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Locus of Control, Awareness of Deficit, and Employment Outcomes Following Vocational Rehabilitation in Individuals with a Traumatic Brain Injury

by

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A Dissertation Submitted in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR OF PHILOSOPHY

in the Department of Psychology

We accept this dissertation as conforming
to the required standard

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ABSTRACT

Employment outcomes in persons with traumatic brain injury (TBI) are far from ideal and have serious implications for quality of life and financial well-being post-injury. Numerous potential correlates of return to work, including locus of control and awareness of deficit, have been examined in past studies with mixed findings. The current study investigated these issues in a relatively ignored segment of the TBI population – those who receive services through state-funded vocational rehabilitation programs. Thirty State of Alaska Division of Vocational Rehabilitation (DVR) clients with TBI completed comprehensive interviews, the Patient Competency Rating Scale (PCRS), the Internal Control Index (ICI), and several neuropsychological test measures. Overall time spent working decreased from 75% pre-injury to 39% post-injury. Participants with poor vocational outcomes underestimated their level of impairment on the PCRS relative to informant ratings, and generally fared worse post-injury than participants with more accurate awareness of their limitations. Locus of control and cognitive function measures did not predict vocational outcome. Given the need for DVR clients to be aware of their deficits in order to set realistic goals, vocational counselors should address awareness of deficit early in the rehabilitation process to optimize employment outcomes and allocation of resources.

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Dedication

I dedicate this project to my husband Greg, for providing me with the love, patience, and support necessary to always meet a challenge. You have shown me new worlds, provided the encouragement needed to face intimidating obstacles, and inspired me in all my endeavors.

Introduction

Locus of Control, Awareness of Deficit, and Employment Outcomes Following Vocational Rehabilitation in Individuals with a Traumatic Brain Injury

Traumatic Brain Injury - Description of the Problem

Traumatic brain injury (TBI) is a relatively new health epidemic (Boake, 1989), with total numbers surpassing those for cerebral palsy, multiple sclerosis, and spinal cord injury combined (Kurtze, 1982). As recently as three decades ago, many traumatic head injuries incurred from events such as motor vehicle accidents and assaults were fatal. At present, medical breakthroughs and advances in technology have greatly increased the chances of surviving a traumatic event and living an average life span. However, these same breakthroughs have failed to address the long-term disabilities, emotional problems, and general decline in quality of life individuals with TBI may be left to face upon their discharge from acute hospitalization. In recent years these numbers have grown, with general injury now the leading cause of death for individuals under 45 years of age (Kraus & McArthur, 1995). TBI is responsible for the majority of these deaths, and claims up to 56,000 American lives annually (Kraus & McArthur, 1995). Each year, about 373,000 Americans are hospitalized secondary to TBI, with 99,000 of these cases classified as moderate to severe (Kraus & Sorenson, 1994). Many of these individuals will be left with chronic disabilities. Implications of these greatly increased survival rates often accompanied by significant disability must be addressed on many levels.

Traumatic brain injury and its sequelae present a host of unique challenges to all levels of professionals involved in the rehabilitation of the individual with TBI. Whereas other patient populations with chronic or severe illnesses and injuries have their own

impediments to resumption of a normal lifestyle, no where do a multitude of factors combine to present obstacles to overcoming disability as they do in TBI patients. First, there is the unique demographic profile characteristic of the individual with TBI. Most often, the person is a young white male (typically age 14-24) with a long life expectancy (Abrams, Barker, Haffey & Nelson, 1993; Kraus, 1993). These demographics describe individuals who in ordinary circumstances would be gainfully employed and significantly contributing to a household's finances. Instead, they face a potential lifelong disability (or multiple disabilities) which significantly impacts their ability to be competitively employed. It has been suggested that the ability to return to employment is the most important predictor of improved quality of life in TBI survivors (Webb, Wrigley, Yoels & Fine, 1995), with the implication that many TBI survivors will experience a decline in overall life satisfaction. Add to these factors the likelihood that the young person has not established a career or even stable employment, and there is the potential for a very serious problem. This problem not only touches the individual with TBI whose life goals have been drastically altered, but also impacts society as a whole as it takes on responsibility for supporting these individuals throughout their lifetime.

Second, the nature of the "typical" cognitive deficits associated with moderate or severe TBI presents formidable barriers to successful outcomes using traditional methods of rehabilitation (Ben-Yishay, Silver, Piasetsky & Rattock, 1987). For example, a person with a spinal cord injury presents with grave physical limitations that restrict his or her access to competitive employment. However, with a knowledgeable vocational rehabilitation counselor these physical barriers can be removed through the use of adaptive equipment and other modifications to a work environment. Successful

outcomes are common. For the individual who has suffered an injury to the brain, the situation is quite different. Physical disabilities that result from traumatic injuries may be just the beginning of challenges to overcome for TBI survivors. Once their body has healed, they are often left with cognitive, behavioral, and emotional problems that render them unable to return to their former environment. Employers may readily understand the need for environmental changes in the workplace to accommodate a recently paralyzed employee. However, they are often ill equipped to troubleshoot problems that arise due to cognitive deficits and interpersonal difficulties that may take them by surprise when an employee with a traumatic brain injury returns to work (Kay & Silver, 1988). To make matters worse, it is common in TBI for the patient to be unaware of their own deficiencies, and therefore unable to describe the potential problems, much less offer problem-solving suggestions (Kay & Silver, 1988).

These challenges in the TBI population have broad implications for the patient, the patient's family, and society at large. The emotional impact alone on the patient and his or her family can be overwhelming and is often at the root of strained family relationships (Kreutzer, Marwitz & Wehman, 1991). Kosciulek and Pichette (1996) reported that the family members of individuals with TBI are typically dissatisfied with the quality of their own long-term adjustment to the injured family member. Too many times a TBI patient returns home after having regained a modicum of functional abilities (e.g., walking, talking, feeding, and dressing themselves) during a brief stay at a rehabilitation unit only to return to their family and behave quite differently in comparison to their pre-injury personality. For the family that has not been educated as to these potential changes, the result can be devastating. A patient may have problems

with impulse control, causing them to say or do things in the heat of the moment which are quite inappropriate and hurtful. This can lead to frequent conflict and blaming in the uninformed family. Alternatively, the patient might withdraw and become apathetic, neglecting their personal care as well as their progress towards once cherished goals. To a family who mistakenly believes their loved one has been returned home safe, sound, and restored to their former health, accusations of "laziness" and "willful oppositional behavior" may regularly greet the patient, who often is equally puzzled and frustrated by this new behavior. It is obvious that such scenarios result in loss of esteem and life satisfaction in the patient, and frustration and increasing isolation on the part of the family who often assumes the full burden of caregiving chores (Jacobs, 1988).

Traumatic brain injury has economic implications at many levels. The patient with TBI may never again return to productive, competitive employment, and may come to rely on other sources of income and support. Dikmen, Machamer and Temkin (1993) examined psychosocial outcomes in a sample of moderate to severe TBI patients, and reported that even at two years post-injury, 82% were still at least partially dependent on sources of income other than paid employment. When this burden falls on the family, it may result in financial ruin or at the very least an unexpected change in financial security and lifestyle. Financial responsibilities become particularly overwhelming in situations where another family member relinquishes his or her job to take care of the injured person (Kreutzer et al., 1991). This young population with long life expectancies may also stretch programs sponsored on the state and federal levels to their financial limits (Abrams et al., 1993). The cost of TBI in the United States is estimated to be $48.3 billion annually, with hospitalization accounting for $31.7 billion (Lewin, 1992)

Return to competitive employment can be considered the most complex and relevant outcome variable when examining recovery from TBI. It is dependent on a multitude of factors, including physical, cognitive, and interpersonal abilities, as well as emotional and behavioral functioning (Conder, 1989). Given this confluence of factors, it is easy to see why return to work is not only a major challenge in this population, but vitally important and worthy of intensive analysis.

Current Vocational Rehabilitation Options

There are a large number of programs in operation to serve the rehabilitation needs of the TBI patient. Several of these will be described to illustrate the variety of approaches to vocational rehabilitation with this population.

Ben-Yishay and colleagues have a well-established program through New York University that addresses multiple needs of TBI patients (Ezrachi, Ben-Yishay, Kay, Diller & Rattock, 1991). This program stresses cognitive rehabilitation as well as awareness and acceptance of deficits and limitations on the part of their clients. Clients first undergo an intense, 20-week neuropsychological rehabilitation phase within a "therapeutic community". This module consists of cognitive exercises, small-group techniques, community activities, and individual and family counseling. During this time, goals include preparation for community and vocational reintegration, awareness and acceptance of newly compromised abilities, and development of compensatory strategies. If deemed suitable, upon completion of this phase clients progress to the second phase, which involves vocational assessment and placement in a competitive work environment. Placement is facilitated by first observing the client in naturalistic employment settings, evaluating their skills and deficits, and determining appropriate

interventions and placement.

The Work Reentry Program (WRP) originated in San Diego by Haffey and colleagues (Haffey & Abrams, 1991) as an attempt to address the barriers that often prevent people with TBI from returning to work. This program's emphasis is on a thorough assessment of the TBI client's vocational aptitudes and readiness, as well as strengths and weaknesses, regardless of their stage of rehabilitation in other areas. The components of the program include a thorough intake assessment, vocational evaluation and situational assessment, simulated work samples, work hardening, a Transitional Employment Program (TEP), vocational counseling, job "seeking/keeping" skills training, job development, job analysis, job placement, on-the-job training/support, and on-going support (Abrams et al., 1993).

The supported employment model developed by Wehman, Kreutzer and colleagues at the Medical College of Virginia (Kreutzer et al., 1991) is perhaps one of the most influential and widely-recognized programs at present. The Supported Employment Program's (SEP) four main components are job placement, job site training and advocacy, ongoing assessment, and job retention and follow-along. This program emphasizes what might be termed "on-the-job" training as opposed to an extensive period of assessment and retraining in an artificial setting. This approach employs job coaches who accompany the TBI patient to their new job placement and provide them with assistance as needed in all aspects of the job. The guiding premise is that a person with TBI will learn best in a naturalistic setting. Likewise, the job coach and rehabilitation counselor can best assess the person as to their strengths and limitations and develop appropriate interventions and treatment recommendations within this environment. This

model does not include formal vocational rehabilitation prior to the actual job placement.

Perhaps the most important models in terms of accessibility and frequency of utilization are those of the Department of Vocational Rehabilitation (DVR) in each state. While not necessarily consistent across counselors, and certainly not always specific to the needs of persons with TBI, this system deserves a high level of attention if for no reason other than its widespread use and accessibility relative to other programs. Government and state funding supports these programs, with no financial resource or health insurance necessary on the part of the client. This is most certainly not the case with most of the previously described models. In reality, the majority of TBI clients who actually seek vocational assistance, especially those with premorbid economic disadvantages (Skord & Miranti, 1994), utilize the services of their own state's Department of Vocational Rehabilitation.

At present, DVR offers two community employment service funding options: traditional vocational rehabilitation services focused on reentry into independent competitive employment, and supported employment (Abrams et al., 1993). The latter is typically useful for those clients that require ongoing support on a long-term basis, although according to some researchers clients with moderate and severe TBI do not fare well regardless of the approach used (Skord & Miranti, 1994). These clients require intensive follow-up and ongoing support, as well as access to rehabilitation programs prior to job placement. Unfortunately, these needs are not always met, and often the person with moderate to severe TBI does not receive maximal benefit from traditional vocational rehabilitation programs. It is important to scrutinize potential factors contributing to this lack of success that might be amenable to change.

Funding Issues

There has been a modicum of research on the cost-effectiveness of vocational rehabilitation with individuals with TBI in light of the fact that success rates, despite the intensive nature of the services, are rather low when compared to other patient populations. Generally, these reports have fared well, and despite success rates well under 100%, have demonstrated the cost-effectiveness of such programs. Abrams et al. (1993) reported the cost-effectiveness of their work reentry program. Their results showed that the overall financial benefits after program completion were twice the cost of the program to taxpayers, and four times more than state funding required for the program. Clearly, even an intensive, relatively expensive program such as the WRP is cost-effective when considering the financial implications of a lifetime of unemployment.

The Supported Employment Program at the Medical College of Virginia also reported cost-effectiveness of their comprehensive program, despite the labor-intensive nature of their follow-along support once TBI clients have re-entered the workplace (West et al., 1991). Specifically, these authors reported that 237.8 hours of staff intervention time, at a cost of $6896, were required to achieve job stabilization for the average TBI client. Follow-along support services averaged 1.64 hours per week at a cost of $47.56. From these numbers, in conjunction with estimates of Social Security payments and other sources of support for clients not working, this method of supported employment will provide a net positive gain to tax payers after 2.5 years of employment. Clearly, given the young age of many TBI survivors and their long life expectancies, supported employment benefits both the individual with TBI and society at large.

Unfortunately, despite the long-term cost-effectiveness of such services, few programs are within the realm of financial possibility or geographical accessibility for the vast majority of TBI patients. Jackson (1994) provides an excellent overview of the relative inaccessibility of community re-entry rehabilitation programs to TBI patients with federal funding, with emphasis on the wide discrepancy between the high level of service required/requested by TBI survivors and the inadequate level of funding for such programs. Specialized head injury programs cost an average of $25,779 per year in 1988, with some programs running as high as $80,000 (McMordie & Barker, 1988). In light of this observation, it is unfortunate that so much time and energy has been put into studying these intensive programs in the literature, with relative neglect of publicly funded programs such as DVR which are the reality for most clients (Goodall, Lawyer & Wehman, 1994). These same authors note that federal-state vocational rehabilitation programs continue to be the most readily accessible means by which individuals with TBI can participate in programs to assist their return to employment and community living.

In a survey of 1052 TBI survivors recruited from National Head Injury Foundation mailing lists in ten states, Roessler, Schriner and Price (1992) found that only 41% had ever received any kind of vocational rehabilitation. Only 20% and 13% had ever received some form of job training and job placement, respectively. Given these numbers, it is clear that not only are most intensive programs out of the financial reach for many TBI survivors, but federally-funded programs are underutilized as well. In this same survey, participants reported extreme dissatisfaction with their access to vocational training, particularly with respect to preparation, placement, and postemployment support

and services. More specifically, reports from TBI survivors indicated a need for specialized programs to address the unique needs of individuals with TBI and more professionals that are knowledgeable to aid in this process.

Employment Outcomes in Individuals with TBI

It is extremely difficult to gain a clear understanding of the magnitude of the problem of return to work in TBI patients, primarily because of the wide discrepancies between various studies. Depending on the study, return to work rates can be anywhere from 15% to 100% (Kay, Ezrachi, & Cavallo, 1984; Ben-Yishay et al., 1987). There are numerous methodological reasons for these equivocal findings, many of which will be described below. First, a few examples of return to work rates from well-documented rehabilitation programs may shed some light on this issue, and give a general understanding of the problem.

Following completion of Ben-Yishay and colleague's program, 63% of a group of 94 TBI patients, all deemed unemployable prior to undertaking this particular rehabilitation program, were employed at a competitive level (Ben-Yishay et al., 1987). An additional 21% were working in subsidized positions, such as sheltered workshops. The authors point out that virtually all of the study participants had not benefited from other forms of rehabilitation undertaken prior to their own program. They attribute the success of their program to an increase in self-awareness and emotional regulation, more effective compensatory strategies for their cognitive deficits, and increased acceptance of these deficits.

Utilizing a Work Reentry Program (WRP) approach, Haffey and Abrams (1991) reported that 68% of their sample returned to paid employment following rehabilitation.

Most patients were referred by the state rehabilitation department and were deemed employable under the right circumstances, but had been unable to obtain or sustain competitive employment prior to participating in this program. Though their return to work rates are approximately equivalent to other intensive rehabilitation programs, the authors cite their program as unique in that they emphasize assessment, matching of client to job, and concentrated on-the-job support. As such, their program is less time and labor intensive than other supported work programs because in depth assessment at the outset helps to improve the chances of a successful placement. This results in a more economically viable program.

The supported employment approach advocated by Wehman, Sherron, et al. (1993) has met with comparable results. These authors report that prior to their intervention, clients with TBI were gainfully employed approximately 13% of the time (measured in months employed divided by months possibly employed). After completing the program, clients worked an average of 67% of the time. This group acknowledges the labor-intensive nature of their intervention program, but concludes that it does seem to be effective for a proportion of TBI patients who prior to intervention may have remained unemployed indefinitely.

Malec, Smigielski, DePompolo and Thompson (1993) at the Mayo Clinic reported on a group of 29 individuals with TBI who had completed a group-oriented comprehensive-integrated TBI rehabilitation program. They found that competitive employment rates increased from 7% to 59% from pre-program to program completion, and only dropped to 48% at one-year follow-up. This study also examined differences between early intervention (less than one year post-injury) and late intervention (more

than one year post-injury), and found that significant gains were made in both groups, though larger gains were made in the early intervention group.

Malec and Basford (1996) reviewed a large sample of postacute brain injury rehabilitation programs and concluded that, though many studies were uncontrolled, return to work rates were reported as high as 50% to 80%, depending on the program doing the reporting. Natural return to work rates, with no formal rehabilitation, averaged 43%. This difference was highly significant given the large number of studies reviewed.

Haffey and Lewis (1989) report that the "natural" return to work rate for TBI patients without any intervention or rehabilitation is 20% to 30%. Clearly, the programs described above have surpassed these rates. Contrary to these findings, in a 1988 study by Fraser, Dikmen, McLean, Miller and Temkin, approximately 75% of a mixed sample of TBI patients had returned to work at one year post-injury. Only 10% of this sample had received any kind of vocational rehabilitation. However, this sample included only TBI patients with a stable work history prior to injury, no prior neurological complications, and no history of drug or alcohol abuse. Additionally, as many as 60% had incurred only a mild head injury. Therefore, this "natural" return to work rate is likely the product of a highly selected sample in which the usual negative predictors of failure to return to work have been excluded. However, it is encouraging to see that without rehabilitation, the most successful patients with a preponderance of good prognostic indicators are generally able to return to work.

Of interest are the aforementioned rates of return to work as they compare with return to work rates in other medical illnesses and conditions. Dikmen, Ross, Machamer and Temkin (1995) reported that 63% of a trauma control group had returned to work at

one year post-injury, while only 49% of the TBI patient group was working after this same time. This information places TBI issues in context and highlights their unique nature. However, the findings on return to work rates both with and without vocational rehabilitation are far from unequivocal. The only certain conclusions that can be drawn are that TBI survivors tend to have more difficulty returning to gainful employment relative to other traumatic conditions, and fare better, though not always dramatically, when they participate in some form of vocational rehabilitation.

Major Impediments to Return to Work

It would appear that TBI survivors do indeed have a more difficult time returning to competitive employment than do people with other disabling conditions. What remains is the determination of factors that contribute to this problem and that may be candidates for manipulation. Numerous researchers have addressed this issue, and have arrived at a general consensus regarding several problems that are seen with some frequency in TBI. Among these are cognitive impairments, behavioral problems, social isolation, and negative societal attitudes. In fact, it is the latter reasons, and specifically interpersonal deficits, that often cause people to lose their jobs rather than deficient work skills per se (Ezrachi et al., 1991).

Jacobs (1988) points out the multifactorial nature of failure to return to work in TBI patients. It is possible that the person was injured at a young age and failed to establish vocational skills or a stable job history pre-injury, or there may be economic disincentives that decrease the person's motivation for investing time and energy in a vocational rehabilitation program. Alternatively, or perhaps additionally, the patient with TBI may have cognitive and/or physical impairments that make employment difficult if

not virtually impossible, or may experience behavioral and emotional problems that disrupt their productivity and work environment on a general level. Haffey and Abrams (1991) report that clients who did not return to work following completion of their program evidenced serious psychiatric disturbances, economic disincentives, and/or substance abuse. It is these authors opinion that such factors prove to be insurmountable barriers to return to competitive employment.

Skord and Miranti (1994) note that many TBI patients are from disadvantaged environments prior to their injury. Characteristics may include low socioeconomic status, substance abuse, below average education, poor work histories/high unemployment rates, impoverished neighborhoods, poor social support systems, and inadequate health insurance. It is easy to see why these pre-injury factors conspire against a person with TBI to preclude an easy transition and successful return to work.

In addition to the aforementioned barriers to return to work in TBI, Ben-Yishay et al. (1987) cite additional problems related to executive functioning. Many TBI patients, in addition to common cognitive deficits and physical impairments, may be hindered in their efforts by problems with apathy or disinhibition of an organic nature. Either will affect an individual's ability to initiate productive activity and pursue goals in an effective manner. In addition, some TBI patients may be unaware of their deficits, due either to the TBI itself or to secondary psychological factors such as denial. In this case, vocational reentry is impeded because the person is unable to set realistic expectations and work towards these goals.

When attempting an analysis of return to work rates, it is important to keep these potential barriers to reentry in mind. It is rare that only one of these factors works to

prevent a successful outcome. Rather, a person's pre-injury characteristics, the nature of their injury, and their post-injury environment may all play a role in their vocational success or failure, with relationships between these factors that are not easily elucidated.

Predictors of Return to Work

After examining the major barriers to successful vocational rehabilitation, it is important to look further to define variables that might predict whether an individual with TBI will in fact return to work. These issues have received much attention in the literature over the past decade, with a few variables consistently identified as related to employment.

Age is a strong predictor of return to work, with older TBI patients having a more difficult time reentering the work force. Brooks, McKinley, Symington, Beattie and Campsie (1987) reported that age was a highly significant predictor of vocational outcome in a sample of severely head-injured patients. Patients over 45 years of age were much less likely to return to work than their younger counterparts. This finding may reflect employers' unwillingness to facilitate older patients with a limited employment future to return to work, or may be due in part to reduced adaptability with regard to vocational training. Dikmen et al. (1994) reported similar findings in a group of TBI patients, with those over 50 years of age having significantly reduced return to work rates.

