Current Conceptual Models of Return to Work

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2.1 Introduction

Over two-thirds of poor-health retirement, long-term absence due to sickness, and disability benefits arise from "common health problems"—i.e., mild/moderate musculoskeletal and cardiorespiratory symptoms and mental health (Waddell and Aylward 2005, 2010). Within the workplace, musculoskeletal pain disorders—which involve injury disorders of muscles, ligaments, tendons, joints, cartilage, and/or spinal disks—represent the most costly, disabling, prevalent, and commonly researched conditions (Schultz et al. 2007; U.S. Department of Labor and Bureau of Labor Statistics 2010). Despite the urgency and contributions from many researchers and clinicians in various fields (e.g., occupational medicine, nursing, rehabilitation medicine, physical therapy, exercise physiology, physical and occupational therapy, ergonomics, engineering, psychology, vocational counseling, economics, and public health), a single theoretical framework unifying these fields remains missing. Comprehensive reviews of existing models were recently published (e.g., Kirsh et al. 2010; Schultz et al. 2007); however, only modest changes have been proposed since then.

2.2 Definitions

Although much research has centered on return to work (RTW) in the field of occupational disability, a clear RTW definition remains elusive (Young et al. 2005). A number of investigators have tried to identify a RTW definition, but differences still remain in how researchers understand and operationalize the terms "disability" and "RTW." Schultz et al. (2007) observed that while occupational or work disability has been operationally defined as "time off of work, reduced productivity, or working with functional limitations as a result (outcome), of either traumatic or nontraumatic clinical conditions, the term 'return to work' is utilized as both a process and outcome measure" (p. 329).

Looking more closely at defining RTW, Krause and colleagues (Krause et al. 2001a, b) further proposed that RTW could be a: (1) process, such as graduated return to work; (2) working status, considered a final, measurable outcome related to disability, and its nuances

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I.Z. Schultz, R.J. Gatchel (eds.), *Handbook of Return to Work*,
Handbooks in Health, Work, and Disability 1, DOI 10.1007/978-1-4899-7627-7_2

including return to pre-injury employer and/or job and the use of accommodations; and (3) a variety of vocational outcome definitions, including length of work inability. Length itself can be measured through methods including cumulative length, categorical (i.e., Yes or No for RTW status), and days lost from work starting from injury date. In sum, based on the stakeholder, wide variations of RTW definitions exist in research and practice, limiting generalizability of research outcomes and knowledge transfer to practice (Franche and Krause 2002; Krause et al. 2001b; Schultz et al. 2007; Stowell and McGeary 2005; Young et al. 2005).

2.3 Historical Perspectives

Current conceptualization of RTW models arise from a few significant sources, including, and not surprisingly, the definition of RTW. Other significant influences include pain disability and health perspectives over the course of history (Schultz et al. 2007). Classic perspectives include Hippocrates' influential ideas on the mind-body connection (Noy 2002), Brody's proposal of a hierarchy systems approach to health that emphasizes interrelatedness (Brody 1973), and Melzack's contribution of the *neuromatrix model of pain*, which accounts for genetic factors, individual responses to the environment, and biological concomitants (Imrie 2004).

Three major theoretical paradigms—biomedical, social construction, and biopsychosocial—form the historical roots of RTW models (Bickenbach et al. 1999; Fine and Asch 1988; Lutz and Bowers 2007; Meyerson 1988; Olkin and Pledger 2003; Smart 2001; Tate and Pledger 2003; Verbrugge and Jette 1994). Within the biomedical approach, disability is produced by a medical condition that is an identified, observable deviation from biomedical norms of function or structure. Disability is viewed as a personal problem that requires medical treatment. Factors such as context and environment are not considered (Bickenbach et al. 1999; Boorse 1975, 1977; Reed et al. 2008; Schultz et al. 2000, 2007; Smart 2001; WHO 2001). Notably, psychiatric diagnostic manuals (i.e., the *Diagnostic and Statistical Manual of Mental Disorders-IV-TR* [*DSM-IV-TR*; American Psychiatric Association [APA] 2000] or the *Diagnostic and Statistical Manual of Mental Disorders-5* [*DSM-5*; APA 2013]) govern and inform the classification of mental disorders and psychological injuries. Under the biomedical model, psychopharmacologic treatment is primarily used to treat mental disorders (Comer et al. 2010; Mojtabai and Olfson 2008, 2011).

