Attendant Care)	9.262	27.283
Year of Injury	81.464	2.994
Level Injury	2.561	1.209
EDUC -- NOW	3.344	1.880
MEDCOMP	1.721	1.420
OUTLOOK 1	3.605	0.964
OUTLOOK	3.179	0.665
BARRS	3.379	1.372
BARRS 1 (Employment)	3.565	1.371
BARRS 2 (Vol. Wk.)	3.319	1.409
BARRS 3 (Housework)	3.167	1.508
BARRS 4 (School)	3.481	1.393
INTERESTS	2.493	1.601

## Employed vs Unemployed

### Sample

87 cases were retained for the discriminant function (DF) analysis of which 47 were unemployed and 40 were employed at least on a part-time basis in the 6 months prior to receipt of the questionnaire.

### Discriminant Function

The discriminant function has significant discriminating power as evidenced by the canonical correlation (.598) which is the correlation between the discriminant score and predictor variables. As such, 36% of the total variability is explained by differences between groups (i.e. the square of the canonical correlation).

In addition, the Wilk's Lambda was computed as .642, thus indicating a discriminant function that has relatively less variability between the groups and relatively more variability within groups. However, the Chi-square statistic (chi-square = 34.288; df of 15) indicates significant discriminating power for the predictor variables in the model ( $p = .0031$ ). As well, the discriminant function remains significant after application of Bonferroni's adjustment of alpha.

### Loading Matrices

One tool in the interpretation of discriminant functions is examination of the loadings of predictor variables on them. Loading matrices are basically factor loading matrices that contain correlations between predictor variables and each of the discriminant functions (canonical variates), and can sometimes be useful in naming and interpreting the functions. In the SPSSx DISCRIM

analysis loading matrices are represented by pooled within-groups correlations between canonical discriminant functions and discriminating variables. By convention, correlations in excess of .30 (9% of variance) are usually considered eligible for interpretation and lower ones are not (see Tabachnick and Fidell, 1983). On this basis, the predictor variables ordered by the size of their correlation with the discriminant function are given in Table 3.

The results suggest that the primary variable in distinguishing between employed and unemployed individuals is willingness to return to work despite financial disincentives. Those respondents who were employed (mean FINWIL = 5.192) were more willing to hold a job even if it meant a reduction in those benefits received by their unemployed counterparts (mean FINWIL = 3.490).

Also contributing to discrimination between these two groups of spinal cord injured individuals are motivation to return to work, level of functional dependence, current level of education, average number of hours per week of paid attendant care, driving one's own vehicle, and medical complications. The employed group were more motivated to return to work, required less assistance with activities of daily living, were better educated, were more likely to be driving their own car or van, and reported fewer medical complications (see table 3 for a comparison of group means).

### Classification Results

To test the power of the discriminant function, classification results were generated using all respondents (n=139). Of the 139 cases, 83 were unemployed and 56 were employed. 58 of the 83 unemployed individuals (69.9%) were ~~correctly~~ predicted to be members of the unemployed group, while 25 (30.1%) were assigned incorrectly to the employed group. Of the 56 employed individuals, 38 were correctly classified, and 18 incorrectly. The

overall percentage of "grouped" cases correctly classified was 69.06%. To determine if the discriminant function yielded a classification rate significantly better than chance, the "maximum chance criterion" was applied. Using this criterion one would expect to correctly classify, by chance, 83 out of 139 cases (i.e. 59.7%). The observed "hit total" of 96 (i.e. a hit rate of 69.1%) yields a standardized normal statistic value of 2.248 ( $p < .02$ ). The classification rule used, therefore, was acceptably accurate.

To determine how much better group membership can be predicted using a classification rule rather than by chance assignment, the proportional reduction in error, or improvement over chance statistic was calculated. In this case, 23.3% fewer errors would be made in group membership than would be expected by chance.

Table 4: Means, Unstandardized Discriminant Function Coefficients, and Pooled Within-Groups Correlations Between Discriminating Variables And The Discriminant Function For EMPLOYMENT

Variables	Group Means		Unstd. DF Coeff.	Pooled W. G. Corr.
	Unemployed	Employed		
FINWIL	3.49	5.19	-0.085	-0.528
MOTIV	3.06	1.92	0.362	0.520
DEPEND	10.64	3.70	0.043	0.508
ED-NOW	3.04	4.12	-0.244	-0.437
PCA	16.11	1.08	0.009	0.383
OWN VEH.	0.72	0.92	-0.053	-0.360
MEDCOMP	2.00	1.35	0.047	0.351
YR INJ	81.85	80.48	0.050	0.282
LEV INJ	2.60	2.20	0.101	0.255
DISCRIM	4.55	4.06	0.203	0.243
BARRS 1	3.88	3.44	0.066	0.223
INTERESTS	0.47	0.38	-0.018	0.126
SOCSUP	3.11	2.96	-0.306	-0.121
OUTLOOK 1	3.66	3.51	-0.010	0.105
AGE	34.00	33.60	-0.005	0.028

NB. vars. above the line have a correlation with the discriminant function > .30

## Volunteer Work

### Sample

Again 87 cases were retained in the DF analysis as 52 had at least one missing discriminating variable and therefore were dropped. Thirty-two respondents reported spending time in volunteer work for the six month period preceding receipt of the questionnaire, while 55 individuals reported no involvement as volunteers.

### Discriminant Function

The discriminant function generated by the predictor variables had significant power to discriminate between the two groups (volunteers vs non-volunteers). For the sample, examination of the group centroids shows that the discriminant function separates the two groups (see canonical discriminant functions evaluated at group means (group centroids). In addition, the chi-square test and Bonferroni's adjustment of alpha indicate that the predictor variables have significant discriminating power (chi-square = 32.866, 15df,  $p = .005$ ).

On the other hand, it should be noted that the canonical correlation (i.e. the correlation between the discriminant score and predictor variables), was low at .588. Therefore only 35% of the total variability is explained by differences between the groups.

Three predictor variables had a significant correlation with the discriminant function, as indicated by the pooled within-groups correlations between discriminating variables and canonical discriminant functions (see Table 4). The primary predictor variable for discriminating volunteers from those not involved in volunteer work was current level of education (correlation

of .495 with the discriminant function). In other words, those involved in volunteer work tended to be better educated (group mean of 4.312) than the non-volunteers (group mean of 3.091). The other predictor variables that were significantly correlated with the discriminant function were year of injury (-.422) and age (.313). Those injured earlier were more likely to be involved in volunteer work as were those individuals on average who were older. The mean year of injury for volunteers was 1980 vs 1982 for non-volunteers. Those engaged in volunteer work had a mean age of 36.6 years as opposed to those not involved in volunteer work (mean age of 32.2 years).

Table 5: Means, Unstandardized Discriminant Function Coefficients, and Pooled Within-Groups Correlations Between Discriminating Variables And The Discriminant Function For VOLUNTEER WORK

Variables	Group Means		Unstd. DF Coeff.	Pooled W. G. Corr.
	No Vol. Work.	Vol. Work.		
ED-NOW	3.09	4.31	0.460	0.495
YR INJ	81.96	79.94	-0.078	-0.422
AGE	32.20	36.59	0.045	0.313
PCA	8.16	14.41	0.030	0.203
MEDCOMP	1.84	1.47	-0.316	-0.193
BARRS 2	3.56	3.19	-0.0003	-0.184
INTERESTS	0.38	0.50	1.256	0.160
DISCRIM	4.23	4.49	0.031	0.126
DEPEND	7.89	6.69	-0.030	-0.082
OWN VEH.	0.80	0.84	0.709	0.075
LEV INJ	2.45	2.34	-0.119	-0.070
OUTLOOK 1	3.62	3.53	0.105	-0.064
FINWIL	4.20	4.40	-0.086	0.056
MOTIV	2.53	2.56	0.037	0.015
SOCSUP	3.04	3.03	0.128	-0.012

NB. vars. above the line have a correlation with the discriminant function > .30



## **Classification Results**

The discriminant function generated was able to correctly classify 71.3% of the 94 respondents reporting no volunteer work, and 73.3% of the 45 respondents engaged in volunteer work. This represents an overall group classification rate of 71.94%.

Using the "maximum chance criterion" one would expect to correctly classify, by chance, 94 out of 139 cases (i.e. 67.6%). The observed "hit total" of 100 (i.e. a hit rate of 71.9%) yields a standardized normal statistic value of 1.088 ( $p = .1379$ ). Given  $p > .05$ , one might question whether the rule used to get the results yielded classification accuracy better than chance.

The proportional reduction in error, or improvement over chance statistic was calculated as .133. Only 13% fewer errors would be made in group membership using the above discriminant function than would be expected by chance.

## **School**

### **Sample**

Of the 87 respondents retained in the discriminant function analysis, 56 had not been engaged in any academic courses in the 6 month period prior to receipt of the questionnaire. On the other hand, 31 respondents were involved in academic coursework.

