

Disentangling the Disability Quagmire in Psychological Injury and Law

Part 2: Evolution of Disability Models: Conceptual, Methodological and Forensic Practice Issues

Izabela Z. Schultz · Alison M. Stewart

Received: 31 January 2008 / Accepted: 18 February 2008 / Published online: 12 September 2008
© Springer Science + Business Media, LLC 2008

Abstract This paper aims to critically analyze the evolution of six models of conceptualization, determination, and prediction of occupational disability relevant in the medico-legal context of psychological injury. The six models are the (a) biomedical, (b) forensic, (c) psychosocial, (d) ecological, (e) economic, and (f) biopsychosocial. We will discuss the key commonalities and differences among the models, including disciplinary tradition, research paradigm, recognition of person–environment interaction, key tenets, and implications for practice and research in psychological injury. The paper will highlight and discuss psychosocial issues, often under-emphasized in forensic psychological practice, including: (a) balanced assessment of primary, secondary, and tertiary gains and losses, (b) self-perception, (c) disability identity, (d) beliefs and expectations, (e) coping, (f) adaptation and positive growth, (g) social stigma and social reactions to disability, including disability harassment, and (h) recognition of system-based environmental influences and demands. We will provide a special focus on the current state of the science and practice of prediction of disability, of particular interest to researchers and clinicians involved in clinical and occupational prognostication in psychological injuries. Finally, we will draw conclusions and recommendations for future research and best practices in the psychological injury area using a cross-diagnostic, dynamic, functionally based, and integrated biopsychosocial and forensic model of disability.

Keywords Psychological injury · Psychological impairment · Models of disability · Forensic model · Biopsychosocial model

I. Z. Schultz (✉) · A. M. Stewart
Department of Educational and Counselling Psychology,
and Special Education, University of British Columbia,
Vancouver, BC, Canada V6T 1Z4
e-mail: ischultz@telus.net

Introduction

The three key theoretical frameworks of disability—the biomedical, social construction, and biopsychosocial paradigms—evolved and blended over time into six identifiable models of disability and parallel models of return to work (RTW). These six models that mark the field are the: (a) classic biomedical, (b) forensic, (c) psychosocial, (d) ecological, (e) economic, and (f) biopsychosocial (Schultz et al. 2007a, b). These models represent different research traditions, underlying constructs, values and main tenets, and have different implications for practice in the field of psychological injury and law. The key disability models vary with respect to the weight they place on the individual with disability, on his/her environment, or the interaction between these two key disability determinants (Smart 2001).

This paper aims to critically analyze the evolution of models of conceptualization, determination, and prediction of occupational disability relevant in the medico-legal context of psychological injury by discussing key commonalities and differences as well as strengths and weaknesses among the disability models. Within the psychosocial framework, the paper highlights psychological issues often underemphasized in forensic psychological practice, including (a) balanced assessment of primary, secondary, and tertiary gains and losses, (b) self-perception, (c) disability identity, (d) beliefs and expectations, (e) coping, (f) adaptation and positive growth, (g) social stigma and social reactions to disability, and (h) recognition of system-based environmental influences and demands.

We will provide a special focus on the current state of the science and practice of prediction of disability, of particular interest to researchers and clinicians involved in clinical and occupational prognostication in psychological

injuries. Finally, we will draw recommendations for future research and best practices in the psychological injury area using an integrated cross-diagnostic, functionally oriented, biopsychosocial model of disability in the forensic context.

Evolution of the Disability Models

A recent critical review of the literature focusing on the most commonly researched disability, musculoskeletal pain disorders (Schultz et al. 2007a, b), identified six models of occupational disability, each having different underlying constructs, research traditions, and implications for research and practice.

Table 1 presents and compares the models.

The boundaries among the models are somewhat arbitrary due to the commonality of many themes and factors. Due to the convergence of some models, the models will be organized into four groups: (1) biomedical and forensic, (2) psychosocial, (3) ecological/case management and economic, and (4) biopsychosocial. Notably, the models vary in regards to the extent of their empirical validation and theoretical advancement (Schultz et al. 2007a, b).

Biomedical and Forensic Models

The biomedical model conforms to a positivist framework in which the disease diagnosed is an observable biological problem that requires amelioration through biomedical procedures (see Table 2). In the *biomedical model* of disability, individuals who are primarily involved are the injured individual and the physician (Pransky et al. 2004; Schultz et al. 2000, 2007a, b). The disability-related

decisions are based upon the physician's evaluation, treatment, and recommendations regarding the injury. The model is rooted in the notion that illness is due to identifiable pathology, and it is explained by both mechanical and linear views of disease where a dose–response relationship may apply (e.g., the more severe the trauma, the more severe the injury and its effects; Leibowitz 1991; Schultz et al. 2000; Turk 1996).

The dependence on biomedical models of disability in research and practice has been decreasing. In parallel to the reduced prominence of medical models, the so-called insurance model of occupational disability (Schultz et al. 2000) has been gradually losing its focus on understanding impairment as a precursor to determine disability entitlement, partly because of its overemphasis on detection of dishonest individuals who malingering or exaggerate psychological or pain symptoms (Schultz et al. 2007a, b). Since the late 1990s, the disability insurance/compensation systems have become more concerned about effective case and disability management (Brines et al. 1999; Green-McKenzie et al. 1998; Pergola et al. 1999; Salazar and Graham 1999; Shaw et al. 2001; Tsai et al. 1999) rather than fixating mostly on determination of causation of impairment and disability. The model that used to be called an insurance model, and is now more aptly called a forensic model, has been largely restricted to the field of litigation of personal injury (Schultz and Brady 2003), and it has focused on determination of causation of impairment and disability. The forensic model is adversarial, although it has developed guidelines in psychological practice (Committee on Ethical Guidelines for Forensic Psychologists 1991), likely fuelled by court-ruled standards regarding the admissibility of scientific evidence (such as *Daubert* standards in the United States (Daubert 1993)).

Table 1 Comparison of underlying constructs and research tradition in conceptual RTW models

Current model	Research tradition	System vs. individual focus	Key determinants of RTW
Biomedical	Medicine	Individual	Medical impairment
Psychosocial	Health and Rehabilitation Psychology	Individual; evolving towards integration of systems based focus	Psychosocial factors: beliefs, perceptions, and expectations re: RTW
Forensic	Forensic Psychology	Individual; evolving towards recognition of system factors	Secondary gain; evolving into interaction among primary, secondary and tertiary gains and losses
Ecological/Case Management	Sociology, Anthropology, Social, Organizational, Occupational Health Psychology; Occupational Health/Therapy	System/System-Individual Interaction	Proactive system-based RTW policies and practices
Economic	Health Economics	System	Economic incentives built into the macrosystem
Biopsychosocial	Interdisciplinary/Transdisciplinary	System and Individual Interaction	The interaction among the medical, psychosocial, and system-based factors in RTW

Adapted from Schultz et al. (2007a)

Table 2 Comparison of the biomedical model and the forensic model

	Biomedical model	Forensic model
Main tenets	Illness is due to medical pathology	People who anticipate secondary gains are likely to be dishonest about their symptoms
	Symptoms and disability are directly proportionate to physical pathology	Objective proof of impairment and disability must be provided
	Mind and body are separate	It is paramount to clearly discriminate between “honest” and “dishonest” claimants
Implications for diagnoses	Physicians in control of diagnoses and treatment direction	Interactions among primary, secondary and tertiary gains and losses should be considered
	Focus on underlying pathology	Thorough and exhaustive assessment using special forensic methods aimed at detection of inconsistencies and deception
	Sequential diagnostic approach	Interdisciplinary model may be utilized
Implications for entitlement determination	Entitlement only for clearly identified medical causes	Individuals showing inconsistencies in testing identified as “illegitimate”, “malingerers”, “symptom magnifiers”, and/or motivated by secondary gain
	Focus on diagnostic labeling	Adversarial service climate
	Assumes disability best predicted by impairment	Entitlement only for “honest” claimants
Limitations in psychological injury context	Psychosocial factors poorly recognized or totally unrecognized	Entitlement only for objectively verifiable impairment
	Poorly applicable to multifactorial biopsychosocial and complex conditions	Diagnostic focus on detection of poor effort, symptom invalidity, malingering and exaggeration
		Assumed primacy of motivational factors in disability
		No single scientific method can reliably and accurately discriminate between “honest” claimants
		All malingering detection methods have strengths and weaknesses; false positives and false negatives
		Difficulty measuring motivation and intentionality
	Systemic context and life demands/supports ignored	
	Focus on secondary gains but not on losses	
	Changing scientific consensus on issues of symptom validity and malingering	
	Potential for bias and abuse by poorly trained clinicians	

Adapted from Schultz et al. (2007a)

Like most of the other conceptual frameworks, the forensic model has been evolving and expanding since the early 2000s. The newest advances within this model attempt to explain the interactions, cognitions, and motivations of the injured person in the medico-legal and compensation context, thus bringing it closer to the biopsychosocial approach (Hadjistavropoulos and Beiling 2001; Sherman and Ohrback 2006). Within this expanded forensic model, Dersh et al. (2004) describe *primary*, *secondary*, and *tertiary gains and losses* that may serve to impact the interaction between the injured individual and the larger disability-related system. Secondary gains are conceptualized as falling into two categories—internal and external. Internal secondary gains are considered to be psychologically motivated (e.g., to resolve psychological issues or to satisfy needs). The external secondary gains are often associated with financial gain, avoidance of debt, or vocational manipulation (Dersh et al. 2005; Leeman et al. 2000). Secondary losses range from economic losses, loss of meaningfully relating to society, loss of work relationships through loss of meaningful family roles and activities,

loss of recreational activities, loss of respect from family and friends, and loss of respect from those in helping professions, to social stigma and guilt (Dersh et al. 2005). Tertiary gains are those sought from a patient’s illness by someone other than the patient, including significant others and family, health care workers, legal professionals, and other members of society involved with the person with disability (Dersh et al. 2005; Fishbain et al. 1994; Kwan et al. 2001). Tertiary loss is defined by Kwan et al. (2001) as the limitation or loss experienced by an individual other than the patient who has been linked to the patient’s disability.

As postulated by Dersh et al. (2005), awareness of secondary and tertiary gains and losses assists in understanding the individual’s behavior in the medico-legal context (Dersh et al. 2005). In this context, a person’s behavior could be conceptualized in terms of economy of secondary and tertiary gains and losses (Fishbain et al. 1994; Kwan et al. 2001).

A review of forensic literature in the psychological injury field indicates that current studies almost exclusively

focus on secondary-gain-related phenomena: malingering, exaggeration, illness behavior, and symptom magnification. No established methodology in psychological injury research and practice exists in balanced assessment of motivational factors and the economy of gains and losses. Consequently, empirical studies in this field have not yet been advanced. The field needs carefully undertaken short-term and long-term studies of the multifactorial impacts on the injured person and her or his recovery and return to work, or conversely, the impediments that lead to disability despite best effort to mitigate losses when these are evident. Then, secondary gain factors can be studied from a differentiated empirical base.