Within the social construction paradigm, disability is viewed as complex combination of activities, relationships, individual attributes, and conditions arising mainly from the social environment of the individual (Bickenbach et al. 1999; DePoy and Gilson 2004; Tate and Pledger 2003; Olkin and Pledger 2003). Disability depends on a societal response in a given context; thus, with an appropriate response, disability would not exist (Smart 2001; Smart and Smart 2007).

The biopsychosocial approach is informed by both social and the biomedical paradigms. Engel (1997) proposed that micro-(interactional), meso-(organizational or community), and macro-(structural) ecological and structural levels predict social and clinical outcomes (Tate and Pledger 2003). Evolvement of this alternative paradigm furthered the conceptualization of disability as multifactorial. This development includes work by Fine and Asch (1988) and Meyerson (1988) who contributed environmental and social components and research by Schultz et al. (2000) and Tate and Pledger (2003), highlighting the psychological and psychosocial elements. Verbrugge and Jette (1994) postulated an interactive disability model where disability is considered situational. Social and environmental factors alter functional limitations. Other important contributions include the model proposed by the Institute of Medicine (Pope and Tarlov 1991) and the International Classification of Functioning, Disability, and Handicaps model (World Health Organization (WHO) [WHO] 1980).

These three major paradigms have collectively given rise to five major groupings within the disability field, informing RTW models: (1) biomedical and forensic, (2) psychosocial, (3) ecological/case management and economic, (4) ergonomic, and (5) biopsychosocial (Schultz et al. 2007a, b). These models are characterized by distinctive constructs, research traditions, main tenets, values, practice implications, weight placed on the individual with the disability, and the environment and its interaction (Schultz 2008; Schultz and Stewart 2008; Smart 2001). Please see Table 2.1 for a comparison of the underlying constructs and research traditions with these five major model groupings.

2.3.1 Biomedical and Forensic Models

Currently, the biomedical model remains the most predominant framework for many researchers and professionals in clinical sciences and healthcare (Leibowitz 1991; Schultz et al. 2000; Turk 1996). However, its prominence and usage are gradually losing emphasis, primarily because this model is no longer viewed as a complete or accurate method of evaluation due to the recognition of many other factors that impact disability (e.g., psychosocial factors, societal influences) (Cocchiarella et al. 2000; Cocchiarella and Andersson 2000; Hunt et al. 2002; Kelly and

Table 2.1 Comparison of underlying constructs and research tradition in conceptual RTW models

Current model	Former model name	Research tradition	System vs. individual focus	Key determinants of RTW
Biomedical	Same	Medicine	Individual	Medical impairment
Forensic	Insurance	Forensic psychology	Individual; evolving toward recognition of system factors	Secondary gain; evolving into interaction among primary, secondary, and tertiary gains and losses
Psychosocial	Psychiatric	Health and rehabilitation psychology	Individual; evolving toward integration of systems based focus	Psychosocial factors: beliefs, perceptions, and expectations re RTW
Ecological/case management	Labor relations	Sociology, anthropology Social, organizational, occupational health psychology; occupational health/ therapy	System/system-individual interaction	Proactive system-based RTW policies and practices
Economic	N/A	Health economics	System	Economic incentives built into the macrosystem
Ergonomic	*N/A*	*Kinesiology, psychology, engineering, occupational and physical therapy, medicine*	*Individual/system interaction*	*Adaptation after injury*
Biopsychosocial	Same	Interdisciplinary/ transdisciplinary	System and individual interaction	The interaction among medical, psychosocial, and system-based factors in RTW

Adapted from Schultz et al. 2007

Additions are italicized

Field 1994; Peterson and Elliott 2008; Robinson et al. 2004; Schultz et al. 2000; Stowell and McGeary 2005). Utility, however, can be found in research contributions related to understanding disease processes and early initiatives around enhancing quality of life, care, and survival. Identification of health outcomes constitutes the medical model's another contribution. Also, information is often gathered in a quantitative and actuarial manner and has classification potential (Peterson and Elliott 2008; Peterson and Threats in press). Medical-legal applications have also benefitted from this model historically (Schultz and Chlebak 2014).