### **Discriminant Function**

Again, the discriminant function generated by the analysis appeared to have significant power to discriminate between "students" and "non-students".

As indicated by the chi-square statistic the predictor variables seemed to have significant discriminating power at  $p = .019$  (chi-square = 28.461 with 15df). In addition, the canonical correlation was .554, therefore, 31% of the total variability was explained by differences between the groups. However, the discriminant function cannot be considered significant at  $\alpha < .05$ , if Bonferroni's adjustment of alpha is applied. As such it is difficult to put much faith in the results of this particular analysis.

Three predictor variables showed significant correlations with the discriminant function (see Table 5). Current level of education had the highest correlation (.460) with the discriminant function and is, therefore, the primary predictor variable for discriminating "students" from "non-students". Those respondents, who on average were better educated, were more likely to be involved in schooling (group mean = 3.161 for "non-students" vs a group mean of 4.226 for "students"). Other predictor variables significantly correlated with the discriminant function were age (correlation of -.459) and willingness to return to work despite financial disincentives (correlation of .300). Younger respondents, and those more willing to return to work despite any financial disincentives, were more likely to be involved in education (see the group means in Table 5). It should be noted that the Wilk's lambda statistic for FINWIL was 3.398, and is significant at  $p = .069$  (i.e.  $p > .05$ ), but was included because its correlation with the discriminant function was greater than .30.

### Classification Results

In this case, the discriminant function correctly classified 68.4% of the respondents in the "non-student" category with 81.8% of those in the "student" group being classified correctly. This represents an overall percentage of 72.66% correct classifications. However, due to the results of Bonferroni's

adjustment of alpha, the results for this analysis hold little weight. As such, it was not necessary to determine if the classification rate was significant.

Table 6: Means, Unstandardized Discriminant Function Coefficients, and Pooled Within-Groups Correlations Between Discriminating Variables And The Discriminant Function For EDUCATION

Variables	Group Means		Unstd. DF Coeff.	Pooled W. G. Corr.
	No Current Ed.	Current Ed.		
ED-NOW	3.16	4.23	0.416	0.460
AGE	35.89	30.06	-0.062	-0.459
FINWIL	3.93	4.88	0.313	0.300
INTERESTS	0.48	0.32	-0.199	-0.235
SOCSUP	2.96	3.18	0.607	0.201
LEV INJ	2.34	2.55	0.163	0.143
BARRS 4	3.52	3.75	0.077	0.122
PCA	7.80	11.71	0.002	0.103
OUTLOOK 1	3.64	3.51	-0.053	-0.098
DISCRIM	4.27	4.44	0.323	0.088
MEDCOMP	1.75	1.61	0.315	-0.077
OWN VEH.	0.80	0.84	-0.971	0.065
YR INJ	81.16	81.32	0.074	0.035
MOTIV	2.52	2.58	0.375	0.029
DEPEND	7.55	7.26	-0.078	-0.022

NB. vars. above the line have a correlation with the discriminant function > .30

## Homemaking

### Sample

This DF analysis was conducted with 86 subjects because 53 had at least one missing discriminating variable. Sixty-eight respondents reported that at least some time was spent in homemaking activities over the 6 month period prior to receiving the questionnaire. This only leaves 18 cases for comparison which is a very small sample. According to Tabachnick and Fidell (1983), unequal sample sizes become a problem when the number of cases does not notably exceed the number of predictor variables. There are more cases than predictors (18 vs 14), but the difference is slight. Therefore, it is possible that the unequal sample sizes in this case will influence the analysis and results should be viewed with caution.

### Discriminant Function

A canonical correlation of .798 was calculated for the discriminant function. This indicates that 64% of the total variability in the data is explained by the differences between, as opposed to within the groups. Therefore, the discriminant function generated by the predictor variables has significant discriminating power. The chi-square statistic also indicates highly significant discriminating power for the predictor variables (Chi-square = 77.348, 15df, and  $p < .00001$ ).

### Loading Matrices

The predictor variable most strongly correlated to the discriminant function is functional dependence with a correlation coefficient of 0.706. The

individuals who reported no participation in homemaking activities were much more dependent on assistance for activities of daily living (group mean = 20.5) than those who report at least some time spent in such activities (group mean = 4.044). Other predictor variables influencing the discriminant function are (also see Table 6): driving one's own car or van (-0.514), the average number of hours of personal care attendants (0.417), social support (0.352), and age (0.300).

In short, those individuals spending relatively more time in homemaking activities were more likely to drive their own vehicles, require much less personal care assistance, received less social support and they were younger (see group means in Table 6).

### **Classification Results**

Of the 139 cases, 110 were engaged in some homemaking activities and 29 were not. Twenty-four of the 29 individuals not involved in homemaking activities (82.8%) were correctly predicted to be members of the "non-homemaker" group, while 5 (17.2%) were assigned incorrectly to the "homemaker" group. Of the 110 members of the homemaking group, 96 were correctly classified, and 14 incorrectly. Therefore, the overall percentage of "grouped" cases correctly classified was 86.33%.

Again, using the "maximum chance criterion", one would expect to correctly classify, by chance, 110 out of 139 cases (i.e. 79.1%). In this case, the observed "hit total" of 120 (i.e. a hit rate of 86.3%) results in a standardized normal statistic of 2.087 ( $p < .02$ ). It would seem that the classification rule used was of acceptable accuracy.

In addition, the improvement over chance statistic indicates that 34.4% fewer errors would be made in group membership than would be expected by chance.

Table 7: Means, Unstandardized Discriminant Function Coefficients, and Pooled Within-Groups Correlations Between Discriminating Variables And The Discriminant Function For HOMEMAKING

Variables	Group Means		Unstd. DF Coeff.	Pooled W. G. Corr.
	No Homemaking	Homemaking		
DEPEND	20.50	4.04	0.122	.706
OWN VEH.	0.39	0.93	-0.271	-0.514
PCA	35.06	2.48	0.009	0.417
SOCSUP	3.69	2.85	0.378	0.352
AGE	40.56	31.98	0.065	0.295
LEV INJ	3.00	2.24	-0.215	0.235
DISCRIM	4.93	4.19	0.099	0.169
FINWIL	3.28	4.50	0.030	-0.167
MEDCOMP	2.22	1.59	-0.153	0.156
MOTIV	2.97	2.40	0.047	0.112
OUTLOOK 1	3.85	3.53	0.189	0.102
BARRS 3	3.03	3.34	-0.062	-0.067
ED-NOW	3.22	3.59	-0.047	-0.065
YR INJ	80.83	81.34	-0.0003	-0.046
INTERESTS	0.44	0.43	0.491	0.011

NB. vars. above the line have a correlation with the discriminant function > .30



## Indoor and Outdoor Leisure/Recreation

### Sample

Again, due to missing data, both of these DF analyses were conducted with samples of 86 subjects. Forty-five subjects reported spending less than an average of 16 hours per week in indoor leisure with 41 spending more than 16 hours per week, on average, in indoor leisure. For the analysis of outdoor leisure, 41 subjects spent less than 9 hours per week on average in outdoor leisure. Forty-five subjects spent more than nine hours in outdoor activities.

### Discriminant Functions

#### Indoor Leisure

The canonical correlation was calculated as .472. Therefore, only 22% of the total variability in the data can be explained by differences between the groups spending more time in indoor leisure vs those spending less time (i.e. the "low" group). Given that so little of the variability can be explained by between group differences, the results of the chi-square statistic is not surprising. A chi-square statistic of 19.269 (15 df) is significant at  $p=.202$  (i.e. not significant at  $p<.05$ ). The discriminant function is inadequate for the purpose of discriminating between the two groups. Overall, the discriminant function generated only correctly classifies 64.03% of the cases.

#### Outdoor Leisure

The results of this analysis also fails to generate a significant discriminant function. Only 20% of the variability in the data can be attributed to between

group differences as opposed to within-group variability. The chi-square statistic of 16.783 (15 df) was significant at  $p = .332$ .

Given this apparent lack of significance, there is little purpose in presenting the classification results.

## CHAPTER 5

### DISCUSSION

The sections below are organized on the basis of the research hypotheses outlined in Chapter 1. Comparisons are drawn between the results of the present study and previous research, and recommendations and limitations of the present study are provided. To begin with, the overall results have been summarized.

#### Overall Results

Recall that the predictor variables were divided into three categories: personal, organic and environmental. In this section consistencies among these 3 categories are described for the outcome categories: employment, volunteer work, and homemaking.

#### Personal Predictor Variables

Of the six personal variables initially entered into the analysis three failed to contribute to the discriminant function for any of the outcome categories: perception of employer discrimination, Holland code (interests), and rehabilitation outlook.

Personal variables were significantly correlated to the discriminant functions in five instances (i.e. with a coefficient of at least .30). This represents a total of 33% of all predictor variables influential on the generated discriminant functions (i.e. 5 of the 15 predictor variables).