Recent theoretical advances in understanding illness behavior, whereby the secondary gains afforded by the sick role outweigh, in their personal value, the secondary losses from disability, utilize the concept of preconscious and conscious thought in the context of Lewin's field theory (Ferrari et al. 2006). The authors postulate that the thought processing underlying illness or disability behavior is mainly preconscious, but conscious dimensions exist, such as intention, potentially leading to controllable behavior. Preconscious processing takes place because it has advantages—it allows for the convenience and efficiency of automaticity. However, goal orientation requires conscious control (Ferrari et al. 2006). To conclude, until these concepts can be measured operationally and shown to have utility in individual cases, they remain part of a model in search of specificity and relevant data. The interplay among concepts of automaticity, volition, and illness behavior continues to be poorly understood. Yet, it is of critical importance in explaining motivational aspects of disability and psychological injury in the legal context.

The forensic model has been constructed upon cumulative qualitative and quantitative evidence from forensic psychology and neuropsychology (see Table 2). It is, therefore, closely linked to empirical findings from research on malingering, exaggeration, effort in testing, and symptom validity. However, the field is replete with difficulties in conceptualization and quality of research undertaken. Limitations of studies on malingering include difficulties with conceptualization and operationalization of the central construct of malingering, the difficulty in finding samples of known malingerers, the use of simulation research design and the use of claim status as a proxy for malingering, small sample sizes, and lack of specific norms and accommodations for persons with disabilities for utilized instruments. The concept and study of *fairness* in assessment and testing of persons with disabilities (AERA 1999), in contrast to other well-known measurement constructs of validity and reliability, are relatively new to the field of forensic practice in psychological injury. Fairness can be conceptualized in multiple ways, for example, as lack of bias, equitable treatment in the

assessment process, and equality in outcomes of testing (AERA 1999).

The question of fairness may arise in psychological injury assessments when sufficient care is not taken to assure adequate reliability and validity of utilized instruments. For example, in research, if psychologists are utilizing tests or scales that produce scores that differ in meaning across examinee subgroups, such as persons with various types of disabilities, without collecting new validity evidence for each relevant subgroup, the results will have limited applicability to forensic practice. Validation studies are particularly critical in high stakes testing such as medico-legal evaluation of psychological injury. For example, the new Fake Bad Scale on the MMPI-2 has been criticized for insufficient validation studies on persons with different types of disabilities and chronic illness, and with respect to women (Arbisi and Butcher 2004; Bagby et al. 2006; Butcher et al. 2001, 2008). Problems such as the use of the scale author's judgment as to what items constitute malingering and reliance on examination of differences between "litigators" and "non-litigators," even though many litigators may have legitimate problems, which may lead to inability to generalize the results and, therefore, discriminate actual malingerers from non-malingerers, especially in persons with illness and disabilities have been raised in the literature (Butcher et al. 2008; Greve and Bianchini 2004; Iverson et al. 2002; Meyers et al. 2002; Wood 2004).

In addition, methodological problems related to the measurement of the intentionality aspect and state-trait (recent-persisting) and conscious–unconscious dimensions of the constructs of exaggeration and malingering are extremely difficult to resolve in research. To complicate matters, there are multiple possible motivations underlying exaggeration (Ruff and Weyer Jamora 2008). These motivations include crying out for help, anger and self-justification, need to be seen as disabled, social reinforcers and secondary gains, concerns about not being taken seriously, and depressive, negativistic thinking (Iverson 2007; Sims 2007). These psychological factors are especially difficult to capture in empirical studies due to limited standardized measurement options.

In the following, we conclude this section by comparing the models described. It prepares the way for description of the remaining models under consideration. Both the biomedical model and the classic forensic model rely primarily on an individual focus on the patient. Though this reliance constitutes strength in understanding and predicting outcome with acutely injured individuals, it does not readily apply to the more chronic and clinically complex patients who often account for much of the disability statistics and difficult psychological injury cases.

The biomedical and forensic models are most commonly applied in the psychological injury context likely due to their universal appeal to objectivity and measurability of impairment (Schultz et al. 2007a, b). The biomedical model continues to be present in the psychological injury field through its subset, i.e., the psychopathology-oriented psychiatric model (Schultz et al. 2000), which focuses on diagnostic labeling, but has been gradually shifting towards a more comprehensive and adaptation-oriented psychosocial model (Bishop 2007; Schultz et al. 2007a, b).

This being said, despite their prominence in the legal and insurance fields, both the biomedical and classic forensic models have significant methodological flaws, including: (a) having a reductionist or overly simplifying approach to assessment and diagnosis, with excessive focus on categorical classification of symptoms while ignoring their context and dimensionality; (b) excessive and, at times, uncritical emphasis on test results, as opposed to a balanced multi-trait, multi-method approach (examining multiple traits with more than one measure each); (c) measuring complex and poorly understood constructs, such as effort, motivation, and malingering; (d) lack of recognition of coping, adaptation, and self-perception factors acting in the individual's presentation and; (e) lack of appreciation of environmental or systemic factors on the presentation of the individual, such as the influence of social demands, supports, and reactions and attitudes of others. Generally, these models tend to be more rooted in the medical compared to social theories, although the forensic model has been evolving towards a social framework through the emphasis on social and individual incentives in disability (Dersh et al. 2005; Schultz et al. 2007a, b). At their best, the models have contributed by having psychologists and the court appreciate the physical and psychiatric diagnoses involved and the role of possible response biases, effort factors, and malingering in complainant presentation. Nevertheless, at their worst, they function to exacerbate the adversarial divide that marks the field by their appearance of objectivity when carefully controlled empirical studies are lacking, and there is still a lack of consensus even on basic definitions and concepts.

Psychosocial Models

According to psychosocial models, from a psychological perspective, disability is a behavior (see Table 3). Additionally, occupational disability is not viewed as an individual attribute, but as a complex set of conditions, activities, and relationships, which have been created by a person's social environment, including the workplace, health care, compensation systems, family, and other societal institutions (Baril and Berthelette 2000; Olkin and Pledger 2003; Schultz and Gatchel 2005; Tate and Pledger

2003). As a result, disability can be conceptualized using cognitive-behavioral and organizational psychology perspectives (Crook et al. 2002; Krause et al. 2001a, b; Polatin et al. 1993; Schultz et al. 2000, 2004; Turk 1996). Each of these perspectives has different implications for the study of disability behavior. Where psychological injury and pain disability are concerned, the cognitive-behavioral perspective benefits from the most consistent empirical support (Karjalainen et al. 2003; Sullivan et al. 2005). For example, thinking catastrophically or pessimistically has been found to affect negatively the recovery process in multiple studies (e.g., Sullivan et al. 2006).

Bandura's social learning theory (Bandura 1977, 1986) appears to hold significant conceptual promise for understanding the motivation to RTW (Schultz et al. 2007a, b). Cognitions related to expectations of outcome (i.e., recovery and RTW), in combination with expectations of self-efficacy, in predicting an individual's ability to achieve desired health, and vocational and economic outcomes, have been gaining empirical support (Cole et al. 2002; Sandström and Esbjörnsson 1986; Schultz et al. 2004; Turner et al. 2006).

The psychosocial perspective focuses on the beliefs, perceptions, expectations, locus of control, self-efficacy, and coping of the *individual* with disability as mechanisms underlying disability (Bishop 2007; Burton et al. 1995; Haldorsen et al. 1998; Jensen et al. 1999; Linton 2000; Schultz et al. 2004, 2007a, b; Turk and Gatchel 2002). These models have moved from an exclusive focus on the individual (Feuerstein and Theborge 1991) and consider both the individual and the workplace by including the perception of the workplace and its role in occupational disability. In more recent applications, the role of both individual cognitive-behavioral factors and the injured person's functional system has been broadened to cover several psychosocial dimensions of larger systems, such as workplace, unions, health care, and disability insurers (Franche et al. 2005; Stowell and McGeary 2005; Sullivan et al. 2005).

The psychosocial model views coping as critical to the challenges presented by injury and illness. Coping is associated with changes in readiness, flexibility, and purposeful behavior in support of adaptation to a medical condition over time (Elliott et al. 2005; Heinemann 1995; Jensen 2004; Wegener and Shertzer 2006). Difficulty in coping is associated with illness uncertainty, loss of autonomy, lower coping efficacy, and mental defeat, a type of catastrophizing or maladaptive coping (Heinemann 1995; Johnson et al. 2006). Poor coping, which is associated with lower socioeconomic status, avoidance coping, and catastrophizing, especially with pain, leads to depression and anxiety post-injury (Dunn and Dougherty 2005; Elliott et al. 2005; Wegener and Shertzer 2006). Belief in one's ability to cope, or coping efficacy, predicts important health benefits,

including readiness to self-manage, which can lead to improvements in pain treatment (Helmes and Goburdhun 2007; Jensen 2004; Johnson et al. 2006). A psychosocial lens has been evolving to incorporate the environmental aspects of coping, which include increased social support, improved family problem solving, and possible changes in policy and/or improvements in accessibility.

Though there is a need for greater conceptual clarity regarding the psychosocial process of coping, there is consensus across theories that coping represents a unique, personal, subjective, and multidimensional response to disability that applies across a range of domains (Bishop 2007; Elliott et al. 2005; Heinemann 1995; Wegener and Shertzer 2006). The psychosocial model is in transition towards conceptualizing coping as a transactional process in response to the interaction between an individual's psychological experience living with disability and the social and physical environment (Bishop 2007; Dunn and Dougherty 2005; Elliott et al. 2005; Heinemann 1995; Wegener and Shertzer 2006). Despite their significance in understanding disability, coping and adaptation factors are not uniformly examined in psychological injury determinations. It is important to assess all possible barriers to recovery, both internal, such as poor coping, and external, such as the response of others to attempts to cope.

An expanded psychosocial perspective also incorporates positive psychology, which views the individual with disability from a holistic perspective—life is perceived as worth living when one sees a purpose in life, has the ability to participate in meaningful and valued activity, and has a sense of individual control and self-worth (Bishop 2007; Dunn and Dougherty 2005; Elliott et al. 2005; Guite et al. 2007). As personal growth increases in response to stressful incidents, distress due to social isolation and loneliness decreases (Elliott et al. 2005). The capacity to undertake a search for meaning includes allowing adapting beliefs and shifting values over time. Generally, acceptance and well-being are seen as related to the person–environment interaction (Elliott et al. 2005; Wegener and Shertzer 2006). In this wider framework, psychological assessments in personal injury would be expected to incorporate evaluations of psychological experiences and perceptions of personal growth and resilience, coping and adaptation to new life circumstances, and acceptance. However, there is no research and clinical consensus on how to best measure these emerging constructs in forensic applications and how to incorporate them into integrative case formulations.

The psychosocial model of disability, in its current formulation, is clearly dominated by *cognition-related individual factors* (Burton et al. 2006; Ferrari et al. 2006; Halligan 2006), such as expectations, beliefs, and perceptions. Because of the popularity of cognitive-behavioral psychology, with its wealth of empirical research and

advanced attempts at theorizing (den Boer et al. 2006; Franche and Krause 2002; Linton et al. 2005a; Marhold et al. 2001; Pincus et al. 2002a), this model holds good promise in the psychological injury context. The model is relatively underdeveloped, however, in the area of measurement of external social/environmental factors involved in disability, including social demands and supports. Likewise, despite a sizeable body of research literature, there is no clear consensus on best measurement tools, especially tests that capture the complexity of cognitions in medico-legal applications outside of specialty practices, such as in the chronic pain field.