In parallel, the forensic model (formerly known as the "insurance model" [Schultz et al. 2007]) reduced the importance of scientifically based information on impairment, focusing

Table 2.2 Comparison of the biomedical model to the forensic model

	Biomedical model	Forensic model
Main tenets	• Pathological illness	• Anticipation of secondary gain can lead to dishonesty about symptomatology
	• Symptoms and disability are directly proportionate to physical pathology • Mind and body are separate • Physicians in control of diagnosis and treatment direction	• Objective proof of impairment and disability must be provided • It is paramount to clearly discriminate between "honest" and "dishonest" clients • Interactions among primary, secondary, and tertiary gains and losses should be considered
Underlying values	• Scientific evidence and objectivity	• Scientific truth • Protection of the system from abuse and dishonesty
		• Cost effectiveness
Implications for diagnosis	• Focus on uncovering organic pathology • Sequential diagnostic approach	• Thorough and exhaustive assessment using special forensic methods aimed at detection of inconsistencies and deception
		• Utilization of interdisciplinary model
		• Individuals showing inconsistencies in testing identified as "illegitimate," "malingerers," "symptom magnifiers," and/or motivated by secondary gain
		• Adversarial service climate
Implications for treatment	• Cure orientated versus coping orientated	• "Honest" clients may receive a wide array of treatment options
	• Need to relate physical treatment to underlying pathology	• "Dishonest" clients receive no treatment
	• Focus on physical treatment modalities	
Implications for compensation	• Compensation for impairments with clearly identified medical causes • Lack of specific built-in financial incentives for coping	• Compensation for "honest" clients only • Appears an attractive option due to simplicity • Long-term costs due to chronicity in incorrectly identified clients • Multiple systemic safeguards necessary to detect malingering may cause service inefficiencies

Adapted from Schultz et al. 2007

instead on detecting individuals who exaggerate symptoms and present malingering behaviors. Case management and rationing treatment and benefits have become paramount (Bernacki and Tsai 2003; Pergola et al. 1999; Schultz et al. 2007; Shaw et al. 2001; Tsai et al. 1999). Within the context of occupational disability, biomedical and forensic models have evolved; thus, some determinants of RTW will be more evidence—supported than others.

The biomedical model primary involves two individuals, the client (e.g., the injured or disabled worker) and the treating physician; the decision to RTW is primarily based on the physician's evaluation, treatment, and recommendations involving the injury (Pransky et al. 2004; Schultz et al. 2000). The forensic model mimics the biopsychosocial approach (Hadjistavropoulos and Bieling 2001; Sherman and Ohrback 2006); it integrates cognitions and motivations while attempting to explain the interactions between the injured worker and the disability system.

The biomedical model relies heavily on objective findings, whereas the forensic model attempts to identify the motivations that may influence the RTW decision. A commonality between the two models is a reliance on an individual focus of the client (Schultz et al.2007). While considered a strength, it also serves as a limitation: these models do not apply well to individuals with "biopsychosocial" conditions, such as chronic pain. Refer to Table 2.2 for a summary of the features of these models.

2.3.2 Psychosocial Models

Evolving from the traditional psychiatric perspective of disability with a focus on psychopathology, the psychosocial model considers a broader psychosocial adaptation perspective (Schultz et al. 2007). RTW is viewed as a behavior, and occupational disability is viewed as a wide-ranging set of conditions created by a client's social environment and other societal institutions versus an individual attribute (Baril and Berthelette 2000; Olkin and Pledger 2003; Schultz and Gatchel 2005; Tate and Pledger 2003).

Expectations of outcome and efficacy in predicting an individual's ability to achieve a desirable outcome have started to gain empirical research support (Cole et al. 2002; Sandstrom and Esbjornsson 1986; Schultz et al. 2004; Turner et al. 2006), implying that Bandura's social learning theory (Bandura 1977; 1986) may still hold significant conceptual promise with this model. Some of the mechanisms underlying disability focus on beliefs, expectations, perceptions, locus of control, self-efficacy, and individual coping (Burton et al. 1995; Haldorsen et al. 1998; Jensen et al. 1999; Linton 2000; Turk and Gatchel 2000). Recent developments include an individual's cognitive-behavioral factors and psychosocial factors of systems such as workplaces, unions, healthcare, and disability insurers (Franche et al. 2005; Schultz et al. 2007; Stowell and McGeary 2005; Sullivan et al. 2005). Refer to Table 2.3 for a summary of this model's features.