Education and premorbid work history consistently correlate with TBI vocational outcomes, with fewer years of schooling, a history of lower status jobs, and an unstable work history predicting poorer outcomes (e.g., Dikmen et al., 1994; MacKenzie et al., 1987). Brooks and colleagues (1987) reported a clear trend for participants with a higher

pre-injury occupational level to return to work in greater numbers. However, these authors believe this finding may be confounded by two factors. First, higher-level managerial and other jobs may be easier for people with physical limitations to negotiate. Additionally, people who return to such positions are more likely to have friends and coworkers "cover" for their reduced capacity to succeed in the workplace. Ezrachi et al. (1991) cite premorbid intellectual ability as highly predictive of employment outcomes, regardless of actual educational attainment. This finding may be attributable to the hypothesized protective factors conferred to those with higher premorbid levels of "cognitive reserve" (Satz et al., 1993).

Severity of injury has been examined by numerous researchers, and has generally been shown to correlate negatively with return to work (Cifu et al., 1997; Dikmen et al., 1995; Ezrachi et al., 1991). Intuitively, persons with more severe TBI have a more difficult time returning to work. However, the relationship is not as clear as it may first appear. The relationship holds up when one compares mild TBI to moderate/severe TBI, but does not seem to play a part in predicting who will return to work when looking within groups of individuals with moderate and severe injuries. Brooks and colleagues (1987) reported that above a certain threshold of severity (e.g., two weeks post-traumatic amnesia - PTA), the predictive value of "severity", as measured by the usual indicators (PTA, length of coma, etc.) is greatly reduced. Interestingly, Dikmen et al. (1995) also reported that severity did not seem to play a role in whether TBI patients who were students prior to injury returned to school. They suggested that the difference between return to work and return to school rates according to severity was likely due to the variable ability of the different settings to accommodate persons with disabilities.

In addition to the severity of head injury incurred, the functional effects of the trauma are also significantly related to work outcomes. In fact, Cifu et al. (1997) postulate that the functional indicators of injury severity may be the more predictive factor in return to work rates. In other words, it is not the severity of the initial trauma per se, but rather the effects of the injury on everyday functioning. Most of the time, decreased functioning is related to increased injury severity, though this is not necessarily a rule. The Functional Independence Measure (FIM) was created specifically to address a TBI patient's functional ability. Using this instrument, Greenspan, Wrigley, Kresnow, Branche-Dorsey & Fine (1996) found that it was not the severity of the injury, but rather the severity as it impacted a person's functional independence that predicted vocational reentry success.

Higher socioeconomic status (SES) and larger social support systems are also predictive of better outcomes. For example, Ben-Yishay et al. (1987) found that social isolation was a prime factor in failure to return to work, and suggested that a constant and stable community-based support system is critical to vocational success. It would appear that during the initial period of recovery, family and friends tend to rally around the person with TBI. Unfortunately, this support network begins to fall apart at about six months once the person is out of immediate danger and the recovery process slows (Kozloff, 1987). At this point, it is often the family that begins to take over the multiple roles that many people use to play, with the result that family members become burnt out and frustrated. Simultaneously, the person with TBI becomes increasingly isolated, which reduces his or her chances at maintaining and forming ties to outside resources including job contacts. This clearly is not only a source of vocational failure, but

adjustment and psychosocial difficulties as well. In another study which examined patients with TBI as well as people with any form of traumatic injury, a strong social network was again related to the success rate for vocational reentry (MacKenzie et al., 1987).

Not surprisingly, cognitive deficits are related to employment outcome success, though the findings are far from consensus. Often cited deficits which present formidable barriers are decreased communication skills, verbal learning and memory, attention, general intellectual ability, and perceptuomotor skills. Specific neuropsychological measures shown to predict vocational outcomes have included, among others, the Logical Memory subtest of the Wechsler Memory Scale - Revised (Brooks et al., 1987), the Paced Auditory Serial Addition Task (Brooks et al., 1987), and the Performance IQ score on the Wechsler Adult Intelligence Scale - Revised (Ip, Dornan & Schentag, 1995). Clearly, there is not yet a gold standard in neuropsychological assessment for determining the likelihood of a successful vocational outcome. Multiple functions have been implicated, though Lezak (1987) concluded that all return to work problems can be traced to the more general arena of executive function deficits. A large meta-analysis also concluded that executive dysfunction was one of four variables that consistently predicted return to work (Crepeau & Scherzer, 1993). Brooks et al. (1987) implicated attentional disturbances and verbal memory deficits as predictive of poorer RTW rates. An excellent study by Fraser et al. (1988) examined variables predictive of return to work in a mixed sample of TBI patients one-year post-injury. This sample was unique in that it excluded subjects with an unstable work history, prior neurological conditions, and pre-injury alcohol or drug addiction. Their findings suggested that neuropsychological

functioning best discriminated between participants who had returned to work at one year post-injury and those who had not. Specifically, they noted that measures of motor speed, cognitive flexibility, visual-spatial memory, overall neuropsychological functions, and visual-spatial problem solving and manipulatory skills were all performed significantly better by the successfully employed group.

Regardless of the predictive ability of one or more cognitive functions, the nature of the occupation in question will determine to some extent the importance of any given cognitive deficit. For example, an employee whose primary responsibilities are verbal in nature will not be as limited by perceptuomotor deficits as someone who works with their hands. In fact, some studies have reported that neuropsychological measures have little predictive value. Malec, Smigielski, et al. (1993) note that a failure to find a relationship between neuropsychological functioning and outcome measures is not surprising, in part because emotional and functional disabilities appear in some studies to have a greater impact on successful outcome. Clearly, neuropsychological research has far to go in better defining specific tests and cognitive functions that will be useful in predicting outcome.

A history of alcohol and/or drug abuse generally predicts poorer vocational outcome. This may be due to damage incurred to an already compromised brain, or to the likelihood that persons with TBI and substance abuse problems will continue to abuse post-injury, thereby interfering with cognitive processes and job success in numerous obvious ways (Kelly, Johnson, Knoller, Drubach & Winslow, 1997). Unfortunately, between 50% and 66% of persons hospitalized for TBI have a history of alcohol and/or drug abuse (Corrigan, 1995), and 50% are intoxicated at the time of injury (Ruff et al.

1990; Kreutzer, Doherty, Harris & Zasler, 1990). Corrigan also makes the observation that professionals tend to be less sympathetic, and thus less accommodating and helpful, when they discover that their client has a history of substance abuse or is currently using or abusing substances. Ruff et al. (1990) found that based on the Glasgow Outcome Scale, individuals with a TBI have more negative outcomes if they have a history of excessive alcohol use. In fact, many of these findings may be underestimates of the true impact of alcohol use because mortality is higher in alcohol abusers. From a neurophysiological perspective, this is due partly to a generalized inability of the compromised organism to survive the stress of head injury, and specifically to greater incidence of mass lesions and susceptibility of vessels to tearing during a trauma. Both premorbid and post-injury substance use and abuse therefore has numerous negative implications for recovery and long-term outcome in TBI patients.

Methodological Difficulties

Though there do appear to be a few variables with unequivocal results, there are numerous methodological difficulties present in recent literature that make interpretation of both outcomes and predictors quite confusing.

The primary problem obvious after the most cursory examination of the literature is the lack of a well-defined definition for return to work or successful vocational outcome (Ben-Yishay et al., 1987). Not only does the criteria vary from study to study, but rarely is there adequate verification of the information gathered from individuals with TBI. Often, a dichotomous variable is used - either the person has been employed, or they have not, since their injury. Such a wealth of information is lost with this crude measure that one sometimes questions why the investigation was undertaken in the first

place. First of all, it is important to know how much time the person has actually spent working in the interim, as well as how many jobs the person has held. A person with TBI who has continuously held one job for 20 hours per week since leaving acute rehabilitation is quite different from the person who has held a string of successive full time jobs, each of which ended on a sour note. Stability of employment is clearly the minimum measure that should be accounted for when examining these issues. Cifu et al. (1997) address this methodological difficulty by creating a ratio of months worked divided by months since injury.

The nature of the work the person is engaged in is also important. Full-time volunteer work may be equally if not more challenging than some paid jobs, but in many studies this type of activity would be coded as an unsuccessful outcome. Second, few studies have examined the discrepancy in pre-injury versus post-injury employment status. This is critical when investigating the person's self-esteem and overall life-satisfaction. For some people, gainful employment at a minimum wage job would hardly be considered a successful outcome when their pre-injury career demanded a high level of cognitive functioning and afforded them a fair amount of social status and/or financial reward. Melamed, Groswasser and Stern (1992) reported on a group of 78 TBI patients, and concluded that increasing levels of work status were related to increased subjective rehabilitation status, as measured by physical well-being, emotional security, and family, social, economic and vocational needs. Patients experienced increased overall life satisfaction with more successful rehabilitation outcomes and higher job status. Quality of life is thus intimately related to the level of vocational success or failure.

Other methodological considerations include the high proportion of subjects who drop out of studies before their completion. Corrigan, Bogner, Mysiw, Clinchot & Fugate (1997) examined this issue, with the conclusion that subjects who drop out of longitudinal studies are more likely to have a history of substance abuse. If this is the case, the return to work rates reported in most studies are probably overestimated, as TBI patients with substance abuse histories are less likely to secure competitive employment. Corrigan et al. (1997) found no other systematic bias in drop out rates, though future research should attempt to replicate these findings.

Many studies are retrospective in nature, with no follow-up to more thoroughly determine outcome predictors and success rates over an extended period of time (Ben-Yishay et al., 1987). There is no guarantee that an individual with TBI employed at one year post-injury will remain employed beyond this time period. Longitudinal research, though not without difficulties, must address these same issues.

The lack of substantial numbers of participants for most studies presents statistical problems for researchers (Dikmen et al., 1994). Unfortunately, there is no obvious solution to this methodological problem. It is difficult to gather a large sample of TBI patients unless the researcher is closely connected with a large trauma center. Even then, obtaining willing participants for studies who meet strict criteria for inclusion in the study and who are available for long-term follow-up is no easy feat. Dikmen asserts that successful longitudinal research in this area requires, at the minimum, extraordinary amounts of time, money, and labor (personal communication, 1999).

Often studies do not control for pre-injury factors, such as alcohol use, education, age at injury, social support, occupational level, and other demographic characteristics of

participants (Dikmen et al., 1994). In light of the aforementioned findings with respect to predictors, these characteristics may clearly play a role in the reported outcome measures, and are likely to confound results when they are not controlled for. However, controlling for these variables tends to restrict sample size and makes robust statistical analysis challenging. Strict inclusion criteria also limits the ability to generalize, particularly in a population where these "confounds" tend to be the rule rather than the exception when describing natural samples.

Most studies fail to clearly define the nature of the brain injury, other than to state that it was "mild", "moderate", or "severe" (if even this much information is provided). This terminology has yet to be operationalized in a consistent manner, and even with clear definitions the data is difficult to determine reliably in retrospective studies. In a single study, the severity of the participants' head injuries may be ambiguous, leaving the reader to draw conclusions based on potentially erroneous assumptions (Dikmen et al., 1994).

Locus of Control

One area that has been addressed in only three studies to date, all from the same group of researchers, is locus of control (LOC) as a correlate of return to work and vocational rehabilitation success. The concept of internal-external locus of control developed originally from Social Learning Theory, which suggests that a person's behavior is guided by the perceived value of a reinforcer, as well as by the extent to which the person perceives control over reinforcement as a consequence of their own actions. As applied to locus of control, these principles suggest that an internal orientation indicates that a person believes that reinforcement is directly related to their

own behavior. A person with a relatively externally-oriented locus of control believes that reinforcement happens as the result of luck, chance, or the actions of powerful people (Duttweiler, 1984). Meyers and Wong (1988) found that internally oriented people evidence less depression, anxiety, and neuroticism, and higher self-esteem than externally oriented people.

Taylor's model of cognitive adaptation has relevance to these issues (Taylor, 1983). In this model, a person who has experienced a major trauma confronts three issues: a search for meaning in the experience, an attempt to gain mastery over the event and over their life in general, and an effort to restore self-esteem. The latter is directly related to locus of control, with a higher internal locus of control associated with higher self-esteem. It is easy to understand how a person's internal locus of control might be seriously damaged by a traumatic, unexpected life event over which they presumably had little or no control. This type of event might reinforce existing beliefs that factors outside the person are responsible for both positive and negative changes in the person's life, thus increasing a person's external locus and decreasing his or her sense of efficacy.

Locus of control has been examined in a multitude of other medical conditions, with fairly consistent findings. Crisp (1992) reported that greater perceived control (i.e., higher internal locus of control) predicted a stronger sense of vocational identity among a sample of spinal cord injury patients. In patients with diabetes, greater internal locus of control has been associated with less depression (Close, Davies, Price & Goodyear, 1986) and better emotional adjustment (Dunn, Smartt, Beeney & Turtle, 1986), both of which contribute to better functional outcomes in general. Smith, Dobbins and Wallston (1991) found that locus of control, along with other measures of coping and competency, was

related to positive psychosocial adaptation, including work status, in a group of patients with rheumatoid arthritis.

These findings all report on samples of patients with a chronic illness, but do not address the more unique aspects associated with TBI. Most importantly, it is easy to see that locus of control might be seriously disrupted in a person with brain damage. It is even possible that what is often viewed as a "trait" measure could be altered significantly following a TBI. Further, Moore and Stambrook (1995) point out that the original intent of this measure was to provide a means of describing an individual's casual beliefs, and not a unidimensional, stable personality "trait". Therefore, given the unique nature of TBI, it is worthwhile to examine this concept as it applies to persons with TBI who are attempting to return to work. Since LOC, unlike injury severity, age, and other predictors, is potentially amenable to treatment, it would be informative to find a link between LOC and employability.

Moore, Stambrook and Wilson (1991) examined LOC beliefs following TBI in a sample of 32 moderate and 22 severe TBI patients. Using the Multidimensional Health Locus of Control Scale (MHLC) and the Revised Internal-External Scale (RIES) to assess LOC, these authors found that a higher internal LOC and a lower external LOC on the MHLC was correlated with a higher reported quality of life (as measured by the Sickness Impact profile, Profile of Mood States, and Center for Epidemiological Studies Depressed Mood Scale). The relationship between scores on the RIES and quality of life measures was not as clear, suggesting that in this sample, LOC as it relates to health concerns measured by the MHLC is most associated with quality of life. In this study, there were no differences between the moderate and severe groups in their LOC

orientation.

This same group of researchers (Moore & Stambrook, 1992) reported that in a group of 55 TBI patients of mixed severity, participants characterized by a higher use of self-controlling and positive reappraisal coping strategies and a lower external locus of control as measured by the MHLC had fewer mood disturbances, fewer physical difficulties, and were less depressed (using the same measures as above). Lubusko, Moore, Stambrook and Gill (1994) used these same measures of LOC and related them to post-injury employment status in a group of severe TBI patients. This study compared 19 severely injured patients on pre- versus post-employment status, and divided them into two groups. The two groups did not differ on demographic or injury variables, except for length of PTA and hospital stay. This time, an increased internal LOC on both the MHLC and the RIES was associated with more successful work outcomes as measured by changes in work status from pre- to post-injury. The above three studies are the only references found in the literature examining relationships between employment outcomes in TBI patients and locus of control. All three studies used combinations of participants from the same sample.

Increased internal LOC can also be described as a measure of empowerment. With a sense of self-efficacy and empowerment, persons with TBI are more likely to engage the rehabilitation process and take an active role in their rehabilitation. Haffey and Lewis (1989) noted this, suggesting that one of the roles of rehabilitation should be to assist a client in switching from an external to an internal LOC. Specifically, these authors suggest that clients should be intimately involved with treatment goal setting, determining the behavioral and environmental changes necessary to meet these goals, and

exercising choice in treatment modalities. Clients should ideally have an appropriate amount of input and control over the decisions made regarding their treatment planning. Under these conditions, it is more likely that the client will be invested in their personal outcome, and will work earnestly to engage the process and move towards improvement. Many state vocational rehabilitation departments have adopted this philosophy and stress empowerment as a primary goal when working with a client.

Awareness of Deficit

Awareness of deficit is another variable that has direct implications for the success or failure of vocational rehabilitation. This lack of insight has been termed Post-Traumatic Insight Disorder by Godfrey, Partridge, Knight and Bishara (1993). Crosson et al. (1989) describe three levels of awareness. The first and most rudimentary level is intellectual awareness, which refers to a person's ability to understand that a functional or cognitive ability is impaired. In some cases, this level may be impaired due to disruption of basic cognitive functions. For example, TBI patients with memory impairments may be unaware of their deficits because they are not able to remember them and are unable to process and learn new information.

Emergent awareness is an intermediate level, and describes a person's ability to recognize a problem as it is happening. This level will be impaired when a person has difficulty monitoring relationships between their actions and their environment, and thus cannot detect a problem as it occurs. Anticipatory awareness is the third and highest level. At this stage, a person is able to anticipate problems that may occur as a result of a deficit. This level of awareness facilitates intervention, with the possibility that the deficient behaviors may be altogether avoided. In addition to these three levels,

awareness may also be impaired as a consequence of psychological denial. This is a subconscious process that works to shield a patient from the unwanted psychological ramifications of accepting negative changes in their functioning. In most cases, psychological denial factors are comorbid with and hard to tease apart from the three basic levels of awareness.

A person with a TBI who can not acknowledge deficits which are readily apparent to outside observers will be unlikely to engage the rehabilitation process willingly and set appropriate goals and expectations for future employment (Ezrachi et al., 1991; Kreutzer, Wehman, Morton, & Stonnington, 1988). A component of Ben-Yishay and colleagues rehabilitation program (discussed above; Ezrachi et al., 1991) included small-group techniques, community activities, and individual and family counseling to increase awareness of deficits and acceptance of the TBI survivor's changed abilities. They found that acceptance of change (and, therefore, awareness of deficits) was the most significant predictor for both post-program employability ratings as well as actual work status six months after program completion.

It is quite possible that individuals who lack good self-awareness will fail to heed the advice of well-meaning professionals, and will pursue (unsuccessfully) occupational goals which are no longer appropriate given their current level of functioning. This can produce frustration not only in the client, but in his or her family and rehabilitation counselors as well, who may eventually simply resign themselves to an unsuccessful outcome. It is even possible that in some cases rehabilitation counselors and families trust the person with TBI's judgement above their own, with the result that the person is inappropriately encouraged to chase dreams that are no longer realistic. Few studies have

addressed these issues in the context of TBI and vocational outcomes. Lam, McMahon, Priddy and Gehred-Schultz (1988) did report that TBI clients who were most aware of their problems were also rated by professionals as more successful in treatment and rehabilitation.

Prochaska and DiClemente's (1982) Stages of Change model is applicable to awareness issues in TBI. Lam et al. (1988) modified this four-step process to the following three steps to make it more directly applicable to TBI: 1) Pre-contemplation – the individual does not recognize problem and does not want to change; 2) Contemplation – the individual is beginning to have an awareness that a problem exists but does not want to change; 3) Action – the individual has actively begun to change their behavior, implying an acceptance and awareness of deficits. Lam et al. believe that progression through these three steps is critical to success in the post-acute treatment setting.

Trudel, Tryon, and Purdum (1998) reported on awareness of deficit and employment outcomes in a group of 63 individuals who had sustained very severe brain injuries an average of seven years prior to the study. These authors found that individuals with impaired awareness (as measured relative to staff ratings on the Scales of Independent Behavior) also had significantly lower vocational status, lower residential status, increased maladaptive behavior, greater distractibility, and increased perseveration. In this study, decreased awareness of deficit was related to increased length of posttraumatic amnesia and impaired general memory functioning. Thus, these authors concluded that impaired awareness resulted from general cognitive impairment rather than from a specific deficit.

Boake, Freeland, Ringholz, Nance and Edwards (1995) investigated awareness of deficit, as specifically measured by awareness of memory loss, in a sample of individuals with severe TBI. This sample showed significant and clinically meaningful impairments in their awareness of memory deficits. The authors noted that this deficit is influenced by both neurogenic (i.e., either the inability to recall memory failures, or an impairment in monitoring complex cognitive functioning (McGlynn & Schacter, 1989)) and psychogenic (i.e., defensive denial) factors. The implications of this study include the increased likelihood that self-reports completed by individuals with a TBI are misrepresentative of their objective functioning.

Dywan and Segalowitz (1996) found that in a small sample of 13 individuals with moderate to severe TBI, participants rated themselves as less impaired than their significant others. However, these authors noted that not every individual showed evidence of decreased awareness of deficit, and not one participant demonstrated impaired awareness across every domain measured in their experimental questionnaire. Clearly, variability in level of awareness is the rule rather than the exception.

Dikmen et al. (1993) found that reporting of problems increased over two years in a sample of individuals with moderate to severe TBI. The authors suggested several explanations for this observation, including improved self-awareness over time, intolerance with non-improvement, and a possible artifact of self-selection over time in the sample. In the former explanation, a higher incidence of problem reporting may actually indicate a relative increase in function, as the person's cognitive abilities improve and allow them to become aware of their deficits. This observation may

confound findings from studies where there is significant variability in time elapsed since injury.