#### Organic Predictor Variables

Organic variables represent 27% (4 out of 15) of the predictor variables in the analysis, but 3 out of the 4 were useful for discriminating among the

dichotomous outcome categories. The year of injury and age were important components of the discriminant function differentiating those involved in volunteer work from those who were not. Age was also influential for discriminating homemakers from non-homemakers. While medical complications was the least important of the significant predictors influencing the discriminant function generated for employment.

### **Environmental Predictor Variables**

Variables considered environmental in nature represented 33% of those in the initial analysis. However, they represented 40% (6 out of 15) of the predictors significantly correlated with the discriminant functions.

**Hypothesis 1:** The majority of SCI subjects will be engaged in activities other than paid employment.

Trieschmann (1982) proposed the thesis that a successful life consists of many types of behaviours, and that employment is only one of these. Studies such as those conducted by Goldberg and Freed (1976), Kemp and Vash (1971) and Devivo (1982, 1983) suggest that less than 50% of the SCI population return to paid employment post-injury. The results of the present study also indicate that the majority are not engaged in competitive employment. Only 40% of the study sample reported participation in paid employment. Therefore, vocational rehabilitation counsellors should not think of competitive employment as the only important rehabilitation outcome. Homemaking, educational pursuits or volunteer work should also be considered.

**Hypothesis 2:** Holland-based Interests will be shown to have a significant influence on employment vs unemployment outcome.

The assumption was made that a significant proportion of the sample would indicate that their primary interest code was "Realistic". As such, post-injury these individuals would still tend to prefer physical/mechanical activities, working with things rather than people, or working outdoors. Fifty-eight (41.7%) respondents reported that their primary interest code was "Realistic".

However, interests as assessed, failed to significantly contribute to the discriminant function generated for employment/unemployment. In other words, the pooled within-groups correlations between the predictor variables and the discriminant function did not exceed .30. A correlation of .126 was calculated for the employment outcome category, and out of 15 variables this represents a ranking of 12. It should be noted that the highest correlation (-0.235) was found for the education category in which interests achieved a ranking of 4. Apparently, Holland-based interests may have a greater influence on education than employment.

**Hypothesis 3:** Environmental variables will be at least as important as personal or organic variables in influencing outcome (as defined by employment, volunteer work, schooling, homemaking or leisure/recreation).

Variables considered environmental in nature represented 33% of those in the initial analysis. However, they represented 39% of the predictors correlated with the discriminant functions (with a coefficient of at least .30). Environmental factors such as transportation (i.e. driving one's own vehicle), the presence or absence of financial disincentives, personal care attendants, and social support appear important in influencing outcome, especially in terms of employment or homemaking. Therefore, the results of the present study confirm

Trieschmann's notion that environmental variables play an important role in outcome, but not all environmental variables were considered important. In no instance did perceptions of employer discrimination or perceived architectural barriers influence outcome. Perhaps these factors were improperly assessed. Or perceptions of employer attitudes, and the presence of architectural barriers, were seen as barriers by both groups regardless of outcome status. In other words, they were not useful factors for discriminating between outcome categories, as they were considered barriers by many respondents.

In summary, personal factors, such as level of education, age, motivational factors, and functional dependence greatly influence outcome after a spinal cord injury. As well, environmental factors which were absent in much of the previous literature, play an important role in determining outcome. In particular financial disincentives, transportation barriers, and personal care issues have been highlighted.

When drawing comparisons between the different outcome categories very little consistency was found. No predictor variables were consistently important determinants in all significant discriminant functions. The individual's current level of education was an important factor for discriminating between those who were employed vs those unemployed, and for volunteer work and schooling. Age was important for outcome categories such as volunteer work, schooling, and homemaking (but not for employment). Additionally, functional dependency, personal care attendants, and owning one's own vehicle were also important factors in terms of employment and homemaking. In general, it seems that factors important for employment as an outcome were not important for the other categories. As such, vocational rehabilitation counsellors cannot assume that the same factors that may influence employment also relate to other "productive" activities.

## Comparisons with Previous Research

For the most part, the results of this study confirm results of previous multivariate studies. It should be kept in mind, however, that it can be difficult to compare studies with different methodologies, different sample sizes, sample populations, and a variety of different predictor variables.

To begin, recall that Goldberg and Freed (1982) undertook a factor analytic study of employment in which three composite variables emerged: rehabilitation outlook, vocational plans and interests, and severity of the disability. The present study provides indirect evidence to support the importance of only one of these factors: severity of the disability (i.e. level of injury). Functional dependence is correlated with level of injury, the third highest correlation with the discriminant function. Rehabilitation outlook and interests were not retained in the discriminant function generated. It should be noted that Goldberg and Freed (1982) rated self-report interview data across 15 measures of educational and vocational data, and conceptually their measures were not equivalent to those used in the present study.

The results more closely coincide with those reported by DeVivo et. al. (1987) and DeJong (1984). DeVivo et. al. (1987) employed a stepwise discriminant analysis to develop a predictive model of outcome as defined by: continuous unemployment, homemaking, schooling, or competitive employment post-discharge. The seven predictor variables were: gender, motivation to work, whether the patient's last job required ambulation, race, educational level, a functional ability score (the Barthel Index, a measure of ability to perform activities of personal care and mobility), and whether the patient had children. It is difficult to draw comparisons with the results of DeVivo et. al.'s (1987) study,

as outcome was a composite of activities. In general terms, however, their results confirm those provided by the discriminant function analyses outlined in the present study. For example, education was an influential factor in discriminating between those who were employed and unemployed, and in terms of volunteer work and schooling. Motivation to return to work, and the willingness to return to work despite financial disincentives influenced employment and schooling. As well, functional dependence (measured by DeVivo et. al. (1987) as the Barthel Index) was an important predictor variable in the discriminant functions for homemaking and employment. Race, gender, number of dependents, and ambulation required in previous work were not included in the present analysis, and comparisons cannot be drawn. However, other factors such as year of injury, age, social support, personal care support, and access to one's own vehicle failed to influence the discriminant function generated by DeVivo et. al. (1987). They were, however, important in the present study when each of the outcome categories were assessed separately.

DeJong et. al. (1984) undertook a stepwise multiple regression (sample size = 75) which revealed that 6 of their 22 possible independent variables explained 60.7% of the variance in productivity outcomes ( productivity defined as gainful employment, school or training activities, community organizations, homemaking and leisure activities). The independent variables were: transportation barriers, presence of economic disincentives, education, the Barthel score, the number of vocational rehabilitation services received (i.e. persons who received more vocational rehabilitation services were generally more productive), and age (younger persons tended to be more productive than older persons). Additional predictor variables such as age and transportation barriers were generated which conform with the findings of the discriminant



function analyses undertaken herein when the results of the outcome categories are viewed as a whole.

Many of the outcome studies outlined in Chapter 2 provide support for the importance of the majority of the personal, organic, and environmental factors just outlined.

### **Financial Disincentives**

Tanaka (1977) itemized the costs of daily living for someone with a disability. According to Trieschmann (1988), these costs can be significantly greater than for the non-disabled. Therefore, many disabled persons require a relatively high salary from employment efforts in order to be able to afford to give up the various benefits to which they are entitled (under some social programs).

### **Drive Own Car or Van**

El Ghatit and Hanson (1978), Trieschmann (1980), and Brown et. al. (1987) pinpoint the importance of having access to a vehicle for employment. Brown et. al. (1987) suggested that access to a vehicle will directly affect return to work and activity patterns such as getting out of the house for recreation. They found that having access to a vehicle improved the individual's probability of being employed by 50%.

### **Motivational Factors**

El Ghatit and Hanson's (1978) study demonstrated the importance of motivation to return to work. In their results, the best predictor of obtaining employment was simply whether or not the individual had actively sought

employment. In other words, if the individual is "motivated" to return to work, he or she is more likely to seek out and find work. This may be related to work-related interests as defined by Goldberg and Freed (1973). They showed that individuals with more work-related interests were more motivated to return to work.

### **Education**

Geisler, Jousee and Wynne-Jones (1966) reported higher employment rates in those individuals with more education. El Ghatit and Hanson (1978) showed that those with education or training beyond high school were more likely to have obtained employment.

In addition, Trieschmann (1980) and Alfred et. al. (1987) highlighted the importance of educational level in determining productivity outcome after a spinal cord injury. Perhaps higher education improves access to less physical occupations which may be more easily accessed by individuals with spinal cord injuries.

### **Medical Complications**

Hospitalization due to medical concerns with bladder and bowel management, pressure sores, or other medical concerns was defined as "medical complications". As a predictor variable it significantly influenced employment outcome, but had no effect on other outcome categories. There is support in the literature for the importance of this variable. For example, individuals able to manage their own bladder and bowel regime are more likely to be employed, according to El Ghatit and Hanson (1978). This is one aspect of self-care and is related to functional independence. Guttman (1979), Anderson and Andberg (1979) and Hallin (1968) also outlined the importance of proper self-care for return to work. DeJong (1981) noted that if the individual

requires less intensive medical treatment; he or she is more likely to be productive and living independently.

