Chapter 2

Why psychology is important in rehabilitation

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Psychological expertise is an integral component of the continuum of rehabilitation processes from medical inpatient treatment for persons with acute-onset disabilities to the vocational training and placement for persons living with severe and chronic disabilities. Psychological perspectives were formally integrated into the vocational rehabilitation enterprise over a century ago; the ensuing decades and accompanying sophistication in research and practice intensified the role of psychologists at all levels of decision-making and service delivery across the rehabilitation service delivery spectrum.

In this chapter, we will review the major areas of psychological expertise in the rehabilitation process. This will entail an overview of important roles and supportive research. We will offer definitive examples of essential activities performed by psychologists and conclude with comments about future directions for practice and research.

Historical overview

Emotional issues and cognitive problems were recognized in the early days of modern medical rehabilitation as psychological concerns that complicated initial reactions to physical disability. However, the mortality rate of persons acquiring severe physical disability in the early twentieth century was quite dismal, and the clinical activities of psychologists of the day were rather circumscribed, so there was little psychological involvement of psychologists in the medical rehabilitation programs at that time. In contrast, persons who incurred disabling (but less life-threatening) physical or sensory disabilities in the evolving workplace that characterized the Industrial Revolution, and others who incurred disability in times of international conflict, experienced considerable difficulties as they returned to their communities. These persons eventually attracted attention and support from policymakers and charitable organizations. Psychologists participated in the vocational rehabilitation programs that emerged in the early to mid-twentieth century to help these individuals resume meaningful roles in their personal, social, and vocational roles (Elliott and Leung, 2005).

Psychologists’ involvement in medical rehabilitation accelerated in the mid-twentieth century as medical interventions and technologies improved and many soldiers survived debilitating wounds incurred in wartime. Psychologists were hired in the medical systems established to provide rehabilitation services for veterans. Rehabilitation medicine was influenced tremendously by pioneers such as Sir Ludwig Guttmann who recognized the need for patients to actively participate in their therapies, resume leisure and recreational activities as part of their rehabilitation program, and pursue community reintegration. Academic psychology was informed by applications of field theory by protégés of Kurt Lewin who worked in clinics serving war veterans (Dunn and Elliott, 2005). Other psychologists entered medical rehabilitation settings to provide behavioral expertise in designing effective services for persons surviving industrial and pedestrian accidents with long-term concomitants that were not responsive to standard medical interventions (e.g. chronic pain; Fordyce, 1976).

New opportunities and formal recognition for professional psychology occurred in several pivotal events in the latter part of the twentieth century. In the United States, psychologists were involved in federal policy that created systems of care for persons who incurred spinal cord injuries (SCI) and later for persons who sustained traumatic brain injuries (TBI). SCI model systems were first initiated to create a shared database across medical centers that permitted the empirical study of medical and psychosocial issues and management techniques for this high-cost yet low-incidence disability. TBI model systems, in turn, were initiated later to address the complex needs of the increasing numbers of persons who sustained this injury. These systems (and other similar systems of care such as burn rehabilitation) provided influential and long-lasting roles for professional psychology in clinical, research, and administrative capacities.

Similarly, professional psychology was established as a required component of programs seeking accreditation from the Commission for the Accreditation of Rehabilitation Facilities (CARF). Other important landmarks include the emergence of related psychological specialties of health psychology, neuropsychology and geropsychology in medical settings, which directly enriched research and service throughout most medical specialties. These applied variants of professional psychology grew in direct association with the increasing numbers of persons with chronic diseases that culminate in disabling conditions (including several that reached epidemic proportions including HIV and diabetes mellitus), the increasing numbers of persons living into old age in the community, the increased life expectancy of persons with physical disabilities, and the increasing inability of traditional medical institutions and professions to meet the ongoing needs of persons living with these circumstances.
As a consequence of these various factors and events, an impressive literature base and repository of collective clinical and administrative experience now characterize the field of rehabilitation psychology. Furthermore, new conceptualizations of disability and rehabilitation have changed from the traditional medical model to others that acknowledge personal, social, and environmental factors that are well within the scientific and clinical purview of psychology.

Evolved models of disability and rehabilitation

Implied in the preceding discussion of the historical background and the contemporary context of rehabilitation was the evolving and shifting roles of medical professions and institutions in the rehabilitation enterprise. The medical model of disability is ultimately responsible for the rapid and effective delivery of medical interventions and coordinated ancillary therapies that met the acute physical needs of persons who sustain disabilities; many in these professions also were among the first to advocate improved social, psychological, community, and governmental services for those who survived acquired disabilities and needed specialized initiatives to improve their quality of life and expedite resumption of personal, social, and vocational activities (Elliott and Dreer, in press).