In addition, the psychosocial model of disability postulates the centrality of the self-perception of disability and disability identity among the determinants of disability (Gill et al. 2003; Linton 1995; Olkin 1999). As emphasized in a study on perceptions of disability by LoBianco and Sheppard-Jones (2007), even controlling for medical factors (e.g., particular disabling conditions and restrictions on the activities of daily living), social and vocational factors were significant predictors of disability perception. The extent to which the individual was engaged with his/her community was found to shape his or her perceptions regarding disability. Employment, marital status, and participation in community events were ameliorating factors in the perception of disability. The fact that “an individual's involvement in the social sphere of life is able to transcend physical and biological realities in forging an identity” (LoBianco and Sheppard-Jones 2007, p. 12) has significant implications for the study and assessment of disability. First, it implies that it is essential to look beyond occupational disability, into non-vocational aspects of engagement with the community, in the research and assessment of psychological injury. Second, it emphasizes the need for accounting for self-perception of disability as a possibly central dimension of measurement. Third, it encourages more research into the pathways that form such self-perceptions.

Together with issues of self-perception of disability, factors related to the social perception of disability, including attitudes towards disabilities, are often not accounted for in psychological injury determinations. Yet, *stigma* and stereotyping towards disabilities, particularly in mental health, are important dimensions of disability (Corrigan et al. 2007; Katz et al. 1988; Livneh 1988; McCarthy 1998). Even the very classification or categorization of disabilities influences societal attitudes towards persons with disabilities and their subsequent eligibility for benefits (Smart 2001; Szymanski and Trueba 1994).

Social stigma in mental disorders has consistently been found to be more disabling than the actual disability (WHO 2001). It has been identified as impacting opportunities for securing employment, career advancement, and tenure

(Kusznir 2001) and as the most salient barrier to RTW (WHO 2001). Social stigma in mental health disability has been largely based on myths that have served to perpetuate employers' discriminatory attitudes (Corrigan et al. 2007; Harnois and Gabriel 2000). Myths include the perception that mental disorder is synonymous with mental retardation, is not amenable to treatment, causes reduced productivity, and may cause workers to become disruptive and harmful to others (Harnois and Gabriel 2000; Schultz et al., manuscript in preparation).

A study on employer attitudes demonstrated that 90% of employers would hire a person with a physical disability, but only 20% of employers would hire a person with mental illness (McFarlin et al. 1991). Of interest to the psychological injury determination field, this result is consistent with findings that employers were most discriminating towards individuals with emotional and cognitive disorders (Greenwood and Johnson 1987). Yet, the social stigma of psychological injury is rarely a recognizable dimension of disability in psychological and neuropsychological expert testimony. This omission constitutes a significant limitation of the individual-oriented psychosocial model of disability and is better addressed by systemic models.

Disability harassment constitutes a behavioral manifestation of social stigma. Disability harassment includes verbal or physical abuse, delay or denial of workplace

accommodations without adequate explanation, improper disclosure of an individual's disability and other invasions of privacy, prevention of promotion, improper use of drug tests, and allegations of faking (Weber, 2007). Disability harassment creates a hostile work environment toward individuals with disabilities. As such, it violates provisions of equal employment rights legislation, such as Americans with Disabilities Act (ADA 1990) in relation to terms and conditions of employment, as well as those of intimidation, coercion, threats, and interference with rights. In determining harassment, the courts require that a hostile environment be severe or pervasive enough that it alters the terms of employment (ADA 1990; Weber 2007). Weber (2007) argues that a hostile work environment is the result of a social construct of person in his/her environmental context and that, therefore, the threshold for severe harassment of persons with disabilities should be lower than in other cases of discrimination. One study by the Equal Employment Commission in 1996 indicated that of the 80,000 ADA complaints of employment harassment received within five years, 9,600 or 12% of these were for alleged disability harassment (GLDBTAC 1996, as cited in Weber 2007). Psychological assessments in harassment cases constitute a relatively new but rapidly developing area of practice in psychological injury, with its own set of emerging standards (Fitzgerald 2003).

Table 3 Summary of the psychosocial model

	Psychosocial model
Main tenets	<p>Psychosocial factors play predominant role in disability and readiness to RTW</p> <p>Psychosocial factors are both individual-related and system-related</p> <p>Perceptions, beliefs, and expectations of recovery and disability, self-efficacy, disability identity, and ways of coping are more important than objective factors in disability formation</p> <p>Motivational factors mediate between impairment and disability</p>
Implications for diagnosis	<p>Psychosocial factors must be assessed and identified at any stage of disability</p> <p>Cognitions about disability must be particularly investigated</p> <p>Stage of readiness for RTW including self-efficacy and decisional balance should be identified</p> <p>Psychological diagnosis is of secondary importance</p>
Implications for entitlement determination	<p>Multifactorial causality, including pre-existing or non-claim related factors, must be recognized</p> <p>Cognitions are subjective yet critical for establishing psychological injury</p> <p>Social, adaptational and coping factors must be balanced with psychopathology</p> <p>Primary, secondary and tertiary gains and losses must be accounted for</p> <p>Dynamics and changes in the disablement process rather than a single binary outcome should be recognized</p> <p>Demands and supports of the environment serve to define disability</p> <p>Multi-method approach</p>
Limitations in the psychological injury context	<p>Legal system poorly prepared to deal with multifactorial causality, change in disability and psychosocial/contextual aspects of disability</p> <p>Poor reliability of clinical methods purporting to separate compensable from non-compensable factors</p> <p>Psychological assessments measuring social, cognitive, environmental, adaptational and coping factors in disability are in the emerging stage</p> <p>Adaptation and coping are complex constructs to measure</p>

Adapted from Schultz et al. (2007a)

Ecological/Case Management and Economic Models

In the last decade, the ecological/case management and economic models expanded and converged in many areas. Consequently, they will be discussed together. Refer to Table 4 for a summarized comparison of the major features of these models.

The primary focus of these models is on the decision and determinants of disability and RTW from a stakeholder position in which the interests of the complex interaction of

the social environment are assessed. This interaction includes the workplace and the impact of RTW on employers, disability payors, insurance carriers, and health care utilization (Loisel et al. 2002; Schultz et al. 2007a, b; Young et al. 2005b). Though the injured individual is also at the center of this model, the societal implications of the disablement and RTW process and decision are critical considerations.

The complexity and the multidimensional, dynamic nature of the ecological/case management model, with its

Table 4 Comparison of the ecological model and the economic model

	Ecological model	Economic model
Main tenets	<p>Occupational disability should be understood in a <i>systemic</i> context considering the interplay among the macrosystem, mesosystem, and microsystem (the individual)</p> <p>Occupational disability has multiple societal stakeholders, including employer, health care, insurance system, and family; each of the stakeholders has different disability paradigms and anticipated RTW outcomes</p> <p>Work injury is understood and managed within the socio-political context of the workplace</p> <p>The needs of the workers and the employers can be complementary</p> <p>System-based responsibility for outcomes</p> <p>Workplace characteristics significantly influence injury sequelae/recovery and rehabilitation</p> <p>Employer has a critical role in RTW and needs incentives to assist injured workers. System changes necessary to accommodate RTW needs of injured worker</p> <p>Multi-disciplinary approach</p> <p>Proactive and disability prevention-focused early intervention in the workplace</p> <p>Service recipient seen as microsystem</p>	<p>Macrosystem of economic forces plays a predominant role in disability</p> <p>Focus on labor force participation, economic incentives, shifts in labor demand, the effects of discrimination, and the long-term economic impact of injury</p> <p>Disability periods are not single episodes, but are recurrent and these patterns are predictors of future disability</p> <p>Longitudinal approach</p>
Implications for diagnosis	<p>Assessment of the impact of macrosystems, mesosystems, and multi-system interactions on RTW</p> <p>Define outcome according to the stakeholder</p> <p>Focus on the assessment of functional work capacity, preferably “<i>in vivo</i>”</p> <p>Analyze the impact of work characteristics and workplace barriers and facilitators on RTW</p> <p>Identification of early risk markers for occupational disability (flagging)</p> <p>Importance of correct clinical diagnosis (label) is secondary</p>	<p>Individual clinical diagnosis is of secondary importance</p> <p>The identification of longitudinal patterns of disability in a macrosystem is of key importance</p>
Implications for entitlement determination	<p>Recognition of social attitudes, demands and supports embedded in macrosystem and mesosystem</p> <p>Focus on functional implications of impairment and disability in context of social and task demands and supports</p> <p>Consider workplace-related factors and job accommodation</p>	<p>Recognition of patterns of disablement over time</p> <p>Recognition of labor market and economic factors</p>
Limitations in psychological injury context	<p>High complexity of task: lack of methodology for multi-system interaction</p> <p>Measurement of systemic/social factors has been a domain of social/organizational psychology; these experts rarely testify in psychological injury</p>	<p>Measurement of these factors requires expertise in forensic economics</p>

Adapted from Schultz et al. (2007a)

built-in multi-system interactions, constitute both this model's strength and limitation. It attempts to capture the complex phenomenon of RTW from a social perspective as arising from the interaction of multiple societal systems. It clearly points out the stakeholders in disability and the relationships among them that facilitate or hinder RTW (Loisel et al. 2001; Young et al. 2005b). In addition, it has a high degree of empirical validation in different legal, social, and economic contexts (Loisel et al. 2001, 2005; Steenstra et al. 2006). Nevertheless, the model continues to require further construct validation and development to better understand the respective contributions of its key system components and their interactions with characteristics of the injured individual in various social contexts (Schultz et al. 2007a).

The ecological/case management model of disability and RTW is, in part, based on Bronfenbrenner's Ecological Systems Theory (1979), which assumes the interaction of *microsystems* (the individual worker factors) with *mesosystems* (workplace, health care, and insurance system factors) and *macrosystems* (economic, social, and legislative factors) (Baril and Berthelette 2000; Friesen et al. 2001; Krause and Ragland 1994; Loisel et al. 2001, 2005). The labor relations or case/disability management model, a specific application of the ecological/case management model, focuses on the mesosystem of work (workplace characteristics, such as climate, culture, organization, job demands and accommodations, policies, procedures, and practices) and effective disability/case management of the injured worker as the key RTW intervention (Amick et al. 2000; Bruyère and Shrey 1991; Harder and Scott 2005; Hunt and Habeck 1993; Hunt et al. 1993; Schultz et al. 2000, 2007a, b; Shrey and Lacerte 1995; Shrey 1995).

The newly articulated *economic model* is macrosystem-based (Schultz et al. 2007). It emphasizes the impact of poor health and disability on labor force participation, the economic effects of disability discrimination, economic incentives in labor demand, and long-term economic outcomes of injury, including intermittent periods of disability and reduced productivity (absenteeism and presenteeism) (Baldwin et al. 1996; Butler et al. 1995; Chirikos and Nestel 1985). This model has the potential to enhance forensic economic testimony in psychological injury, but, to date, it has been advanced only in research and remains poorly articulated, as such, for practical and legal applications. Of interest to psychologists and lawyers in the psychological injury field, the model attempts to measure patterns of disability and return to work and reduced productivity as important disability outcomes, together with the quantification of the effects of disability discrimination.

Both the ecological and economic models of disability are relatively new to the legal environment. The application of key dimensions of the ecological model in the psychological injury field would require closure of the

chasm between individual-oriented psychologies: clinical, neuropsychological, and forensic, on one hand, and system-oriented psychologies: organizational, community, industrial, and educational, on the other. Methods developed by, for example, organizational psychology to measure work climate, workplace demands and occupational stress, and employer attitudes (e.g., Franche et al. 2005; Graffam et al. 2002; Kates and George 2004; Schultz et al., manuscript in preparation) could become integrated in future assessments of psychological injury and its impact on various aspects of function. Economic expertise recognizing not only the presence but also patterns of disablement over time is expected to complement the expertise of the clinical, rehabilitation or neuropsychologist, and the vocational rehabilitation consultant in the legal/insurance system.