Godfrey et al. (1993) also noted an increase in awareness of deficit over a three-year follow-up period, but their analyses revealed that this increased awareness was related to higher levels of emotional distress and dysfunction. In other words, individuals who are less aware of their deficits are likely to be less worried and depressed about them. These authors believe that rather than awareness of deficit being primarily a consequence of neurological insult, it represents the result of "motivated denial" stemming from disincentives to acknowledge deficits. Another component of this process is that in the acute and sub-acute stage, individuals with a TBI tend to receive little feedback as to their behavior because they are typically in highly structured settings, and are more focused on their relatively rapid physical recovery. This insight deficit makes it critical to gather collateral information from friends and family members during the first year post-injury. Most importantly, given that increasing levels of insight awareness are likely to take place over time and are important for adjustment to disability, it is important for this to happen in a way that is supportive and reduces the risk for increased emotional dysfunction.

There is evidence to suggest that the apparently high incidence of reduced deficit awareness in individuals who have suffered a TBI is directly attributable to damage in the frontal regions of the brain (Dywan & Segalowitz, 1996). These cortical areas are particularly susceptible to damage in acceleration-deceleration injuries such as those incurred in motor vehicle accidents. Dywan and Segalowitz posit two separate areas of ability based on evoked potential studies, neuropsychological performance, and self- and

other- reports of functioning on a wide variety of tasks assumed to be at least partially controlled by the frontal lobes. One area of ability involves planning and initiation and appears to be dependent upon intact functioning of dorsolateral cortex. The second area involves social monitoring and arousal control, and is subsumed by intact functioning of the orbitofrontal and brain stem regions. This distinction was evident on behavioral measures as well, such that ratings of planning and initiation were separate from those tapping attention, arousal, and social monitoring. They posit that the latter deficits, which are often evident in individuals with a TBI, may be due to poor control over excitatory and inhibitory processes (i.e., orbitofrontal functioning).

Prigitano and Altman (1990) also discussed neuroanatomical correlates of awareness of deficit. Specifically, they hypothesized that more impaired awareness of deficit would be associated with right-hemisphere dysfunction, and potentially with frontal and parietal lobe injuries. Based on the work of Mesulam (1985) and Pribram (1987), the latter two are considered to be "heteromodal cortex", and thus intimately involved in the integration of cognitive and affective information. This integration is necessary for self-awareness. However, the results of this study failed to confirm this hypothesis. Rather than awareness of deficit being related to neuroanatomical and neuropsychological test correlates, it appeared that awareness of deficit originated from a functional or psychiatric basis.

One of the most frustrating aspects of awareness of deficit from a research perspective is that the construct is far from tangible, and must be inferred rather than objectively measured. The primary challenge is determining a "gold standard" assessment of behavior against which to measure the individual's self-report of

functioning. There are several ways to measure awareness of deficit (Sherer et al., 1998), each with their own benefits and drawbacks. Awareness has been measured most often by comparing the patient's report on a questionnaire to the report of a significant other, rehabilitation professional, or clinician who is well acquainted with the patient's daily functioning.

Hart et al. (1998) cite several problems with this method. First, the questionnaires typically relied on for collecting this information assess general abilities rather than performance on specific and objective tasks. This leaves much room for interpretation and creates poor interrater reliability. These measures also rely on intact expressive and receptive language, both of which are frequently impaired in patients with TBI. Lastly, there is plenty of evidence to suggest that significant others and sometimes clinicians are biased in their reports, and may not be objective when assessing functioning in the patient. Additionally, Dikmen et al. (1993) also concur that collateral reports hardly represent an unbiased, objective opinion. At best, these reports are merely a complement to the individual's report, and one cannot be substituted for the other. Despite these limitations, at this point in time this method is the most widely used and accepted, is relatively easy to administer and score, and has been reported in the literature with some regularity.

Another method of assessing awareness is to compare self-report of cognitive functioning with objective neuropsychological performance. Unfortunately, this method has not proven effective in most studies, with poor concordance between neuropsychological measures and subjective awareness (e.g., Dywan & Segalowitz, 1996; Prigitano & Altman, 1990). Awareness may also be measured simply via rating

scales completed by rehabilitation professionals or clinicians. These reports are not compared to either self-report or to quantifiable data, are clearly subject to bias, and can not be objectively evaluated. Lastly, some recent research has attempted, with some success, to measure awareness by examining a patient's ability to detect and correct errors as they occur in the course of everyday functioning (Hart et al., 1998). This last method holds promise as both a valid and objectifiable means of measuring this often elusive construct.

This study will examine these issues in a relatively overlooked population. The sample is drawn from DVR clients in the rural state of Alaska. To date, there have been no studies conducted which examine these variables in this highly heterogeneous, underserved population. Given that most TBI patients who manage to secure vocational rehabilitation do so through state agencies, it is imperative that research begin to examine the efficacy of this rehabilitation model in an effort to provide relevant services and maximize allocated funds.

It is hypothesized that participants who have failed to secure stable employment following a TBI, despite having received vocational rehabilitation services, will have a lower internal locus of control than vocationally successful participants. Individuals with TBI who tend to attribute control over events in their life and their health status to external factors (e.g., powerful others, random events, chance circumstances) are less likely to engage in the steps necessary to seek competitive employment. It is difficult for them to take responsibility for initiating positive changes in their lives, in part because they are likely to believe that such efforts will result in failure or at best in no change.

Those who have a stronger sense of effectiveness and empowerment are more likely to engage a program of change and to be open to suggestions for improvement from others.

It is also predicted that less vocationally successful participants will have a relative lack of awareness of their observed functional, emotional, and interpersonal deficits when compared with evaluations provided by their significant other. Individuals with TBI often display a relative lack of awareness and appreciation of their deficits, particularly when the deficits are in the interpersonal/behavioral realm. It is precisely these areas that can be the most disruptive in a work setting and present a considerable barrier to stable employment. Lack of awareness translates into a reduced investment to improve these deficiencies, since the person does not acknowledge the presence of such deficits to begin with. As such, persons with these characteristics are more likely to set unrealistic expectations for themselves. Coupled with an unwillingness to initiate change, this results in poor employment choices and negative vocational outcomes.

Method

Participants

Participants were recruited through the State of Alaska Division of Vocational Rehabilitation (DVR), Access Alaska, and Southeast Alaska Independent Living Inc. (SAIL). A total of 204 letters were mailed through DVR; the number distributed through Access Alaska and SAIL is unknown. Responses were received from 54 DVR clients, and 38 interviews were conducted. Interviews could not be scheduled or completed with 16 interested potential participants for the following reasons: seven had conditions that were not consistent with a traumatic brain injury (e.g., stroke, viral encephalitis), four responded to the mailer after the deadline or were living in a remote area inaccessible to the researcher, three indicated an initial interest but then declined to confirm an appointment, and two failed to show to their scheduled appointment.

The remaining 38 participants completed the majority of the interview and test session during March and April 1998. A total of eight participants were later excluded from all further analyses for the following reasons: Six participants suffered from neurological disturbances not directly attributable to a TBI (i.e., stroke, electrocution, dementia pugilistica, osteomyelitis, syringomyelia, and gunshot wound complicated by infection); one participant spoke English as a second language and was unable to complete the neuropsychological testing or provide a reliable, English-speaking informant to complete the questionnaires; and one had psychiatric complications that made his results suspect and data difficult to interpret. This brought the sample to a total of 30 participants, all of whom received services from DVR for some period of time since their TBI.

Table 1 compares basic demographic information for the current sample to the recruitment sample (i.e., all DVR clients since 1993 with TBI as a primary disability). It is clear from a cursory examination of Table 1 that the sample choosing to participate in the study is chronologically older than the usual TBI client seen by DVR by an average of about eight years. No Alaska Natives were included in the study sample. This apparent bias is in part the result of geographic location, as interviews were not held in more remote areas with a preponderance of Native villages. Lastly, it may also reflect a predilection among Alaska Natives for receiving vocational services through the Indian Health Service or through their own tribal organizations, rather than through government agencies such as DVR.

The current sample also contained more married participants and fewer divorced clients than expected. Anecdotally, this is not surprising, as it was often the spouse of the person with a TBI who encouraged their involvement and arranged the interview. Clients without such a support system were probably less likely to respond to the recruitment letter initially. Clients from Fairbanks and Wasilla were overrepresented (Table 2) in the study sample, while clients from Anchorage were somewhat underrepresented. This investigator noted that Fairbanks appeared to have an exceptionally active support group for people with TBI, and this may have influenced their participation. The preponderance of Wasilla residents is not easily explained.

Table 1.
Comparison between research and DVR samples for selected demographic variables.

	Research Sample (n=30)	DVR Sample (n=204)
Gender		
Male	56.7%	64.5%
Female	43.3%	35.5%
Age at Interview (years)		
21 and under	3.3%	24.6%
22-30	6.7%	22.7%
31-40	46.7%	28.1%
41-50	33.3%	17.7%
51-60	10%	5.4%
61 and older	0.0%	0.5%
Unknown	0.0%	1.0%
Race		
Caucasian	90.0%	75.4%
African American	0.0%	5.9%
Alaska Native	0.0%	16.3%
Asian/P. Islander	6.7%	1.5%
Unknown/Other	3.3%	1.0%
Marital Status at Interview		
Married	33.3%	20.7%
Widowed	0.0%	0.5%
Divorced	16.7%	23.6%
Separated	6.7%	4.4%
Never Married	43.3%	48.3%
Unknown	0.0%	1.0%

Table 2.
Comparison between research and DVR samples for location.

	Research Sample (n=30)	DVR Sample (n=204)
Location		
Anchorage	33.3%	53.4%
Fairbanks	20.0%	13.7%
Juneau	13.3%	10.3%
Kenai peninsula	6.6%	2.0%
Southeast region	6.6%	2.5%
Wasilla	20.0%	7.8%
Other	0.0%	10.3%

As seen in Table 3, the participant sample had a mean age of 40.03 years (range of 21 to 55 years) and 13.47 years of education (range of 8 to 19 years). These demographics represent an older, better-educated sample than is the norm for the usual TBI population (Abrams et al., 1993). On average, the TBI was incurred at 30.00 years

of age (range of 7 to 47 years), and participants were an average of 120.93 months post-injury at the time of interview (range of 11 to 338 months). These participants were by no means "recently" brain-injured. Coma length was approximately 22.44 days on average (range of 0 to 100 days), though many subjects experienced no coma at all. Whereas the original recruitment letter stipulated that all participants were to have incurred a moderate to severe TBI, several participants in fact had mild head injuries (n = 4). Most head injuries were acquired during a motor vehicle accident (46.7%), though some participants were involved in motorcycle (13.3%) or bicycle accidents (13.3%), falls (10.0%), assaults (10.0%), or were hit by a car as a pedestrian (6.7%). This profile is very similar to previously reported trends in causation (Annegers et al., 1980).

Table 3.
Means and standard deviations for selected demographic variables.

	N	Minimum	Maximum	Mean	Standard Deviation
Age at interview	30	21	55	40.03	7.84
Education (years)	30	8	19	13.47	2.47
Age at injury	30	7	47	30.00	10.00
Months since injury	30	11	338	120.93	83.00
Length of coma (days)	27	0	100	22.44	28.41

Measures

Demographic Measures

Age and gender were coded for each subject. Education was reported in years, with a GED or other high school diploma equivalents represented as 12 years of education. Head injury severity was recorded as either mild (no loss of consciousness or impairment in awareness) or moderate/severe (loss of consciousness, usually with coma). These determinations were typically based on findings and diagnoses available in previous neuropsychological or neurological reports. Drug and alcohol use was recorded

for both pre- and post-injury, according to the following scale:

1 = minimal use
2 = significant/frequent use
3 = history of problems related to substance abuse (e.g., treatment, rehabilitation, legal difficulties).

Locus of Control

1. Internal Control Index (ICI, Duttweiler, 1984; see Appendix A for protocol). Numerous general scales of locus of control have been developed since the first such measure, Rotter's Internal-External Scale (RIES; Rotter, 1966; Furnham & Steele, 1993). One more recent measure that has received little attention is the Internal Control Index (ICI), developed by Duttweiler in 1984. This instrument comprises 28 items based on variables the author believes critical to an internal locus of control: cognitive processing, autonomy, resistance to influence attempts, delay of gratification, and self-confidence. The measure represents an attempt to assess where a person looks for, or expects to obtain, reinforcement. Each item is scored on a five point Likert scale, such that total scores range from 28 to 140 with higher scores reflecting a relatively greater internal locus of control. Based on the normative data collected during test construction (Duttweiler, 1984), the mean total score for normal controls in the 31-40 age range (the range most similar to the current sample) is 112.1 (SD = 13.4). From this same set of normative data, which is broken down by age groups, sex, race, educational level, and socio-economic level, the mean total response ranges from 99.3 (unemployed normal controls) to 120.8 (over 50 age group).

Findings to date have reported excellent psychometric properties, with coefficient alphas consistently in the range of .82 to .87 in a variety of non-clinical samples (Jacobs, 1993; Goodman & Waters, 1987; Duttweiler, 1984; Maltby & Cope, 1996; Meyers &

Wong, 1988). Efforts to examine the factor structure of this instrument have met with mixed results. The author of the test reported a two-factor solution, but did not choose to separate the items into subscales. She called these factors "self-confidence" and "autonomous behavior". Meyers and Wong (1988) reported a three-factor structure, but similarly to Duttweiler did not believe there was any gain in grouping items into subscales over using a total score. There is some evidence that two of the items (12 and 17) are only weakly correlated with the rest of the test items (Jacobs, 1993; Maltby & Cope, 1996), and suggestions have been made to either exclude these items from the test, or examine the correlation matrix when using the ICI in a clinical sample.

Reports on construct validity indicate that the ICI is significantly correlated to Rotter's I-E Scale (Goodman & Waters, 1987; Duttweiler, 1984; Meyers & Wong, 1988), suggesting that this measure displays convergent validity with other tests of the same construct. However, the ICI has better psychometric properties than the RIES, and as such warrants use in the current study as a general measure of locus of control. The wording of the individual items appears less threatening than other measures of locus of control, and is likely not to elicit defensive responding from participants.

2. Multidimensional Health Locus of Control Scale (MHLC; Wallston, Wallston, & DeVellis, 1978; see Appendix B for protocol). The original Health Locus of Control Scale was devised by Wallston, Wallston, Kaplan, and Maides in 1976 as a new measure of locus of control as related to beliefs about one's health and health concerns. Subsequently, Wallston, Wallston and DeVellis (1978) redeveloped the scale in order to better represent the multidimensionality believed by some to be inherent in any discussion of locus of control. This revised scale, the MHLC, contains three subscales

purported to independently measure the extent to which respondents believe their health is controlled by themselves (Internal subscale - I), powerful others (Powerful Others subscale - P), or chance and luck (Chance subscale - C). The test contains 18 items rated using a six point Likert scale, giving a range for each subscale of 6 to 36. Higher scores on the P and C subscales reflect greater external locus of control, and higher scores on the I index are indicative of greater internal locus of control.

Reports on the psychometric properties of this scale have consistently met with favorable results. Hartke and Kunce (1982) reported results from a factor analytic study that generally agreed with the original factor structure proposed by Wallston. Others have reported a lack of distinction between the P and C subscales using factor analysis (Winefield, 1982; Umlauf & Frank, 1986), and these scales have been correlated in several studies to date. As such, these two subscales may represent the more general dimension of "external" locus of control. Internal reliability is good, with coefficient alphas ranging from .83 to .85 (Furnham & Steele, 1993). Several studies have reported that the P and C subscale scores increase with age and education (Hartke & Kunce, 1982; Winefield, 1982). This is important to bear in mind when interpreting results in populations that vary widely in age and education.

The MHLC has been used extensively since its development to measure locus of control in a wide variety of medical populations (Wallston, Wallston, Smith & Dobbins, 1987; Hartke & Kunce, 1982; Lewis, Morisky & Flynn, 1978; Russell & Ludenia, 1983). It is important to note that research suggests that the P subscale is less predictive of health-related behaviors in healthy samples, while in chronically ill samples this subscale is related to health behaviors (e.g., compliance with medical professionals). This

distinction should guide conclusions drawn from results using the MHLC in chronically ill populations. For scales I, C, and P, normative data for chronic patients are 25.78, 17.64, and 22.54, respectively (Wallston et al., 1978). For college students, mean scores are 26.68, 16.72, and 17.87, and healthy adults score, on average, 25.55, 16.21, and 19.16 (Wallston et al., 1978).

Despite some problems with the multidimensionality of this scale and its relative instability between different samples, it is the only health-related scale that has been used in the scant literature on locus of control in traumatic brain injury samples. As such, it warrants attention as a potential correlate of return to work.

After careful consideration of this measure and the data it generated, it was decided to exclude the MHLC from further analyses. It was difficult for participants to understand and often met with resistance, thus making the data of questionable validity. Additionally, the items concerned locus of control as related to health concerns, and this was not directly applicable to vocational outcomes, as most participants who chose to take part in the study were well past physical recovery from their trauma. In future studies, it may prove more useful to administer this questionnaire in a 2-level response format (i.e., "agree" vs. "disagree", rather than the six level Likert scale), as suggested by McCallum, Keith and Wiebe, 1988. These authors did not find any benefit to using the six-level format over the two-level format when attempting to classify subjects, and this format may prove easier for TBI patients to interpret and respond to.

Awareness of Deficit

1. Patient Competency Rating Scale (PCRS; Fordyce & Roueche, 1986; see Appendices C and D for protocols). The PCRS was specifically designed to evaluate

awareness of deficit in patients with TBI. This instrument consists of 30 behavioral task descriptions that are rated on a five-point Likert scale by both the patient and a significant other (henceforth referred to as "informant") as to ease of performance. These items cover the patient's interpersonal skills, emotional status, and ability to perform functional activities. The multifactorial nature of the instrument is desirable in the current study, since it is quite possible that a person with a TBI might be well aware of his or her functional limitations, but fail to have a full appreciation of more subtle interpersonal deficits. Since it is often the latter that influences the ability to return to work and remain successfully employed, it is important to include a measure that can tease apart these issues. In the current study, analyses were conducted using both the entire set of questions as well as a subset of questions that were directly related to interpersonal skills and emotional status. These items were chosen because they require a higher level of awareness to assess than do items related to concrete functional tasks (e.g., washing dishes, doing laundry), and are more likely to be impaired in a person with a TBI.

Research has shown acceptable test-retest reliability (Fleming, Strong, & Ashton, 1996). No other psychometric data is available. Higher scores reflect more reported or perceived difficulty performing each task. In the current study, a difference score was calculated by subtracting the informant's average response from the participant's average response. In this way, participants could be described as either underestimating (negative scores) or overestimating (positive scores) their deficits relative to their informants' ratings.

2. Brock Adaptive Functioning Questionnaire (BAFQ; Dywan & Segalowitz, 1996; see Appendices E and F for protocols). The BAFQ is an experimental

questionnaire designed to measure aspects of adaptive functioning that are otherwise difficult to quantify. It was specifically created for use with adult brain-injured populations, and as such is an appropriate measure for consideration in the current study. This measure consists of 68 items rated on a five-point Likert scale by both the participant and informant. As scored in the current study, higher scores are equated with increasing levels of reported dysfunction or deficits. Items cover a wide variety of behaviours, including planning, initiation, attention/memory, arousal/inhibition, and social monitoring. These domains are common areas of difficulty for the person with a TBI. A difference score was calculated in the same manner as for the PCRS.

After examining the data generated by the BAFQ, this measure was excluded from all further analyses. Many participants and informants refused to answer a variety of questions because of the relatively long administration time, as well as difficulty understanding many statements (many of which are phrased as double negatives). Therefore, there was a preponderance of missing data, and the validity of the measure in this sample was questionable. Additionally, most BAFQ measures were highly significantly correlated with most PCRS measures, thus suggesting that this experimental measure was essentially redundant in terms of explanatory power while at the same time reducing degrees of freedom in analyses.

Emotional Functioning

The Beck Depression Inventory-II (BDI-II; Beck, 1996) was used to screen for symptoms of depression. This test comprises 21 multiple choice items for self-report of numerous depressive symptoms based on the DSM-IV criteria for Major Depressive Disorder, including vegetative signs. The Beck Anxiety Inventory (BAI; Beck, 1990)

was also administered to screen for anxiety symptoms. However, this measure was excluded from all analyses because it appeared highly confounded with a host of neurologically-based symptoms common to people with a TBI, but not necessarily related to the presence of subjective anxiety.

Cognitive Functioning

A brief battery of selected neuropsychological instruments was administered to each participant. This battery comprised the following tests:

1. Wechsler Adult Intelligence Scale-Revised (WAIS-R; Wechsler, 1981) – Picture Completion, Digit Span, Digit Symbol, and Similarities subtests. These subtests measure a variety of intellectual functions, including attention, visual perception, graphomotor speed, and verbal abstraction. The four together are used in the present study to estimate current general intellectual ability. Based on the findings of Ward and Ryan (1997), these four subtests adequately estimate full scale IQ, with the mean estimated IQ minus the mean of the actual IQ = -2.22 IQ points. The reliability coefficient for the WAIS-R standardization data averaged across age groups in Ward and Ryan (1997) is $r = .92$.

2. North American Adult Reading Test (NAART; Blair & Spreen, 1989). Premorbid intellectual ability was determined using the IQ estimate derived from the NAART, a simple word-pronunciation task believed to measure so-called "crystallized" intellectual abilities which are relatively resistant to the negative effects of TBI.

3. Brief Test of Attention (BTA; Schretlen, 1997). This is a brief (10 minute) assessment of auditory divided attention administered via audio tape. It includes two parallel forms that can be used separately or in combination to provide a T-score. In the

current study, both forms were used to derive a total score.