Ultimately, health care services based in a medical model assume a ‘find it and fix it’ approach to any presenting problem: A problem is diagnosed based on the best objective evaluation and an established and logical treatment is prescribed (Kaplan, 2002). This line of reasoning guided the development of acute care facilities and tertiary care programs designed to provide specialized services (as prescribed) to restore function in affective domains (or rehabilitate to the utmost capacity), and to evaluate the progress of the prescribed treatments. This approach relies heavily on the objective assessment and diagnosis of a condition and its concomitants, and as such, eventual success of the treatment does not depend on subjective reports and feedback from the patient receiving the service.

With improved emergency response interventions and medical rehabilitation services, more individuals survive acquired disabilities and the life expectancy for persons with physical disability has increased substantially (Crews, in press). The course of chronic disease and disability, including the prevention of disabling secondary complications and the attainment of optimal functioning and quality of life, is influenced primarily by behavioral and social mechanisms. Medically based models of service delivery and their associated institutions are best suited for acute care service delivery, and they are ill-suited for conceptualizing and directing services that address behavioral and social factors that can prevent complications and promote health and wellness. Traditional acute rehabilitation programs do not adequately meet the educational and therapeutic needs of persons with acquired disabilities who return to the community with considerable life expectancy (Frank et al., 2004).

Moreover, the financial costs associated with the provision of health care services to persons with chronic disease and disability — including acute episodes of care for preventable complications — account for the majority of health care expenditures across most Western nations (Institute of Medicine, 2001; WHO, 2002). In attempts to manage these costs, most health care delivery systems have curtailed services and limited access to care for many persons with disability.

The limitations of the medical model of disability have been addressed in alternative models espoused by the Institute of Medicine (Institute of Medicine, 2001) and the World Health Organization (WHO, 2001), and a chapter devoted to health and well-being appeared in the most recent Healthy people 2010 series (US Department of Health and Human Services, 2000). In the International classification of functioning, disability, and health (ICF), the WHO recommends separate ratings of impairment along dimensions of body structure impairment (and functioning) at the organic level, the degree of functional activity (or limitation) at the person level, and the degree of participation at the societal level. Environmental factors are recognized in this conceptualization as a major aspect of disablement. In the ICF, a specific medical condition (or physical disability) is an insufficient means of explaining, understanding, anticipating or rehabilitating any aspect of disability experienced by an individual. This highly influential model of disability places greater emphasis on behavioral and social factors in the optimal adjustment of persons who live with chronic disease and disability, and ratings are contingent upon objective evaluations and subjective reports from individuals with the condition.

Psychology and rehabilitation: a working model for research and practice

Psychologists have long understood that disability and rehabilitation is best expressed in the Lewinian equation

\[ b = f(p \times e) \]

in which behavior is a function of the person and the environment (Wright, 1960). The degree to which psychologists place greater weight on the person or the environment side of the equation has varied, depending upon theoretical or clinical bias. Nevertheless, decades of research practice across literatures and clinical settings converge to provide a dynamic model for understanding adjustment following disability that can inform the current role of psychology at all levels of rehabilitation. As depicted in Figure 2.1, adjustment is a dynamic process that can be understood in the parallel
domains of physical health and personal well-being, and these domains are influenced by factors routinely studied in the broader fields of psychology including behavioral patterns, individual difference variables, social support, interpersonal and family relationships, and specific characteristics of the psychosocial environment that may affect adjustment including gender, culture, race and ethnic identity, and age-related and other developmental variables. Practically all of these reflect basic psychological processes that are studied among people in general, and the associated principles and properties of these psychological theories and constructs apply to persons with disabilities.

There are certain accommodations in this conceptualization to account for unique aspects of a specific disabling condition and environmental aspects that pertain to matters of policy and access. First, unique aspects and concomitants associated with a specific disability are subsumed under the domain labeled Enduring Characteristics and Individual Differences. This is at odds with medically based models that construe a diagnostic condition as a primary explanatory factor in the adjustment process. In contrast, the dynamic model explicitly recognizes the far-reaching implications of psychological characteristics and behavioral patterns for health and well-being.

Second, this model acknowledges the dynamic continuum in which behavior occurs, in terms of changes that follow in the wake of legislative and market trends, and in terms of changes that may be associated with age, family relationships, acquired abilities, and income. Third, the model concede that individuals vary considerably in the environmental conditions in which they live that in turn may pose unique impediments to their adjustment (or unique supports that facilitate it), as contained in the component Environmental Characteristics and Social Characteristics.

However, the dynamic model recognizes that the relation of these factors to adjustment is mediated through phenomenological and appraisal processes unique to the individual; this component is an obvious concession to influential stress and coping models that have established the primacy of subjective appraisal activity in personal adjustment in times of stress (Lazarus and Folkman, 1984). The implications of this component are considerable and they derive from the known influence appraisals have on coping, motivation, and self-report measures of behavior, generally, and on various aspects of an individual's interpersonal and social world.