Biopsychosocial Models

Empirical support is lacking for a purely biomedical model of occupational disability and RTW, but, in contrast, the evidentiary basis for psychosocial determinants of disability has been growing (Crook et al. 2002; Hunt et al. 2002; Linton 2001; Linton et al. 2005b; Pincus et al. 2002b; Pransky et al. 2005; Schultz et al. 2002; Wunderlich et al. 2002). Indeed, in psychosocially oriented research, there appears to be a trend to omit medical factors *a priori* because of their presumed non-contributory status in occupational disability studies. The biopsychosocial model is more inclusive of the full array of factors that influence disability outcome and does advocate the integration of individual characteristics, including biological or medical impairment, together with psychosocial, environmental, and ergonomic factors into a systems-based approach.

Nevertheless, despite its multifactorial construction, the biopsychosocial model suffers from some of the same impediments to precise and controlled research on disability and RTW outcome. Until there is a consensual base in definition and operationalization, empirical research conducted from the biopsychosocial perspective will remain a work in progress. Nevertheless, compared to the other models in the present comparison, this model has demonstrated clear advancement. This being said, the difficulty in the application of a not-quite-yet-ready transdisciplinary paradigm and methodology, including the ICF Model (WHO 2001), to conceptualization and measurement of the interaction between the physical and the psychosocial may be at the root of the lack of a universally agreed upon "best" model for understanding the complex issues of occupational disability and RTW. Refer to Table 5 for a summary of the biopsychosocial model.

The biopsychosocial model attempts to explain both disability and RTW by a set of complex relationships among a variety of factors, including psychological, pain-

Table 5 Summary of the biopsychosocial model

	Biopsychosocial model
Main tenets	Response to injury considered to be multidimensional Medically-defined impairment does not reliably predict disability and symptoms. Psychosocial factors mediate one's reaction to injury Integrated interdisciplinary/transdisciplinary approach Focus on self-responsibility and self-management of the worker Disablement and RTW are time-based processes
Implications for diagnosis	Multi-dimensional/interdisciplinary diagnosis Admission of limitations of diagnosis Multi-method approach Functional focus in assessment Early assessment of medical, psychosocial and system-based risk factors for disability Identification of biopsychosocial factors responsible for readiness to RTW, including stage/temporal aspects of the process Rehabilitation-oriented assessment
Implications for entitlement determination	Relatively good research evidentiary basis Entitlement determination based on function not diagnosis Interdisciplinary collaboration essential: physician, physiotherapist, occupational therapist, psychologist and vocational rehabilitation consultant Interaction among medical, psychological and social factors must be recognized Clear compensability guidelines required if multifactorial causality present
Limitations in psychological injury context	High model complexity No single unified model Mind-body interaction difficult to determine given current status of knowledge Labor-intensive, interprofessional endeavor

Adapted from Schultz et al. (2007a)

related and physical impairment, and functional and social disability (Gatchel 1996; Schultz et al. 2000, 2007a; Turk and Monarch 2002). Not only do these multiple factors contribute to the etiology of disability but they also have reciprocal effects on one another that may intensify and perpetuate each other and, ultimately, affect the intensity and duration of disability (Jones et al. 2002; Schultz et al. 2000, 2007a, b). Through its comprehensive nature, the biopsychosocial model potentially accounts for all interactions, both within and between the individual worker, the employer, case managers, health care providers, insurance payors, and the social environment.

The biopsychosocial model has been criticized for its overemphasis on the “psycho” part of biopsychosocial theory, with an underemphasis on the “social factors” (Dersh et al. 2005). This selective emphasis has also led to the criticism that the biopsychosocial model, while stressing that its component factors interact with each other, tends to view these factors statically and not as embedded in ever-changing larger social and historical processes (Morris 1998; Schultz et al. 2007a, b). Despite this criticism, more recently, Sullivan et al. (2005) have reported the increasing research emphasis on social factors within occupational disability. Moreover, the problem lies not with the model, *per se*, but the extent of its application in the research conducted, and this shortcoming appears to be in the process of remedy.

The field of health and rehabilitation has been steadily demonstrating increased reliance upon the biopsychosocial model. This growth has been affecting the field of psychological injury through several pathways: (1) strong evidentiary support in health care and return to work literature; (2) increased recognition and efforts towards operationalization of both the depth of the multidimensional systems involved and the individuals and the breadth of the interactions between the systems and the individuals (Schultz et al. 2007a, b); and (3) legal emphasis on the enhancement of scientific standards for psychological injury testimony in the court (for example, through application of Daubert 1993 and Kumho 1999 standards).

The biopsychosocial model in psychological injury is expected to merge with the expanded “socialized” forensic models in the upcoming decade of research and practice. This prediction is based on the observed evolution of the forensic model in the direction of the biopsychosocial model over the last 10 years (Schultz et al. 2007a, b). Indeed, Young (2006, 2008) has constructed a biopsychosocial model of causality applicable to psychological injury that emphasizes consideration of all relevant factors in assessments and in offering evidence to court. In conducting comprehensive assessments of psychological injury for court purposes, the model emphasizes (a) the need to consider the role of not only the index event in question but

also the influence of (b) cumulative lifetime stressors, (c) possible partial or full malingering and related response biases, and (d) preexisting factors, such as psychological vulnerabilities and ongoing psychopathology, which may explain some if not all of a complainant's presenting condition.

Predicting Disability and Return to Work

Central to psychological injury determination in the legal environment is the issue of whether the injury has been disabling. The clinician, the court, the employer, and the compensation system are vitally interested in *who* will develop disability following injury, how *severe* the disability is likely to be, how *long* it will likely persist, and how it can be *ameliorated* (Schultz and Gatchel 2005). Therefore, the psychological, vocational, and legal experts rely, in their testimony, on the scientific literature on prediction of disability, an empirically informed field of inquiry which has been increasingly contributing to individual prognostications in psychological assessments.

There appears to be a consensus in the current literature on occupational disability that the Western world is facing a disability epidemic with far-reaching economic consequences (Melhorn et al. 2005). In particular, there is a proliferation of individuals with musculoskeletal pain and psychological or neuropsychological disabilities that challenge the traditional biomedically based health care, compensation, and employment systems in industrialized countries. The need for a biopsychosocial paradigm in managing and combating this epidemic has not translated into new public awareness, policy development, or the administrative structures and service delivery models sensitive to the biopsychosocial construction of such disabilities. Nevertheless, there is a recent consensus-based risk-flagging system for injured workers with disability claims that has been developed, but, as yet, it lacks evidence-based support (Main and Spanswick 2000; Main et al. 2005), rendering difficult its translation into practice.

Though the focus on prediction of disability and RTW, rather than on disorder itself, is becoming more prevalent in the area of musculoskeletal pain conditions, studies on psychological or neuropsychological conditions still appear to be dominated by research into individual risk/vulnerability factors for developing a condition. This trend, likely reflective of the medical, pathology-based paradigm, seems to be particularly evident in the current research literature on posttraumatic stress disorder and other posttraumatic conditions, as well as depression (Bowman 2005; Gnam 2005; Koch and Samra 2005; Schultz and Gatchel 2005), although interest in the occupational aspects of mental health conditions has been growing (Drake et al. 2003; Haslan et al. 2005; Krupa 2004; MacDonald-Wilson et al. 2003;

Matthews and Chinnery 2005). Another common theme across the spectrum of psychological disorders and disabilities is the consensus that impairment alone does not predict disability. Biopsychosocial models include individual, workplace, health-care-related, compensation-related, and other social system factors as influences on whether impairment translates into disability, in a whole-person in context perspective. Therefore, the model appears to explain the multifactorial matrix that may be responsible for occupational disability more accurately than traditional biomedical, pathology-based, and demographic factors (Schultz and Gatchel 2005).

The severity of trauma or injury also does not seem to have a direct bearing on disability outcomes. Rather, it is the *perception* or individual appraisal and experience of trauma, injury, and their sequelae that has been consistently shown to be a predictor of disability, together with the ability to cope with adverse consequences of trauma or injury (Bowman 2005; Koch and Samra 2005; Sbordone 2005; Schultz and Gatchel 2005). The research conceptualization of psychological aspects of occupational disability appears to be shifting from the psychopathology model to the study of individual differences in cognitions and behaviors in interaction with the context of injury and recovery, including the health care, compensation, workplace, and other social systems (Franche and Krause 2002; Schultz and Gatchel 2005; Sullivan et al. 2005; Young et al. 2005a, b).

The integration of the ecological, system-oriented approach (Loisel et al. 2002; MacKenzie et al. 1998) with the individual clinical approach is likely to lead to change in disability outcomes through development of better informed clinical practices. Positive long-term (as opposed to short-term) outcomes in pain disability (Dersh et al. 2005; Durand and Loisel 2001; Linton et al. 2005b; Linton 2001; Loisel et al. 2002; Loisel and Durand 2005; Waddell and Burton 2001) using this approach have already been identified. This model is, however, almost unknown in the field of psychological injury and law, which is dominated by individual-focused assessment and decision-making paradigms.

The accuracy of predicting future disability based on initial sets of data constitutes a critical issue in individual prognosis and in wide-scale administrative risk identification screening efforts. Historically, predictions have been based either on the clinical judgment of the practitioner or on empirical evidence using some statistical formula. This *clinical* versus *actuarial* approach to prediction has been widely discussed in forensic psychology applications (Dawes et al. 1989; Garb 1998; Groth-Marnat 2003; Lanyon and Goodstein 1997) and the superiority of the actuarial models over clinical models argued. The actuarial model is based on research evidence that allows the

predictors to be quantified and combined following a set of empirically supported rules. There is no inherent ordering of the variables in terms of their significance; selection is based on each variable's contribution to the prediction of outcomes, such as duration of disability, return to work, or costs (Linton et al. 2005b). However, the actuarial approach is difficult to apply to individual assessments because (a) it includes the assumption that the variables are stable and static, (b) there is a lack of recognition of individual differences, leading to misclassifications, and (c) it has low utility when the ceiling of predictive accuracy is low and when the underlying evidence is weak or limited. Moreover, generalizability of predictive models to other populations and contexts is unknown (Linton et al. 2005b).

Ultimately, there is likely to be a continuum rather than a dichotomy of predictive decision rules and procedures in arriving at conclusions about future disability in psychological injury assessments, ranging from the use of subjective clinical judgment to advanced statistical algorithms, depending on the purpose of the prediction and the sophistication of the research evidence at hand. Currently, the most advanced actuarial prediction paradigms are available in musculoskeletal pain studies and involve predictive accuracy for occupational disability in the range of 75% to 85% (Linton et al. 2005b; Schultz et al. 2002; Waddell et al. 2003). Predictive actuarial formulae have yet to be developed for mental disorders. This research gap may appear to make testimony on prognosis of disability more vulnerable in the courtroom. However, the degree of specificity in the population level actuarial formula for the one area where it has been developed (for example musculoskeletal pain disorders) still lacks enough rigor to be particularly useful in individual assessments. Such algorithms cannot apply to the range of variables to consider in any one case, and, if relied upon as the principle decision-making procedure in prediction of future disability for court purposes, will likely be subject to withering and effective cross-examination. The psychologist is advised to gather comprehensively all the data needed about impairments and effects of functionality in context, in particular, when attempting to predict future disability and to treat any application of algorithmic formulae as supplemental information to consider until the research supports giving them more weight in such decision making.