In summary, the results of this study, along with corresponding findings from previous literature, indicate that:

1. personal factors such as level of education, age, motivation, and functional dependence also greatly influenced outcome in a number of categories, but they were not the sole influential factors; and
2. organic factors such as medical complications were considered important, at least for employment, but these factors were not important to the extent reflected by modern rehabilitation's continued focus on the medical model;
3. environmental factors such as financial disincentives, personal care attendants, having access to a vehicle, and social support influence outcome (as defined) after a spinal cord injury, in particular in the areas of employment and homemaking. Other factors such as perceptions of employer discrimination and the presence of architectural barriers are also worthy of further exploration. They were considered important barriers by both groups regardless of outcome.

Vocational rehabilitation counsellors must consider personal, organic, and environmental factors when attempting to understand "productivity" after a spinal cord injury. However, they cannot assume that the same factors that influence employment will also be influential in areas such as homemaking, leisure, and so on.

## Recommendations

Despite certain methodological limitations, a number of recommendations for vocational rehabilitation counsellors can be derived from the results of this study. Recommendations/implications will be presented for the three or four most important predictor variables for each outcome category for which significant results were found. In addition, only those factors that can be easily manipulated by a vocational rehabilitation counsellor will be considered.

### Employment

1. Counsellors should be encouraged to learn more about motivation, and the ways that clients may be motivated or encouraged in their vocational rehabilitation. Support groups or peer counselling could be of benefit for maintaining client motivation.
2. Researchers should be encouraged to pursue further study in the area of work motivation given its importance.
3. Counsellors should advocate for changes in the social welfare and vocational rehabilitation system to overcome difficulties associated with financial and other disincentives.
4. There should be more of an emphasis on functional independence after the client leaves the rehabilitation centre, possibly through regular home-visits, or transitional independent living arrangements.
5. Counsellors should advocate for better homecare and personal care support, and more should be done to provide personal care support in the work place.
6. A program should be developed which helps clients overcome the difficulties associated with formal schooling, learn new skills, and perhaps prepare for

further education. This program might be made part of a Vocational Rehabilitation Department's regular programming (e.g. at a rehabilitation centre) in conjunction with transitional work or on-the-job training programs.

7. Rehabilitation counsellors should advocate for greater access to funding for modifications to vehicles, and for assistance to fund the purchase of a vehicle.

### **Volunteer Work**

Support should be provided to individuals unable or unwilling to pursue paid employment, but who are interested in volunteer work. For these individuals volunteer work should be encouraged, and possibly promoted through educational upgrading or volunteer training.

### **Homemaking**

1. Functional dependence and social support should be encouraged through homecare or personal care support and counselling support for the family.
2. Mobility, as defined by the use of one's own vehicle, should be encouraged by incentive programs for purchase and modification of a vehicle.

Rehabilitation research has historically focused upon describing the characteristics of the disabled person and upon the development of professional treatment services directed at reducing the "imperfections" in the disabled person. This focus is known as the "functional limitations model" of handicapping aspects of disability. According to Rubin and Roessler (1987), it places the responsibility for the social problem of handicap with the person rather than the environment or the attitudes and system that control the environment. However, the functional limitations model is unable to provide a satisfactory explanation for the inability of disabled persons to fully participate in

society. As the results of the present study and the work of Trieschmann (1980, 1984, 1987) indicated, environmental factors also must be considered. Hahn (1985b) asserts that "the major problems associated with disability might be perceived as a consequence of a disabling environment rather than as a result of personal limitations." This, therefore, is a shift away from a "person-blaming" to a "system-blaming" orientation and is termed a "minority group model". Instead of stressing methods of improving the physical and economic capabilities of disabled individuals to enable them to cope with the existing environment, rehabilitation clinicians would assume responsibility for the removal of environmental barriers.

Unfortunately, according to Hahn (1985a), society is still unprepared to significantly change the environment that disabled persons must negotiate. He states, "this denies the reality that extent of limitation for disabled persons is a product of the interaction between the characteristics of the person and the characteristics of the environment." Trieschmann's (1980) P, O, E model is in keeping with this view, and she asserts that disabled individuals must be viewed as whole persons within an environment that must be factored into any rehabilitation approach. Individuals with spinal cord injuries will not assume their rightful place in society until all aspects of adjustment are addressed.

## Future Research

There is further need to study methods by which societal attitudes and the system could be changed to deal with the issues governing environmental barriers. As Trieschmann (1988) states,

"...the literature suggests that research into the identification of promising candidates has not been very productive. Rather, it is the person in interaction with his environment that is the critical feature of all rehabilitation efforts. Therefore, to change the person's behaviour, the environment must be modified; thus research into person-environment interactions and strategies to modify these interactions seems to be the key to future progress in rehabilitation."

The individual does have a responsibility for his future and therefore research into motivation and other personal attributes is warranted. But this is not the only factor in the equation leading to successful rehabilitation. Further Canadian research should be undertaken to develop ways of changing the system. In particular, effective ways to remove the environmental barriers should be further researched.

Certainly, a similar study could prove useful if applied to other disability groups, or expanded beyond British Columbia. With a larger sample size more predictor variables could be included, generalizability would be less of an issue, and the analysis could be predictive rather than just descriptive in nature.

The study results should now be analyzed in greater depth. Subsets of the sample should be examined. For example, the extent to which the results are moderated by age or level of lesion. As well, researchers should assess the causal relationships among the predictor variables in terms of outcome. This could be accomplished through a Path Analysis. Finally, leisure/recreational activities warrant further investigation in order to determine the influential factors.

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Appendix A: Cover Letter

Dear:

People with spinal injuries are likely to be more fully involved in community activities today than in previous decades. We are interested in discovering why some people are more involved in vocational and avocational activities than others. We want to learn about the barriers people encounter in their quest to become more active in the community, and investigate the circumstances or events that have assisted people to achieve their goals, be they work-related or other important activities.

With this in mind, we are asking all people with spinal cord injuries who have been patients at G. F. Strong Rehabilitation Centre over the past eight years to complete the enclosed survey. This research is being conducted by Jeffrey Karp, with the assistance of Glen MacDonald and Dr. Leone Prock. Both G. F. Strong Rehabilitation Centre and the Canadian Paraplegic Association fully support and endorse this work. Of course your participation is voluntary, but we believe this research has the potential to improve programs and services to people with spinal cord injuries for the future. It is valuable research; we hope that you will assist us, and the results will not simply be shelved! Confidentiality is assured, and the results of the study will be grouped to ensure anonymity. In addition, you have been given a special code number simply as a means of keeping track of who has returned the questionnaires, and all questionnaires will be destroyed after the study is completed.

If you wish to have information on the final results of this work, we would be happy to send you a summary of our findings.

Please read on for instructions on how to complete the questionnaire.

Thank you for your assistance.

Yours sincerely,

George Hahn, M. D.  
Medical Director

Appendix B: Follow-up Letter

A small, handwritten mark or signature in the bottom right corner of the page, consisting of a few loops and a short horizontal line.

Dear:

Recently, you received a questionnaire endorsed and supported by G. F. Strong Rehabilitation Centre and the Canadian Paraplegic Association. If you recall, the purpose of the study was to investigate the circumstances or events that have helped or hindered spinal cord injured people achieve their goals, be they work related or non-work related.

If you have sent off the questionnaire thank you very much for your contribution, and please disregard this letter.

**However, if you have not completed this simple task, please grab a coffee, sit down and take some time to complete our questionnaire.**

The study will not gather dust on the shelf, as steps will be taken to apply the results to improve programs and services at G. F. Strong Rehabilitation Centre, and strive to remove barriers affecting a person's quest to become more active in the community. In addition the results will be made known to policymakers and researchers through various publications, seminars and conferences.

If you need assistance, don't hesitate to call pager #: 645 - 5525 (within the Lower Mainland), 1- 645 - 5525 (outside the Lower Mainland) or 1 - 604 - 645 - 5525 (outside B. C.).

**We will help you :**

- 1. if you have any questions or concerns,**
- 2. if you want the questionnaire to be picked up, or**
- 3. if you wish to complete the questionnaire over the phone.**

**PLEASE HELP US - nothing will result if you do not respond!**

Yours sincerely,

Bonita Armstrong  
for Norman Haw  
Director of Rehabilitation Services  
Canadian Paraplegic Association - B. C. Div.

Appendix C: Instruction Sheet



## INSTRUCTIONS

**Help us work towards improving services and programs for people with a spinal cord injury.**

**In filling out the questionnaire:**

1. Please be as truthful as possible and complete the questionnaire **in full**.
2. To answer a question simply put a check in the box next to your answer, and please do not write your name on the questionnaire.
3. When you have completed the questionnaire, fold it and place it in the stamped self-addressed envelope (NB. it fits if folded **width-wise!**). We would like to have the questionnaire returned **As Soon As Possible**.
4. If you require any assistance phone 737-6356.