The dynamic model emphasizes elements of positive adjustment, and its focus is not confined to matters of pathology. Optimal adjustment among persons with physical disability is the fundamental outcome in the rehabilitation enterprise, and it is characterized by subjective well-being, meaningful activities, satisfying relationships, and good health. Too often rehabilitation programs—like most health care delivery systems, generally—are preoccupied with secondary complications, ill health, and psychopathology at the expense of adaptive behaviors, positive assets, and indicators of optimal adjustment (Elliott et al., 2002a). This bias certainly reflects the problem-oriented (and problem-solving) mentality of rehabilitation programs, but it also demonstrates the ways in which people with disabilities are inadvertently defined by the existence and detection of problems and deficits, which relegates them to a second-class citizenship (Olkin, 1999; Wright, 1960). The dynamic model recognizes both positive and negatives aspects of adjustment over the lifespan, and stipulates that these outcomes are essentially predicted by similar psychosocial mechanisms.

**Integrating the ICF and the dynamic model of adjustment**

The ICF tacitly acknowledges the limited explanatory power of any given medical diagnosis in the prediction of any significant index of adjustment, and it recognizes the powerful influence of behavioral and social factors in subsequent adjustment. Unlike the medical model, which relies on professional and objective assessment of symptoms, signs, and outcomes, the ICF places considerable weight on the subjective experience of the individual, and upon the individual's report of personal, social, and
environmental factors. The ICF also recognizes psychological well-being and social activity as essential elements of overall adjustment and it implies recognition of the intricate link between psychological adjustment and optimal physical health. Yet the ICF is not a psychological model of adjustment; it does not provide explicit and testable hypotheses to advance our understanding of behavioral processes among people with chronic health conditions. However, the ICF acknowledges the importance of psychological well-being and personal independence in everyday routines, and thus it respects individual experience in ratings of adjustment and performance in various domains.

The ICF offers tremendous and unprecedented opportunities for psychologists to further illustrate the immense explanatory power and utility of psychological science, research, and consultation that stem from psychological theory expertise, which in turn will provide clear avenues for developing and implementing testable interventions and services for persons with chronic health conditions to facilitate their overall health and well-being (Johnstone, 1997). To a great extent, this scenario will permit psychologists to assume a lead role in promoting science-based, empirically driven service delivery systems for persons with chronic health conditions.

Reasons why psychology is important in rehabilitation

Within the context of the dynamic model of adjustment following disability, we can enumerate the basic tenets of rehabilitation that demonstrate the reasons why psychology is essential to the rehabilitation process, and we can delineate emerging roles in which psychology will realize more influential activity in administration, resource allocation, and policymaking. We can consider these essential functions in clinical and research activities across all components of the dynamic model.

First reason: psychological factors predict adjustment

Behavioral and social factors account for substantial variance in the prediction of important outcomes among persons with physical disability, above and beyond that attributable to immutable characteristics of any specific disabling condition (with some exceptions occurring in cases of severe brain-behavior deficits).

The WHO ICF model implicitly acknowledges that a specific disability diagnosis has insufficient explanatory power: There is considerable variation in the ways in which people adjust to their circumstances and pursue their routines, activities, and personal and social roles in everyday life. Evidence from the extant literature underlines this position: Both people in general and people with chronic health conditions vary in their ability to cope and adjust, and this is determined by an array of behavioral and social processes.

These factors are accommodated in the dynamic model of adjustment, but their importance is often obfuscated in clinical service programs and research designs that are constructed upon specific diagnostic entities. The diagnostic condition serves as the centerpiece for clinical and academic activity. Consonant with the medical model, this has considerable utility and convenience in acute care episodes in which necessary interventions are relatively circumscribed and focused on expert, coordinated, and fairly invasive procedures dictated by the urgency and severity of the physical condition. This is a hallmark of medical specialties and their respective services and literature base. But this model proves awkward and cumbersome as the acute needs are met and behavioral and social issues exert their influence on routine and ongoing activities that affect daily living, and ultimately influence outcomes important in the ICF model. Unfortunately, much of the relevant literature is demarcated by artificial boundaries that define medical specialties, so it is difficult to appreciate the converging evidence supporting the consistency of the underlying behavioral and social processes that affect adjustment across diagnostic conditions.