There are also dangers arising from indiscriminate applications of predictive formulae in various disability administration systems. Many newly developed models may have narrow applications (e.g., workers' compensation claimants only in the subacute stage post-injury, in a non-litigious workers' compensation system) and should not be automatically generalized to other systems. The evaluation of the validity, with particular emphasis on specificity-sensitivity issues, of emerging models for applications other than the original research purpose will likely constitute a

challenge for researchers (Linton et al. 2005b; Schultz and Gatchel 2005; Waddell et al. 2003). Despite the limitations of the existing predictive models, even small improvements in the early ability to detect those at risk for disability are of critical importance, clinically, legally, and economically (Dersh et al. 2005; Gatchel et al. 2003; Loisel and Durand 2005; Loisel et al. 2002; Schultz and Gatchel 2005). Therefore, we encourage continuation of research on the matter with all necessary variables included and with sufficient interval from injury date to determination of the presence or absence of disability to support psychologists in their decision making conclusions in their testimony or reports and the evidence offered to court.

The disability inferences offered by actuarial approaches need to be integrated with data and inferences which can be collected through the use of clinical methods. It is anticipated that future computer-assisted analysis of clinical assessment/examination data will be increasingly capable of providing actuarial predictions (i.e., Garb 2000). This approach will be of particular assistance to clinicians working with complex biopsychosocial disabilities, including mental health, in the contentious medico-legal environment. The enhanced application of actuarial formulae for prognosis purposes in a medico-legal context will likely serve to increase the scientific standard of clinical assessments, objectifying them and making them more forensically defensible. More so than the case for uniquely clinician-judgment-based assessments without the supplemental use of actuarial data, such assessments would meet court standards for the admissibility of scientific evidence arising from *Daubert* challenges (Schultz and Gatchel 2005).

Future research developments in the prediction of occupational disability would benefit from methodological improvements that include broadening the operational scope of the biopsychosocial model to incorporate employer reactions, job market, and family factors. There is a need for increased use of prospective, inception studies and longitudinal studies that use a broad range of psychometrically sound measures and apply them over time to capture the dynamic relationships leading to future disability or RTW. A clear definition and description of the sample and the criteria for selection, together with ensuring the representativeness of the sample, are necessary. There is a need for new, efficient, and psychometrically tested assessment measures reflecting current models of disability and RTW. Further, data analysis would profit from the enhanced use of multivariate techniques as well as follow-ups over longer periods of time. Collaboration with the disability stakeholders is also seen as maximizing knowledge transfer (Linton et al. 2005b). With improved prediction research, and increased generalization of results in the field of mental health and psychological injury, at the practical level, the resultant psychological disability

evidence will achieve a higher degree of relevance for court purposes and, at the theoretical level, it will lend consistency to the biopsychosocial model of disability. This type of research would provide a better empirical basis for prognosis and determination of the future functional impact of impairment in the context of social demands and supports while ultimately serving to improve legal standards for admissibility of scientific evidence.

Currently, only limited studies are available to elucidate the relationship between mental disorder and occupational functioning, but large-scale epidemiological studies have been providing some key background data. Workers with mental disorders, as compared to the rest of the working population, have a higher number of days where they are either unproductive or unable to function at full capacity. The direct and indirect costs of mental health problems in the workplace have been estimated to equate to 14% of the net annual profits of all companies, roughly 3% of gross domestic product in industrialized countries such as Canada (Standing Senate Committee on Social Affairs, Science and Technology 2004). Similarly, proportionately high costs are reported for Australia, Britain, and the United States (Standing Senate Committee 2004; Stewart et al. 2003). The young age of workers with mental health problems and the cyclical and stress-dependent nature of these disorders have been considered as the key challenges for employers and society at large (Standing Senate Committee 2004).

The estimates of unemployment among individuals with mental health disabilities are high. Figures for the United States show between 75% and 85% of people with severe mental illness are unemployed, whereas in the UK, estimates range from 61% to 73% (Crowther et al. 2001). Furthermore, data indicate that persons with mental illness not only seek entry to work but are also struggling to maintain productivity and employment (Akabas 1994). Research has consistently demonstrated an elevated risk for unemployment, absenteeism, or reduced productivity for individuals dealing with posttraumatic stress disorder (Koch and Samra 2005; Sbordone 2005), mood and anxiety disorders (Gnam 2005), learning disorders (Atkins 2002), and traumatic brain injury (Cifu et al. 1997; Holzberg 2001; Keyser-Marcus et al. 2002; McCrimmon and Oddy 2006; Ownsworth and McKenna 2004; Wehman et al. 2003, 2005; Yasuda et al. 2001) as well as for a wide range of psychological disorders associated with physical disabilities (Turner et al. 2006). Increased reliance on research evidence on the relationship between psychological impairment and occupational functioning to formulate an informed functional disability prognosis in psychological injury cases is necessary to enhance current standards of practice in forensic, rehabilitation, and related clinical psychological practices.

Recommendations for research and practice in psychological injury

The literature on disability-related aspects of psychological injury draws from multiple and often conflicting theoretical frameworks, traditions of research, and conceptualizations of disability and RTW. The literature is vast and multidisciplinary, but fragmented and insufficiently informed by empirical research. Consequently, arising psychological evidence and legal arguments of disability or its absence can be polarized and politicized, particularly in application to psychologically complex and poorly understood constructs such as psychological injury. Both practitioners in the field of psychological injury and researchers making use of such data can enhance their practices by considering the following best practice guidelines:

- Recommendation no. 1. When conceptualizing disability for research or clinical purposes, it is important to select the right disability model for the context and goals of the medico-legal work and be aware of each model's strengths and weaknesses. One would err on the side of caution by selecting the biopsychosocial model and considering the ICF Model (WHO 2001) to facilitate conceptualization. However, the use of the biopsychosocial model could be tempered by consideration of relevant forensic issues, such as whether response bias, suboptimal effort, and malingering are involved.
- Recommendation no. 2. When working from the suggested combined biopsychosocial-forensic model, psychologists are advised to select instruments with the best psychometric properties not only to assess the individual but also the environmental and social context in which she/he functions, including activities of daily life, work, and social demands, reactions and attitudes of others, and supports and resources. Both individual and system-based factors known to affect disability need to be considered.
- Recommendation no. 3. By adopting a multi-trait, multi-method approach to assessment

of impairment as part of a comprehensive psychological assessment and a multidisciplinary or interdisciplinary approach to disability determination, whenever appropriate, the assessor is likely to enhance validity and fairness of psychological and neuropsychological assessment. In addition, psychologists are advised to focus on both diagnosis-specific and cross-diagnostic functional implications of impairment in the environmental context in which this impairment occurs. Depending on the purpose of the inquiry, the use of quantitative approaches balanced by well-established qualitative approaches in assessment may enhance impairment determination.

- Recommendation no. 4. Caution, together with a multi-method, multi-trait, and psychometrically sound approach, should be exercised when attempting to measure complex and poorly defined motivational constructs important to the forensic component of the assessments, such as intentionality of actions, exaggeration, malingering, symptom validity, secondary gain, and illness behavior. It is advised to expand the concept of secondary gain to include secondary losses and tertiary gains and losses. These complex phenomena will be better understood by considering dynamic interactions among contextual, coping, and adaptation factors. Moreover, of particular concern, the assessor should adhere to the principle of fairness in assessment. He or she should use instruments validated on persons with disabilities and provide test accommodations whenever appropriate. If the instruments used have not been validated on persons with disabilities, this procedure should be considered as a limitation of the assessment.
- Recommendation no. 5. In forensic contexts, it is important to consider and attempt to measure self-perception of disability and other disability-related cognitions, such as beliefs and expectations about disability, recovery, and return to work. The assessor should incorporate understanding of the various personal strengths of the individual and the adaptation, coping, and personal growth factors known to mediate the disability experience.
- Recommendation no. 6. The assessor should remain aware of and undertake measurement of interactive, temporal, and dynamic aspects of disability, including adaptation, coping, recovery, and return to work over time; these are of key significance in medico-legal applications. One should avoid static conceptualizations and consider stages of readiness for recovery and return to work and time-based conceptualizations of return to work. The assessor should be cognizant of and proceed to measure long term health outcomes rather than focusing on single return to work events, thereby improving the understanding of disability outcomes.
- Recommendation no. 7. When qualifying and quantifying impairment in psychological injury, depending on the subject of the assessment, psychologists are advised to consider using psychometrically sound measures of functioning in occupational, social, educational, daily living, and recreational domains, together with consideration of the environmental and temporal context in which function is being evaluated. In assessment, balancing strengths and weaknesses, including those related to impairments, constitutes an important consideration.
- Recommendation no. 8. It is important to stay abreast of the research on predictors of disability in conditions of forensic

interest. When using the research evidence to date, psychologists are advised to critically evaluate methodology before producing an opinion. If making use of a statistical predictive formula, psychologists should ensure that it is generalizable to the population or individual of interest and be aware of the pitfalls of using group-based decision-making rules to understanding a person's behavior. In the process of elaborating conclusions, psychologists need to consider carefully the empirical evidence on the relationship between the psychological impairment of interest and possible occupational disability to provide scientifically informed prognoses of future functional status and justifiable conclusions on predicted disability outcome.

Recommendation no. 9. In psychological and legal determinations, the psychologist should remain vigilant to a broader understanding of disability as an outcome in personal injury. Functional outcomes of interest could go beyond traditional vocational predictions into avocational functional domains, including those related to daily living, caregiving, social relationships, recreation, education, and community involvement. Within vocational outcomes, presenting patterns of absenteeism and reduced productivity could enhance the range of future predictions, as would consideration of the reactions of others to disability, including evidence of stigma and discrimination.

More theorizing and empirical data collection on disability issues must occur and converge before practice in the field of psychological injury and law further advances within the scientist-practitioner model. It is anticipated that the models of disability will continue their convergence towards integrated biopsychosocial and forensic conceptualizations, with the emphasis on person–system interaction and the recognition of importance of psychosocial factors, particularly cognitions involved in self-perception,

coping, self-efficacy, adaptation, and resilience. The research in mental health has already demonstrated an emergence of interest in functional and work-related aspects of various conditions. This new research can benefit from the increasing accumulated knowledge and methodological advances gained from research on musculoskeletal pain. With an improved and more balanced research base, the practice of psychological injury and law will advance in the direction of objectivity, fairness, and the elimination of bias.

Acknowledgment The authors would like to express special appreciation to the Editor of Psychological Injury and Law, Gerald Young, for his insightful comments and suggested improvements to the paper. We also would like to thank Natalie Moore and Alanna Winter for their valuable assistance with research and technical aspects of this paper.