4. California Verbal Learning Test (CVLT; Delis, Kramer, Kaplan & Ober, 1987). This test requires participants to learn a list of words over five learning trials, and then to recall these same words after a distracter task and after short and long delays. It measures multiple aspects of verbal memory, including attention, encoding, spontaneous retrieval, and recognition. The total number of words recalled during the learning trials was used in statistical analyses.

5. Trail Making Test (Trails A, Trails B; Lezak, 1995; Reitan & Wolfson, 1993). This test requires participants to perform rapid numeric and alphanumeric sequencing, and measures attention and mental flexibility.

6. Finger Tapping (Reitan & Wolfson, 1993). This test requires participants to rapidly depress a key with their index finger, and measures manual dexterity and motor speed in the participant's dominant and nondominant hands.

7. Stroop Test – Victoria Version (Regard, 1981). In this purported measure of executive functioning, participants must name the color of dots, name the ink color that common words are printed in, and then name the color of ink that names of colors are printed in (the ink color does not correspond to the word itself). This test measures a participant's ability to shift set and inhibit impulsive responding.

8. Word Fluency Test (F-A-S; Borkowski, Benton & Spreen, 1967; Benton, 1968). Spontaneous production of words is recorded by asking participants to name as many words as they can beginning with a specified letter within a given time frame. This task measures mental flexibility, verbal fluency, and verbal retrieval strategies.

This selection of measures assessed a wide range of cognitive functions, including

attention and concentration, memory, language, general intellectual ability, motor speed, and mental flexibility/ability to inhibit impulsive responding.

A participant's overall level of cognitive impairment was determined by averaging T-scores for the following measures: WAIS-R estimate (calculated with formula 4 of Tellegen and Briggs, 1967), Trails A and B (Heaton, Grant & Matthews, 1991, norms based on age, sex, and education), and Finger Tapping for the dominant and nondominant hand (T-scores again derived from Heaton et al., 1991).

Luria-Nebraska Memory Task

An additional neuropsychological measure was used in this study to examine a cognitive skill related to awareness of deficit. The memory task from the Luria-Nebraska Neuropsychological Battery (LNNB; Golden, Purisch & Hammeke, 1985) is a brief list-learning task. It requires the test-taker to predict prior to each reading of the list how many words they think they will remember based on how many they were able to recall after the last reading. In the current study, it was used as a measure of the ability to benefit from feedback and adjust responses accordingly. These skills are one way of measuring an individual's awareness of their performance and level of impairment in an objective, psychometric manner. The memory index score was used in all analyses of cognitive function, and is calculated by subtracting the actual number of words recalled from the predicted number recalled, dividing by the number of trials administered minus one, and multiplying by 100. Higher scores indicate poorer prediction ability, and hence poorer awareness of functioning.

Outcome Measures

In previous research, return to work has typically been assessed by asking the

participants whether or not they have been gainfully employed either during the week prior to the survey, or during the time since injury. Conceptualizing a "successful" outcome in this dichotomous manner can lead to faulty conclusions, and does not accurately portray the functional outcome of any given participant. First, persons with TBI not only often have a difficult time securing employment, but may also have even more difficulty maintaining a given job. This scenario may occur because the subtle aspects of behavioral deficits following brain injury are not always readily apparent. It may take several weeks or even months before an employer begins to notice problems the employee has coping with stress, managing multiple tasks simultaneously, and getting along with fellow coworkers. As such, it is common for a person with TBI to have a history of unstable employment since the time of injury, with variable amounts of time between each of what may be many short-lived jobs (Sale, West, Sherron & Wehman, 1991). Dichotomizing this variable, based on the person's performance over the past week or month, loses much of this qualitative and functionally important information.

Second, categorizing patients as either having returned to work (and therefore an example of a "successful" outcome) or not does not give a complete picture of what the person is doing day to day. It is important to know how many hours the person is working at paid employment each week, as well as how many "productive" hours they are engaged in. Though a person with TBI may not be gainfully employed, they may be volunteering substantial hours of their time in a productive manner, attending courses to advance their education, or receiving vocational readiness training through supported employment or a job coach, perhaps at a sheltered workshop. These hours of productivity are just as important to both the person's self-esteem and to society at large

as hours engaged in competitive employment. In addition, it is important to realize that not all adults, with or without a disability, work continuously or full time. Pre-injury work history is important to consider when determining changes in functioning from pre- to post-injury.

To address these issues, three outcome variables will be examined:

1. Employment will be expressed as a ratio of months engaged in any type of employment (full time, part time, sheltered, etc.) divided by the total time that the participant was eligible to be a member of the work force. This Employment Ratio (ER; Wehman et al., 1989) takes into account the person's total work history, rather than quantifying it at only one point in time. The ER can also be recalculated and modified to include time spent in school, volunteer activity, and other activities to better depict the overall "productivity" of each participant.

The ER, as described by Wehman et al. (1989), was derived by dividing the number of months a DVR client was gainfully employed in any capacity (full time, part time, etc.) by the number of months that he or she could possibly have been employed post-injury. In the case of clients injured as children, their 20th birthday was taken as the start date of potential employment post-injury, unless they began gainful employment prior to that age. For clients injured as adults, these same criteria were used to determine the beginning of potential employment pre-injury. Potential post-injury employment was considered to begin after the patient was discharged from the hospital (or rehabilitation facility, where applicable), or six months after coma if the discharge date was not known.

A difference score was created by subtracting the participant's pre-injury employment ratio from their post-injury ratio, thus creating a measure of change in time

spent employed from pre- to post-injury. Negative scores reflect a decrease in the total time spent employed following a TBI, as compared to a participant's pre-injury work history.

2. Each participant's work history was reviewed with respect to job status. Jobs were examined with regards to their Dictionary of Occupational Titles classification (DOT; U.S. Department of Labor, Employment and Training Administration, 1977), and classified according to the following categories:

1 = professional/technical/managerial
2 = clerical/sales
3 = service
4 = structural (e.g., unskilled labor)

Participants who were unemployed received a rating of 5. Scores were given for job status at injury, at interview, highest status achieved pre-injury, and highest status achieved post-injury. This variable will allow an examination of how the person's nature of employment has changed, presumably as a result of the head injury. Few studies have reported this information (Fraser et al., 1988), though it clearly has implications for both the patient with TBI and their family's financial and social standing, as well as the person's self-esteem.

3. A third measure was derived from DVR records. Each participant's total months of DVR service over the past ten years (the start date for DVR records) was divided by 120 months (possible months during that same time) or months since injury, if this was less than 10 years ago. A participant was considered to be receiving services from DVR if they had an open case file with the agency. Higher scores indicate greater use of DVR services. This measure is necessary in order to determine potential predictors of service usage and whether or not resource allocation is effective.

It was decided to examine two of the aforementioned outcome measures in formal statistical analyses. First, the employment ratio post-injury was concluded to be the best indicator of true employment since a participant's injury, and most directly representative of his or her productivity in the work force. Second, the percent of time the participant used DVR services over the past 10 years (or since injury, if less) was used as an outcome measure in the hopes of examining predictor variables associated with resource utilization. It is important to determine whether fewer months of DVR service indicate reduced need for assistance, and therefore less use of resources, or if decreased utilization may be related to poorer outcomes.

Additionally, a thorough pre- and post-injury employment history was taken, including income earnings the year prior to injury and the year prior to the interview, employment expressed as hours per week at injury and interview, number of jobs held post-injury, and a dichotomous variable classifying each participant as "productive" or "unproductive" at injury and interview.

Predictor Variables

Predictors of outcome include the following:

1. The PCRS difference score, representing each participant's tendency to overestimate or underestimate his or her current level of functioning, was used as an independent variable. This measure examines awareness of deficit.

2. The total score for the Internal Control Index (ICI) was used as an independent variable representative of locus of control.

3. Global cognitive impairment was measured as described above. This independent variable will help determine if differences in employment outcomes are simply reflective

of overall level of cognitive deficit.

Procedure

Participants were recruited through the State of Alaska Division of Vocational Rehabilitation (DVR), Access Alaska, and Southeast Alaska Independent Living Inc. (SAIL). The latter two are organizations for people with disabilities run by members of each respective agency. DVR counselors distributed a mailer (see appendix G for sample mailer) to all current or past clients since 1993 (year DVR data base was started) with a diagnosis of traumatic brain injury, along with explicit instructions as to how they could contact the researcher. Each recipient of the mailer was coded in the DVR system as having a traumatic brain injury as their primary or secondary disability, or their primary or secondary disability was directly attributable to a TBI (e.g., learning disorders or mental and emotional disorders, as opposed to "psychotic" or "neurotic" conditions, that were believed to be secondary to a TBI). This same mailer was sent to members of Access Alaska's and SAIL's TBI support groups.

Each participant completed an interview and neuropsychological testing over a three to four hour period at either their home or their nearest DVR office. A comprehensive interview was conducted with each participant, and included questions regarding the nature and extent of their injury, a brief medical history, occupational history, drug and alcohol history, and psychiatric history. Where necessary, this information was either obtained from or corroborated through DVR records, medical records, or neuropsychological reports (see Appendix H for sample Release of Information form). Study participation required each participant to give written informed consent prior to the interview (Appendix I) and each participant received $25

reimbursement for his or her time. Inability to comprehend the interview and test procedures or to effectively communicate responses precluded a client's participation. All participants were assured of total anonymity, and informed that they would receive a brief report detailing their personal results, as well as a report summarizing the major findings of the study upon completion of the project.

Each of the awareness of deficit measures was administered to an informant designated by the participant as someone who knew them very well and could provide information and opinions as to their current functioning. In over half the cases, this person was the participant's mother (33.3%) or spouse (29.6%). Other informants included friends (18.5%), siblings (11.1%), or children (7.4%). Most informants completed the questionnaires during a phone interview with the author, though some completed them in person at the time of the participant's interview. All informants gave either verbal (for telephone interviews) or written informed consent prior to completing the questionnaires (Appendix I). Three participants were unable to provide the name and phone number of any person who knew them well and would be willing to answer such a questionnaire.

Analyses

Because not all participants and informants answered every item on the PCRS, it was decided to examine only the items from these questionnaires that every respondent had answered. Thus, a set of "common items" was created, ensuring that the label "awareness of deficit" represented the same measure across participants. After creating these variables for the PCRS, "common item" difference scores were calculated by subtracting each informant's rating from each participant's rating. These "common item"

difference scores were highly correlated with the total difference scores, and were significant at the $p = .000$ level. Thus, there was no meaningful difference between these shortened "common item" PCRS variables and the PCRS variables including all items, and a decision was made to report only the total average difference scores, regardless of the actual items answered.

The PCRS comprises numerous items related to a person's everyday functioning, some of which relate to daily tasks (e.g., laundry, dishes) and others which examine interpersonal skills and emotional regulation (e.g., starting conversations in a group, controlling crying). It is much more likely that people who have experienced a TBI and may be having trouble with awareness of deficit will underreport their difficulty with the latter skills and accurately perceive their ability to perform the former, more concrete tasks. In an effort to tease apart these issues, the PCRS was recalculated for each participant and informant, using only 15 of the original 30 items, each of which tapped an interpersonal or emotional skill (see Table 4 for a listing of these items). Both total scores and recalculated scores were used in statistical analyses. Three practicing clinical neuropsychologists were asked to divide the PCRS items according to the same criteria, and there was good agreement between raters and the investigator as to how the items should be divided.

It was decided to first examine correlations between the primary independent variables of interest (i.e., awareness of deficit, locus of control, and global cognitive impairment) and the respective outcome measures (i.e., post-injury employment ratio and DVR usage). Regression models were used to examine the predictive value of each of these independent variables. Additionally, numerous descriptive statistics were used to

better quantify this sample, as well as to provide qualitative analysis.

Table 4.
Items included in and excluded from re-calculation of the PCRS.

Included PCRS Items	Excluded PCRS Items
8. starting conversations in a group	1. preparing meals
15. getting help when confused	2. dressing self
16. adjusting to unexpected change	3. personal hygiene
17. handling arguments with people	4. washing dishes
18. accepting criticism	5. laundry
19. controlling crying	6. finances
20. acting appropriately around friends	7. keeping appointments
21. showing affection to people	9. working when bored or tired
22. participating in group activities	10. remember last night's dinner
23. recognizing when you upset someone	11. remembering familiar people's names
26. meeting daily responsibilities	12. remembering daily schedule
27. controlling temper when upset	13. remembering important things
28. keeping from being depressed	14. driving a car
29. keeping emotions from affecting functioning	24. scheduling daily activities
30. controlling laughter	25. understanding new instructions

Adjunct Survey

As an adjunct to the original study, a survey was created to assess the attitudes and experiences of vocational rehabilitation counselors with regards to TBI clients. This brief survey was distributed to each vocational rehabilitation counselor affiliated with DVR in the state of Alaska, with the request that it be completed anonymously and returned to the principle investigator. This confidential questionnaire covered areas including: attitudes about their TBI clients; knowledge of TBI with emphasis on recovery; education specific to TBI (e.g., workshops, special seminars, etc.); success rates with TBI clients, including definitions of "success"; and expectations for return to work for TBI clients (Appendix J). These surveys produced both quantitative and qualitative data that will be used to inform the conclusions of this study.

Results

Employment Outcomes

Descriptive statistics for all outcome variables are presented in Table 5. Participants received 26.46 months of services from DVR on average, with "service" meaning that the participant had an open case file with DVR. The average DVR client in this study received services for approximately 33% of the months from the time of their TBI to the time of the interview (or within the past ten years), with at least one client receiving services for 89% of those months. It is evident upon examination of the employment ratios that participants were working nearly twice as much prior to injury (75%) as they were following their TBI (39%). Median ERs pre- and post-injury are even more striking (100% and 35%, respectively).

Table 5.
Descriptive statistics for outcome variables.

	N	Minimum	Maximum	Mean (SD)	Median
Total months receiving DVR services	28	2	80	26.46 (21.99)	17.00
% DVR services used	28	.07	.89	.33 (.22)	.28
Hours/week at interview	30	.00	40.00	11.60 (15.91)	00.00
Income at interview	30	.00	60000.00	6,489 (13,163)	300.00
Jobs held post-injury	29	0	18	2.86 (3.50)	2.00
Employment Ratio; post-injury	29	.00	1.00	.39 (.34)	.35
Employment Ratio; post-injury WITH school	29	.00	1.00	.42 (.33)	.47
Employment Ratio; pre-injury	25	.07	1.00	.75 (.35)	1.00
Employment Ratio; pre-injury WITH school	30	.08	1.00	.83 (.31)	1.00
Employment Ratio; (post-injury) – (pre-injury)	23	-1.00	.41	-.40 (.42)	-.33
Employment Ratio; (post-injury) – (pre-injury) WITH school	29	-1.00	.31	-.40 (.38)	-.33

Including academic hours in the employment ratios (1:1 correspondence with regular hours of employment) did not change the pre- and post-Employment Ratios in

meaningful ways. In fact, considering school as work resulted in an ER difference that was identical to that calculated without school hours (i.e., 33% median reduction in employment). The median number of jobs held post-injury was two, with at least one participant holding as many as 18 discrete jobs. Median annual earned income was $300, and median hours worked per week at interview was 0.

If a "successful" outcome of DVR services is defined as engaging the client in an active rehabilitation plan or closing their case after securing employment, 53.5% of this sample meets criteria for a successful outcome based on their most recent DVR status (see Table 6). Some form of employment at interview was reported by 43.3% of participants. However, an additional 39.3% of clients can be considered "unsuccessful" outcomes, with their cases closed either prior to plan development or without securing employment. In fact, at the time of interview, 50.0% of participants were unemployed based on self-report. This is almost four times the number unemployed at the time of injury (13.3%). The discrepancy between unsuccessful DVR outcome (39.3%) and participant-reported unemployment (50.0%) is due in part to the fact that some participants who had been discharged from DVR upon securing employment had since quit or been fired from this job, and had failed to regain employment on their own. Thus, DVR outcomes tend to be skewed toward more positive outcomes than are actually the case, primarily based on failures in job retention.

To better appreciate the variability in the sample and to gain a better assessment of how employment changed relative to work status at injury, Table 7 documents employment status at injury and interview for each participant. Four people who were working full time at injury were employed full time at interview. Nine full-time

employees at injury were unemployed at interview. Only four of twenty-nine participants were working more at interview than at injury, while at least seventeen participants were functioning at a lower vocational level with regards to productivity when compared to their status at injury.

Table 6.
Frequencies for DVR and employment outcomes.

	Percent
Most Recent DVR Outcome (n=28)	
Closed, not accepted for services	3.6%
Eligible	3.6%
In an active rehab plan	32.1%
Closed, employed	21.4%
Closed, not employed	17.9%
Closed, prior to plan development	21.4%
Employment Status at Injury (n=30)	
Full time	63.3%
Part time	3.3%
Student	20.0%
Unemployed	13.3%
Employment Status at Interview (n=30)	
Full time	20.0%
Part time	23.3%
Student	6.7%
Unemployed	50.0%

Table 7.
Employment status at injury and interview.

	Status at Interview			
Status at Injury	Full Time	Part Time	Student	Unemployed
Full Time	4	5	1	9
Part Time	0	0	1	0
Student	2	1	0	3
Unemployed	0	1	0	3

Table 8 reports income levels for participants pre-injury and post-injury. This measure is divided into earned income at injury and interview, and total income, which takes into account financial support from disability benefits, public assistance, family assistance, and other unearned income. It is clear that incomes dropped dramatically in this sample after a TBI, and that other forms of assistance (i.e., unearned income) make

up a substantial portion of their current financial support.

Table 8.
Percentage of participants in each income category pre- and post-injury.

	Earned Income at Injury (n=22)	Present Earned Income (n=30)	Total Present Income (n=30)
no income	9.1%	50.0%	13.3%
< $10,000	9.1%	30.0%	36.7%
$11,000 - $20,000	36.4%	13.3%	36.7%
$21,000 - $40,000	18.2%	0.0%	3.3%
$41,000 - $60,000	22.7%	3.3%	6.7%
>$60,000	4.5%	3.3%	3.3%

Table 9 displays information regarding job status based on the Dictionary of Occupational Titles (DOT) classification system. Two trends are evident. First, post-injury job status tends to be better represented by the middle levels (i.e., clerical/sales and service) relative to pre-injury levels, where job status is primarily bimodal (i.e., professional and structural). Second, though participants are well represented at each level of job status at their highest level post-injury, they do not maintain this standing, as represented by relatively lower status levels at interview (and much higher unemployment rates). This is often secondary to failure to maintain employment. It is indicative of many participants' ability to secure employment post-injury, even at his or her prior level, and subsequent inability to maintain this level of functioning over the long-term.

Table 9.
Percentage of participants in each DOT job classification pre-injury and post-injury.

	Highest DOT pre-injury (n = 25)	DOT at injury (n = 25)	Highest DOT post-injury (n = 30)	DOT at interview (n = 30)
Professional/Technical/ Managerial	36.0%	28.0%	16.7%	6.7%
Clerical/Sales	8.0%	4.0%	20.0%	13.3%
Service	12.0%	8.0%	26.7%	13.3%
Structural	44.0%	40.0%	20.0%	13.3%
Unemployed	0.0%	20.0%	16.7%	53.3%

Independent Variables

Table 10 displays means, medians, and standard deviations for measures of awareness of deficit, locus of control, and global cognitive impairment. In addition to these independent variables, means for the BDI-II are presented to give some indication of the level of reported depressive symptoms in the overall sample.

Table 10.
Descriptive statistics for independent variables and depression.

	N	Mean (SD)	Median
PCRS-self average response	30	2.22 (.57)	2.08
PCRS-other average response	28	2.32 (.61)	2.39
PCRS difference score	28	-.17 (.65)	-.08
Internal Control Index	30	100.83 (13.27)	102.00
Global Cognitive Impairment	30	41.51 (8.36)	40.10
BDI-II	30	12.40 (11.08)	9.50

Due to the large variability within the PCRS difference data, the median scores are the best representation of the sample. As seen in the table, participants tended to rate themselves as less impaired (-.83) than their informants. Overall, per self- and other-ratings, the participants in this sample do not appear to be as impaired as their head injury severity would lead to believe. A rating of "2" on the PCRS indicates that the task was rated as "fairly easy to do"; a "3" indicates "can do with some difficulty". The median responses on both the self- and other- ratings fall between these two response levels. Participants' responses on the ICI and BDI-II are within the average range for non-clinical samples. Global cognitive impairment falls in the low average range.

Multiple Regression

To test the original hypothesis that decreased awareness of deficit and decreased internal locus of control will be related to poorer employment outcomes, a stepwise multiple regression procedure was used. Each outcome measure (% DVR, post-injury employment ratio, pre- minus post-injury employment ratio, hours worked per week at

interview, and earned income at interview) was used as the dependent variable in separate regressions using global cognitive impairment, awareness of deficit (PCRS difference score), and locus of control (ICI total score) as independent measures. Negative scores on the PCRS difference score represent participants who underestimate their level of impairment relative to their relatives/friends. Higher scores on the ICI are indicative of greater internal locus of control.

Percent of time spent by the participant as a DVR client since the time of their injury (or within the last ten years, which ever was shorter) was best predicted by overall level of cognitive impairment ($R^2 = .165$, $p = .036$). Participants with less cognitive impairment used significantly more DVR resources. Locus of control was entered into the regression on subsequent models as a significant predictor variable, but given its low correlation with the dependent variable ($r = .236$, $p = .118$), this finding was likely erroneous and due to suppression effects. Awareness of deficit, as measured by the PCRS, was not a significant predictor.

Each participant's post-injury employment ratio and difference between their pre-injury and post-injury employment ratio were not significantly predicted by any of the independent variables using a regression procedure. Likewise, these variables did not predict earned income or total hours employed per week at the time of interview.