**Key terms required for questions 3 and 4 are defined and listed below:**

**Attending Classes/Doing Schoolwork:** taking course, going to school (day or night classes, lectures, or laboratory work); preparing for class, studying in a library or at home; also independent studying, formally or informally.

**Paid Employment:** for pay or for profit, on a job or for yourself

**Volunteer Work:** any unpaid work; including community service (activities with community organizations such as recreational groups, Scouts, Red Cross, social service agencies, neighborhood associations, political parties, trade unions; etc.).

**Housework (i.e. Home And Family):** taking care of your room, apartment, or house; fixing or cleaning up after meals; shopping; caring for dependents such as children or aging parents; (see questionnaire).

**Indoor Leisure/Recreation:** activities inside such as watching television; reading; relaxing or loafing; pursuing hobbies; etc.

**Outdoor Leisure/Recreation:** outside activities such as taking part in sports; going to movies, theatre, or concerts; being out with family or friends; etc.

Thank you for your assistance.

Yours sincerely,

Norman Haw  
 Director of Rehabilitation Services  
 Canadian Paraplegic Association  
 B. C. Division

Yours sincerely,

Jeffrey Karp  
 for Dr. Leone Prock  
 Simon Fraser University

Appendix D: Questionnaire



**3. For the 6 months prior to your injury, please estimate the average number of hours per week you spent in the following activities:**

Paid Employment \_\_\_\_\_ hours per week

Volunteer Work \_\_\_\_\_ hours per week

Housework\* \_\_\_\_\_ hours per week

Attending Classes and  
doing schoolwork \_\_\_\_\_ hours per week

Indoor Leisure/Recreation \_\_\_\_\_ hours per week

Outdoor Leisure/Recreation \_\_\_\_\_ hours per week

Other (specify activity)

Activity \_\_\_\_\_ hours per week

\*Housework includes activities around the house such as cooking, cleaning, laundry, minor house repairs, etc.

**4. Please estimate the average number of hours per week you spent in the following activities over the past 6 months**

Paid Employment \_\_\_\_\_ hours per week

Volunteer Work \_\_\_\_\_ hours per week

Housework \_\_\_\_\_ hours per week

Attending Classes and  
doing schoolwork \_\_\_\_\_ hours per week

Indoor Leisure/Recreation \_\_\_\_\_ hours per week

Outdoor Leisure/Recreation \_\_\_\_\_ hours per week

Other (specify activity)

Activity \_\_\_\_\_ hours per week

\*Housework includes activities around the house such as cooking, cleaning, laundry, minor house repairs, etc.

5. How much assistance do you require for the following activities?

	No Assistance	A Little Assistance	Moderate Assistance	Complete Assistance
Dressing .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bathing .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eating .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooking .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Bowel/ Bladder management .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Driving a Vehicle .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shopping .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Laundry .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
House Cleaning .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grooming .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transferring .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Please indicate your gross annual income arising from your disability (i.e. before taxes) and income from other sources...

a) Annual income arising from your disability (i.e. pensions, subsidies, etc.) \$ \_\_\_\_\_ Per Year

b) Income from other sources \$ \_\_\_\_\_ Per Year

c) Income Sources (check off as many as are appropriate)..

- Self
- Spouse
- Parents
- Handicapped Persons Income Assistance
- Unemployment Insurance
- Insurance Corporation of B.C.
- Wage Loss Insurance
- Long Term Disability (Company Pension Plan)
- GAIN (i.e., Social Assistance)
- Other (specify) \_\_\_\_\_

- Workers' Compensation Board Industrial Pension
- Workers' Compensation Board Criminal Injuries Compensation
- Private Insurance Settlement
- National Health And Welfare
- Vocational Rehabilitation Services
- Long Term Disability (Private Pension Plan)
- Department of Veterans Affairs Pension

**7. Is litigation (i.e. a court settlement) pending?**

Yes

No

**8. Please indicate your current requirements for each of the following services... (Check One For Each Line)**

Don't need this service

Need, but don't have this service

Receive this service

Physical Therapy .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Occupational Therapy .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vocational Assessment .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vocational Counselling .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Job Training .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Job Placement .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Further Education .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Homemaker .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visiting Nurse .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Child-Care Services .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal Counselling .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family Counselling .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Help in Finding Services .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sexual Counselling .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**9a. To the best of your knowledge, to what extent are these benefits actually reduced when you hold a paid job...**

	Not At All Reduced	Somewhat Reduced	Quite A Bit Reduced	Completely Removed	Not Applicable
Income benefits (e.g. disability pensions, insurance claims, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Medical benefits (e.g. medications, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Homecare benefits (e.g. attendants, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**9b. How willing are you to hold a job if the following benefits are reduced as a result of earnings from that job...**

	Very Unwilling	Moderately Unwilling	Slightly Unwilling	Slightly Willing	Moderately Willing	Very Willing
Income benefits (e.g. disability pensions, insurance claims, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medical benefits (e.g. medications, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Homecare benefits (e.g. attendants, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**10a. What type of transportation do you use?  
(Check off as many as are appropriate)**

- drive own car or van
- car or van driven by someone else
- public transport
- HandiDart system
- taxi
- none
- other (please specify) \_\_\_\_\_

**10b. To what extent does the transportation you currently use enable you to do the following..**

	Not At All	Only A Little	Moderate Amount	Quite A Bit	Very Much	Not Appl.
Go to school .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Get to appointments .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Go shopping .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Engage in Recreational/ Social Activities .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Go to work .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**11. In general, how satisfied are you with the amount of social contact you have with friends, family or others?**

Not at all satisfied	Slightly Satisfied	Somewhat Satisfied	Quite Satisfied	Very Satisfied	Extremely Satisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**12. In general, how satisfied are you with the closeness of social contact you have with friends, family or others?**

Not at all satisfied	Slightly Satisfied	Somewhat Satisfied	Quite Satisfied	Very Satisfied	Extremely Satisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**13a. On average how many hours per week do you receive attendant care from the following sources? (Enter 0 If None)**

Service received from paid attendant \_\_\_\_\_ Hours Per Week

Service received from others (e.g. family , friends, etc.) \_\_\_\_\_ Hours Per Week

**13b. Do you require any additional hours which you cannot obtain for financial or other reasons? (Enter 0 If None)**

Additional Hours Required From Attendant \_\_\_\_\_ Hours Per Week



**14. Think of people who are an important source of help, support, or guidance to you at this time in your life. To what extent do these people ...**

	Not At All	Only A Little	Moderate Amount	Quite A Bit	Very Much
a) assist you with housework .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) assist with your shopping .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) help you with transportation .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) make sure you get enough rest .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) make sure you get enough to eat .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) make sure you get enough exercise .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) show genuine concern and interest in your feelings and worries .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) include you in their activities (i.e. make you feel you belong) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) make you feel cared for and loved .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) are there when you need them for support .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k) give you information or advice .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l) make your problems seem smaller .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m) have similar concerns to yours .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n) serve as a model or example for you to follow .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**15. Demographic Information...**

a) Your date of birth:        
MONTH YEAR

b) Are you male  or female?

c) Your Marital Status:

At Time Of Injury		Now
<input type="checkbox"/>	Married	<input type="checkbox"/>
<input type="checkbox"/>	Single	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Separated	<input type="checkbox"/>
<input type="checkbox"/>	Divorced	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Common Law	<input type="checkbox"/>
<input type="checkbox"/>	Widowed	<input type="checkbox"/>

Have you been divorced and remarried since your injury: yes  no

d) Do you have any dependents (i.e. son, daughter or other relative financially dependent on you)?

Yes  No

If Yes, Please indicate the ages of each: 1.   2.   3.    
 4.   5.   6.

e) Date of Your Injury:        
MONTH DAY YEAR

f) Level Of Injury:  Paraplegia Incomplete  Paraplegia Complete  
 Quadriplegia Incomplete  Quadriplegia Complete

g) Level of Lesion:  C1 - C4  T7 - T12  
 C5 - C8  L1 - L5  
 T1 - T6  S1 - S5

h) Highest Level Of Education:

At Time Of Injury		Now
<input type="checkbox"/>	8th Grade or less	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Some High School	<input type="checkbox"/>
<input type="checkbox"/>	High School Graduation	<input type="checkbox"/>
<input type="checkbox"/>	Some Community College	<input type="checkbox"/>
<input type="checkbox"/>	Community College Graduation	<input type="checkbox"/>
<input type="checkbox"/>	Some Undergraduate University Training	<input type="checkbox"/>
<input type="checkbox"/>	University Bachelor's Degree	<input type="checkbox"/>
<input type="checkbox"/>	Postgraduate Study (i.e., beyond a Bachelor's Degree)	<input type="checkbox"/>

16. To what extent have your spiritual/religious beliefs helped you adjust to your injury?

Not At All	Only A Little	A Moderate Amount	Quite A Bit	Very Much
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17 a. Within the last 6 months have you been hospitalized or seen by a doctor due to:

bladder or bowel problems (e.g. bladder infection) .....	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
autonomic problems (e.g. autonomic hyper-reflexia) .....	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
kidney stones .....	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
skin breakdown (e.g. pressure sores) .....	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
pain .....	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
psychiatric/psychological concerns .....	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No

17 b. How does your present general health compare with your general health six months ago?

better     worse     the same

17 c. Did you lose consciousness at the time of injury?