Indicators of disability severity may be related to specific functional abilities, but key reviews have concluded that participation in meaningful, and rewarding personal and social activities is inconsistently associated with disability severity (Dijkers, 1997; Whiteneck, 1992). This is not surprising, given the well-documented effects of behavioral and social factors in the prediction of self-reported adjustment among persons with disabling conditions (e.g., Elliott and Frank, 1996). For many decades, antiquated and untested stage models of adjustment dominated clinical thinking about initial and subsequent reactions to sudden or gradual physical disability, and the lingering effects of these anecdotal models can still be heard in casual references to ‘denial’ observed among persons receiving rehabilitative services. However, empirical investigations have consistently demonstrated that persons at risk of depressed moods, depressive symptoms, and episodes of depressive syndromes have unique and measurable psychosocial characteristics that are observed among people in general at risk of depression. Moreover, individuals with physical disability who have more psychosocial assets along these various dimensions are more likely to exhibit optimal adjustment and resume meaningful activities (Elliott et al., 2002a).

These differences have been found on self-report measures of positive and negative adjustment. Persons who have effective problem-solving abilities are more likely to report greater acceptance of disability at discharge from an inpatient rehabilitation program than persons who have ineffective problem-solving skills (Elliott, 1999). Ineffective problem-solving abilities
are also associated with higher depression scores and more psychosocial impairment above and beyond variance attributable to disability severity and time since the onset of injury (Elliott et al., 1991). Ineffective problem-solving skills have been associated with greater self-reported disability among persons with chronic low back pain (Witty et al., 2001) and among persons with traumatic brain injury (Rath et al., 2003a). Other psychological characteristics predictive of self-reported disability and functional impairment regardless of disability severity include hope (Snyder et al., 2005), goal orientation (Elliott et al., 2000), and neuroticism (Jang et al., 2002; Rozen and Casten, 2001). Collectively, these findings indicate that psychological characteristics have a pronounced effect on self-report measures of adjustment, function, and disability. The actual mechanisms that are at work in these effects may range from influence on adaptive coping and goal-directed behavior that result in optimal adjustment, to a response bias that contaminates self-report measurement of disability and adjustment.

Compelling evidence from studies integrating objective indicators of severity, symptoms, and outcomes with important psychological constructs has given us insight into several possible mechanisms that influence adjustment following disability. As suggested in the dynamic model, several enduring personality characteristics appear to predispose individuals to certain outcomes. In the chronic pain literature, for example, personality characteristics assessed by Scale 3 of the Minnesota Multiphasic Personality Inventory (MMPI) are predictive of persons who return to work six months (Gatchel et al., 1995a) and one year (Gatchel et al., 1995b) after participating in a pain rehabilitation program (and there is prospective evidence linking these characteristics to persons at risk of pain injuries in the workplace; see Bigos et al., 1991). These studies provide evidence of possible long-term and substantive effects of personality in the rehabilitation process. Generally, the MMPI measures rather pathological behavioral patterns that are often expressed in personality characteristics; of particular importance in these studies is the use of an objective and meaningful adjustment outcome. Employment is associated with greater life satisfaction among persons with disabling conditions and individuals who are not employed are often at risk of secondary complications (Elliott and Leung, 2005).

Pre-disability behavioral patterns emerge as strong predictors of outcomes across other conditions. Pre-injury occupational status is a major determining factor of employment following traumatic brain injury (along with several behavioral, emotional, and neuropsychological indicators; Ownsworth and McKenna, 2004). Among persons with SCI, persons with pre-disability patterns of heavy alcohol consumption display fewer functional gains and longer stays in initial rehabilitation than those without such histories (Bombardier et al., 2004), and they are more likely to develop pressure sores over the first three years of SCI (Elliott et al., 2002b). Certain cognitive-behavioral characteristics have also been associated with health status following disability. These characteristics may be relatively stable and reflect pre-disability behavioral patterns, yet they are amenable to cognitive-behavioral intervention. Effective problem-solving abilities are prospectively predictive of pressure sore occurrence in the first three years of SCI, and this effect occurs independently of disability severity (Elliott et al., 2006). Other data implicate family caregivers' problem-solving abilities in pressure sore development among persons with SCI (Elliott et al., 1999).

The dynamic model posits that subjective appraisal processes are unique mechanisms that influence adjustment, and these often mediate the effects of disability variables, personality characteristics, and behavioral patterns on subsequent adjustment. In this conceptualization, the dynamic model differs from the ICF: The ICF makes no allowance for these important phenomenological activities and these can affect adjustment. Yet cognitive appraisals can directly influence the perception, experience, and reporting of distress, symptoms, and impairment.