2.3.3 Ecological/Case Management and Economic Models

The stakeholder's perspective forms the primary focus of these models. Decisions and determinants of RTW are assessed with a complex intersystem interaction between workplaces, disability payers, insurance carriers, and healthcare. Possessing strengths in complexity and multidimensionality, these models require improved construct validation and further development to understand the key contributions of its system components and their interactions (Schultz et al. 2007).

Foundational differences exist in these models. The ecological/case management model is founded on a whole host of disciplines including anthropology, health psychology, industrial/organizational psychology, nursing, occupational health and therapy, sociology, and social work. The economic model is tightly founded on the field of economics (Schultz et al. 2007). In addition, the ecological/case management model is focused on the role of systems; Bronfenbrenner's systems theory (1979), involving interactions

Table 2.3 Summary of the psychosocial model

	Psychosocial model
Main tenets	• Psychosocial factors play predominant role in disability and readiness to RTW
	• Psychosocial factors are both individual related and system related
	• Perceptions, beliefs, and expectations of recovery and disability, self-efficacy, and ways of coping are more important than objective factors in disability formation
	• Motivational factors mediate between impairment and disability
Underlying values	• Scientific evidence
	• Comprehension of disability drivers
Implications for diagnosis	• Psychosocial factors must be assessed and identified at any stage of disability
	• Beliefs about disability need to be investigated
	• Stage of readiness for RTW including self-efficacy and decisional balance should be identified
	• Psychological diagnosis is of secondary importance
Implications for treatment	• Modifiable psychosocial factors must be targeted in treatment on a priority basis
	• Psychological treatment of choice: cognitive-behavioral interventions
	• Prevention targeting psychosocial factors can be undertaken in the interdisciplinary intervention context, not only in psychological therapy context
Implications for compensation	• Psychological factors must be accounted for in treatment even if they are uncompensable
	• Expedited RTW, possible increase in benefits

Adapted from Schultz et al. 2007

between *microsystems*, *mesosystems*, and *macrosystems*, heavily influences this model (Baril and Berthelette 2000; Friesen et al. 2001; Krause and Ragland 1994; Loisel et al. 2001a, b; 2005).

Loisel and colleagues (Loisel et al. 2001, 2005) present the most up-to-date ecological/case management model of RTW; please see Fig. 2.1 for a conceptual model of RTW and secondary prevention.

This model emphasizes that the most important stakeholders are the workplace, health-care system, and the compensation system; the actions and attitudes of these stakeholders are crucial in conceptualizing RTW. The economic model focuses mainly on macrosystem factors (Baldwin and Johnson 1995; 1996; Butler et al. 1995; Chirikos and Nestel 1984; Johnson and Baldwin 1993). Refer to Table 2.4 for a summary of the features.

2.3.4 Ergonomic Models

The ergonomic perspective of disability focuses on understanding the interactions among humans and other system elements through application of theoretical principles and methods to optimize human well-being (IEA n.d.). While the field of ergonomics covers three distinct disciplines—physical, cognitive, and organizational—within the context of disability, this section will focus on the physical and cognitive aspects. Refer to Table 2.5 for a summary of the major features of this model.

Traditionally, this model focuses on both interactions between individual and system elements and in injury prevention (Leyshon and Shaw 2008). From this viewpoint, whether or not an individual is able to RTW is an outcome based on adaptations made in the workplace (e.g., job tasks, working hours) (Stewart et al. 2012). Often, the domain of ergonomics is split: *macro-ergonomics* and *micro-ergonomics*.

Macro-ergonomics deals with the large scale, encompasses a more global approach, and addresses policies, attitudes, and processes (Hendrick 2003; Leyshon and Shaw 2008). Applications are typically at both company and governmental levels. On the other hand, micro-ergonomics encapsulates what the typical public views as ergonomics, i.e., mainly worker-specific interventions and/or the worker and machine interface. Micro-ergonomics can therefore be applied to the worker or a machine. A common