Yes     No



**20. Where does your disability fit into this scale?**

Worst That Could Happen	A Very Bad Thing	A Bad Thing	Neither Bad Nor Good	A Good Thing	A Very Good Thing	Best That Could Happen
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**21. To what extent has your disability caused you anxiety or concern about your :**

	Not At All	Only A Little	Moderate Amount	Quite A Bit	Very Much
a. Social Contacts .....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Job Prospects .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Sexual Relationships .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**22a. How important would the availability of accessible washrooms be for your participation in each of the following activities:**

	Not At All	Only A Little	Moderate Amount	Quite A Bit	Very Much
a. Paid Employment .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Volunteer Work .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Housework .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Attending Classes .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**22b. How important would availability of elevators and adapted doorways be for your participation in each of the following activities:**

	Not at all	Only a Little	Moderate Amount	Quite A Bit	Very Much
a. Paid Employment .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Volunteer Work .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Housework .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Attending Classes .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**22c. How important would availability of widened hallways be for your participation in each of the following activities:**

	Not At All	Only A Little	Moderate Amount	Quite A Bit	Very Much
a. Paid Employment .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Volunteer Work .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Housework .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Attending Classes .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**22d. How important would availability of sidewalks with ramps/curb cuts be for your participation in each of the following activities:**

	Not At All	Only A Little	Moderate Amount	Quite A Bit	Very Much
a. Paid Employment .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Volunteer Work .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Housework .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Attending Classes .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**23a. If you use a wheelchair, does your home have any of the following to help make it wheelchair accessible?**

Grab Bars .....	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Lifts .....	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Ramps .....	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Widened Corridors .....	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Adapted Doorways .....	<input type="checkbox"/> Yes	<input type="checkbox"/> No

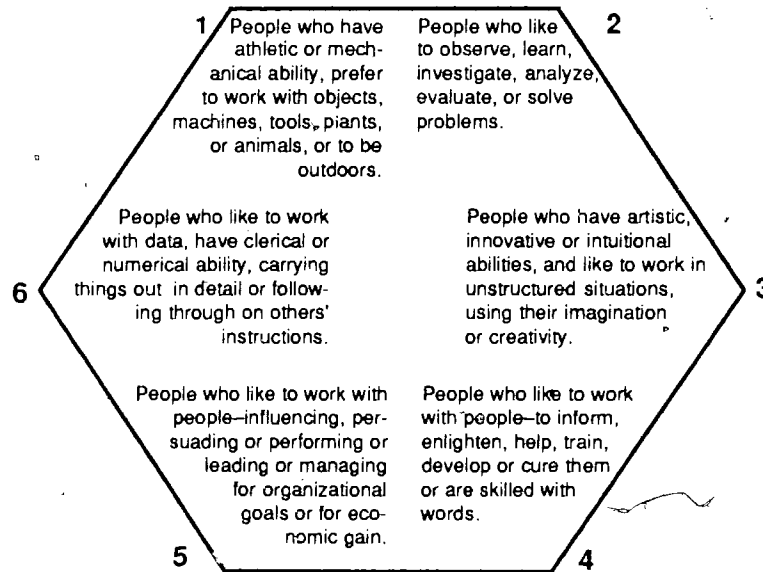
**23b. If you use a wheelchair, what areas of your home/ apartment are not accessible?**

<input type="checkbox"/> Bathroom	<input type="checkbox"/> Upstairs	<input type="checkbox"/> The yard	<input type="checkbox"/> The basement
<input type="checkbox"/> Kitchen	<input type="checkbox"/> One or more bedrooms	<input type="checkbox"/> The garage	
<input type="checkbox"/> Other (please specify) _____			

**24. Your Interests...**

**Instructions:** Imagine that the hexagon below is a room (aerial view) and that for some reason six groups of people have gathered in the corners of the room as described below (Specify the appropriate group number for each of the following questions):

- a) Which group would you most enjoy spending the longest time with, assuming a work setting, over a 10 to 20 year period? #
- b) Which group would be your second choice? #
- c) Which group would be your third choice? #



**25. To what extent do you feel you will experience future:**

	Not At All	Only A Little	Moderately	Quite A Bit	Very Much
a. Physical improvements .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Social/Recreational Improvements .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Psychological Improvements .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Vocational/Occupational Improvements .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. Were you ever told you had a head injury?

- Yes       No

27. Was your spinal cord injury associated in any way with alcohol or other drugs?

- Yes       No

28. Was your family originally...(check all that are appropriate)

- |  |  |
|--|--|
| <input type="checkbox"/> British             | <input type="checkbox"/> Chinese               |
| <input type="checkbox"/> Native Indian/Inuit | <input type="checkbox"/> German                |
| <input type="checkbox"/> Indo Pakistan       | <input type="checkbox"/> Italian               |
| <input type="checkbox"/> Dutch               | <input type="checkbox"/> Other (specify) _____ |

29. Are you currently living in...

- parents' home       friend's home
- rented home/apartment/condominium
- own home/apartment/condominium
- University/College Residence
- Group Home       relative's home
- Institution: Hospital, Nursing Home, Extended Care Facility, etc.
- Other (please specify) \_\_\_\_\_

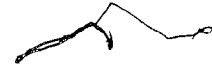
30. Are you living...

- |   |  |
|---|--|
| <input type="checkbox"/> alone                                      | <input type="checkbox"/> with children only        |
| <input type="checkbox"/> with family members                        | <input type="checkbox"/> with parents only         |
| <input type="checkbox"/> with spouse                                | <input type="checkbox"/> with parents and siblings |
| <input type="checkbox"/> with spouse and children                   | <input type="checkbox"/> with other relatives      |
| <input type="checkbox"/> with facility care-givers and/or residents | <input type="checkbox"/> with friend(s)            |
| <input type="checkbox"/> with live-in attendant                     | <input type="checkbox"/> other (please specify)    |



31. Would you like a summary of the results?

Yes  No



Comments or criticisms: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*Thank you for your help in completing this questionnaire.*

Appendix E: Code Book

**G. F. Strong Rehabilitation Centre  
Vocational/Avocational Outcome Study  
Code Book Revised Copy**

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VARIABLE NUMBER	DESCRIPTION	QUESTION	COLUMN(S)
-	Record Number (Code = 1)	-	1
RID	Respondent Identification Number (Direct code 3 digit)	-	(2-4)
(1-4)	<u>Employer Discrimination-Perceptions</u>	1	(5-8)
	(a)    (b)		
	1    7 = Strongly Agree		
	2    6 = Moderately Agree		
	3    5 = Slightly Agree		
	4    4 = Neutral (some missing)		
	5    3 = Slightly Disagree		
	6    2 = Moderately Disagree		
	7    1 = Strongly Disagree		
	9    9 = Not Stated		
1	Employers are not.....(a)		5
2	Most employers.....(b)		6
3	People with a.....(b)		7
4	Employers are willing.....(a)		8
(5-9)	<u>Motivation To Return To Work</u>	2	(9-13)
	(a)    (b)		
	1    7 = Strongly Agree		
	2    6 = Moderately Agree		
	3    5 = Slightly Agree		
	4    4 = Neutral (some missing)		
	5    3 = Slightly Disagree		
	6    2 = Moderately Disagree		
	7    1 = Strongly Disagree		
	9    9 = Not Stated		
5	My own opinion.....(a)	2a	9
6	I don't feel very.....(a)	2b	10
7	I generally don't.....(b)	2c	11
8	Even if I won.....(a)	2d	12
9	Having a job is.....(a)	2e	13
10	<u>Paid Employment Pre-injury</u> (Direct Coding In Hours Per Week) 000 = Less than one hour 999 = Not Stated	3a	(14-16)
11	<u>Volunteer Work Pre-injury</u> (Direct Coding In Hours Per Week) 000 = Less than one hour 999 = Not Stated	3b	(17-19)