Appraisals can be situation- or stress-specific. It is imperative to note that there is considerable variation in the appraisal process between people and we know there can also be considerable consistency over time in the ways a given individual may appraise stress. For example, persons high in neuroticism have a more pessimistic interpretation of routine and stressful events than those low in neuroticism (Watson and Pennebaker, 1989), so we expect persons with high neuroticism to have negatively valenced scores on any self-report measure, including measures of physical symptoms (including pain), environmental constraints, or functional activity. Others may interpret actual physical sensations in a 'catastrophizing' manner, which contributes to greater distress and disability (Turner et al., 2002). Alternatively, persons who report effective problem-solving abilities are less likely to report physical symptoms under routine and stressful conditions (Elliott et al., 2004). Individuals who look inward to find some ability to exert control over their internal states, regulate negative cognitions and moods, identify meaningful personal goals, and restructure their personal values are more likely to experience positive psychological growth following disability (Elliott et al., 2002a).

Specific appraisals of the degree to which a disabling condition interferes with goal-directed and routine activities predict greater distress than objective qualities of the condition (Harkins et al., in press); in contrast, this study also demonstrated that perceived abilities to tolerate symptoms were associated with less distress. Both interference and tolerance appraisals operate in the regulation of distress, and in the process exert an effect on self-reported impairment independent of disability severity (Dreer et al., 2005).
Case Vignette 2.1: How psychological therapy can enhance rehabilitation outcomes

Mike was a 26-year-old unremarkable Caucasian man who was admitted to inpatient rehabilitation nine days after a traumatic SCI. He had sustained an ASIA A L2-L3 injury following a motor vehicle accident in which he was the sole passenger. An evaluation was done by the rehabilitation psychologist on the first morning of his admission. Mike presented initially with severely depressed mood and anxious affect. He was tearful when discussing the events of the accident, of which he remembered and verbalized feelings of guilt (for the circumstances/policies that caused the accident to occur). Mike also expressed significant emotional distress over the effect his SCI would have on his sexual functioning. According to Mike, "My life is completely over. I don't have anything left." Within a few minutes of the session, he began to verbalize not only thoughts of suicide but to plan how to end his life after leaving the hospital. The rehabilitation psychologist, in consultation with the psychiatrist, was able to develop a safety plan for Mike, including contact with Psychiatry to prescribe antidepressant medication. Psychological intervention was provided to Mike on a daily basis to provide cognitive-behavioral therapy for his depression and education on sexuality issues following SCI. This helped him to learn ways to cope with his condition and to see and understand options for intimacy and sexual expression. Additionally, the rehabilitation psychologist worked with Mike and his girlfriend of two years in couple sessions to help them communicate more effectively when Mike got frustrated over his limitations and projected those frustrations on his girlfriend. Throughout his rehabilitation stay, Mike's coping skills increased dramatically and his coping skills increased, his verbalizations of hopelessness and helplessness dramatically decreased. His affect and mood also improved on a daily basis. As his psychological state improved, his physical ability to manage his SCI also increased. When Mike reached the end of his inpatient stay, his high anxiety level returned when he prepared for the transition to home with his parents; however, these issues were discussed in depth in individual sessions to help normalize the experience of the transition from inpatient rehabilitation to home. Additionally, the rehabilitation psychologist worked closely with the specialty home-based program that was in place for his continued rehabilitation needs. This allowed the coping skills learned in inpatient rehabilitation to be reinforced by the home-based treatment team. Within five months of discharge to the home setting, Mike was experiencing only occasional episodes of sad mood that appeared to be well within normal limits. He began to attend the outpatient support group for individuals with SCI at the rehabilitation hospital and was using his own experience to help newly injured patients at the hospital, on both an individual basis and in the inpatient group. Mike also maintained his relationship with his girlfriend and she continued to show her support by encouraging Mike in his new pursuits of driving and his eventual plan to return to college.

Second reason: psychological expertise in measurement and service delivery is essential to rehabilitation

With their scientist-practitioner orientation, psychologists have the particular expertise to develop, study, and administer measures and assessments of activities relevant to the rehabilitation enterprise and to the development, implementation, and evaluation of services to persons with physical disability.

Given the immense evidence demonstrating the predictive power of psychological variables in the well-being and health of persons receiving rehabilitation services, psychologists have a vital role in the evaluation, assessment, and measurement of these and other activities integral to rehabilitation. Traditionally, psychologists have conducted clinical assessments to identify specific deficits, characteristics, and needs for rehabilitation, and to confer with multidisciplinary teams and various community agencies (e.g., vocational rehabilitation programs, school systems) to maximize therapeutic and community reintegration (Glueckauf et al., 1993). In the early years of rehabilitation, psychologists were involved in the development of relevant norms and the adaptation of popular measures for use with persons with an array of physical or sensory impairments, as these persons were typically underrepresented in normative data and understudied, generally (Elliott and Leung, 2005). These activities remain vibrant aspects of rehabilitation psychology (see Cushman and Scherer, 1995), and clinical practice continues to rely on psychometric instruments for expert assessment in the domains of psychopathology, personality, and individual differences, behavioral patterns, cognitive and intellectual abilities, and physical and emotional health. These domains are subsumed in the related components of the dynamic model of adjustment displayed in Figure 2.1.