References

- Akabas, S. H. (1994). Workplace responsiveness: Key employer characteristics in support of job maintenance for people with mental illness. *Psychosocial Rehabilitation Journal*, 17(3), 91–101.
- American Educational Research Association, American Psychological Association, National Council on Measurement in Education (1999). *Standards for educational and psychological testing*. Washington, DC: Author.
- Americans with Disabilities Act (ADA). (1990). 42 U.S.C.A. § 12101 et seq. (West 1993).
- Amick III, B. C., Habeck, R. V., Hunt, A., Fossel, A. H., Chapin, A., Keller, R. B., et al. (2000). Measuring the impact of organizational behaviors on work disability prevention and management. *Journal of Occupational Rehabilitation*, 10, 21–38.
- Arbisi, P. A., & Butcher, J. N. (2004). Failure of the FBS to predict malingering of somatic symptoms: Response to critiques by Greve and Bianchini and Lees Haley and Fox. *Archives of Clinical Neuropsychology*, 19, 341–345.
- Atkins, R. (2002). Supported employment for people with severe learning disabilities. *British Journal of Therapy and Rehabilitation*, 9, 92–95.
- Bagby, R. M., Marshall, M. B., Bury, A. S., Bacchiochi, J. R., & Miller, L. S. (2006). Assessing underreporting and overreporting response styles on the MMPI-2. In J. N. Butcher (Ed.) *MMPI-2: A practitioner's guide* (pp. 39–70). Washington, DC: American Psychological Association.
- Baldwin, M. L., Johnson, W. G., & Butler, R. J. (1996). The error of using returns-to-work to measure the outcomes of health care. *American Journal of Industrial Medicine*, 29, 632–641.
- Bandura, A. (1977). Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191–215.
- Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.
- Baril, R., & Berthelette, D. (2000). *Les composantes et les déterminants organisationnels des interventions de maintien du lien d'emploi en entreprises (IRSST; Rapport No. R-238)*. Montréal, Canada: Institut de recherche en santé et en sécurité du travail du Québec.
- Bishop, M. (2007). Quality of life and psychosocial adaptation to chronic illness and acquired disability: A conceptual and theoretical synthesis. In A. E. Dell Orto, & P. W. Power (Eds.) *The psychological & social impact of illness and disability* (pp. 230–248). New York: Springer.

- Bowman, M. (2005). The role of individual factors in predicting posttraumatic stress disorder. In I. Z. Schultz, & R. Gatchel (Eds.) *Handbook of complex occupational disability claims: Early risk identification and intervention* (pp. 315–332). New York: Springer.
- Brines, J., Salazar, M. K., Graham, K. Y., & Pergola, T. (1999). Return to work experience of injured workers in a case management program. *AAOHN Journal*, *47*, 365–372.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Bruyère, S. M., & Shrey, D. E. (1991). Disability management in industry: A joint labor-management process. *Rehabilitation Counseling Bulletin*, *34*, 227–242.
- Burton, A. K., Tillotson, K. M., Main, C. J., & Hollis, S. (1995). Psychosocial predictors of outcome in acute and subchronic low back trouble. *Spine*, *20*, 722–728.
- Burton, A. K., Waddell, G., & Main, C. J. (2006). Beliefs and obstacles to recovery in low back pain. In P. Halligan, & M. Aylward (Eds.) *The power of belief: Psychosocial influences on illness, disability, and medicine* (pp. 161–176). New York: Oxford University Press.
- Butcher, J. N., Gass, C. S., Cumella, E., Kally, Z., & Williams, C. L. (2008). Potential for bias in MMPI-2 assessments using the fake bad scale (FBS). *Psychological Injury and Law* (in press).
- Butcher, J. N., Graham, J. R., Ben-Porath, Y. S., Tellegen, A., Dahlstrom, W. G., & Kaemmer, B. (2001). *Minnesota Multiphasic Personality Inventory-2 (MMPI-2): Manual for administration, scoring, and interpretation (Rev. ed.)*. Minneapolis, MN: University of Minnesota Press.
- Butler, R. J., Johnson, W. G., & Baldwin, M. L. (1995). Managing work-disability: Why first return to work is not a measure of success. *Industrial and Labor Relations Review*, *48*, 452–469.
- Chirikos, T. N., & Nestel, G. (1985). Further evidence on the economic effects of poor health. *Review of Economics and Statistics*, *67*, 61–69.
- Cifu, D. X., Keyser-Marcus, L., Lopez, E., Wehman, P., Kreutzer, J. S., Englander, J., et al. (1997). Acute predictors of successful return to work 1 year after traumatic brain injury: A multicenter analysis. *Archives of Physical Medicine and Rehabilitation*, *78*, 125–131.
- Cole, D. C., Mondloch, M. V., Hogg-Johnson, S., & Early Claimant Cohort Prognostic Modelling (EPM) Group (2002). Listening to injured workers: How recovery expectations predict outcomes—A prospective study. *Canadian Medical Association Journal*, *166*, 749–754.
- Committee on Ethical Guidelines for Forensic Psychologists (1991). Specialty guidelines for forensic psychologists. *Law and Human Behavior*, *15*, 655–665.
- Corrigan, P. W., Larson, J. E., & Sachiko, A. K. (2007). Mental illness stigma and the fundamental components of supported employment. *Rehabilitation Psychology*, *52*, 451–457.
- Crook, J., Milner, R., Schultz, I. Z., & Stringer, B. (2002). Determinants of occupational disability following a low back injury: A critical review of the literature. *Journal of Occupational Rehabilitation*, *12*, 277–295.
- Crowther, R. E., Marshall, M., Bond, G. R., & Huxley, P. (2001). Helping people with severe mental disorder obtain work: Systematic review. *British Medical Journal*, *322*, 204–208.
- Daubert v. Merrell Dow Pharmaceuticals. (1993). 509 U.S. 579.
- Dawes, R. M., Faust, D., & Meehl, P. E. (1989). Clinical versus actuarial judgment. *Science*, *243*, 1668–1674.
- den Boer, J. J., Oostendorp, R. A. B., Beems, T., Muunneke, M., & Evers, A. W. (2006). Reduced work capacity after lumbar disc surgery: The role of cognitive behavioral and work-related risk factors. *Pain*, *126*, 72–78.
- Dersh, J., Gatchel, R. J., & Kishino, N. (2005). The role of tertiary gain in pain disability. *Practical Pain Management*, *5*, 13–28 (September/October).
- Dersh, J., Polatin, P. B., Leeman, G., & Gatchel, R. J. (2004). The management of secondary gain and loss in medicolegal settings: Strengths and weaknesses. *Journal of Occupational Rehabilitation*, *14*, 267–279.
- Drake, R. E., Becker, D. R., & Bond, G. R. (2003). Recent research on vocational rehabilitation for persons with severe mental illness. *Current Opinion in Psychiatry*, *16*, 451–455.
- Dunn, D. S., & Dougherty, S. B. (2005). Prospects for a positive psychology of rehabilitation. *Rehabilitation Psychology*, *50*, 305–311.
- Durand, M., & Loisel, P. (2001). Therapeutic return to work: Rehabilitation in the workplace. *Work*, *17*, 57–63.
- Elliott, T. R., Kurylo, M., & Rivera, P. (2005). Positive growth following acquired physical disability. In C. R. Snyder, & S. J. Lopez (Eds.) *Handbook of positive psychology* (pp. 687–699). New York: Oxford University Press.
- Ferrari, R., Kwan, O., & Friel, J. (2006). Volition and psychosocial factors in illness behaviour. In P. Halligan, & M. Aylward (Eds.) *The power of belief: Psychosocial influences on illness, disability, and medicine* (pp. 69–86). New York: Oxford University Press.
- Feuerstein, M., & Theborge, R. W. (1991). Perceptions of disability and occupational stress as discriminators of work disability in patients with chronic pain. *Journal of Occupational Rehabilitation*, *1*, 185–195.
- Fishbain, D. A., Cutler, R. B., Rosomoff, R. S., & Rosomoff, H. L. (1994). The problem-oriented psychiatric examination of the chronic pain patient and its application to the litigation consultation. *Clinical Journal of Pain*, *10*, 28–51.
- Fitzgerald, L. F. (2003). Forensic evaluation in sexual harassment litigation: A comprehensive approach. In I. Z. Schultz, & D. O. Brady (Eds.) *Psychological injuries at trial (CD-ROM)*. Chicago: American Bar Association.
- Franche, R.-L., Baril, R., Shaw, W., Nicholas, M., & Loisel, P. (2005). Workplace-based return-to-work interventions: Optimizing the role of stakeholders in implementation and research. *Journal of Occupational Rehabilitation*, *15*, 525–542.
- Franche, R.-L., & Krause, N. (2002). Readiness for return to work following injury or illness: Conceptualizing the interpersonal impact of health care, workplace and insurance factors. *Journal of Occupational Rehabilitation*, *12*, 233–256.
- Friesen, M. N., Yassi, A., & Cooper, J. (2001). Return-to-work: The importance of human interactions and organizational structures. *Work*, *17*, 11–22.
- Garb, H. N. (1998). *Studying the clinician: Judgment research and psychological assessment*. Washington, DC: American Psychological Association.
- Garb, H. N. (2000). Computers will become increasingly important for psychological assessment: Not that there's anything wrong with that. *Psychological Assessment*, *12*, 31–39.
- Gatchel, R. J. (1996). Psychological disorders and chronic pain: Cause-and-effect relationships. In R. J. Gatchel, & D. C. Turk (Eds.) *Psychological approaches to pain management: A practitioner's handbook* (pp. 33–52). New York: Guildford Press.
- Gatchel, R. J., Polatin, P. B., Noe, C., Gardea, M., Pulliam, C., & Thompson, J. (2003). Treatment- and cost-effectiveness of early intervention for acute low-back pain patients: A one-year prospective study. *Journal of Occupational Rehabilitation*, *13*, 1–9.
- Gill, C. J., Kewman, D. G., & Brannon, R. W. (2003). Transforming psychological practice and society: Policies that reflect the new paradigm. *American Psychologist*, *58*, 305–312.
- Gnam, W. H. (2005). The prediction of occupational disability related to depressive and anxiety disorders. In I. Z. Schultz, & R. J. Gatchel (Eds.) *Handbook of complex occupational disability*