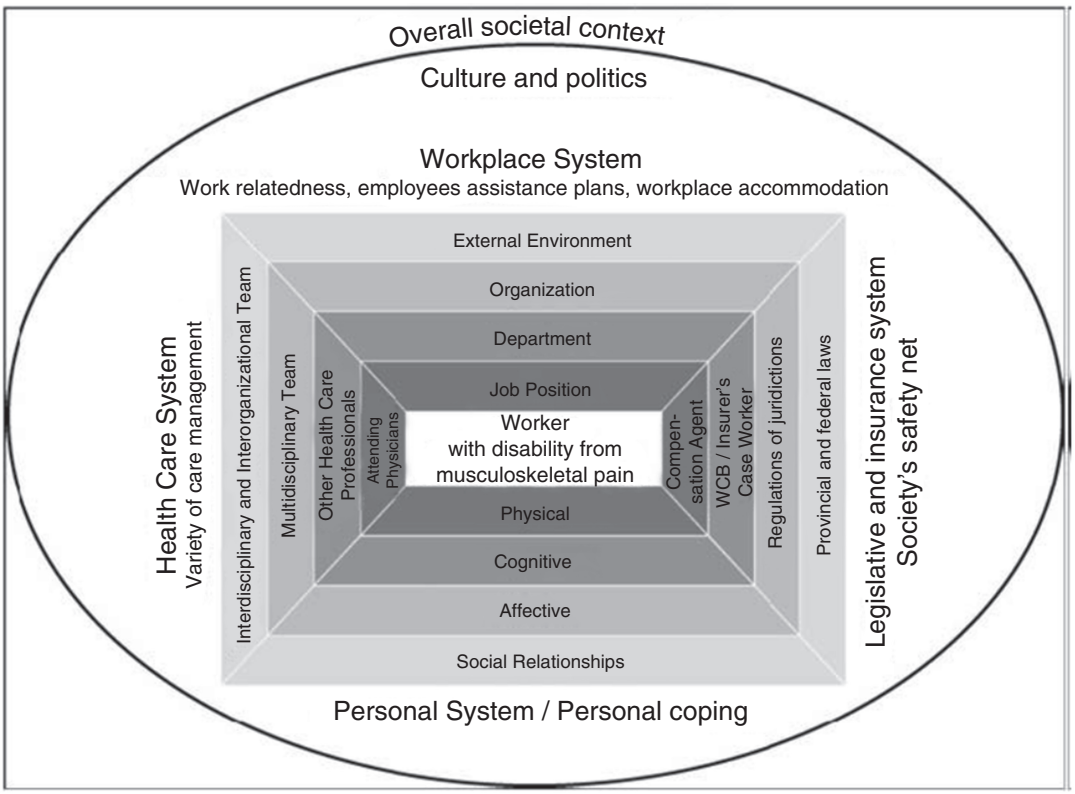

Fig. 2.1 The arena in occupational disability prevention (Loisel et al. 2005)

example is an adapted computer keyboard or an ergonomic desk chair, both designed to reduce and/or prevent injury (Leyshon and Shaw 2008). Three main disciplines in ergonomics have emerged: physical, cognitive, and organizational; ergonomists often describe themselves in one of the three categories.

The ergonomic model of RTW is based on the interaction between the individual and the system. More recent contributions have moved away from the traditional ergonomic approach to *participatory ergonomics*. This approach involves active participation and a strong commitment from both the employee and employer in order to identify workplace risk factors and interventions to prevent long-term disability (Anema et al. 2003).

Ergonomic interventions have been increasingly found useful in preventing musculoskeletal disorders among workers and reducing injury rates (Anema et al. 2003, 2004, 2007; De Jong and Vink 2000; Droeze and Johnson 2005; Halpern and Dawson 1997; Haslam 2002; Hendrick 2003; Jack 2005; Ketola et al. 2002; Koningsveld et al. 2005; Kuorinka et al. 1994; Leyshon and Shaw 2008; Marcal and Mazzoni 1988; McCluskey et al. 2006; Pohjonen et al. 1998; Vink et al. 1995, 1997; Vedder and Carey 2005; Wickstrom et al. 1993; Wilson 1995). The use of ergonomic interventions in long-term disability prevention or RTW outcomes has not been as prevalent. Limited evidence exists in the literature concerning the use of ergonomics for injured workers rehabilitation and RTW strategies (Leyshon and Shaw 2008). However, empirical evidence suggests that ergonomic interventions may be effective for worker's RTW outcomes (Anema et al. 2004; Baldwin et al. 1996; Habeck et al. 1998; Loisel et al. 2001). More research is needed using the ergonomic model and examining RTW outcomes.