In the acute inpatient setting, psychologists often receive consultations from attending physicians to assess the psychological and cognitive functioning of a patient within the first few days of the onset of injury. Assessments in the intensive care unit usually include a clinical interview to assess the patient's psychological functioning, complemented by a brief
Case vignette 2.2: How psychological assessment can enhance gains in rehabilitation

David was a 42-year-old Caucasian man who was injured following an unrestrained motor vehicle collision (MVC). As a result of the MVC, David sustained a 12-inch fracture resulting in paralysis and sensory deficits in the lower extremities. He also sustained a closed TBI and had a Glasgow Coma Scale score of 14. An initial psychological assessment of David was done in the intensive care unit (ICU) and included the Galveston Orientation and Amnesia Test (GOAT). David’s GOAT score was in the borderline range and indicated the presence of post-traumatic amnesia. David also reported feeling depressed, hopeless, and worried about the future, as well as reporting symptoms of insomnia, decreased appetite, and tearfulness. The initial psychological assessment also allowed the rehabilitation psychologist to be part of the inpatient SCI team for David’s transition to inpatient rehabilitation.

Once David was admitted to inpatient rehabilitation, he was seen again by the rehabilitation psychologist who conducted the initial evaluation in the ICU. David was given a series of tests to assess both his cognitive and emotional functioning. The purpose of the assessment was to use the results to help the inpatient SCI team work with David’s potential deficits but also to capitalize on his strengths to improve their therapy interventions. David was given the following measures: the Wechsler Adult Intelligence Scale (3rd edition, WAIS-III), the Millon Behavioral Medicine Diagnostic (MBMD), a second GOAT, the Rivermead Behavioral Memory Test (2nd edition, RBMT-2), and the Beck Depression Inventory (BDI). The results of David's testing suggested that he had an IQ in the average range and the differences between his verbal and performance scales suggested that he would perform better on visual motor tasks as compared to verbal tasks. This was an important finding to share with the inpatient SCI treatment team. As a consequence of this information, the therapists and physician provided David with visual demonstrations and pictures rather than verbal instruction whenever possible to enhance his comprehension of the SCI education curriculum. David’s repeat GOAT showed a shift from a borderline range at the ICU assessment to a normal range at the time of the evaluation in inpatient rehabilitation. However, he still reported retrograde amnesia. Additionally, David’s performance on visual memory was in the average range, as was his performance on auditory non-contextual memory ability. Again, this was critical information for the inpatient SCI team as they found it beneficial to provide him with...
repetition in a variety of therapy tasks and educational materials. It also lessened the frustration on the part of the therapists when David didn't seem to be getting better.

The MBMD and BDI provided an overview of David's socio-emotional and personality functioning as well as suggestions for how the therapy staff could better interact with him, in order to meet the treatment goals. David did endorse symptoms of depression as indicated by both the BDI and the MBMD. However, personality testing also indicated that David had always conceptualized his life in a negative way, which was substantiated by the clinical interview. David had experienced many negative life events including the death of his father three months prior to his SCI and an estranged relationship with his mother. He had a very limited social support system which consisted primarily of his current girlfriend, and he feared he would lose the relationship because of the SCI. Personality testing also indicated that he had a historical tendency to be distrustful of others for fear of being hurt and being taken advantage of (which was confirmed by his own perceived minimal social support). Tests also showed David's strengths. He endorsed that he viewed himself as tough and strong, and despite his depression, he viewed himself as someone with a future. This testing allowed the rehabilitation psychologists to help communicate to the team that the best approach in working with David was to build a strong, working alliance to facilitate his progress and therefore maintain his overall performance in physical therapy and occupational therapy tasks. Additionally, the testing suggested David's need to have a therapist as the admission rehabilitation hospital plan included regular psychological intervention to build his coping skills and provide much-needed support and empathy. As a consequence of the psychological assessment, David's therapy team could help him maximize his rehabilitation and provide him with the tools he needed to cope effectively with his SCI.

Third reason: psychological expertise is essential at all levels of service development, delivery, and evaluation

With their scientist-practitioner orientation, psychologists have the particular expertise to develop, study, administer, and evaluate services provided to persons who live with physical disability.

Rehabilitation provides a series of coordinated, strategic therapies that ideally restore function and facilitate personal health. Psychologists possess unique consultative, measurement, and research skills that can guide and enhance all rehabilitation therapies. Psychologists have particular expertise in recommending, administering, and providing specific behavioral interventions and related services. The extant literature is replete with evidence supporting the appropriateness and effectiveness of psychological interventions in rehabilitation.