To closer examine the issue of "productive activity", as defined by paid employment or educational activity, the formerly described employment ratios were adjusted to account for educational activity (i.e., academic coursework, regardless of level, was considered as "employment" during any given time period). The above regressions were then recalculated using the new "employment" ratios. All results were

essentially the same, with no independent variable significantly predictive of employment ratios.

Alcohol and Drug Use

Table 11 compares drug and alcohol use by participants prior to their injury and during the interim from injury to interview. In this sample, the general trend is for alcohol and drug consumption to decrease following a TBI. This aspect of the sample is similar to findings from past studies reporting decreased rates of alcohol and substance use and abuse post-injury (Kreutzer et al., 1991). However, unlike previous findings, the current sample has a relatively low pre-injury rate of alcohol and substance abuse. Others have reported pre-injury alcohol abuse rates in moderate to severe TBI patients ranging from 25% (Sparadeo & Gill, 1989) to 67% (Kreutzer, Wehman, Harris, Burns & Young, 1991).

Table 11.
Alcohol and drug use by participants at time of injury and at interview.

	Percent Pre-Injury (n = 30)	Percent from Injury to Interview (n = 30)
Minimal/none	63.3%	76.7%
Significant/frequent	10.0%	23.3%
History of problems/treatment	26.7%	0.0%

Analysis by Groups

Rehabilitation Outcome. In addition to analyzing the data using regression analyses, it was decided to separate the sample into two groups: "successful" and "unsuccessful" participants as defined by their most recent DVR outcomes. "Successful" participants were defined as those participants whose cases were closed after securing employment or were in an active rehabilitation plan at the time of interview. "Unsuccessful" rehabilitation outcomes were defined as consumers of DVR services

whose case was closed prior to plan development, closed and not employed, or closed/not accepted for services. Table 12 examines premorbid and demographic variables in these two groups.

Table 12.
Premorbid and demographic variable comparison between "successful" and "unsuccessful" participants based on rehabilitation outcomes.

	N	Successful group mean (SD)	N	Unsucessful group mean (SD)
Age at Interview	15	39.67 (7.49)	13	38.85 (7.82)
Education (years)	15	13.47 (2.77)	13	13.38 (2.26)
Premorbid EtOH/drug use	15	1.60 (.91)	13	1.62 (.87)
EtOH use at interview	15	1.07 (.26)	13	1.38 (.51)
Premorbid Employment Ratio	13	.69 (.36)	10	.78 (.36)

Independent samples t-tests were used for all group comparisons of means. The only notable difference between groups on premorbid or demographic variables is on current use of alcohol and other substances. This comparison approached significance ($t = 2.045$, $p = .056$), with unsuccessful participants reporting higher substance use at the time of interview than successful participants. No other variables were statistically significant between groups.

Table 13 compares successful and unsuccessful rehabilitation participants on injury variables that have been correlated with functional outcome measures in previous studies. In addition to means, medians are also reported. This measure of central tendency is a better representation of group averages, given that the variability within each measure was often quite large, with some standard deviations exceeding the mean. Interestingly, the successful group averaged more days in coma than the unsuccessful group, though this finding was not statistically significant. Other studies have suggested that beyond a certain length of time in coma, additional days of coma are not predictive of outcome, therefore the current finding is not necessarily incongruous with previous

findings. No other injury variables were statistically significant between groups.

Table 13.
Injury variable comparison between "successful" and "unsuccessful" participants based on rehabilitation outcomes.

	N	Successful group mean (SD)	Median	N	Unsuccessful group mean (SD)	Median
Length of coma	13	24.08 (29.37)	14.00	12	13.58 (18.07)	9.00
Severity	15	1.07 (.26)	1.00	13	1.23 (.44)	1.00
Age at injury	15	30.60 (7.84)	33.00	13	28.85 (12.49)	34.00
Months since injury	15	109.93 (57.21)	107.00	13	119.85 (104.31)	92.00

Next, hypothesized predictors of employment outcome, as well as the BDI, were compared between groups (Table 14). Again, medians are reported for comparison of measures with high variability. The unsuccessful group underestimated their level of impairment relative to informants while the successful group tended to overestimate their level of functioning (median PCRS difference score), though the mean scores between the two groups on the PCRS were not statistically significant. No significant difference between groups was noted for measures of locus of control, global cognitive impairment, or depression.

Table 14.
Predictor variable comparison between "successful" and "unsuccessful" participants based on rehabilitation outcomes.

	N	Successful group mean (SD)	Median	N	Unsuccessful group mean (SD)	Median
Internal Control Index	15	100.80 (13.21)	100.00	13	99.85 (14.43)	102.00
PCRS Difference Score	15	-.14 (.73)	.13	12	-.21 (.60)	-.15
Global Cognitive Impairment	15	41.66 (5.40)	41.80	13	42.57 (11.00)	40.40
BDI	15	10.60 (7.10)	10.00	13	15.69 (14.53)	12.00

The next table (Table 15) examines differences between groups on cognitive variables. There were no statistically significant differences between groups on any measure.

Table 15.
Neuropsychological variable comparison between "successful" and "unsuccessful" participants based on rehabilitation outcomes.

	N	Successful group mean (SD)	N	Unsuccessful group mean (SD)
WAIS-R deviation quotient (FSIQ)	15	91.20 (7.32)	13	92.69 (11.84)
Digit Span (SS)	15	8.00 (2.36)	13	8.69 (2.21)
Digit Symbol (SS	15	7.93 (2.02)	13	8.23 (2.77)
Picture Completion (SS)	15	9.27 (2.02)	13	9.69 (1.80)
Similarities (SS)	15	9.27 (2.15)	13	8.92 (2.33)
NAART IQ estimate	14	98.93 (5.95)	13	101.08 (9.81)
Trails A (T-score)	15	44.33 (8.98)	13	48.77 (16.97)
Trails B (T-score)	15	41.07 (8.80)	13	40.23 (21.76)
Tapping dominant (T-score)	13	40.92 (11.34)	13	43.23 (13.08)
Tapping nondominant (T-score)	14	37.07 (15.43)	13	41.62 (13.23)
Verbal Fluency (T-score)	14	39.71 (9.65)	13	47.23 (12.94)
Stroop (Interferenc) (T-score)	15	42.98 (9.22)	12	37.39 (21.73)
Brief Test of Attention (T-score)	15	29.85 (16.78)	13	36.62 (17.60)
CVLT (total 1-5) (T-score)	14	19.07 (15.15)	13	24.38 (13.88)

Table 16.
Outcome measure comparison between "successful" and "unsuccessful" participants based on rehabilitation outcomes.

	N	Successful group mean (SD)	Median	N	Unsuccessful group mean (SD)	Median
% DVR usage	15	.36 (.26)	.27	13	.29 (.17)	.29
Employment hours/week at interview	15	16.53 (16.63)	15.00	13	6.92 (14.94)	.00
Post-injury Employment Ratio	15	.45 (.31)	.47	13	.36 (.36)	.22
Post-Injury – Pre- Injury Employment Ratio	13	-.25 (.31)	-.10	9	-.55 (.47)	-.70
Current earned income	15	8,717 (15,000)	4,200	13	4,870 (11,865)	0

Table 16 compares the two groups on outcome measures. It is evident that successful participants, though using about the same amount of DVR resources as the unsuccessful group, were earning twice as much income and working two to three times as many hours at the time of interview, and had less change in their employment ratio from pre- to post-injury (were working 25% less as compared with 55% less in the unsuccessful group) than their unsuccessful counterparts. When using median scores for comparison, the differences are even more dramatic. Despite these clearly clinically and

functionally meaningful differences, these did not reach statistical significance, likely due to the large variability within groups.

Employment Ratio. Another way to divide participants is according to their employment ratio post-injury, with category membership determined by whether the participant is above or below the median for the group as a whole. In essence, this divides the sample into two groups: those that are "more successful" post-injury with regards to paid employment, and those that are "less successful". This method of division makes it clear which participants are the most productive post-injury (i.e., the most successful in the work world). The previous division directly examined outcome at one point in time as measured by DVR and as recorded in their outcome statistics used to guide programming. This second division more accurately reflects productivity over the entire length of time post-injury.

Using this criterion, the same measures were examined as above. Table 17 demonstrates group means for demographic variables. Less successful participants were again more likely to be using alcohol or drugs prior to injury and at the time of interview than more successful participants were, and this latter difference approached significance ($t = -1.954$, $p = .065$). The less successful group also had fewer years of education, though this difference was not significant. Interestingly, there was no difference between the groups on overall pre-injury employment ratio.

Table 18 compares the groups on injury variables. Less successful participants incurred their head injuries when they were an average of nine years older than the more successful group ($t = -2.715$, $p = .013$). Additionally, successful participants were an average of two to five years longer post-injury than their less successful counterparts,

according to median and mean number of months ($t = 2.117$, $p = .044$).

Table 17.
Premorbid and demographic variable comparison between "more successful" and "less successful" participants based on post-injury Employment Ratios.

	N	"More Successful" group mean (SD)	N	"Less Successful" group mean (SD)
Age at Interview	15	37.80 (8.81)	14	41.93 (6.34)
Education (years)	15	14.27 (2.31)	14	12.71 (2.52)
Premorbid EtOH/drug use	15	1.40 (.83)	14	1.79 (.89)
EtOH use at interview	15	1.07 (.26)	14	1.36 (.50)
Premorbid Employment Ratio	10	.75 (.37)	14	.74 (.35)

Table 18.
Injury variable comparison between "more successful" and "less successful" participants based on post- injury Employment Ratios.

	N	"More Successful" group mean (SD)	Median	N	"Less Successful" group mean (SD)	Median
Length of coma	13	20.77 (28.55)	14.00	13	18.15 (20.25)	14.00
Severity	15	1.13 (.35)	1.00	14	1.14 (.36)	1.00
Age at injury	15	25.80 (11.69)	24.00	14	34.86 (5.30)	35.00
Months since injury	15	144.67 (90.55)	107.00	14	85.36 (54.52)	82.50

Table 19 displays group means and medians on outcome predictor variables. According to median differences, more successful participants tended to overestimate their level of impairment relative to informant ratings, whereas less successful participants underestimated their deficits. This finding was not statistically significant when comparing means, but mean comparison in this case is not appropriate due to the large variability within groups. No other comparisons were statistically significant.

Table 19.
Predictor variable comparison between "more successful" and "less successful" participants based on post-injury Employment Ratios.

	N	"More Successful" group mean (SD)	Median	N	"Less Successful" group mean (SD)	Median
Internal Control Index	15	98.60 (10.74)	99.00	14	103.14 (16.03)	104.00
PCRS Difference Score	15	-.06 (.59)	.10	12	-.31 (.75)	-.15
Global Cognitive Impairment	15	43.03 (8.22)	42.60	14	40.71 (8.34)	39.00
BDI	15	11.40 (9.72)	10.00	14	14.14 (12.68)	10.00

Table 20 displays group means on cognitive measures. As can be seen from a review of this table, the more successful group performed better on nine of fourteen measures, indicative of a trend towards better cognitive performance. However, these differences are very small and unlikely to be clinically significant. None of these variables were significantly different between groups.

Table 20.
Neuropsychological variable comparison between "more successful" and "less successful" participants based on post-injury Employment Ratios.

	N	"More Successful" group mean (SD)	N	"Less Successful" group mean (SD)
WAIS-R deviation quotient	15	92.20 (9.72)	14	91.79 (9.34)
Digit Span	15	8.73 (2.19)	14	7.86 (2.28)
Digit Symbol	15	8.27 (2.55)	14	7.71 (2.16)
Picture Completion	15	9.07 (2.15)	14	10.21 (1.81)
Similarities	15	9.13 (2.26)	14	9.07 (2.13)
NAART IQ estimate	14	100.93 (9.26)	14	99.29 (6.38)
Trails A	15	48.87 (12.58)	14	43.21 (13.38)
Trails B	15	42.20 (15.21)	14	38.43 (16.41)
Tapping dominant	15	44.20 (9.36)	12	38.42 (14.53)
Tapping nondominant	15	35.07 (16.15)	12	44.50 (9.95)
Verbal fluency	15	41.59 (10.10)	13	44.50 (13.63)
Stroop (interference)	14	40.36 (16.64)	14	39.31 (15.96)
Brief Test of Attention	15	30.47 (16.07)	14	33.81 (19.53)
CVLT (total 1-5)	15	20.73 (14.13)	13	22.08 (15.10)

Table 21 displays comparisons for outcome measures. Obviously, post-injury Employment Ratios are highly significantly different between groups ($t = 9.152$, $p = .000$), as this was the criteria for group membership. Likewise, post ER – pre ER significantly differed between groups ($t = 3.368$, $p = .003$). Percent DVR usage was virtually identical between the two groups (more successful %DVR = .34; less successful % DVR = .31), though income earned at interview differed in functionally meaningful ways. The median yearly income for the successful group was $3600, while the median for the unsuccessful group was zero.

Table 21.
Outcome measure comparison between "more successful" and "less successful" participants based on post-injury Employment Ratios.

	N	"More Successful" group mean (SD)	Median	N	"Less Successful" group mean (SD)	Median
% DVR usage	15	.34 (.25)	.28	13	.31 (.19)	.27
Hours/week at interview	15	16.87 (18.29)	15.00	14	6.07 (11.80)	.00
Post-Injury Employment Ratio	15	.67 (.21)	.67	14	.10 (.12)	.06
Post-Injury – Pre-Injury Employment Ratio	10	-.13 (.31)	-.10	13	-.61 (.37)	-.73
Current earned income	15	8,845 (15,168)	3,600	14	4,386 (11,177)	0

Cognitive measures and awareness of deficit

Another area of investigation involves the potential neuropsychological correlates of awareness of deficit. When all cognitive measures were correlated with the PCRS variables, only IQ estimates were significantly related to awareness measures. Better performance on the WAIS-R subtests and the NAART was associated with a tendency for participants to overestimate their impairment relative to their informants' rating ($r = .412, p = .029$; $r = .382, p = .049$, respectively).

Groups were also compared on the LNNB memory task to determine if there were consistent differences between groups. Table 22 displays results by groups based on rehabilitation outcome, while the performance for groups based on Employment Ratio is displayed in Table 23.

Table 22.
LNNB Memory Task comparison between groups based on rehabilitation outcome.

	Successful group mean (SD) n = 15	Median	Unsuccessful group mean (SD) n = 13	Median
LNNB index score	81.60 (65.75)	67.00	59.92 (61.96)	50.00

Table 23.
LNNB Memory Task comparison between groups based on post-injury Employment Ratio.

	"More Successful" group mean (SD) n = 15	Median	"Less Successful" group mean (SD) n = 14	Median
LNNB index score	58.87 (52.40)	50.00	83.57 (72.03)	67.00

As readily noted, no consistent results are apparent, and differences between groups were not statistically significant. In fact, the directional trend differed depending upon criteria for group membership. There were no clear relationships between this cognitive measure of awareness of deficit and rehabilitation or vocational success.

Summary

Overall, few significant correlations were reported, and predictors for outcome measures as determined through multiple regression were limited. It is important to note that within this relatively small sample there was a large amount of variability on most measures of interest, thus making it difficult to detect statistically significant differences. However, there are three examples of what appear to be clinically significant differences between groups. The first consistent relationship, noted between groups regardless of the criteria for group membership, is that the more successful group consistently used less alcohol post-injury. Additionally, more time had elapsed since injury for this group. Lastly, the more successful groups consistently rated themselves as more impaired than their informants did, while the less successful group was more likely to underestimate their impairment relative to their informants.

Recalculated PCRS score

When the PCRS totals were recalculated using items more closely related to "awareness of deficit" as conceptualized in TBI patients (see Table 4), the average difference between participants' and informants' ratings was larger, in the direction of

underestimation of deficit on behalf of the participants (Table 24).

Table 24.
Descriptive statistics for recalculated PCRS scores.

	N	Minimum	Maximum	Mean	SD	Median
Recalculated PCRS-Self score	30	1.27	3.73	2.33	.61	2.33
Recalculated PCRS-Other score	28	1.47	3.92	2.62	.73	2.67
Recalculated PCRS difference score	28	-1.67	.67	-.34	.72	-.37

When successful and unsuccessful groups based on rehabilitation outcome were compared on this new PCRS score, there was a large difference between the groups, with successful participants rating their functioning much more similarly to their informants (see Table 25). In fact, the successful group's median response was equal to that of their informants. Unsuccessful participants, as a group, underestimated their impairment relative to their informant's ratings.

Table 25.
Comparison between successful and unsuccessful rehabilitation outcome groups on re-calculated PCRS difference score.

	Successful group mean (SD) n = 15	Median	Unsuccessful group mean (SD) n = 12	Median
Re-calculated PCRS difference score	-.20 (.73)	.00	-.51 (.72)	-.47

Similarly, when groups were divided based on whether they were above or below the median for post-injury employment ratio, there was a large difference between groups on this newly calculated PCRS score. Again, unsuccessful participants underestimated their level of impairment relative to informant ratings (Table 26). Mean differences were not statistically significant between groups. However, median scores are more representative of measures of central tendency, as standard deviations far exceed the mean scores. Clearly, median scores consistently point to a tendency for unsuccessful participants to underreport their deficits, while successful participants' reports are nearly

identical to informants' reports.

Table 26.
Comparison between more successful and less successful participants based on employment ratios on re-calculated PCRS difference score.

	"More Successful" group mean (SD) n = 15	Median	"Less Successful" group mean (SD) n = 12	Median
Re-calculated PCRS difference score	-.21 (.77)	.00	-.50 (.67)	-.47

VRC Survey

Responses to the survey regarding clients with traumatic brain injuries were received from 19 vocational rehabilitation counselors (VRCs), representing about two-thirds of all DVR counselors in the state. Table 27 portrays the respondents' geographical distribution throughout the state. Table 28 displays responses for each of ten questions (see Appendix J). This group of VRCs has limited experience with TBI clients, with 42.1% having seen only between one and five clients with a TBI. Another 15.8% have seen six to ten clients, while 31.6% have seen more than 15 clients with a TBI. Despite their relative inexperience with such clients, most all (84.2%) have taken part in some form of training focusing on TBI. Of these VRCs, 31.3% have received one or fewer days of training. Another 43.8% have attended between two and five days of training, while 25.0% have attended more than one week of formal training.

Table 27.
Geographical distribution of VRC respondents by DVR office.

	Frequency	Percent
Anchorage	6	31.6
Bragaw	1	5.3
Fairbanks	2	10.5
Juneau	3	15.8
Kenai	2	10.5
Ketchikan	1	5.3
Sitka	1	5.3
Wasilla	3	15.8

Unfortunately, despite training seminars specifically aimed at addressing the characteristics and vocational concerns of individuals with TBI, 63.2% of the respondents felt only somewhat or minimally prepared to provide services to this population. A mere 10.5% felt very well prepared. Not surprisingly, 77.8% of the respondents reported that they find their efforts with TBI clients to be less or much less successful than with other clients. Respondents generally felt that they used about the same standards of success for their TBI clients as compared to other clients (87.5%). Only 12.5% felt that they lowered their standards for success with TBI clients.

A resounding 94.4% of responding VRCs reported that TBI clients have some or many issues that set them apart from other DVR clients. Only one respondent felt that the issues were "about the same" as in other populations.

Respondents were somewhat split on their views as to the usefulness of existing sources of support. Two VRCs reported families as not at all helpful or a major hindrance to the rehabilitation process. However, the majority (87.6%) felt that family support was critical or at least somewhat helpful. Another 70.6% felt that other agencies (such as TBI support groups and Access Alaska) were somewhat helpful or critical to the vocational rehabilitation process. Surprisingly, despite the intentions of such groups, 29.4% of the respondents reported that these groups are not at all helpful to the process.

Respondents were also asked to indicate the difficulties they most commonly associate with TBI from a list of 16 symptoms often reported in TBI patients. There were clearly several items that received endorsement by the vast majority of respondents (Table 29). These included "insight/awareness of deficit" (88.9%), "goal setting" (83.3%), "social judgement" (77.8%), "impulsivity" (72.2%), and "memory" (66.7%).

Table 28. Frequency and percent responses to VRC questionnaire by item.

	Frequency	Percent
Number of Clients		
0	0	0%
1 – 5	8	42.1%
6 – 10	3	15.8%
11 – 15	2	10.5%
> 15	6	31.6%
TBI Training		
No	3	15.8%
Yes	16	84.2%
Time Spent in TBI Training		
< one day	1	6.3%
one day	4	25.0%
two – five days	7	43.8%
one week	0	0%
> one week	4	25.0%
How Well Prepared for TBI Clients		
minimally	4	21.1%
somewhat	8	42.1%
adequately	5	26.3%
very well	2	10.5%
Success Rate with TBI Clients (compared to others)		
much less successful	2	11.1%
less successful	12	66.7%
about the same	4	22.2%
more successful	0	0%
much more successful	0	0%
Definition of Success for TBI Clients (compared to others)		
lower standard	2	12.5%
about the same	14	87.5%
higher standard	0	0%
Issues Unique to TBI Clients		
many issues	6	33.3%
some issues	11	61.1%
about the same	1	5.6%
fewer issues	0	0%
Family Helpful to TBI Clients		
not at all helpful	2	12.5%
somewhat helpful	7	43.8%
critical to the process	7	43.8%
Family a Hindrance to TBI Clients		
not at all a hindrance	4	26.7%
somewhat of a hindrance	9	60.0%
major hindrance	2	13.3%
Agencies Helpful to TBI Clients		
not at all helpful	5	29.4%
somewhat helpful	8	47.1%
critical to the process	4	23.5%

The respondents were then asked to designate symptoms from this same list that they found to be the most troublesome for vocational rehabilitation (Table 30). These same five symptoms again received the highest endorsement, though with somewhat different response rates. Respondents indicated that the following symptoms created the biggest obstacles to rehabilitation: "social judgement" (77.8%), "goal setting" (77.8%), "impulsivity" (72.2%), "memory" (66.7%), and "insight/awareness of deficit" (61.1%). Surprisingly, respondents rarely endorsed the numerous common somatic complaints often accompanying TBI and included on this list of symptoms. In fact, several of these symptoms received no endorsement as being consistently troublesome, including problems with vision, dizziness, balance, and ambulation. Speech problems, headaches, fatigue/lack of stamina, and chronic pain all received only one endorsement (5.6%).