Table 2.4 Comparison of the ecological/case management model to the economic model

	Ecological/case management model	Economic model
Main tenets	• Occupational disability (previously injury) should be understood in a systemic context considering the interplay among the macrosystem, mesosystem, and microsystem (the individual) • Occupational disability has multiple societal stakeholders, including employer, healthcare, insurance system, and family; each of the stakeholders has different disability paradigms and anticipated RTW outcomes	• Macrosystem of economic forces plays a predominant role in disability • Focus on labor force participation, economic incentives, shifts in labor demand, the effects of discrimination, and the long-term economic impact of injury
	• Work injury is understood and managed within the sociopolitical context of the workplace	• Disability periods are not simple episodes but are recurrent, and these patterns are predictors of future disability
	• The needs of the workers and the employers can be complementary	• Longitudinal approach
	• System-based responsibility for outcomes	
	• Workplace characteristics significantly influence injury sequelae/recovery and rehabilitation	
	• Employer has a critical role in RTW and needs incentives to assist injured workers. System changes necessary to accommodate RTW needs of injured worker	
	• Multidisciplinary approach	
	• Proactive and disability prevention focused	
	• Early intervention in the workplace	
	• Service recipient seen as microsystem	
Underlying values	• Integration of prevention, rehabilitation, and RTW	• Improvement of macrosystem
	• Harmonious multisystem relationships	
	• Protection of injured worker from exploitation	
	• Cost containment	
Implications for diagnosis	• Assessment of the impact of macrosystems, mesosystems, and multisystem interactions on RTW	• Individual clinical diagnosis is of secondary importance
	• Define outcome according to the stakeholder • Focus on the assessment of functional work capacity, preferably “in vivo”	• The identification of longitudinal patterns of disability in a macrosystem is of key importance
	• Analyze the impact of work characteristics and workplace barriers and facilitator on RTW	

(continued)

Table 2.4 (continued)

	Ecological/case management model	Economic model
	• Identification of early risk markers for occupational disability (flagging)	
	• Importance of correct clinical diagnosis (label) is secondary	
Implications for treatment	• Disability management in the workplace	• Effective treatment is expected to impact disability
	• Treatment integrated with RTW process	• RTW patterns over time, not a single episode
	• Work conceptualized as therapy • Work return transition programs and job accommodation	• Cost-offset data on RTW interventions are important
	• Integrated case management approach	
Implications for compensation	• Reduction in long-term disability costs • Costs partly shifted to the specific accident employer	• Can account for multiple economic factors that impact long-term RTW among injured workers
		• Able to identify and quantify the macrosystem inputs to work disability instantaneously and over time
		• Cost reduction due to improved system-based identification and intervention targeting multiple economic factors in RTW over time

Adapted from Schultz et al. 2007

Table 2.5 Summary of the ergonomic model

	Ergonomic model
Main tenets	• Adaptation
	• Prevention
	• Identify workplace risk factors
Underlying values	• Injury prevention
	• Outcome = return to work
Implications for diagnosis	• Multidimensional/interdisciplinary diagnosis
	• Identifying prevention strategies in order to lower costs
Implications for treatment	• Injury prevention and adaptation are important
	• Worker and system are co-responsible for RTW outcome
Implications for compensation	• Greater rehabilitation, lower costs

Adapted from Schultz et al. 2007

2.3.5 Biopsychosocial Models

The biopsychosocial model of RTW integrates key aspects from both the biomedical and the psychosocial model. It focuses on the conceptual interaction among biological, physical, behavioral/psychological, and social factors. However, a more complete comprehensive biopsychosocial model includes medical, psychosocial, environmental, and ergonomic factors in addition to those mentioned previously, all within a system-based approach (Peterson and Threats in press; Schultz et al. 2007). As a strength, this model was developed using empirically driven risk factors and the cumulative clinical experience with clients with chronic musculoskeletal pain. However, some see the latter as a limitation to the model (Schultz et al. 2007). Peterson and Threats (in press) asserted that this perspective has the "potential to inform healthcare in the broadest sense, while providing specific benefit to people with disabilities by using a universal, culturally sensitive, integrative and interactive model of health and disability that is sensitive to social and environmental aspects of functioning." Refer to Table 2.6 for a summary of the main features of this model.