- claims: *Early risk identification, intervention, and prevention* (pp. 371–384). New York: Springer.
- Graffam, J., Shinkfield, A., Smith, K., & Polzin, U. (2002). Factors that influence employer decisions in hiring and retaining an employee with a disability. *Journal of Vocational Rehabilitation, 17*, 175–181.
- Green-McKenzie, J., Parkerson, J., & Bernacki, E. (1998). Comparison of workers' compensation costs for two cohorts of injured workers before and after the introduction of managed care. *Journal of Occupational & Environmental Medicine, 40*, 568–572.
- Greenwood, R., & Johnson, V. A. (1987). Employer perspectives on workers with disabilities. *Journal of Rehabilitation, 53*(3), 37–45.
- Greve, K. W., & Bianchini, K. J. (2004). Response to Butcher et al. (2003) The construct validity of the Lees-Haley Fake-Bad Scale. *Archives of Clinical Neuropsychology, 19*, 337–339.
- Groth-Marnat, G. (2003). *Handbook of psychological assessment* (4th ed.). Hoboken, NJ: Wiley.
- Guite, J. W., Logan, D. E., Sherry, D. D., & Rose, J. B. (2007). Adolescent self-perception: Associations with chronic musculoskeletal pain and functional disability. *The Journal of Pain, 8*, 379–386.
- Hadjistavropoulos, T., & Beiling, P. (2001). File review consultation in the adjudication of mental health and chronic pain disability claims. *Consulting Psychology Journal: Practice & Research, 53*, 52–63.
- Haldorsen, E. M. H., Indahl, A., & Ursin, H. (1998). Patients with low back pain not returning to work: A 12-month follow up study. *Spine, 23*, 1202–1208.
- Halligan, P. (2006). Beliefs: Shaping experience and understanding illness. In P. Halligan, & M. Aylward (Eds.) *The power of belief: Psychosocial influences on illness, disability and medicine* (pp. xi–xxvi). New York: Oxford University Press.
- Harder, H. G., & Scott, L. R. (2005). *Comprehensive disability management*. Philadelphia: Elsevier Science.
- Harnois, G., & Gabriel, P. (2000). *Mental health work: Impact, issues and good practices*. Geneva, Switzerland: World Health Organization.
- Haslan, C., Atkinson, S., Brown, S. S., & Haslan, R. A. (2005). Anxiety and depression in the workplace: Effects on the individual and organization (a focus group investigation). *Journal of Affective Disorders, 88*, 209–215.
- Heinemann, A. W. (1995). Measures of coping and reaction to disability. In L. A. Cushman, & M. Scherer (Eds.) *Psychological assessment in medical rehabilitation* (pp. 39–89). Washington, DC: American Psychological Association.
- Helmes, E., & Goburdhun, A. (2007). Cognitions related to chronic pain: Revision and extension of the cognitive evaluation questionnaire. *Clinical Journal of Pain, 23*, 53–61.
- Holzberg, E. (2001). The best practice for gaining and maintaining employment for individuals with traumatic brain injury. *Work, 16*, 245–258.
- Hunt, H. A., & Habeck, R. V. (1993). *The Michigan disability prevention study: Research highlights (Staff Working Papers 93-18)*. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research April.
- Hunt, H. A., Habeck, R. V., VanTol, B., & Scully, S. (1993). *Disability prevention among Michigan employers (Upjohn Institute Technical Report No. 93-004)*. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research.
- Hunt, D. G., Zuberbier, O. A., Kozlowski, A. J., Berkowitz, J., Schultz, I. Z., Milner, R. A., et al. (2002). Are components of a comprehensive medical assessment predictive of work disability following an episode of occupational low back trouble? *Spine, 27*, 2715–2719.
- Iverson, G. L. (2007). Identifying exaggeration and malingering. *Pain Practice, 7*, 94–102.
- Iverson, G. L., Henrichs, T. F., Barton, E. A., & Allen, S. (2002). Specificity of the MMPI-2 Fake Bad Scale as a marker for personal injury malingering. *Psychological Reports, 90*, 131–136.
- Jensen, M. P. (2004). Changes in readiness to self-manage pain are associated with improvement in multidisciplinary pain treatment and pain coping. *Pain, 111*, 84–95.
- Jensen, M. P., Romano, J. M., Turner, J. A., Good, A. B., & Wald, L. H. (1999). Patient beliefs predict patient functioning: Further support for a cognitive-behavioural model of chronic pain. *Pain, 81*, 95–104.
- Johnson, L. M., Zautra, A. J., & Davis, M. C. (2006). The role of illness uncertainty on coping with fibromyalgia symptoms. *Health Psychology, 25*, 696–703.
- Jones, M., Edwards, I., & Gifford, L. (2002). Conceptual models for implementing biopsychosocial theory in clinical practice. *Manual Therapy, 7*, 2–9.
- Karjalainen, K., Malmivaara, A., van Tulder, M., Roine, R., Jauhiainen, M., Hurri, H., et al. (2003). Multidisciplinary biopsychosocial rehabilitation for subacute low back pain among working age adults. *The Cochrane Database of Systematic Reviews*, DOI 10.1002/14651858.CD002193.
- Kates, N., & George, L. (2004). Organizational and environmental factors can influence effectiveness of new care models. *Healthcare Papers, 5*, 68–71.
- Katz, J., Hass, R. G., & Bailey, J. (1988). Attitudinal ambivalence and behavior toward people with disabilities. In H. E. Yunker (Ed.) *Attitudes toward persons with disabilities* (pp. 47–57). New York: Springer.
- Keyser-Marcus, L. A., Bricout, J. C., Wehman, P., Campbell, L. R., Cifu, D. X., Englander, J., et al. (2002). Acute predictors of return to employment after traumatic brain injury: A longitudinal follow-up. *Archives of Physical Medicine & Rehabilitation, 83*, 635–641.
- Koch, W. J., & Samra, J. (2005). Posttraumatic stress disability after motor vehicle accidents: Impact on productivity and employment. In I. Z. Schultz & R. Gatchel (Eds.), *Handbook of complex occupational disability claims: Early risk identification, intervention and prevention* (pp. 333–342). New York: Springer.
- Krause, N., Dasinger, L. K., Deegan, L. J., Rudolph, L., & Brand, R. J. (2001a). Psychosocial job factors and return-to-work after compensated low back injury: A disability phase-specific analysis. *American Journal of Industrial Medicine, 40*, 374–392.
- Krause, N., Frank, J. W., Sullivan, T. J., Dasinger, L. K., & Sinclair, S. J. (2001b). Determinants of duration of disability and return to work after work-related injury and illness: Challenges for future research. *American Journal of Industrial Medicine, 40*, 464–484.
- Krause, N., & Ragland, D. R. (1994). Occupational disability due to low back pain: A new interdisciplinary classification based on a phase model of disability. *Spine, 19*, 1011–1020.
- Krupa, T. (2004). Employment, recovery and schizophrenia: Integrating health and disorder at work. *Psychiatric Rehabilitation Journal, 28*, 8–15.
- Kumho Tire, Inc. v. Carmichael. (1999). 119 S.Ct.1167.
- Kusznir, A. (October, 2001). Understanding return to work challenges with depression. *2nd Annual National Symposium of the National Institute of Disability Management and Research*. Ottawa, Ontario.
- Kwan, O., Ferrari, R., & Friel, J. (2001). Tertiary gain and disability syndromes. *Medical Hypotheses, 57*, 459–464.
- Lanyon, R. I., & Goodstein, L. D. (Eds.) (1997). In *Personality assessment* (3rd ed.). New York: Wiley.
- Leeman, G., Polatin, P., Gatchel, R., & Kishino, N. (2000). Managing secondary gain in patients with pain-associated disability: A clinical perspective. *Journal of Workers Compensation, 9*, 25–44.
- Leibowitz, G. (1991). Organic and biophysical theories of behavior. *Journal of Developmental and Physical Disabilities, 3*, 201–243.

- Linton, S. J. (1995). An overview of psychosocial and behavioral factors in neck-and-shoulder pain. *Scandinavian Journal of Rehabilitation Medicine. Supplement*, 32, 67–77.
- Linton, S. J. (2000). A review of psychological risk factors in back and neck pain. *Spine*, 25, 1148–1156.
- Linton, S. J. (2001). Occupational psychological factors increase the risk for back pain: A systematic review. *Journal of Occupational Rehabilitation*, 11, 53–66.
- Linton, S. J., Boersma, K., Jansson, M., Svärd, L., & Botvalde, M. (2005a). The effects of cognitive-behavioral and physical therapy preventive interventions on pain related sick leave: A randomized controlled trial. *Clinical Journal of Pain*, 21, 101–119.
- Linton, S. J., Gross, D., Schultz, I. Z., Main, C. J., Côté, P., Pransky, G., et al. (2005b). Prognosis and the identification of workers risking disability: Research issues and directions for future research. *Journal of Occupational Rehabilitation*, 15, 459–474.
- Livneh, H. (1988). Rehabilitation goals: Their hierarchical and multifaceted nature. *Journal of Applied Rehabilitation Counseling*, 19(3), 13–18.
- LoBianco, A. F., & Sheppard-Jones, K. (2007). Perceptions of disability as related to medical and social factors. *Journal of Applied Social Psychology*, 37, 1–13.
- Loisel, P., Buchbinder, R., Hazard, R., Keller, R., Scheel, I., van Tulder, M., et al. (2005). Prevention of work disability due to musculoskeletal disorders: The challenge of implementing evidence. *Journal of Occupational Rehabilitation*, 15, 507–524.
- Loisel, P., & Durand, M.-J. (2005). Working with the employer. In I. Z. Schultz, & R. Gatchel (Eds.) *Handbook of complex occupational disability claims: Early risk identification and intervention* (pp. 479–488). New York: Springer.
- Loisel, P., Durand, M., Berthelette, D., Vézina, N., Baril, R., Gagnon, D., et al. (2001). Disability prevention: New paradigm for the management of occupational back pain. *Disease Management and Health Outcomes*, 9, 351–360.
- Loisel, P., Lemaire, J., Pointras, S., Durand, M., Champagne, F., Stock, S., et al. (2002). Cost-benefit and cost-effectiveness analysis of a disability prevention model for back pain management: A six year follow up study. *Occupational and Environmental Medicine*, 59, 807–815.
- MacDonald-Wilson, K. L., Rogers, E. S., & Massaro, J. (2003). Identifying relationships between functional limitations, job accommodations, and demographic characteristics of persons with psychiatric disabilities. *Journal of Vocational Rehabilitation*, 18, 15–24.
- MacKenzie, E. J., Morris, J. A., Jurkovich, G. J., Yasui, Y., Cushing, B. M., Burgess, A. R., et al. (1998). Return to work following injury: The role of economic, social, and job-related factors. *American Journal of Public Health*, 88, 1630–1637.
- Main, C. J., Phillips, C. J., & Watson, P.-J. (2005). Secondary prevention in health care and occupational setting in musculoskeletal conditions focusing on low back pain. In I. Z. Schultz, & R. J. Gatchel (Eds.) *Handbook of complex occupational disability claims: Early risk identification, intervention and prevention* (pp. 387–404). New York: Springer.
- Main, C. J., & Spanswick, C. C. (2000). *Pain management: An interdisciplinary approach*. Edinburgh: Churchill Livingstone.
- Marhold, C., Linton, S. J., & Melin, L. (2001). A cognitive-behavioral return-to-work program: Effects on pain patients with a history of long-term versus short-term sick leave. *Pain*, 91, 155–163.
- Matthews, L., & Chinnery, R. (2005). Prediction of work functioning following accidental injury: The contribution of PTSD symptom severity and other established risk factors. *International Journal of Psychology*, 40, 339–348.
- McCarthy, M. (1998). Whose body is it anyway? Pressures and control for women with learning disabilities. *Disability & Society*, 13, 557–574.
- McCrimmon, S., & Oddy, M. (2006). Return to work following moderate-to-severe traumatic brain injury. *Brain Injury*, 20, 1037–1046.
- McFarlin, D. B., Song, J., & Sonntag, M. (1991). Integrating the disabled into the work force: A survey of Fortune 500 company attitudes and practices. *Employee Responsibilities and Rights Journal*, 4, 107–123.
- Melhorn, J. M., Lazarovic, J., & Roehl, W. K. (2005). Do we have a disability epidemic? In I. Z. Schultz, & R. Gatchel (Eds.) *Handbook of complex occupational disability claims: Early risk identification and intervention* (pp. 7–24). New York: Springer.
- Meyers, J. E., Millis, S. R., & Volkert, K. (2002). A validity index for the MMPI-2. *Archives of Clinical Neuropsychology*, 17, 157–169.
- Morris, D. B. (1998). *Illness and culture in the postmodern age*. Berkeley & Los Angeles, CA: University of California Press.
- Olkin, R. (1999). *What psychotherapists should know about disability*. New York: Guilford Press.
- Olkin, R., & Pledger, C. (2003). Can disability studies and psychology join hands? *American Psychologist*, 58, 296–304.
- Owensworth, T., & McKenna, K. (2004). Investigation of factors related to employment outcome following traumatic brain injury: A critical review and conceptual model. *Disability & Rehabilitation*, 26, 765–784.
- Pergola, T., Salazar, M. K., Graham, K. Y., & Brines, J. (1999). Case management services for injured workers: Providers' perspectives. *AAOHN Journal*, 47, 397–404.
- Pincus, T., Burton, A. K., Vogel, S., & Field, A. P. (2002a). A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain. *Spine*, 27, E109–E120.
- Pincus, T., Vlaeyen, J. W. S., Kendall, N. A. S., Von Korff, M. R., Kalauokalani, D. A., & Reis, S. (2002b). Cognitive-behavioral therapy and psychosocial factors in low back pain. *Spine*, 27, E133–E138.
- Polatin, P. B., Kinney, R. K., Gatchel, R. J., Lillo, E., & Mayer, T. G. (1993). Psychiatric illness and chronic low-back pain. The mind and the spine—which goes first? *Spine*, 18, 66–71.
- Pransky, G., Gatchel, R. J., Linton, S. J., & Loisel, P. (2005). Improving return to work research. *Journal of Occupational Rehabilitation*, 15, 453–457.
- Pransky, G. S., Shaw, W. S., Franche, R.-L., & Clarke, A. (2004). Disability prevention and communication among workers, physicians, employers, and insurers—current models and opportunities for improvement. *Disability & Rehabilitation*, 26, 625–634.
- Ruff, R. M., & Weyer Jamora, C. (2008). Forensic neuropsychology and mild traumatic brain injury. *Psychological Injury and Law* (in press).
- Salazar, M. K., & Graham, K. Y. (1999). Evaluation of a case management program. *AAOHN Journal*, 47, 416–423.
- Sandström, J., & Esbjörnsson, E. (1986). Return to work after rehabilitation: The significance of the patient's own prediction. *Scandinavian Journal of Rehabilitation Medicine*, 18, 29–33.
- Sbordone, R. J. (2005). Following post traumatic stress disorder. In I. Z. Schultz, & R. J. Gatchel (Eds.) *Handbook of complex occupational disability claims: Early risk identification, intervention and prevention* (pp. 343–370). New York: Springer.
- Schultz, I. Z., & Brady, D. O. (2003). *Psychological injuries at trial*. Chicago: American Bar Association.
- Schultz, I. Z., Crook, J. M., Berkowitz, J., Meloche, G. R., Milner, R., Zuberbier, O. A., et al. (2002). Biopsychosocial multivariate predictive model of occupational low back disability. *Spine*, 27, 2720–2725.
- Schultz, I. Z., Crook, J., Fraser, K., & Joy, P. W. (2000). Models of diagnosis and rehabilitation in musculoskeletal pain-related occupational disability. *Journal of Occupational Rehabilitation*, 10, 271–293.
- Schultz, I. Z., Crook, J., Meloche, G. R., Berkowitz, J., Milner, R., Zuberbier, O. A., et al. (2004). Psychosocial factors predictive of occupational low back disability: Towards development of a return to work model. *Pain*, 107, 77–85.