Table 29.
VRC responses to "five most common problems you associate with TBI".

	YES		NO	
	Frequency	Percent	Frequency	Percent
chronic pain from physical injuries	0	0%	18	100%
decreased realistic goal setting	15	83.3%	3	16.7%
decreased initiative and drive	1	5.6%	17	94.4%
decreased insight and awareness	16	88.9%	2	11.1%
decreased vision	0	0%	18	100%
dizziness	0	0%	18	100%
fatigue/lack of stamina	2	11.1%	16	88.9%
headaches	2	11.1%	16	88.9%
increased impulsivity	13	72.2%	5	27.8%
poor balance	0	0%	18	100%
poor memory	12	66.7%	6	33.3%
poor social judgment	14	77.8%	4	22.2%
problems following directions	9	50.0%	9	50.0%
problems speaking	0	0%	18	100%
problems ambulating	0	0%	18	100%
reduced attention span	3	16.7%	15	83.3%

Table 30.
VRC responses to "five problems you believe are most troublesome for successful VR".

	YES		NO	
	Frequency	Percent	Frequency	Percent
chronic pain from physical injuries	1	5.6%	17	94.4%
decreased realistic goal setting	14	77.8%	4	22.2%
decreased initiative and drive	5	27.8%	13	72.2%
decreased insight and awareness	11	61.1%	7	38.9%
decreased vision	0	0%	18	100%
dizziness	0	0%	18	100%
fatigue/lack of stamina	1	5.6%	17	94.4%
headaches	1	5.6%	17	94.4%
increased impulsivity	13	72.2%	5	27.8%
poor balance	0	0%	18	100%
poor memory	12	66.7%	6	33.3%
poor social judgment	14	77.8%	4	22.2%
problems following directions	10	55.6%	8	44.4%
problems speaking	1	5.6%	17	94.4%
problems ambulating	0	0%	18	100%
reduced attention span	4	22.2%	14	77.8%

Discussion

This paper reports the results for 30 past and present DVR clients who suffered a traumatic brain injury at least one year prior to the interview. This is the first study to examine the relationships between locus of control, awareness of deficit, and employment outcomes in individuals with TBI who have received vocational rehabilitation. It also represents an initial attempt to address these issues as they apply to state and federally funded vocational rehabilitation programs. The current sample represents outcomes for individuals who have utilized the most readily-accessible, affordable programs, rather than an expensive or geographically limited rehabilitation program.

Sample considerations

This sample tended to be older, better educated, and less involved in problem drug and alcohol use than the traditional "young male" population usually associated with TBI. Additionally, the research sample was older and more likely to be married/less likely to be divorced than the DVR population from which it was drawn. This subsample appears more stable, with a more consistent pre-injury work history and more social supports post-injury than is typically the case with TBI patients. For this reason, reported employment rates in this sample are probably overestimates of the return to work rate in the population from which this sample was drawn. The 43.3% employment rate at interview in this sample is substantially higher than commonly reported 20% to 30% natural return to work rates (Haffey & Lewis, 1989). This may be a testament to services provided by the State of Alaska DVR, a reflection of the length of time that passed from

injury to interview, or may simply be a bias in this self-selected sample. These caveats should be considered when attempting to generalize to the TBI population as a whole.

At an average of ten years post injury, this sample is further from acute recovery than is the case in most studies. However, Sbordone, Liter and Pettler-Jennings (1995) make a good case for continued functional recovery (as measured by the Portland Adaptability Inventory) as much as ten years post injury in a sample of 20 severely head injured individuals. Therefore, DVR clients should not be excluded from rehabilitation programs simply because they are many years post-injury.

Perhaps the most striking feature of this sample, though not obvious when examining quantitative data in tabular form, was the profound variability between participants. It would be difficult to describe a "typical" DVR client with TBI, as characteristics were wide-ranging, and more often than not other factors were present which complicated the diagnostic and prognostic picture. Of particular note was the observation that participants with a mild head injury did not appear to be doing any better, and in fact often had more negative outcomes than those participants with moderate or severe head injuries and complicated orthopedic injuries. Vocational rehabilitation counselors (VRC) should be reminded that the level of deficit a client experiences is multifactorial in nature (e.g., psychiatric issues, support systems, drug and alcohol use, patterns of cognitive deficits), and not simply correlated to the severity of the head injury or to incurred physical deficits. Dikmen et al. (1995) also reported that a striking feature of their sample was that despite a consistent trend for outcome to be poorer with increased TBI severity, even among the most severe TBI cases good outcomes were noted. This report also suggested that variability makes the development

of good outcome prediction equations challenging at best. It is clear that there is profound variability among subjects, despite the best efforts to control confounding variables or to select a relatively homogeneous sample. Heterogeneity remains the rule.

Outcome measures

Work outcomes in this sample of 30 TBI survivors, though better than commonly reported averages, were still far from ideal. At interview, participants worked an average of only eleven hours, and most were not working at all. Average earned income at interview was $6,489 per year, with a median income of only $300. The employment rate dropped from 66.6% pre-injury to 43.4% at the time of interview, while the unemployment rate increased from 13.3% to 50.0% (discrepancies due to student status). Overall time spent working decreased by 40% from pre- to post-injury, and job status as rated by the DOT was significantly lower after injury. Despite an average of 27 months of DVR services, participants showed relatively poor outcomes.

It is clear from a review of Table 8 that the economic impact of TBI in this sample is significant. Dikmen et al. (1995) found that one year post-injury, TBI patients were significantly more dependent on external sources of financial support than they were prior to injury. The current sample extends this observation, in that even an average of ten years post-injury at least one-third of participants are financially dependent on outside sources for economic support.

Locus of control

Locus of control (i.e., feelings of "empowerment") as measured by the ICI was neither related to nor predictive of outcome variables. In fact, the total score on the ICI was very nearly equivalent between groups defined by two outcome measures. This

refuted the first hypothesis. One consideration is that the LOC measure used in this study (ICI) represents just one way of measuring this construct. As pointed out by Goodman & Waters (1987) and by Ward (1994), correlations between different LOC instruments are relatively small, suggesting that each instrument records a different aspect of this construct. Though a measure is purportedly based on a theoretical construct, it does not necessarily stand to reason that each such measure is in fact a valid, representative, or comprehensive measure of this theory. Future studies should consider using multiple measures of LOC.

Furnham and Steele (1993) provide an excellent review of the many conceptual issues that are infrequently addressed in the construction and use of locus of control scales. It is likely that many of these theoretical considerations may be in part responsible for the lack of significant findings in the current study. First, these authors suggest that some individuals may express internally-oriented attitudes in real-life competitive situations, while reporting externally-oriented attitudes when directly questioned as a method of defense against expected failure. One solution to this confound is to collect data from significant others as a way of checking reported behavior and beliefs against actual behavior. However, there is no measure reported in the literature at this time that adequately assesses this construct through the report of an informant.

A second issue concerns the consistent belief espoused in the literature that an internal locus of control is consistently related to better functioning while externally-oriented individuals have poorer overall functioning. It could also be argued that people with highly internalized beliefs experience significant drops in their self-esteem when

faced with failure or an unexpected negative event. Another issue to consider is that one individual might maintain separate belief systems for their own personal behavior and another system for other people's behavior.

Lastly, as related to learning theory, cause, effect, and reciprocity combine to create either more internalized or more externalized orientations than the individual had prior to a significant negative or positive life event. In other words, a positive experience is likely to reinforce an internal locus of control, which in turn bolsters confidence and self-esteem, leading to more experiences that are positive. In the case of an individual with a TBI, it is easy to see how this cycle might reverse itself and create a spiral of increasingly external attribution of negative events. All of these issues elucidate the complex nature of locus of control as a construct. Clearly, it is impossible for one measure to adequately assess all of these different dimensions. Therefore, it is possible that in the current study, several of these issues were at play and could not be fully assessed with the ICI or MHLC.

Awareness of deficit

Awareness of deficit was related to vocational rehabilitation outcome and overall employment outcome when the PCRS items were limited to those statements most related to the concept of deficit awareness in people with a TBI. Participants who underestimated their deficits on the PCRS worked fewer months and had poorer DVR outcomes than clients who accurately estimated or overestimated their impairment. Each group received approximately equivalent lengths of DVR services. This supports the hypothesis that a greater awareness of deficit facilitates efficient rehabilitation services, and conversely those participants who underestimate their level of impairment work less

and have poorer outcomes. These findings have implications for determining who is most likely to benefit from DVR services and allocation of resources in general, and are generally in agreement with a recent study by Trudel et al. (1998).

If awareness of deficit is a factor in vocational success, interventions targeted at improving impaired awareness should be examined. The previously mentioned levels of awareness (Crosson et al., 1989) assist in determining a suitable intervention for a given patient with TBI. The most effective intervention, though not appropriate for patients with any significant awareness deficits, is anticipatory compensation, in which the person is able to anticipate a problem that will occur in the absence of compensation. This technique requires anticipatory awareness, and for all intents and purposes is not useful in TBI rehabilitation given the preponderance of deficits in awareness. The next method of compensatory strategies is recognition compensation, and is appropriate for those patients who have intact emergent awareness. These patients are coached to use feedback from their environment to cue them to apply a compensatory strategy.

If a patient has only intellectual awareness of their deficits, they must use situational compensation. This strategy is triggered by a specific circumstance, and is most closely related to a habit. In other words, a person learns to apply the strategy across all settings and situations in which they might possibly experience difficulty. Thus, it is inflexible and overgeneralized, but is the only compensation available to patients with severely limited awareness. If the patient is unable to recognize that they are having problems, that is, they do not possess intellectual awareness, rehabilitation professionals and families must rely on external compensation. These methods are initiated by others, and act to modify the patient's environment rather than relying on the

patient for positive behavior change. Clearly, this situation requires the most stable of environments and support systems to be successful, is generally inflexible, but is the only means of compensation available to many patients with a TBI.

Interaction between Locus of Control and Awareness of Deficit

Locus of control and awareness of deficit in TBI patients are potentially related, as awareness of a problem might lead the patient to believe that deficits they have noticed are under their control. A patient who does not acknowledge a personal deficit might be more inclined to attribute their problems in daily functioning and failure to obtain employment to others. The interrelatedness of these two concepts has not been examined to date, and due to a relatively small sample and lack of significant findings could not be addressed in the current study. However, future studies should examine this interaction in an effort to provide information that might guide treatment planning. Vocational outcomes are likely to be unsuccessful if the client is denying his or her problems and attributing control over their deficits to someone else or chance. In this case, it may be possible to implement interventions aimed at increasing awareness of deficits and encouraging a more internal locus of control prior to initiating vocational rehabilitation. This might increase the likelihood of a successful outcome once vocational rehabilitation is initiated.

Global Cognitive Impairment

Better cognitive functioning was associated with higher use of DVR resources. This finding is not easily explained. It is possible that more impaired clients may simply be turned down for services from DVR at the outset. It would be interesting to see if there is an unspoken consensus among VRCs as to the "minimal" level of cognitive

functioning required to successfully participate in vocational rehabilitation. Importantly, there was no clear relationship between cognitive functioning and employment outcomes. This again would suggest that the presence of obvious deficits is not a good indicator of who will benefit from rehabilitation services.

Relationships Between Neuropsychological Measures and Outcome/Predictor Variables

There were no consistent relationships between any discrete cognitive measures and awareness of deficit, locus of control, or employment outcome. This negative finding speaks to the absence of relationships in this sample between neuropsychological test results and functional measures. More specifically, there were no clear relationships between cognitive functions and awareness of deficit, which refutes the recent findings of Trudel et al. (1998), who suggested that impaired awareness arises from generalized cognitive impairment. It is possible that relationships were present in the current data, but the small sample size and large variability within the sample precluded the ability to detect such relationships.

Dywan and Segalowitz (1996) also reported few significant correlations between BAFQ measures and laboratory measures of neuropsychological functioning. These authors offer several explanations for the lack of correlation between neuropsychological variables and functional behavior questionnaires. First, diffuse damage in most TBI, as opposed to focal cortical damage that the tests were originally designed to detect, makes the ecological validity of such tests limited. Second, the highly structured nature of the test setting decreases demands on the individual's attentional capacity and dampens affective arousal during test administration. Hence, the individual is better able to control their responses. This structured, time-limited artificial setting also allows the individual

to sustain and focus attention for relatively short periods of time while expending very high levels of energy. This energy level cannot usually be maintained day to day in the individual's regular environment in the manner necessary to achieve good functional outcomes. Lastly, there are few if any natural contingencies for performing complex neuropsychological tests in an assessment situation. These findings lend support to the notion that a thorough assessment of an individual with a TBI must include functional behavior measures that are rated by the individual and an informant, rather than relying solely on formal neuropsychological measures or on self-report.

Prigitano and Altman (1990) also failed to find evidence of hypothesized relationships between a variety of neuropsychological and neuroanatomical correlates of awareness of deficit. They suggested that intact higher-order cognitive functioning relies on heteromodal cortex proximal to the paralimbic belt. These impairments are not detected because commonly used standardized neuropsychological instruments fail to measure such highly complex integrated functions. The authors state that it is precisely this integrative cortex that is responsible for intact awareness of deficit.

Other Potential Mediator Variables

Injury Variables

There were no significant relationships between injury variables (i.e., severity, length of coma, age at injury) and outcome measures. This is consistent with previous findings demonstrating that head injury severity and length of coma are not predictive of outcome. Despite the counterintuitive nature of these findings, the multifactorial attributes of outcome predictors in TBI make them plausable. In other words, it may appear that a person with a severe head injury should have a more difficult time returning

to work than someone with a mild or moderate injury. However, though this might be true if all other factors were equal, this is rarely the case. Rather, the interplay between a multitude of factors (e.g., social support, premorbid history, psychological disturbance, nature of cognitive deficits, etc.) determines the vocational success or failure of a given individual with TBI.

Demographic Variables

Successful and unsuccessful groups differed on only a few demographic variables. There was a tendency for successful participants to be further post-injury at the time of interview, suggesting that a person with TBI may require an extensive period of time before returning to the work force. This is consistent with recent findings reporting increasing return to work rates over time. A 1995 study (Sbordone, Liter & Pettler-Jennings) reported that a group of 20 severe TBI patients made gradual but steady improvements in vocational functioning and outcomes over a ten-year period after their injury. One possible explanation for this observation is that awareness of deficit tends to improve over time as a person is exposed to opportunities for feedback and as recovery takes place within the brain. Thus, participants who are further post-injury have had more opportunities to increase their level of awareness, which may translate into greater vocational success.

There was no difference between groups regardless of outcome definition on pre-injury employment ratios. Therefore, post-injury vocational success or failure can not easily be attributed to pre-injury work experience or other vocational factors.

It should be noted that premorbid demographic characteristics of the typical TBI patient might act to increase the likelihood of negative outcomes. Dikmen et al. (1995)

reported employment outcomes in TBI patients and in non-TBI trauma and friend controls. The employment rates one year post-injury were approximately the same for trauma and TBI patients, and even in friend controls there were findings suggestive of unstable work and home life. For example, in the friend control group, 6% of those living independently were living with their parents at one-year follow-up, and 14% of those working were unemployed at follow-up. Even in the absence of a discrete trauma, individuals with demographic characteristics typical of TBI survivors may have unstable work and social histories.

Drug and Alcohol Use

One of the clearest relationships evident in this sample regardless of the outcome measure used was the tendency for participants with poorer vocational and rehabilitation outcomes to use more drugs and alcohol post-injury than successful participants. This discrepancy was noted despite equivalent levels of pre-injury drug and alcohol use between groups. This is fully compatible with numerous other studies that consistently show substance use and abuse to be a poor prognostic indicator for most all outcome measures following a TBI. The encouraging news is that in the current sample, overall substance use declined following a TBI relative to pre-injury levels. Though it is tempting to conclude that substance use precludes a successful return to paid employment, it is also possible that failure to secure steady work results in increased substance use. It is not possible to determine direction of causality in the current study, though this would be an excellent topic for future research. Regardless of direction of causality, it is imperative that substance abuse be addressed during vocational rehabilitation. A thorough intake assessment should seek to expose any substance use

issues, and potential problems should immediately be addressed through referrals to community treatment programs or programs established by DVR. Efficacious intervention at this level will increase the likelihood of a successful vocational rehabilitation outcome. For clients who are having difficulty finding vocational placement, an effort should be made to regularly assess their substance use in order to catch developing problems before they escalate and preclude a favorable return to work.

Depression

There were no notable differences between successful and unsuccessful participants on a measure of depression (BDI-II). In this sample, psychological distress, as measured by depressive symptomatology, was not a good predictor of vocational outcomes. It may be useful in future studies to conduct a more thorough evaluation for psychological distress, psychopathology, and personality disorders. Anecdotally, it was noted that participants who were not working or who had a history of numerous short-lived jobs also demonstrated signs of character pathology, particularly in the group of participants with mild head injuries. These characteristics were not formally measured in the current study, and no further conclusions can be drawn.

VRC Survey

The results of the VRC survey clearly demonstrated the frustration many professionals experience when coordinating rehabilitation efforts for this population. Most notably, it is interesting that the majority of VRCs have participated in numerous training programs to increase their knowledge about these clients. This appears to be a considerable amount of training for the relatively few clients with this diagnosis. However, this situation likely reflects the frustrations that VRCs may feel with this

population, and the VRCs' concurrent need and/or desire for continued education. Unfortunately, this training does not appear to adequately address their frustrations, as the majority of VRCs report that they are less or much less successful with these clients. Many VRCs acknowledged the unique characteristics of this patient population. Clearly, TBI clients offer unique challenges to the VRC that have not been met adequately, though specialized training sessions are apparently common.

VRC's opinions on the usefulness of families and support groups in the rehabilitation process were far from consensus. These findings most certainly reflect the variability in both the quality of support systems as well as the heterogeneity of the TBI population.

VRCs consistently reported that lack of insight/unawareness of deficit, decreased goal setting, poor social judgement, impulsivity, and poor memory are common to TBI patients, and pose the most challenging obstacles to a successful rehabilitation outcome. This is fully consistent with the results of the current study, which demonstrated a relationship between awareness of deficit and vocational/rehabilitation success. These impressions of VRCs are interesting in light of the fact that physical disabilities are often viewed as primary causes for unemployment. It would appear that to the VRCs responding to this survey, physical difficulties are of little importance when compared to deficits in social skills, planning, and insight. This is in direct contrast to the typical DVR client who seeks services to return to work following some kind of physical incapacity.

It would appear that despite their frustrations and less than impressive "success" rates, VRCs are well aware of the problems common in this population that serve to

hinder effective interventions. Most important is the observation that VRCs are fully aware of the diversity between patients in this population. One VRC commented in response to question 12 (see Appendix H) "...I will not comment here as each client is individual. This is the primary programmatic concern with this population – individualism in functional capacities and limitations." This statement encapsulates the predicament in which rehabilitation counselors find themselves. Another counselor noted "There is a great deal of variability person to person. It is difficult if not impossible to speak of TBI in general terms. Family can be either a great boost or a major hindrance. I believe that the more specialty counselors and resources that are available, the more successful we'll be as a program in reaching employment goals." One suggestion in response to this dilemma would be to implement the administration of a standardized measure (such as the PCRS) that would allow the VRC to assess the client's functioning in the areas of social judgement, goal setting, and insight/awareness of deficit. In this way, the VRC could efficiently gain information as to the level at which each client is functioning in terms of realistic goal planning, and then meet the client at that level.

Implications for Vocational Rehabilitation of the Client with a TBI

Fraser et al. (1988) point out that given the wide variability in TBI patients with regard to premorbid employment history and status, it would take a large number of DVR clients to be able to form enough specialized groups and programs to adequately address each of these groups needs. It would be difficult if not impossible to form group programs that would serve the needs of each type of TBI client. For example, groups might be formed for those individuals who are accustomed to a high status vocational position, have poor insight, and want to return to a level of employment that is now

impossible for them, and for severely impaired clients who are only suitable for sheltered workshops or other low-level employment. Clearly, these difficulties are only compounded in a rural, geographically isolated state like Alaska. Nonetheless, programs should attempt where at all possible to tailor programs to unique groups of clients. Specific protocols for TBI clients in general would represent a step in the right direction.

One of the most important implications for vocational rehabilitation is the need for a thorough assessment of all aspects of client functioning, including awareness of deficit, prior to initiating formal rehabilitation plans. Counselors who assess awareness of deficit would be better equipped to determine how much concrete feedback the client will require in terms of goal-setting and planning for the future. Input from close family and friends is crucial to this process. Ezrachi et al. (1991) promote the use of structured, small-group techniques to increase awareness in TBI patients during rehabilitation. Such groups, if facilitated by a leader knowledgeable in TBI and associated deficits, may aid in the rehabilitation process. Lastly, VRCs should be aware that emotional distress may escalate as awareness improves (Lam et al., 1988). Therefore, the client should be supported in their efforts and protocols should be in place to treat this potential side effect. VRCs may find referrals to mental health professionals not only helpful but also necessary.