12	<u>Housework Pre-injury</u> (Direct Coding In Hours Per Week) 000 = Less than one hour 999 = Not Stated	3c	(20-22)
13	<u>Attending Classes And Doing Schoolwork Pre-injury</u> (Direct Coding In Hours Per Week) 000 = Less than one hour 999 = Not Stated	3d	(23-25)
14	<u>Indoor Leisure/Recreation Pre-injury</u> (Direct Coding In Hours Per Week) 000 = Less than one hour 999 = Not Stated	3e	(26-28)
15	<u>Outdoor Leisure/Recreation Pre-injury</u> (Direct Coding In Hours Per Week) 000 = Less than one hour 999 = Not Stated	3f	(29-31)
16	<u>Other Activities Pre-injury</u> (Direct Coding In Hours Per Week) 000 = Less than one hour 999 = Not Stated	3g	(32-34)
17	<u>Pd Employment Over The Past 6 Mos.</u> (Direct Coding In Hours Per Week) 000 = Less than one hour 999 = Not Stated	4a	(35-37)
18	<u>Vol. Work Over The Past 6 Months</u> (Direct Coding In Hours Per Week) 000 = Less than one hour 999 = Not Stated	4b	(38-40)
19	<u>Housework Over The Past 6 Months</u> (Direct Coding In Hours Per Week) 000 = Less than one hour 999 = Not Stated	4c	(41-43)
20	<u>Attending Classes And Doing Schoolwork Over The Past 6 Months</u> (Direct Coding In Hours Per Week) 000 = Less than one hour 999 = Not Stated	4d	(44-46)

21	<u>In. Leisure/Rec. Over The Past 6 Mos.</u> 4e	(47-49)
	(Direct Coding In Hours Per Week)	
	000 = Less than one hour	
	999 = Not Stated	
22	<u>Out. Leisure/Rec. Over The Past 6 Mos.</u> 4f	(50-52)
	(Direct Coding In Hours Per Week)	
	000 = Less than one hour	
	999 = Not Stated	
23	<u>Other Activities Over The Past 6 Months</u> 4g	(53-55)
	(Direct Coding In Hours Per Week)	
	000 = Less than one hour	
	999 = Not Stated	
(24-34)	<u>Functional Independence</u> 5	(56-66)
	0 = No Assistance	
	1 = A Little Assistance	
	2 = Moderate Assistance	
	3 = Complete Assistance	
24	Dressing	5a 56
25	Bathing	5b 57
26	Eating	5c 58
27	Cooking	5d 59
28	Bowel and Bladder Management	5e 60
29	Driving a vehicle	5f 61
30	Shopping	5g 62
31	Laundry	5h 63
32	House Cleaning	5i 64
33	Grooming	5j 65
34	Transferring	5k 66
35	<u>Net Annual Income from disability</u> 6a	(67-68)
	(Direct Code In \$000)	
	99 = Not Stated	
36	<u>Income From Other Sources</u> 6b	(69-70)
	(Direct Code in \$000)	
	99 = Not Stated	
(37-46)	<u>Income Sources</u> 6c	71-80
	01 = Self	
	02 = Self and Spouse	
	03 = Spouse	
	04 = Parents	
	05 = HPIA	
	06 = UIC	
	07 = ICBC Wage Loss	
	08 = Company Pension Plan	
	09 = Gain	

- 10 = OAP  
 11 = WCB - Industrial  
 12 = WCB - Criminal Injuries  
 13 = Private Insurance Settlement  
 14 = Canada Disability Pension  
 15 = National Health and Welfare  
 16 = Vocational Rehabilitation Services  
 17 = Long Term Disability  
 18 = Canada Pension Plan  
 19 = Other (specify)  
 99 = Not Stated  
 (NB. Assume no more than 5 will apply)

37-38	1st Income Source	71-72
39-40	2nd Income Source	73-74
41-42	3rd Income Source	75-76
43-44	4th Income Source	77-78
45-46	5th Income Source	79-80

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**END OF RECORD ONE**

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-	Record Number (Code = 2)	-	1
RID	Respondent Identification Number (Direct code 3 digit)	-	2-4
47	<u>Litigation Pending</u> 0 = No 1 = Yes 9 = Not Stated	7	5
(48-62)	<u>Perceived Agency and Government Support</u> 1 = Receive this service 2 = Need, but don't have this service 3 = Don't need this service 9 = Not Stated	8	(6-20)
48	Physical Therapy	8a	6
49	Occupational Therapy	8b	7
50	Vocational Assessment	8c	8
51	Vocational Counselling	8d	9
52	Job Training	8e	10
53	Job Placement	8f	11
54	Further Education	8g	12
55	Homemaker	8h	13
56	Visiting Nurse	8i	14
57	Child Care Services	8j	15
58	Personal Counselling	8k	16
59	Family Counselling	8l	17
60	Help In Finding Services	8m	18
61	Sexual Counselling	8n	19
62	Other (specify)	8o	20

(63-65)	<u>Financial Disincentives 1</u> (actual reduction) 4 = Completely Removed 3 = Quite A Bit Reduced 2 = Somewhat Reduced 1 = Not At All Reduced 8 = Not Applicable 9 = Not Stated	9a	(21-23)
63	Income Benefits...		21
64	Medical Benefits...		22
65	Homecare Benefits		23
(66-68)	<u>Financial Disincentives 2</u> 6 = Very Unwilling 5 = Moderately Unwilling 4 = Slightly Unwilling 3 = Slightly Willing 2 = Moderately Willing 1 = Very Willing 9 = Not Stated	9b	(24-26)
66	Income Benefits...		24
67	Medical Benefits...		25
68	Homecare Benefits		26
(69-73)	<u>Transportation Used</u> 0 = No 1 = Yes 9 = Not Stated/Not Applicable (If question is a blank)	10a	(27-31)
69	none		27
70	taxi/handi dard/public transport		28
71	car or van driven by someone else		29
72	drive own car or van		30
73	Other (specify; categorize)		31
(74-78)	<u>Mobility</u> 1 = Not At All 2 = Only A Little 3 = Moderate Amount 4 = Quite A Bit 5 = Very Much 8 = Not Applicable 9 = Not Stated	10b	(32-36)
74	Go to school		32
75	Get to appointment		33
76	Go shopping		34
77	Engage in recreational/social activities		35
78	Go to work		36

79	<u>Social Contact-Satis.: Amount(1)</u>	11	37
	1 = Not At All Satisfied		
	2 = Slightly Satisfied		
	3 = Somewhat Satisfied		
	4 = Quite Satisfied		
	5 = Very Satisfied		
	6 = Extremely Satisfied		
	9 = Not Stated		
80	<u>Social Contact-Satis.: Closeness(2)</u>	12	38
	1 = Not At All Satisfied		
	2 = Slightly Satisfied		
	3 = Somewhat Satisfied		
	4 = Quite Satisfied		
	5 = Very Satisfied		
	6 = Extremely Satisfied		
	9 = Not Stated		
81	<u>Average Number Hours Of Paid Attendant Care (3) Per Week (3 Digit Direct Code in Hours) 999 = Not Stated</u>	13a(1)	(39-41)
82	<u>Average Number Hours Of Attendant Care Per Week (4) (3 Digit Direct Code in Hours) 999 = Not Stated</u>	13a(2)	(42-44)
83	<u>Number Of Additional Attendant Care Hours (5) (3 Digit Direct Code in Hours) 999 = Not Stated</u>	13b	(45-47)
(84-98)	<u>Social Support (6)</u>	14	(48-61)
	1 = Not At All		
	2 = Only A Little		
	3 = Moderate Amount		
	4 = Quite A Bit		
	5 = Very Much		
	9 = Not Stated		
84	assist you with housework	14a	48
85	assist with your shopping	14b	49
86	help you with transportation	14c	50
87	make sure you get enough rest	14d	51
88	make sure you get enough to eat	14e	52
89	make sure you get enough exercise	14f	53
90	show genuine concern and interest		
91	in your feelings and worries	14g	54



92	include you in what they do (i.e. make you feel you belong)	14h	55
93	make you feel cared for and loved	14i	56
94	are there when you need them for support	14j	57
95	give you information or advice	14k	58
96	make your problems seem smaller	14l	59
97	have similar concerns to yours	14m	60
98	serve as a model or example for you to follow	14n	61
99	<u>Month Of Birth (1)</u> (e.g. Jan. = 01) 99 = Not Stated	15a(1)	(62-63)
100	<u>Year Of Birth (2)</u> (Direct Code Last 2 digits e.g. 1960 = 60)) 99 = Not Stated	15a (2)	(64-65)
101	<u>Sex</u> 1 = Male 2 = Female 9 = Not Stated	15b	66
102	<u>Marital Status (At Time Of Injury)</u> 1 = Married 2 = Single 3 = Separated 4 = Divorced 5 = Common Law 6 = Widowed 9 = Not Stated	15c(1)	67
103	<u>Marital Status (Now)</u> 1 = Married 2 = Single 3 = Separated 4 = Divorced 5 = Common Law 6 = Widowed 9 = Not Stated	15c(2)	68
104	<u>Divorce &amp; Remarriage Post-injury</u> 0 = No 1 = Yes 9 = Not Stated	15c(3)	69