- Schultz, I. Z., & Gatchel, R. J. (2005). Research and practice directions in risk for disability prediction and early intervention. In I. Z. Schultz, & R. J. Gatchel (Eds.) *Handbook of complex occupational disability claims: Early risk identification, intervention and prevention* (pp. 523–540). New York: Springer.
- Schultz, I. Z., Stowell, A. W., Feuerstein, M., & Gatchel, R. J. (2007a). Models of return to work for musculoskeletal disorders. *Journal of Occupational Rehabilitation, 17*, 327–352.
- Schultz, I. Z., Winter, A., Milner, R., Zuberbier, O., Krupa, T., et al., (2007b). *Towards best evidence-informed workplace practices for job accommodations for persons with mental health disabilities: Integration of evidence. Unpublished manuscript.*
- Shaw, W. S., Feuerstein, M., Lincoln, A. E., Miller, V. I., & Wood, P. M. (2001). Case management services for work related upper extremity disorders. *AAOHN Journal, 49*, 378–389.
- Sherman, J. F., & Ohrback, R. (2006). Objective and subjective measurement of pain: Current approaches to forensic applications. In G. Young, A. W. Kane, & K. Nicholson (Eds.) *Psychological knowledge in court: PTSD, pain and TBI* (pp. 193–214). New York: Springer.
- Shrey, D. E. (1995). Worksites disability management and industrial rehabilitation: An overview. In D. E. Shrey, & M. Lacerte (Eds.) *Principles and practices of disability management in industry* (pp. 3–53). Winter Park, FL: GR Press.
- Shrey, D. E., & Lacerte, M. (1995). *Principles and practices of disability management in industry*. Winter Park, FL: GR Press.
- Sims, D. C. (2007). The myth of malingering: diagnosing dishonesty in the classroom. *Florida Justice Association Journal, 520*, 56–58.
- Smart, J. F. (2001). *Disability, society, and the individual*. Austin, TX: Pro-Ed.
- Standing Senate Committee on Social Affairs, Science and Technology (2004). *Mental health, mental disorder and addiction: Overview of policies and programs in Canada* pp. 1–247. Ottawa, ON, Canada: Government Printing Office (Report 1 of 3).
- Steenstra, I. A., Anema, J. R., van Tulder, M. W., Bongers, P. M., de Vet, H. C., & van Mechelen, W. (2006). Economic evaluation of a multi-stage return to work program for workers on sick-leave due to low back pain. *Journal of Occupational Rehabilitation, 16*, 557–578.
- Stewart, W. F., Ricci, J. A., Chee, E., Hahn, S. R., & Morganstein, D. (2003). Cost of lost productive work time among U.S. workers with depression. *Journal of the American Medical Association, 289*, 3135–3144.
- Stowell, A. M., & McGeary, D. D. (2005). Musculoskeletal injury: A three-stage continuum from cause to disability to decision. In I. Z. Schultz, & R. J. Gatchel (Eds.) *Handbook of complex occupational disability claims: Early risk identification, intervention and prevention* (pp. 117–39). New York: Springer.
- Sullivan, M. J. L., Feuerstein, M., Gatchel, R. J., Linton, S. J., & Pransky, G. (2005). Integrating psychosocial and behavioral interventions to achieve optimal rehabilitation outcomes. *Journal of Occupational Rehabilitation, 15*, 475–489.
- Sullivan, M. J. L., Martel, M. O., Tripp, D. A., Savard, A., & Crombez, G. (2006). Catastrophic thinking and heightened perception of pain in others. *Pain, 123*, 37–44.
- Szymanski, E. M., & Trueba, H. T. (1994). Castification of people with disabilities: Potential disempowering aspects of classification in disability services. *Journal of Rehabilitation, 60*(3), 12–20.
- Tate, D. G., & Pledger, C. (2003). An integrative conceptual framework of disability. *American Psychologist, 58*, 289–95.
- Tsai, J. H., Salazar, M. K., Graham, K. Y., & Brines, J. (1999). Case management for injured workers: A descriptive study using a record review. *AAOHN Journal, 47*, 405–415.
- Turk, D. C. (1996). Biopsychosocial perspective on chronic pain. In R. J. Gatchel, & D. C. Turk (Eds.) *Psychological approaches to pain management: A practitioner's handbook* (pp. 3–32). New York: Guilford Press.
- Turk, D. C., & Gatchel, R. J. (2002). *Psychological approaches to pain management: A practitioner's handbook* (2nd ed.). New York: Guilford Press.
- Turk, D. C., & Monarch, E. S. (2002). Biopsychosocial perspective on chronic pain. In D. C. Turk, & R. J. Gatchel (Eds.) *Psychological approaches to pain management: A practitioner's handbook* (pp. 3–29) 2nd ed. New York: Guilford.
- Turner, J. A., Franklin, G., Fulton-Keoh, D., Sheppard, L., Wickizer, T. M., Wu, R., et al. (2006). Worker recovery expectations and fear-avoidance predict work disability in a population-based workers' compensation back pain sample. *Spine, 31*, 682–689.
- Turner, R. J., Lloyd, D. A., & Taylor, J. (2006). Physical disability and mental health: An epidemiology of psychiatric and substance disorders. *Rehabilitation Psychology, 51*, 214–223.
- Waddell, G., & Burton, A. K. (2001). Occupational health guidelines for the management of low back pain at work: Evidence review. *Occupational Medicine, 51*, 124–135.
- Waddell, G., Burton, A. K., & Main, C. J. (2003). *Screening to identify people at risk of long-term incapacity for work: A conceptual and scientific review*. London: Royal Society of Medicine Press.
- Weber, M. C. (2007). *Disability harassment*. New York: New York University Press.
- Wegener, S. T., & Shertzer, E. L. (2006). *Foundations of rehabilitation psychology: Adaptation and emotion*. American Psychological Symposium #3134, American Psychological Association Annual Convention, New Orleans, August 12, 2006.
- Wehman, P., Kregel, J., Keyser-Marcus, L., Sherron-Targett, P., Campbell, L., West, M., et al. (2003). Supported employment for persons with traumatic brain injury: A preliminary investigation of long-term follow-up costs and program efficiency. *Archives of Physical Medicine & Rehabilitation, 84*, 192–196.
- Wehman, P., Targett, P., West, M., & Kregel, J. (2005). Productive work and employment for persons with traumatic brain injury: What have we learned after 20 years? *Journal of Head Trauma Rehabilitation, 20*, 115–127.
- Wood, R. L. (2004). Understanding the 'miserable minority': A diathesis-stress paradigm for post-concussive syndrome. *Brain Injury, 18*, 1135–1153.
- World Health Organization (WHO) (2001). *International classification of functioning, disabilities and health problems*. Geneva, Switzerland: Author.
- Wunderlich, G., Rice, D., & Amado, N. (2002). *Dynamics of disability: Measuring and monitoring disability for social security programs*. Washington, DC: National Academy Press.
- Yasuda, S., Wehman, P., Targett, P., Cifu, D., & West, M. (2001). Return to work for persons with traumatic brain injury. *American Journal of Physical & Medical Rehabilitation, 80*, 852–864.
- Young, G. (2008). Psychological injury and law: Introduction to the first issue. *Psychological Injury and Law, 1*, (this issue) DOI [10.1007/s12207-008-9004-5](https://doi.org/10.1007/s12207-008-9004-5).
- Young, G., Kane, A. W., & Nicholson, K. (Eds.) (2006). In *Psychological knowledge in court: PTSD, pain, and TBI*. New York: Springer.
- Young, A. E., Roessler, R. T., Wasiak, R., McPherson, K. M., van Poppel, M. N. M., & Anema, J. R. (2005a). A developmental conceptualization of return to work. *Journal of Occupational Rehabilitation, 15*, 557–568.
- Young, A. E., Wasiak, R., Roessler, R. T., McPherson, K. M., Anema, J. R., & van Poppel, M. N. M. (2005b). Return-to-work outcomes following work disability: Stakeholder motivations, interests and concerns. *Journal of Occupational Rehabilitation, 15*, 543–556.

Dr. Schultz provides expert witness testimony on impairment and disability in complex neuropsychological and psychological injury cases in Canada and the United States.

Alison Stewart is the Research Coordinator of the University of British Columbia's Return to Work Research Laboratory.