Conclusions

The implications of these findings are threefold. First, locus of control had no predictive power and did not vary between groups based on outcome measures. This is somewhat surprising given the emphasis on empowerment issues evident in current rehabilitation literature as well as the philosophy promoted by DVR, though not

completely inexplicable. There are some plausible explanations for these apparent contradictions. When one examines significant correlations between the BAFQ and the ICI, it is evident that a higher internal locus of control is associated with decreased reporting of deficits ($r = -.376$, $p = .041$). In contrast, higher scores on the externalizing scales (P and C) of the MHLC were associated with reports of better functioning by the participants' informant ($r = -.436$, $p = .016$). It is possible that in the TBI population as represented by this sample, high scores on internal locus of control measures may reflect a predilection to inflate one's sense of functioning as well as effectiveness in general. While in people with other disabilities internal locus of control may reflect genuine empowerment, in a subset of the TBI population it may merely reflect a unique form of grandiosity. This grandiosity may translate into unrealistic perceptions of self, expectations, and goals. Therefore, in this population it is prudent to include family members in the decision-making process, rather than to rely solely on reports from the client with a TBI. While an emphasis on empowerment should certainly not be discouraged, neither is there empirical evidence, based on this current sample, to support its importance.

Second, awareness of deficit does appear to be predictive, though not significantly, of several indices of employment success. TBI clients who underestimate their impairment have poorer rehabilitation outcomes and work less than individuals who accurately assess their functional limitations. It is important to note that awareness differed between groups whereas other variables commonly associated with outcome, such as depression, age, and length of coma, did not.

Third, judging from the current results, it would appear that the PCRS is a reasonable predictor of employment and rehabilitation success, and as such should be given consideration for use by DVR. Administration is straightforward, usually requiring less than 15 minutes to complete. It is an excellent source for gathering basic information regarding functioning from both the client and a close family member or friend, and this information can then be used to assess the level at which the client is functioning in terms of realistically evaluating their strengths and weaknesses. Given the numerous anecdotal comments gathered from informants during the course of this investigation, it is clear that clients' relatives and friends would appreciate the opportunity to share their perspective on the client's functioning. They may often paint a very different picture than the one presented by the client. However, as a caveat, vocational rehabilitation counselors must keep in mind that relative's opinions and comments do not necessarily constitute a litmus test for client functioning. These informants may come to the assessment with just as many biases and skewed perspectives with regards to the client's functioning as the client, if not more. The comments of family members who are burnt out from caregiving or who otherwise possess an overly negative or positive bias should particularly be taken with a grain of salt.

Should a VRC determine that a TBI client is not yet ready to fully engage in the rehabilitation process because they are misperceiving their deficits or limitations, a course of action should be taken prior to initiating a formal treatment plan. One suggested intervention would be further cognitive evaluation in order to determine the individual's cognitive ability to plan, reason, set goals, and appreciate their circumstance. Following such an evaluation, cognitive rehabilitation, small group interventions, or

psychological treatment might provide effective ways to assist the client in achieving a more accurate level of awareness. In this way, the chances for a successful vocational rehabilitation outcome would be greatly improved.

Methodological Considerations

As evident in the current study, research in the area of TBI is plagued by methodological difficulties. First, gathering a sample size that is adequate for robust statistical analysis is highly challenging. In fact, unless recruitment takes place acutely through a Level I trauma center, it is nearly impossible to recruit large samples once individuals have been discharged and have progressed through the acute phase of recovery. Most of the participants in this study were several, if not many, years post-injury. Therefore, records were often not available to document their injury, and numerous life events had occurred in the interim to confound the picture. Second, there is much heterogeneity inherent in such a sample. In the present study, each participant had many unique characteristics, which made it difficult to compare him or her directly with other members of the sample.

Perhaps the biggest methodological difficulty is the wide range of pre- and post-injury confounding variables. In many cases, the pre-injury variables are the very factors that place people at risk for a head injury (e.g., alcohol and drug abuse, impulsivity, etc.). Other variables, though perhaps not so directly accountable, are associated with this increased risk (e.g., lower socioeconomic status, unstable work history, etc.). Lastly, the TBI itself places people at risk for further complications and negative events, including additional head injuries. This was often the case in this sample, with some participants included in the sample having incurred as many as three or four head injuries. To

exclude participants with such histories would restrict the potential participant pool so severely that it would become virtually impossible to collect a large enough sample for analysis. In any case, excluding these subjects would also effectively limit the sample of study to a highly selected group of people who are not necessarily representative of the majority of people with a TBI. Though the current sample shows evidence of all of the above methodological complications, it is a very representative sample in terms of the multifactorial nature of predictor and outcome variables in individuals with a TBI, particularly in a rural area such as Alaska.

Recruitment issues with a sample that is long post-injury are of paramount importance. For example, in this study, ethics boards and institutional regulations required that the principle investigator not have direct access to or detailed information about potential participants. Therefore, the only approved means of reaching potential subjects was to create a flyer, complete with pre-stamped and addressed postcard and a number the recipient could call collect, that was then sent to all potential sample members as determined by DVR. Unfortunately, it was discovered during the recruitment phase that DVR in Alaska codes people with any kind of a brain injury as having a "traumatic brain injury". This became apparent when individuals that clearly did not fit the sample requested to participate. This included DVR clients with neoplasms, cerebrovascular accidents, infectious processes, and congenital malformations. Clearly, these people do not fall under the conventional category of "traumatic brain injury".

Another problematic factor was the means by which an individual became a member of the sample. The recruitment procedure required the individual with TBI to

read and comprehend a flyer from a stranger, decide to either mail back a postcard or place a collect call to a stranger at a residence, and then set up an appointment several weeks or even months in the future and arrive at that appointment on time. These planning and organizational skills are often the very ones that are deficient in a person with a TBI. This had the effect of inadvertently selecting a sample that could complete these organizational tasks, which are often the very skills that, if lacking, preclude a successful return to work.

Directions for Future Research

Surprisingly, no variables in the current study adequately predicted the employment ratio outcome variable using a regression model. While this outcome measure intuitively appears to be the best representation of employment and productivity (taking into account actual months of employment pre- and post-injury), no independent variables adequately predicted it. Future research should continue to attempt to define relationships between this variable and other factors. Fraser et al. (1988) suggest that a broader range of work-related variables should be examined, including salary level, time in the work force, supervisors' ratings of adequacy, and absenteeism both pre- and post-injury.

It is clear that the most difficult obstacle to overcome in conducting research with TBI patients is recruitment of an adequate sample. Even with access to a population that will yield a potentially adequate N, the researcher is still faced with decisions regarding exclusion criteria. On the one hand, conclusions drawn from fairly homogeneous samples are more robust because there are fewer confounds in the subject pool. Prior alcohol and drug abuse, a history of multiple head injuries, and poor work histories all

make it difficult to determine predictor variables and to draw meaningful conclusions from the data. However, these "confounds" are the very characteristics often seen in many TBI patients. To take these out of the equation makes it difficult to generalize conclusions to a real world sample. One solution to this problem is to gather a large enough N, with lenient inclusion criteria, so that the researcher can examine the sample as a whole (i.e., more representative and therefore generalizable), and also has the option of partitioning the group into subsamples based on more stringent exclusion and inclusion criteria. This is likely difficult if not impossible to do in the state of Alaska, where most residents are treated both acutely and subacutely in another state, and hence difficult to recruit at the time of injury or shortly thereafter. The rural nature of living conditions in the state and the lack of consistent resources and follow-up, particularly for residents in bush and island communities, also pose an added challenge to research. One solution for optimizing initial recruitment is to collaborate with researchers in Seattle, Washington at a Level I trauma center where residents of Alaska are often taken for initial treatment and acute rehabilitation.

Measuring awareness of deficit also poses methodological difficulties. Specifically, the only means at this time of measuring an "accurate" portrayal of the TBI patient's functioning is to ask for a second person's opinion. This person is usually either a family member or a rehabilitation professional with whom the patient works closely. However, these informants hardly constitute a gold standard for an accurate assessment of the patients' functioning, as each person is subject to their own biases, regardless of direction. This was quite evident in the current study, though not obvious from examination of the raw data. It was noted during telephone interviews with family

members or friends that some informants demonstrated a tendency to minimize their loved ones' deficits, often in a defensive manner. Conversely, there were others who were frustrated and burnt out from dealing with the participants behavior, and seemed apt to overestimate the participant's level of impairment. There is no easy solution to this problem, though future studies should continue to develop highly objective measures with concrete behavioral definitions to aid in a more accurate assessment of functioning. When questions and statement are worded in ambiguous ways, there is room for the informant to interpret at will and provide subjective rather than objective data. It should also be noted that, as in the current study, it is quite possible that there is a subset of items within such awareness measures that best discriminates between successful and unsuccessful rehabilitation clients. It may prove useful to focus on questionnaire items that specifically address more subtle behavioral and emotional functioning rather than include all items. Questionnaires with items that are easy for everyone to answer accurately will decrease variability due to subjectivity.

Lastly, determining what measurement best constitutes a successful outcome is difficult. Depending on the values and goals of each individual, this may mean return to premorbid level of functioning (including job status), finding any form of gainful employment, engaging in productive activity regardless of monetary compensation, or simply enjoying recreational activities and interpersonal relationships. Each of these criteria is certainly valid depending on the point of view taken. However, if one wishes to examine success as a measure of economic productivity and allocation of financial and other resources, then one must examine return to productive work in relation to the amount of public and private funds spent in an effort to realize this goal. Though keeping

this measure of outcome consistent from study to study would be desirable from a research perspective, it is not realistic and is not representative of the many different ways of characterizing "success". Regardless of outcome measures used, future studies should make a point of justifying their own perspective and generalizing only where appropriate.

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Appendix A – **Internal Control Index**

Please read each statement. Where there is a blank, decide what your normal or usual attitude, feeling, or behavior would be:

A = Rarely (less than 10% of the time)
B = Occasionally (about 30% of the time)
C = Sometimes (about half the time)
D = Frequently (about 70% of the time)
E = Usually (more than 90% of the time)

Of course, there are always unusual situations in which this would not be the case, but think of what you would do or feel in most normal situations.

Write the letter that describes your usual attitude or behavior in the *space provided on the response sheet.*

1. When faced with a problem I ____ try to forget it.
2. I ____ need frequent encouragement from others for me to keep working at a difficult task.
3. I ____ like jobs where I can make decisions and be responsible for my own work.
4. I ____change my opinion when someone I admire disagrees with me.
5. If I want something I ____ work hard to get it.
6. I ____ prefer to learn the facts about something from someone else rather than have to dig them out for myself.
7. I ____ will accept jobs that require me to supervise others.
8. I ____ have a hard time saying "no" when someone tries to sell me something I don't want.
9. I ____ like to have a say in any decisions made by any group I'm in.
10. I ____ consider the different sides of an issue before making any decisions.
11. What other people think ____ has a great influence on my behavior.
12. Whenever something good happens to me I ____ feel it is because I've earned it.
13. I ____ enjoy being in a position of leadership.
14. I ____ need someone else to praise my work before I am satisfied with what I've done.
15. I ____ am sure enough of my opinions to try and influence others.
16. When something is going to affect me I ____ learn as much about it as I can.
17. I ____ decide to do things on the spur of the moment.
18. For me, knowing I'm done something well is ____ more important than being praised by someone else.
19. I ____ let other peoples' demands keep me from doing things I want to do.
20. I ____ stick to my opinions when someone disagrees with me.
21. I ____ do what I feel like doing not what other people think I ought to do.
22. I ____ get discouraged when doing something that takes a long time to achieve results.
23. When part of a group I ____ prefer to let other people make all the decisions.
24. When I have a problem I ____ follow the advice of friends or relatives.
25. I ____ enjoy trying to do difficult tasks more than I enjoy trying to do easy tasks.
26. I ____ prefer situations where I can depend on someone else's ability rather than just my own.
27. Having someone important tell me I did a good job is ____ more important to me than feeling I've done a good job.
28. When I'm involved in something I ____ try to find out all I can about what is going on even when someone else is in charge.

Appendix B – **Multidimensional Health Locus of Control Scale**

This is a questionnaire designed to determine the way in which different people view certain important health-related issues. Each item is a belief statement with which you may agree or disagree. Each statement can be rated on a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we wold like you to record the number that represents the extent to which you disagree or agree with the statement. The more strongly you agree with a statement, then the higher will be the number you record. The more strongly you disagree with a statement, then the lower will be the number you record. Please make sure that you answer every item and that you record *only one* number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

Please answer these items carefully, but do not spend too much time on any one item. As much as you can, try to respond to each item independently. When making your choice, do not be influenced by your previous choices. It is important that you respond according to your actual beliefs and not according to how you feel you should believe or how you think we want you to believe.

1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Slightly agree
5 = Moderately agree
6 = Strongly agree

____ 1. If I get sick, it is my own behavior which determines how soon I get well again.
____ 2. No matter what I do, if I am going to get sick, I will get sick.
____ 3. Having regular contact with my physician is the best way for me to avoid illness.
____ 4. Most things that affect my health happen to me by accident.
____ 5. Whenever I don't feel well, I should consult a medically trained professional.
____ 6. I am in control of my health.
____ 7. My family has a lot to do with my becoming sick or staying healthy.
____ 8. When I get sick, I am to blame.
____ 9. Luck plays a big part in determining how soon I will recover from an illness.
____ 10. Health professionals control my health.
____ 11. My good health is largely a matter of good fortune.
____ 12. The main thing which affects my health is what I myself do.
____ 13. If I take care of myself, I can avoid illness.
____ 14. When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.
____ 15. No matter what I do, I'm likely to get sick.
____ 16. If it's meant to be, I will stay healthy.
____ 17. If I take the right actions, I can stay healthy.
___ 18. Regarding my health, I can only do what my doctor tells me to do.

Appendix C – **Patient Competency Rating Scale (Self Report)**

Instructions

The following is a questionnaire that asks you to judge your ability to do a variety of very practical skills. Some of the questions may not apply directly to things you often do, but you are asked to complete each question as if it were something you "had to do". On each question, you should judge how easy or difficult a particular activity is for you and mark the appropriate space.

	Can't do	Very Difficult to do	Can do with some difficulty	Fairly easy to do	Can do with ease
1. How much of a problem do I have in preparing my own meals?	___	___	___	___	___
2. How much of a problem do I have in dressing myself?	___	___	___	___	___
3. How much of a problem do I have in taking care of my personal hygiene?	___	___	___	___	___
4. How much of a problem do I have in washing the dishes?	___	___	___	___	___
5. How much of a problem do I have in doing the laundry?	___	___	___	___	___
6. How much of a problem do I have in taking care of my finances?	___	___	___	___	___
7. How much of a problem do I have in keeping appointments on time?	___	___	___	___	___
8. How much of a problem do I have in starting conversations in a group?	___	___	___	___	___
9. How much of a problem do I have in staying involved in work activities even when bored or tired?	___	___	___	___	___
10. How much of a problem do I have in remembering what I had for dinner last night?	___	___	___	___	___

	Can't do	Very Difficult to do	Can do with some difficulty	Fairly easy to do	Can do with ease
11. How much of a problem do I have in remembering names of people I see often?	___	___	___	___	___
12. How much of a problem do I have in remembering my daily schedule?	___	___	___	___	___
13. How much of a problem do I have in remembering important things I must do?	___	___	___	___	___
14. How much of a problem would I have driving a car if I had to?	___	___	___	___	___
15. How much of a problem do I have in getting help when I'm confused?	___	___	___	___	___
16. How much of a problem do I have in adjusting to unexpected changes?	___	___	___	___	___
17. How much of a problem do I have in handling arguments with people I know well?	___	___	___	___	___
18. How much of a problem do I have in accepting criticism from other people?	___	___	___	___	___
19. How much of a problem do I have in controlling my crying?	___	___	___	___	___
20. How much of a problem do I have in acting appropriately when I'm around friends?	___	___	___	___	___
21. How much of a problem do I have in showing affection to people?	___	___	___	___	___
22. How much of a problem do I have in participating in group activities?	___	___	___	___	___

	Can't do	Very Difficult to do	Can do with some difficulty	Fairly easy to do	Can do with ease
23. How much of a problem do I have in recognizing when something I say or do has upset someone else?	___	___	___	___	___
24. How much of a problem do I have in scheduling my daily activities?	___	___	___	___	___
25. How much of a problem do I have in understanding new instructions?	___	___	___	___	___
26. How much of a problem do I have in consistently meeting my daily responsibilities?	___	___	___	___	___
27. How much of a problem do I have in controlling my temper when something upsets me?	___	___	___	___	___
28. How much of a problem do I have in keeping from being depressed?	___	___	___	___	___
29. How much of a problem do I have in keeping my emotions from affecting my ability to go about the day's activities?	___	___	___	___	___
30. How much of a problem do I have in controlling my laughter?	___	___	___	___	___

Appendix D – **Patient Competency Rating Scale (Relative's Form)**

Instructions

The following is a questionnaire which asks you to judge this person's ability to do a variety of very practical skills. Some of the questions may not apply directly to things they often do, but you are asked to complete each question as if it were something they "had to do". On each question, you should judge how easy or difficult a particular activity is for them and mark the appropriate space.

	Can't do	Very Difficult to do	Can do with some difficulty	Fairly easy to do	Can do with ease
1. How much of a problem do they have in preparing their own meals?	___	___	___	___	___
2. How much of a problem do they have in dressing themselves?	___	___	___	___	___
3. How much of a problem do they have in taking care of their personal hygiene?	___	___	___	___	___
4. How much of a problem do they have in washing the dishes?	___	___	___	___	___
5. How much of a problem do they have in doing the laundry?	___	___	___	___	___
6. How much of a problem do they have in taking care of their finances?	___	___	___	___	___
7. How much of a problem do they have in keeping appointments on time?	___	___	___	___	___
8. How much of a problem do they have in starting conversations in a group?	___	___	___	___	___
9. How much of a problem do they have in staying involved in work activities even when bored or tired?	___	___	___	___	___
10. How much of a problem do they have in remembering what they had for dinner last night?	___	___	___	___	___

	Can't do	Very Difficult to do	Can do with some difficulty	Fairly easy to do	Can do with ease
11. How much of a problem do they have in remembering names of people they see often?	___	___	___	___	___
12. How much of a problem do they have in remembering their daily schedule?	___	___	___	___	___
13. How much of a problem do they have in remembering important things they must do?	___	___	___	___	___
14. How much of a problem would they have driving a car if they had to?	___	___	___	___	___
15. How much of a problem do they have in getting help when they are confused?	___	___	___	___	___
16. How much of a problem do they have in adjusting to unexpected changes?	___	___	___	___	___
17. How much of a problem do they have in handling arguments with people they know well?	___	___	___	___	___
18. How much of a problem do they have in accepting criticism from other people?	___	___	___	___	___
19. How much of a problem do they have in controlling crying?	___	___	___	___	___
20. How much of a problem do they have in acting appropriately when they are around friends?	___	___	___	___	___
21. How much of a problem do they have showing affection to people?	___	___	___	___	___
22. How much of a problem do they have in participating in group activities?	___	___	___	___	___

	Can't do	Very Difficult to do	Can do with some difficulty	Fairly easy to do	Can do with ease
23. How much of a problem do they have in recognizing when something they say or do has upset someone else?	___	___	___	___	___
24. How much of a problem do they have in scheduling daily activities?	___	___	___	___	___
25. How much of a problem do they have in understanding new instructions?	___	___	___	___	___
26. How much of a problem do they have in consistently meeting their daily responsibilities?	___	___	___	___	___
27. How much of a problem do they have in controlling their temper when something upsets them?	___	___	___	___	___
28. How much of a problem do they have in keeping from being depressed?	___	___	___	___	___
29. How much of a problem do they have in keeping their emotions from affecting their ability to go about the day's activities?	___	___	___	___	___
30. How much of a problem do they have in controlling their laughter?	___	___	___	___	___

Appendix E - **The Brock Adapative Functioning Questionnaire (Self Report)**

NAME: _____ DATE: _____

IF YOU REQUIRE SOME HELP IN FILLING OUT THIS FORM, PUT THE NAME OF THE HELPER HERE: _____

RELATIONSHIP OF HELPER TO YOU: _____

DATE OF BIRTH: _____ DATE OF INJURY: _____

TYPE OF INJURY: _____

_____

EDUCATION LEVEL (PRIOR TO INJURY): _____ SINCE INJURY: _____

EMPLOYMENT/CAREER/SCHOOL GRADE (PRIOR TO INJURY): _____

_____

EMPLOYMENT/CAREER/SCHOOL GRADE (CURRENT): _____

_____

SPECIAL INTERESTS, HOBBIES, ETC., (PRIOR TO INJURY): _____

_____

SPECIAL INTERESTS, HOBBIES, ETC., (CURRENT): _____

_____

People are different in the way they approach situations. Please answer each question based on your typical behavior **AT THIS TIME.**

If you cannot answer a question, circle the [?].

If you feel that you would have answered a question the same before your brain injury, place a check beside ***same*** which means that this behavior is the ***same as before the injury.***

If a particular behavior has developed since your brain injury place a check beside ***changed*** which means that it represents ***a change in behavior that you have noticed since the brain injury.***

Jane Dywan, Ph.D., 1994 (version 02/01/95)

Place a check in the space that best describes your behavior. Read your choices carefully each time so you check the right end of the scale. Some behaviors may never be true for you. If you like, you can write "never" where we say "hardly ever" and then check that place.