105	<u>Dependents</u> 0 = No 1 = Yes 9 = Not Stated	15d(1)	70
(106-109)	<u>No. of Dependent's By Age</u> (Direct Code In #'s)	15d(2)	(71-74)
106	< or equal to age 9		71
107	ages 10-19		72
108	ages 20-29		73
109	> or equal to age 30		74
110	<u>Month Of Injury (1)</u> (Direct Code by Month e.g. Jan.= 01) 99 = Not Stated	15e(1)	75-76
111	<u>Year Of Injury (2)</u> (Direct Code by Year e.g. 1960=60) 99 = Not Stated	15e(2)	77-78
112	<u>Level Of Injury</u> 1 = Paraplegia Incomplete 2 = Paraplegia Complete 3 = Quadriplegia Incomplete 4 = Quadriplegia Complete 9 = Not Stated	15f	79-
113	<u>Level of Lesion</u> 1 = C1-C4 2 = C5-C8 3 = T1-T6 4 = T7-T12 5 = L1-L5 6 = S1-S5 9 = Not Stated	15g	80

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**END OF RECORD TWO**

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-	Record Number (Code = 3)	-	1
RID	Respondent Identification Number (Direct code 3 digit)	-	2-4
114	<u>Highest Level Of Education At Time Of Injury</u> 0 = 8th Grade Or Less 1 = Some High School 2 = High School Graduation 3 = Some Community College 4 = Community College Graduation 5 = Some Undergraduate University Training 6 = University Bachelor's Degree 7 = Post Graduate Study 9 = Not Stated	15h(1)	5

115	<u>Highest Level Of Education</u> <u>Now</u>	15h(2)	6
	0 = 8th Grade Or Less 1 = Some High School 2 = High School Graduation 3 = Some Community College 4 = Community College Graduation 5 = Some Undergraduate University Training 6 = University Bachelor's Degree 7 = Post Graduate Study 9 = Not Stated		
116	<u>Spiritual/Religious Beliefs</u>	16	7
	0 = Not At All 2 = Only A Little 3 = Moderate Amount 4 = Quite A Bit 5 = Very Much 9 = Not Stated		
(117-122)	<u>Medical Complications (1)</u>	17a	(8-13)
	0 = No 1 = Yes 9 = Not Stated		
117	bladder or bowel problems (e.g. bladder infection)		8
118	autonomic problems (e.g. autonomic hyper-reflexia)		9
119	kidney stones		10
120	skin breakdown (e.g. pressure sores)		11
121	pain		12
122	psychiatric/psychological concerns		13
123	<u>General Health (2)</u>	17b	14
	0 = Worse 1 = The Same 2 = Better 9 = Not Stated		
124	<u>Head Injury/Loss of Conc.(1)</u>	17c	15
	0 = No 1 = Yes 9 = Not Stated		
125	<u>Other Handicapping Conditions</u>	17d	16
	0 = No 1 = Yes 9 = Not Stated		
(126-130)	<u>Locus Of Control (Disability) (1)</u>	18	(17-21)
	1 = Not At All 2 = Only A Little 3 = Moderate Amount 4 = Quite A Bit 5 = Very Much 9 = Not Stated		

126	Self	17
127	Other People	18
128	Luck, Chance	19
129	God	20
130	Fate	21
(131-137)	<u>Locus Of Control (General) (2)</u>	19 (22-28)
	(a) (b)	
	1 7 = Strongly Agree	
	2 6 = Moderately Agree	
	3 5 = Slightly Agree	
	4 4 = Neutral (some missing)	
	5 3 = Slightly Disagree	
	6 2 = Moderately Disagree	
	7 1 = Strongly Disagree	
	9 9 = Not Stated	
131	Most of the good...(a)	22
132	Most of the unhappy things...(b)	23
133	It is not wise to plan too...(b)	24
134	I often feel that I have...(b)	25
135	The average person can have...(a)	26
136	My life is guided by things...(b)	27
137	My problems in life are generally...(a)	28
138	<u>Rehab Outlook (Part 1)</u>	20 29
	1 = Worst That Could Happen	
	2 = A Very Bad Thing	
	3 = A Bad Thing	
	4 = Neither Bad Nor Good	
	5 = A Good Thing	
	6 = A Very Good Thing	
	7 = Best That Could Happen	
	9 = Not Stated	
(139-141)	<u>Rehab Outlook (Part 2)</u>	21 (30-32)
	1 = Very Much	
	2 = Quite A Bit	
	3 = Moderate Amount	
	4 = Only A Little	
	5 = Not At All	
	9 = Not Stated	
139	Social Contacts	30
140	Job*Prospects	31
141	Sexual Relationships	32
(142-145)	<u>Architectural Barriers (washrooms)22a</u>	(33-36)
	1 = Not At All	
	2 = Only A Little	
	3 = Moderate Amount	
	4 = Quite A Bit	
	5 = Very Much	
	9 = Not Stated	

142	Paid Employment		33
143	Volunteer Work		34
144	Housework		35
145	Attending Classes		36
(146-149)	<u>Architectural Barriers</u> (elevators and doorways)	22b	(37-40)
	1 = Not At All		
	2 = Only A Little		
	3 = Moderate Amount		
	4 = Quite A Bit		
	5 = Very Much		
	9 = Not Stated		
146	Paid Employment		37
147	Volunteer Work		38
148	Housework		39
149	Attending Classes		40
(150-153)	<u>Architectural Barriers (hallways)</u>	22c	(41-44)
	1 = Not At All		
	2 = Only A Little		
	3 = Moderate Amount		
	4 = Quite A Bit		
	5 = Very Much		
	9 = Not Stated		
150	Paid Employment		41
151	Volunteer Work		42
152	Housework		43
153	Attending Classes		44
(154-157)	<u>Architectural Barriers (sidewalks)</u>	22d	(45-48)
	1 = Not At All		
	2 = Only A Little		
	3 = Moderate Amount		
	4 = Quite A Bit		
	5 = Very Much		
	9 = Not Stated		
154	Paid Employment		45
155	Volunteer Work		46
156	Housework		47
157	Attending Classes		48
(158-162)	<u>Accessibility (Home) (1)</u>	23a	(49-53)
	0 = No		
	1 = Yes		
	9 = Not Stated/Not Applicable		
158	Grab Bars		49
159	Lifts		50
160	Ramps		51
161	Widened Corridors		52
162	Adapted Doorways		53

(163-169)	<u>Inaccessible Areas (2)</u>	23b	(54-60)
	0 = No		
	1 = Yes		
	9 = Not Stated/Not Applicable (if Q. is a blank)		
163	Bathroom		54
164	Kitchen		55
165	Upstairs		56
166	One or more bedrooms		57
167	The Yard		58
168	The Garage		59
169	The Basement		60
170	<u>Interests (First Choice)</u>	24a	61
	1 = Realistic		
	2 = Investigative		
	3 = Artistic		
	4 = Social		
	5 = Enterprising		
	6 = Conventional		
	9 = Not Stated		
171	<u>Interests (Second Choice)</u>	24b	62
	1 = Realistic		
	2 = Investigative		
	3 = Artistic		
	4 = Social		
	5 = Enterprising		
	6 = Conventional		
	9 = Not Stated		
172	<u>Interests (Third Choice)</u>	24c	63
	1 = Realistic		
	2 = Investigative		
	3 = Artistic		
	4 = Social		
	5 = Enterprising		
	6 = Conventional		
	9 = Not Stated		
(173-176)	<u>Rehab Outlook (Part 3)</u>	25	(64-67)
	1 = Not At All		
	2 = Only A Little		
	3 = Moderately		
	4 = Quite A Bit		
	5 = Very Much		
	9 = Not Stated		
173	Physical Improvements	25a	64
174	Social/Recreational Improvements	25b	65
175	Psychological Improvements	25c	66
176	Vocational/Occup. Improvements	25d	67

177	<u>Head Injury (2)</u> 0 = No 1 = Yes 9 = Not Stated	26	68
178	<u>Alcohol/Drug Association</u> 0 = No 1 = Yes 9 = Not Stated	27	69
(179-181)	<u>Family Origin</u>  01 = British 02 = Native Indian/Inuit 03 = Indo Pakistan 04 = Dutch 05 = Chinese 06 = German 07 = Italian 08 = Other (specify) 09 = Not Stated	28	(70-75)
179	Choice 1		70-71
180	Choice 2		72-73
181	Choice 3		74-75
182	<u>Current Residence</u> 0 = Parent's home 1 = Friend's home 2 = Rented home/apartment/condominium 3 = Own home/apartment/condominium 4 = University/college residence 5 = Group home 6 = Relative's home 7 = Institution: hospital, nursing home, extended care facility, etc. 8 = other (specify) 9 = Not Stated	29	76
183	<u>Living with.....</u> 01 = Alone 02 = With family members 03 = With spouse 04 = With spouse and children 05 = With live-in attendant 06 = With children only 07 = With parents only 08 = With parents and siblings 09 = With other relatives 10 = With friend(s) 11 = Other (specify) 99 = Not Stated	30	77-78
-	BLANK	-	(79-80)

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END OF RECORD THREE

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