Clinical assessment is essential to the determination of appropriate psychological interventions. Issues, characteristics, and behavioral patterns can be assessed along the dimensions delineated in the dynamic model of adjustment. Thus, specific interventions for depression or anxiety would be conducted in the context of pre-disability behavioral patterns or stable personality characteristics. The dynamic model places particular emphasis on the critical issue of timing: Interventions are most effective when they are tailored to the problems that occur at specific points in the disability experience. The importance of strategically timing interventions to specific problems is inherent in most rehabilitation therapies in medical settings, but this feature is less obvious in the provision of psychological interventions.

Assessments of both psychological and cognitive functioning allow the psychologist to make recommendations to the attending team. Behavioral recommendations can assist the ICU and trauma staff to effectively respond to 'problem behaviors' such as agitation of a patient with TBI. Understanding behavioral interventions allows the psychologist to develop a behavioral plan for both the patient and the staff. Recommendations are also made with the team and the family to help determine the discharge disposition. With lengths of hospital stays becoming increasingly shorter, and resources of individuals in short supply, it is not uncommon for patients to leave an acute trauma unit even if further specialized care, such as inpatient rehabilitation for a TBI or SCI, is needed.

Many psychological interventions have demonstrable effects in the acute inpatient setting. Some of these interventions alleviate discomfort from symptoms (e.g. hypnosis for pain relief; Patterson and Jensen, 2003). Other formats, such as cognitive-behavioral group therapy, may be effective in providing participants with skills that augment their coping repertoire (King and Kennedy, 1999) and their community reintegration (Rath et al., 2003b). Indeed, the therapeutic effects of group therapy can exert their benefits on phenomenological appraisals of stress, and in fostering a sense of social support among participants (King and Kennedy, 1999). Individual psychotherapy is better suited for detailed problems that require greater confidentiality and tailoring to issues that may at times stem from unique aspects of the disabling condition (Mohr et al., 2001) or for examining issues that may require clinical attention at a later time (e.g. motivational interviewing for substance abuse problems; Bombardier and Rimmle, 1999).

Psychologists play an important role in the development and implementation of patient and family education following injury and subsequent
disability. From the onset of an illness or injury, patients and their families often seek answers from a variety of sources, most immediately the medical professionals and then later from sources ranging from the internet to shared experiences with others. Theoretically, early education and information about one's medical condition should result in a reduction of the anxiety and distress that accompany a new and unfamiliar situation. It is logical then that the ICUs and acute trauma units provide a potential opportunity to start early education about an individual's condition to reduce the overall anxiety that commonly occurs.

As observed earlier, however, acute rehabilitation programs do not adequately prepare people for the challenges and issues they face upon their return to live in the community. Therefore, it is critical for the psychologist to help determine what psychological and cognitive resources the individual might need following hospitalization as well as recognize the dynamic issues with the family that can be either barriers or supports to a plan for discharge to home. Many interventions are better suited for persons who have returned to community residence, as certain skills taught in cognitive-behavioral therapies have greater value and generalizability. Social skills training, for example, has been effective for community-residing persons with disability (Dunn et al., 1981; Glueckauf and Quittner, 1992).

In other situations, home- and community-based programs are strategic options. Although these programs are informed by psychological expertise, they are particularly attractive because they may be effectively operated by low-cost service providers. For example, family caregivers report significant benefits from problem-solving training provided in weekly telephone counseling sessions with a nurse (Grant et al., 2002). On a larger scale, structured employment programs, which typically rely on low-cost service providers as on-site job trainers, have demonstrated considerable efficacy in several clinical trials in returning people to competitive work following disability (Bond et al., 2001; Elliott and Leung, 2005).

Other psychological therapies may be required to help persons unlearn 'disabled behavior' that has inadvertently developed over time and compromised adjustment (e.g., pain rehabilitation; Gatche1, 2005). Individual psychotherapy can be useful in helping clients understand ways to accept difficult thoughts, feelings, and bodily sensations without struggling with them, and focus on overt activities that contribute to important outcomes (in acceptance and commitment therapy; Hayes et al., 1999). Applications of this model in rehabilitation settings reveal that greater acceptance of chronic pain sensations is associated with less depression and pain-specific anxiety, with less physical and psychosocial disability, and with greater routine activity and work status (McCraeckin, 1998). Psychologists have also developed disability-affirmative therapy to help individuals find meaning in their circumstances, develop personal goals in the face of stigma and discrimination, and facilitate rewarding significant relationships with others based on acceptance and understanding (Olkin, 1999). In general, cognitive-behavioral therapies have demonstrated considerable utility and flexibility for use with persons who have disabling conditions (Elliott and Jackson, 2005; Radnitz, 2000).