Planning

1. **Do you have a hard time making plans for the day on your own?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

2. **When going out for the day, do you think about what you might need later in the day, for example, would you remember to bring a jacket in case it got colder, etc.?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

3. **When you have several tasks to do, do you organize them in an efficient way?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

4. **Would you be able to manage if an emergency came up when you were home alone?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

5. **When you make choices now, do you consider how they may affect you in the future?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

6. **When making long term plans for yourself, do you think carefully about what you would need to do in order to reach your goals?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

7. **When you make plans, do you think that your plans show good judgement (i.e., are they workable and realistic)?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

Initiation

8. **Do you have serious difficulty getting up in the morning unless you are actually prompted by another person?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

9. **Do you do your household jobs without being reminded by anyone?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

10. **Do you have trouble getting started on a project unless someone helps you get going?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

11. **Even when you know exactly what has to be done to keep a project going, do you have a hard time moving to the next step on your own?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

Flexibility

12. **Once you have made plans, is it very difficult for you to change them?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

13. **When doing a task, can you easily distinguish between the more important and the less important parts of the task? (That is, if you were forced to hurry, would you be able to skip the less important steps?)**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

14. **When telling someone about an event or a movie, can you easily skip the unimportant details if pressed for time?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

15. **Do you have real difficulty switching topics during a conversation?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

Excess Caution

16. **Do you go over and over the same things in your mind more than you really need to?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

17. **Do you find that you need to do things in the same way each time?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

18. **Do you become very uncomfortable if your usual routines have to be changed?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

19. **Do you find yourself checking <u>many times</u> to be sure that everything is safe (e.g., doors locked, stove off, etc.)?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

20. Do you have a hard time trusting other people?

Hardly ever / Rarely / Sometimes / Often / Almost always

[?]
[ ] same
[ ] changed

Attention

21. Do you get distracted easily?

Hardly ever / Rarely / Sometimes / Often / Almost always

[?]
[ ] same
[ ] changed

22. Are you likely to forget that you have left the stove or kettle on?

Hardly ever / Rarely / Sometimes / Often / Almost always

[?]
[ ] same
[ ] changed

23. Do you have a lot of trouble keeping track of where things are around the house?

Hardly ever / Rarely / Sometimes / Often / Almost always

[?]
[ ] same
[ ] changed

24. Do you have trouble following spoken directions?

Hardly ever / Rarely / Sometimes / Often / Almost always

[?]
[ ] same
[ ] changed

25. Do you have trouble sticking to the point you are trying to make when you are having a discussion?

Hardly ever / Rarely / Sometimes / Often / Almost always

[?]
[ ] same
[ ] changed

26. Are you easily confused in stores and shopping malls?

Hardly ever / Rarely / Sometimes / Often / Almost always

[?]
[ ] same
[ ] changed

27. Are you likely to get lost even in relatively familiar places?

Hardly ever / Rarely / Sometimes / Often / Almost always

[?]
[ ] same
[ ] changed

Memory

28. Do you have a hard time learning new skills?

Hardly ever / Rarely / Sometimes / Often / Almost always

[?]
[ ] same
[ ] changed

29. Do you have difficulty remembering events that happened in the last week?

Hardly ever / Rarely / Sometimes / Often / Almost always

[?]
[ ] same
[ ] changed

30. **Do you have difficulty remembering to do things that you had planned to do?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

31. **Do you have a lot of trouble remembering the names of people that you see regularly?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

32. **Do you have difficulty recognizing people that you have met before?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

33. **Do you have great difficulty recalling things that you used to know quite well?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

34. **Do you find it difficult to know whether the things you tell people happened in exactly the way you say they did?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

35. **Do you find it hard to distinguish between things that really happened and things that didn't really happen?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

Arousal Level

36. **Do you have difficulty staying awake or alert?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

37. **Does you voice sound flatter than you would like it to?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

38. **Do you find it very difficult to get enthusiastic about things?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

39. **Do you find it very hard to stay interested in what you are doing for a long period of time?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

40. Do you feel very sad or depressed?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

Emotionality

41. Do you feel as though you get much too excited about things?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

42. Do you think that you cry much too easily?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

43. Do you think that there are times when you talk or laugh too much or too loudly?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

44. Do you think that your eye contact can be too intense during conversations?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

Impulsivity

45. Do you find that you blurt things out that you probably shouldn't have said?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

46. Do you use alcohol (or other drugs) more than you think you should?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

47. Do you spend money unnecessarily without giving it much thought?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

48. Do you find yourself making comments that have to do with sex without thinking too much about what the effect will be on others?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

49. Do you find that you touch people in ways that would be considered sexual whether they want to do so or not?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

50. **Do you have a very hard time controlling the amount you eat?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

51. **Do you need help from others to keep from eating too much?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

Aggressiveness

52. **Are you quick to take offense at what others say?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

53. **When you get frustrated, are you likely to throw things around or damage things?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

54. **When you get angry are you likely to threaten people?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

55. **When you are pushed to the limit, could you strike out at someone?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

56. **If there is something that you really want to do, would you do it even if it was illegal?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

Social Monitoring

57. **Do you think that you stand a little too close when talking to people?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

58. **Do you miss the point of many jokes or stories that other people seem to enjoy?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

59. **Do you watch other peoples' faces to make sure that they are following your conversation?**

_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

60. **When telling things to other people, do you give them as much background information as they need so they can follow you easily?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

61. **If others are looking disinterested in what you are saying, do you try to bring your story to an end or change the topic?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

62. **Do you find yourself telling the same story over again to the same people?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

63. **When a social situation has gone poorly, do you try to figure out what went wrong so you can make it go better next time?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

64. **When someone has just done something for you, do you try to show your appreciation?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

65. **Can you tell when someone is feeling overtired or worried?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

66. **When someone close to you is overworked or worried, do you figure out ways to ease their load?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

67. **Do you notice when other people are feeling awkward in a social situation?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

68. **When someone is feeling awkward in a social situation, will you try to do something to make them more comfortable?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

ARE THERE ANY AREAS IN EVERYDAY FUNCTIONING WHERE YOU DO VERY WELL OR VERY POORLY THAT HAVE NOT BEEN COVERED IN THIS QUESTIONNAIRE THAT YOU THINK WOULD BE IMPORTANT TO MENTION? YOU COULD MAKE NOTE OF THEM HERE:

Appendix F - **The Brock Adaptive Functioning Questionnaire (Family member/friend)**

NAME OF FAMILY MEMBER/FRIEND: _____ DATE: _____

RELATIONSHIP TO PATIENT: _____

DATE OF ASSESSMENT: _____

DATE OF PREVIOUS ASSESSMENT (IF APPLICABLE): _____

SUBJECT INFORMATION

NAME OF PATIENT: _____ D.O.B.: _____

TYPE OF INJURY: _____
_____

DATE OF INJURY: _____

EDUCATION LEVEL (PRIOR TO INJURY): _____ (SINCE INJURY)_____

EMPLOYMENT/CAREER/SCHOOL GRADE (PRIOR TO INJURY): _____
_____

EMPLOYMENT/CAREER/SCHOOL GRADE (CURRENT): _____
_____

SPECIAL INTERESTS, HOBBIES, ETC., (PRIOR TO INJURY): _____
_____

SPECIAL INTERESTS, HOBBIES, ETC., (CURRENT): _____
_____

People are very different in the way they approach situations. Please answer each question based on the behavior of your friend or family member **AT THIS TIME.**

If you cannot answer a question, circle the [?].

If you feel that you would have answered a question the same before your friend or family member had a brain injury, place a check beside ***same*** which means that this behavior is the ***same as before the injury***.

If a behavior has developed since the brain injury, place a check beside ***changed*** which means that it represents ***a change in their behavior that you have noticed since the brain injury.***
Place a check in the space that best describes his/her behavior. Read your choices carefully each time so you check the right end of the scale. Some behaviors may never be true of your friend or family member. If you like, you can write "never" where we say "hardly ever" and then check that place.

Planning

1. **Does he/she have a hard time making plans for the day on their own?**
   _____/_____/_____/_____/_____ [?]
   Hardly ever Rarely Sometimes Often Almost always [ ] same
   [ ] changed

2. **When going out for the day, does he/she think about what might be needed later in the day, for example, bringing a jacket in case it got colder?**
   _____/_____/_____/_____/_____ [?]
   Hardly ever Rarely Sometimes Often Almost always [ ] same
   [ ] changed

3. **When he/she has several tasks to do, does he/she organize them in an efficient way?**
   _____/_____/_____/_____/_____ [?]
   Hardly ever Rarely Sometimes Often Almost always [ ] same
   [ ] changed

4. **Would he/she be able to manage (take the appropriate steps) if an emergency came up and they were home alone?**
   _____/_____/_____/_____/_____ [?]
   Hardly ever Rarely Sometimes Often Almost always [ ] same
   [ ] changed

5. **When making choices, does he/she consider how these choices may affect them in the future?**
   _____/_____/_____/_____/_____ [?]
   Hardly ever Rarely Sometimes Often Almost always [ ] same
   [ ] changed

6. **When making long term plans, does he/she think carefully about what they would need to do in order to reach their goals?**
   _____/_____/_____/_____/_____ [?]
   Hardly ever Rarely Sometimes Often Almost always [ ] same
   [ ] changed

7. **When he/she makes plans, would you say that their plans show good judgement (i.e., are they workable and realistic)?**
   _____/_____/_____/_____/_____ [?]
   Hardly ever Rarely Sometimes Often Almost always [ ] same
   [ ] changed

8. **Is he/she able to get up on time in the morning without actually being prompted by another person?**
   _____/_____/_____/_____/_____ [?]
   Hardly ever Rarely Sometimes Often Almost always [ ] same
   [ ] changed

9. **Does he/she carry out their household jobs without being reminded by anyone?**
   _____/_____/_____/_____/_____ [?]
   Hardly ever Rarely Sometimes Often Almost always [ ] same
   [ ] changed

10. **Does he/she have trouble getting started on a project unless someone starts them off?**
    _____/_____/_____/_____/_____ [?]
    Hardly ever Rarely Sometimes Often Almost always [ ] same
    [ ] changed

11. **Even though he/she knows exactly what has to be done to keep a project going, does he/she have a hard time moving to the next step on their own?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

Flexibility

12. **Once he/she has made plans, do they find it very difficult to change them?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

13. **When doing a task, can he/she easily distinguish between the more important and the less important aspects of the task? (That is, if forced to hurry, would he/she be able to skip the less important steps?)**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

14. **When telling someone about an event or a movie, can he/she easily skip unimportant details if pressed for time?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

15. **Does he/she have a hard time switching topics during a conversation?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

Excess Caution

16. **Does he/she appear to go over and over the same things in their mind more than they need to?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

17. **Does he/she like to do things in the same way each time?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

18. **Does he/she become uncomfortable if their usual routines have to be changed?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

19. **Does he/she check <u>many times</u> to make sure that things are safe (e.g. doors locked, stove off, etc.)?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

20. Does he/she seem more suspicious of other people than you think is necessary?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

Attention

21. Does he/she get distracted easily?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

22. Is he/she likely to forget that the stove or kettle has been left on?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

23. Does he/she have a lot of trouble keeping track of where things are around the house?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

24. Does he/she have trouble following spoken directions?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

25. Does he/she have trouble sticking to the point that they are trying to make when having a discussion?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

26. Is he/she easily confused in stores and shopping malls?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

27. Is he/she likely to get lost even in relatively familiar places?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

Memory

28. Does he/she have a hard time learning new skills?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

29. Does he/she have difficulty remembering events that happened in the last week?

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

30. **Does he/she have difficulty remembering to do things that they had planned to do?**
_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

31. **Does he/she have trouble remembering the names of people that they see regularly?**
_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

32. **Does he/she have a hard time recognizing people they have met before?**
_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

33. **Does he/she have trouble recalling things that they used to know quite well?**
_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

34. **Does he/she tell people things that may not be true?**
_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

35. **Does he/she tell people things that could not possibly be true?**
_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

Arousal Level

36. **Does he/she have difficulty staying awake or alert?**
_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

37. **Does his/her voice sound flat compared to other people?**
_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

38. **Does he/she find it very difficult to get enthusiastic about things?**
_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

39. **Does he/she find it very hard to maintain interest in what they are doing for a long period of time?**
_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

40. **Does he/she seem very sad or depressed?**
_____/_____/_____/_____/_____ [?]
Hardly ever Rarely Sometimes Often Almost always [ ] same
[ ] changed

Emotionality

41. Does he/she get much too excited about things?

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

42. Does he/she have difficulty controlling emotional responses (e.g., crying much too easily)?

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

43. Are there times when he/she laughs or talks too much or too loudly compared to others?

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

44. Do you find that his/her eye contact can be too intense during conversations?

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

Impulsivity

45. Does he/she make inappropriate comments or blurt things out that would be better left unsaid?

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

46. Does he/she use alcohol (or other drugs) more than they should?

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

47. Does he/she spend money unnecessarily without giving it much thought?

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

48. Does he/she make sexual remarks which seem inappropriate?

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

49. Does he/she touch people in ways which are sexually inappropriate?

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

50. Does he/she have a lot of trouble controlling the amount they eat?

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

51. **Does he/she need external constraints in order to control eating (for example, careful control over what food is left around the house, or a lock on the refrigerator)?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

Aggressiveness

52. **Is he/she quick to take offense at what others say?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

53. **When he/she gets frustrated, will they throw things around or damage things?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

54. **When he/she gets angry, will they threaten people?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

55. **When pushed to the limit, could he/she strike out at someone?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

56. **Would he/she do what they really want to do, even if it was illegal?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

Social Monitoring

57. **Does he/she stand a little too close when engaged in a conversation?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

58. **Does he/she seem to miss the point of many jokes or stories that other people seem to enjoy?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

59. **Does he/she seem to pay attention to whether others are following what they are saying?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

60. **When he/she is telling things to other people, does he/she give them as much background information as is needed so people can follow easily?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?] [ ] same [ ] changed

61. **If others are looking disinterested in what he/she is saying, will he/she try to stop talking or change the subject?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

62. **Does he/she tend to tell the same story over again to the same people?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

63. **When a social situation has gone badly, does he/she try to figure out what went wrong so they can make it go better the next time?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

Empathy

64. **If he/she had just received a favor or some special consideration, would they show appropriate appreciation?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

65. **Would he/she notice if someone was feeling overtired or worried?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

66. **If he/she noticed that someone close looked overworked or worried, would they do what they could to ease their load?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

67. **Does he/she seem to notice when other people are feeling awkward in a social situation?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

68. **When someone is feeling awkward in a social situation, will he/she do something that makes the person feel more comfortable?**

Hardly ever / Rarely / Sometimes / Often / Almost always [?]
[ ] same
[ ] changed

ARE THERE ANY AREAS IN EVERYDAY FUNCTIONIJNG WHERE YOUR FAMILY MEMBER OR FRIEND DOES VERY WELL OR VERY POORLY THAT HAVE NOT BEEN COVERED IN THIS QUESTIONNAIRE THAT YOU THINK WOULD BE IMPORTANT TO MENTION? YOU COULD MAKE NOTE OF THEM HERE:

_____

_____

_____

_____

Thank You

NEW RESEARCH ON HEAD INJURIES!

You can be a part of exciting new research aimed at helping vocational rehabilitation programs learn new and better ways to help people with head injuries find employment. If you choose to participate and complete the required interview, **you will receive $25 for your time.**

You can participate if you:

- had a head injury/traumatic brain injury that required hospitalization within the last 10 years,
- were 18 or older at the time of the injury, and,
- received any vocational rehabilitation services since this injury

This is what the study will require of you:

- Three hours of your time;
- Answer questions about your everyday life, how you feel about things, and changes you have noticed since your injury;
- Answer questions about your background (e.g., work history, education) and your present life;
- Take three or four short, interesting "tests" that will measure learning ability and drawing conclusions from information;
- Choose a family member or close friend I can call to ask a few more questions.

HOW CAN I BE A PART OF THIS STUDY??

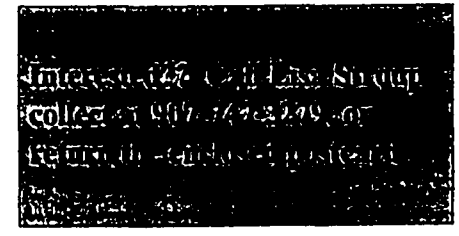
If you fit the description and would like to take part in the study:

- **return** the enclosed pre-addressed, stamped postcard. Fill out the back so that I can contact you when I receive it,

OR

- **call** me collect at 907-747-3279 if you would like to talk with me directly or if you just have some more questions. I will pay for the call.

Dates and locations for interviews are on the back of this flyer, and are tentative. If the dates or locations are not convenient, call me to reschedule.



Locations and Dates for Interviews

Anchorage
March 16th, 18th, and 19th
April 21st, 22nd, and 24th

Wasilla (Mat-Su area)
March 17th and 20th
April 20th and 23rd

Fairbanks
March 23rd and 24th
April 16th and 17th

Juneau
March 25th and 26th
April 27th and 28th

Sitka
anytime - contact me

- You will receive $25 for your time.
- The interview will be at a time to fit your schedule.
- Meetings can be at your local DVR office, your home, or another location.
- If you do not live in one of these locations, but are interested, please call to see if we can work something out. I may travel to the Kenai in April, and can travel to towns in Southeast anytime.

Some other information.....

- The results of this study may be used to improve the services of the Division of Vocational Rehabilitation. However, your participation is FULLY voluntary and in NO WAY affects your ability to receive services from DVR or any other agency.
- Everything we talk about, including test results, will be confidential. Your name will not be associated with any of the results or findings from this study.
- You will receive a brief report describing your results about one month after the interview. This will give you some idea about how you compare to people in the study, and to other people in general.
- You will always be able to contact me by phone if you have any questions, comments, or concerns regarding the study.

Thank you very much for taking the time to read this - I hope to meet you!!!

Sincerely,

Lisa Stroup, M.A.
Doctoral candidate in clinical psychology
at the University of Victoria

P.O. Box 639
Sitka, AK 99835
(907) 747-3279

Interested in Helping Other People with Head Injuries???

Keep reading for more information...

Appendix H – **Vocational Rehabilitation Counselor Survey**

The following survey is designed to supplement an ongoing study of employment outcomes in people who have sustained a traumatic brain injury. This research will, in part, fulfill a doctoral dissertation requirement, and is being funded by the Division of Vocational Rehabilitation. It is our desire to better quantify the nature of vocational rehabilitation services as they apply to this population. By answering the following questions, you will enable us to examine another component of this process.

Please circle your responses on the scale that follows each question. Obviously, there are no right or wrong answers. Your responses will remain confidential – there is no need to put your name on this questionnaire. If you have further comments on any of the questions, please use the space provided for feedback.

From here forward, "TBI" will refer to a traumatic brain injury or head injury that resulted from a discrete traumatic event, such as a motor vehicle accident or work-related accident. It does NOT refer to other degenerative or biological processes, such as dementia, stroke, viral encephalitis, toxic exposures, or other neurological disorders.

Thank you very much for your time and participation in this critical study.

1.) How many clients have you worked with whose primary disability is a result of a TBI?

0 *1-5* *6-10* *11-15* *more than 15*

2.) Have you ever participated in any workshops, continuing education classes, training sessions, or inservices specifically designed to increase your knowledge and awareness of issues related to TBI?

No *Yes*

3.) If you answered "Yes" to question 2, about how much time have you spent in these training sessions?

<one day *one day* *two to five days* *one week* *>one week*

4.) How well-prepared are you to provide effective vocational rehabilitation counseling to clients with a TBI?

minimally *somewhat* *adequately* *very well*

5.) How would you describe your "success" rate with TBI clients as compared to clients with other disabilities?

much less successful	*less successful*	*about the same*	*more successful*	*much more successful*

6.) With respect to "standards", do you define "success" differently for clients with a TBI as compared to clients with other disabilities?

lower standard *about the same* *higher standard*

If you circled "lower" or "higher", please comment:

7.) Do you believe that clients with a TBI have rehabilitation issues that make them unique from all other clients with respect to vocational planning?

many issues *some issues* *about the same* *fewer issues*

8.) How helpful to the rehabilitation process, generally speaking, are family and friends of the client with a TBI?

not at all helpful *somewhat helpful* *critical to the process*

9.) How much of a hindrance to the rehabilitation process are family and friends of the client with a TBI?

not at all a hindrance *somewhat of a hindrance* *major hindrance*

10.) How helpful do you find other agencies and organizations, such as Independent Living Centers, head injury support groups, etc., to be in vocational rehabilitation and planning with a client with a TBI?

not at all helpful *somewhat helpful* *critical to the process*

11.) Please circle the FIVE **most common** problems YOU associate with a TBI:

Chronic pain from physical injuries
Decreased ability to set realistic goals
Decreased initiative and drive
Decreased insight/awareness of deficits
Decreased vision
Dizziness
Fatigue/lack of stamina
Headaches
Increased impulsivity
Poor balance
Poor memory
Poor social judgement
Problems following directions
Problems speaking
Problems with ambulation
Reduced attention span

12.) Now, from the same list as above, circle the FIVE problems that YOU believe are the **most troublesome for successful vocational rehabilitation:**

Chronic pain from physical injuries
Decreased ability to set realistic goals
Decreased initiative and drive
Decreased insight
Decreased vision
Dizziness
Fatigue/lack of stamina
Headaches
Increased impulsivity
Poor balance
Poor memory
Poor social judgement
Problems following directions
Problems speaking
Problems with ambulation
Reduced attention span

If you wish, please share any other thoughts or comments on your experience with TBI clients:

Thank you for your time – please return this survey to the address indicated in the cover letter.
Lisa Stroup, M.A.
Doctoral Candidate in Clinical Neuropsychology at the University of Victoria