Fourth reason: psychological expertise in research and scientific methods is essential to rehabilitation

Consonant with their scientist-practitioner heritage, psychologists have the particular expertise to advance the empirical and scientific study of rehabilitation with theoretical models of behavior that can expand its knowledge base, develop new therapies, and advance rational allocation of services, generally.

Rehabilitation settings utilize techniques and practices that are often considered the standard of care, but relatively little if any research has been done to determine the true efficacy of the treatment. Psychologists have an important role in working with their colleagues to encourage critical thinking skills and help the development of research studies that directly affect clinical practice. For example, aquatic therapy is routinely utilized in many rehabilitation facilities to improve functional outcomes (e.g., range of motion, gait) but there is relatively no research on its utility, especially in certain conditions such as SCI. Many professions in rehabilitation are moving to research-based practice. However, many standard techniques are a result of clinical expertise rather than true evidence-based practices.

Psychologists possess unique critical thinking skills, grounded in theory and empiricism, that are required to constantly question, examine, refine, and improve the rehabilitation process. Not surprisingly, psychologists have been active in developing standards for evidence-based practice in several areas, and have participated in literature reviews used in clinical standards of care, research agendas, and policy development (Frank and Elliott, 2000). Psychologists have also assumed the lead in critiquing the lack of evidence for routine medical interventions in rehabilitation (e.g., the lack of clinical trials supporting antidepressant therapies in SCI; Elliott and Kennedy, 2004).

Throughout its history, rehabilitation psychology has excelled in practical applications of psychological theories to the understanding and alleviation of problems encountered in the clinical setting, including applications of Lewinian field theory (Wright, 1960), operant behavioral principles (Fordyce, 1976), psychophysiology (Ince, 1980), and behavioral neuroscience (Uswatte and Taub, 2005). Constraint-induced movement therapy, developed from a neuroscience perspective and first examined in laboratory models of behavior and disability, provides an instructive case-in-point. The implications of this work are immense, demonstrating the plasticity of
neural pathways in learning new neural pathways to effect motor ability following damage incurred in stroke and other brain-related injuries. Although these treatment modalities may currently lack clinical efficacy (in terms of financial costs), the beneficial effects of these interventions raise many possibilities and new avenues for treatment to assist individuals who would otherwise live without certain abilities. In this scenario, the theory and research are essential to developing new interventions that may later result in financial viability in the clinical enterprise.

Similarly, expert use of new statistical methods informs the development, support, and dispensation of clinical services. There are statistical methods that now permit the modeling of an individual’s growth and progress during rehabilitation, and these analyses permit a greater understanding of a priori characteristics that predict greater response to rehabilitation therapies, and of those that indicate a poorer prognosis (Warschauisky et al., 2001). These tools allow a more precise examination of characteristics of persons at risk of complications following their return to the community, and of those who are likely to adapt well on their own recognizance (see Elliott et al., 2001, for a prospective study of family caregiver adjustment). It should be emphasized, however, that these statistical procedures are more informative when they are guided by an a priori theoretical model that provides a reasonable explanation of anticipated relationships between predictor variables that relate to a clinical outcome. In a study germane to this issue, an atheoretical model built primarily on clinically important variables, without specifying a priori relationships between the immutable demographic and disability-specific variables and the psychological constructs in the model, found that demographic and disability severity variables were significantly predictive of pressure sore occurrence in the first three years of SCI (Elliott et al., 2006). This finding was consistent with the extant clinical literature. However, when an a priori model was used to specify the direct paths between the predictor variables, so that the psychological constructs were related to demographic and injury variables in a theoretical and reasonable manner, the psychological constructs were the important contributors to the model, and the demographic and injury variables were no longer significantly related to pressure sore occurrence. The implications for theory in the development of predictive models are considerable: This information is essential for greater precision in identifying persons at risk of complicated adjustment, and for developing cost-effective community-based interventions and prevention programs for these individuals.

**Summary**

With the advent and international embrace of the ICF as a template for guiding rehabilitative services in contemporary health care, the behavioral and social factors that determine health and well-being following disability will attain recognition. By the very nature of their scientist-practitioner model of training in both clinical application and research expertise, psychologists are critical stakeholders in rehabilitation, and they possess the expertise to influence all levels of rehabilitation service development, provision, and evaluation as systems respond to the needs and concerns of persons living with chronic and disabling health conditions. In this process, psychologists can assume unprecedented leadership roles in practice, research administration, advocacy, and policy development.

**Acknowledgements**

This chapter was supported in part by funds to the first author from the National Institute on Disability and Rehabilitation Research (Grant #H133N009 and #H133B980016A), National Institute on Child Health and Human Development (#T32 HD07420), and Centers for Disease Control and Prevention — National Center for Injury Prevention and Control (Grant #R49/CE000191) to the University of Alabama at Birmingham. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the funding agencies.

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