Regarding disability and RTW, a complex relationship exists between many factors including pain, physical and psychological impairment, and functional and social disability (Gatchel 1996; Schultz et al. 2000; Turk and Monarch 2002). Because of its complexity, the biopsychosocial model considers the interactions between the injured worker (or person with disability), the employer, case managers, medical providers, and social environment (Schultz et al. 2007).

Feuerstein (1991) introduced an early approach to the biopsychosocial model. This model proposed that work demands required by the job in relation to the worker's current physical condition formed key factors in RTW. Medical status and behavioral/psychological resources further influenced these relationships. See Fig. 2.2 for an overview of this approach. The Center for Occupational Rehabilitation at the University of Rochester used this model as the basis for its comprehensive multidisciplinary rehabilitation program (Feuerstein and Zastowny 1996; Linton et al. 2005). While this model incorporated ergonomic factors related to the work demand component, the overall system was not reflected in this model.

More recent scientific contributions emphasize the recognition of the dynamic, time-based (temporal) dimensions of the RTW process. Evidence suggests that RTW and occupational disability should not be considered static employment outcomes (Linton et al. 2005). It recognizes that risk factors may change over time and takes workers' expectations into account; both elements have been shown to play a large role in recovery and RTW (Schultz et al. 2007). Other notable contributions include a three-phase back disability model and an eight-phase occupational disability model. Although differences exist in the integration of social and medical definitions and the definition of occupational disability, similarities are found in the alignment of disability risk factors by phase and the application of specific interventions for each phase (Krause and Ragland 1994; Main and Spanswick 2000). More recently, the three phases of back pain disability, namely, acute, subacute, and chronic, have emerged (Dasinger et al. 2001; Krause et al. 2001; McIntosh et al. 2000).

Franche and Krause (2002) proposed a Readiness to Return to Work model that weaves in stages of change identified by Prochaska and DiClemente (1983) (i.e., pre-contemplation, contemplation, preparation for action, action, and maintenance). Subsequent developments include a self-report staging scale for injured workers with musculoskeletal injuries (Franche et al. 2007) and a reconceptualization of the stages with workers with musculoskeletal injuries (i.e., workers with workplace difficulties, workers with no workplace difficulties and back pain, and workers with multiple difficulties, in particular, depression) (Steenstra et al. 2010). Empirical validation of the model within the RTW context is still needed. In addition, more generally speaking, a stage-based model is challenged based on the recognition that many conditions do not fit neatly into arbitrarily assumed stages and outcomes (Schultz et al. 2007).

Table 2.6 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
	• Interdisciplinary/transdisciplinary whole person approach
	• Focus on self-responsibility and self-management of the worker
	• Disablement and RTW are time-based processes
	• *Role of beliefs*
Underlying values	• Client and his/her well-being
	• Outcome = improved function
	• Chronicity prevention
	• *Beliefs shape expectations*
Implications for diagnosis	• Multidimensional/interdisciplinary diagnosis
	• Admission of limitations of diagnosis
	• 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
	• Treatment-oriented assessment
Implications for treatment	• Treatment and RTW more important than diagnosis
	• Coping is a desirable outcome if cure not possible
	• Worker as an active participant in the process and responsible for the outcome
	• Coordinated team and case management approach
	• Linkages with the environment the worker returns to (e.g., employer, family)
	• Time-based intervention approach with flexible early intervention dependent on readiness to RTW
	• *Expectancies are related to recovery and RTW*
Implications for compensation	• Clear guidelines required for compensability if exact causality/etiology unknown or interactive
	• Higher rehabilitation, lower compensation costs
	• Compensability primarily for treatment failures and permanent impairment
	• Compensation used as an incentive for rehabilitation/RTW

Adapted from Schultz et al. 2007

A newer addition to the biopsychosocial model is the role of beliefs and expectations (Stewart et al. 2012). Beliefs are understood to shape expectancies of RTW (Halligan 2006; Main and Spanswick 2000); for example, investigators have found that beliefs and corresponding expectations may hinder recovery and RTW (Burton et al. 2006).

Notably, no single, unified biopsychosocial model exists in either research or clinical applications. Including personal characteristics, microsystem interrelationships, reciprocal interactions, expectation factors, time factors, and environmental variables are recommended (Schultz et al. 2007). While the biopsychosocial model may have many strong features over some of the other models, two problems still remain: its generic nature and lack of specificity (Imrie 2004). This model, similarly to the medical model, might lead to medicalization or "professionalism"

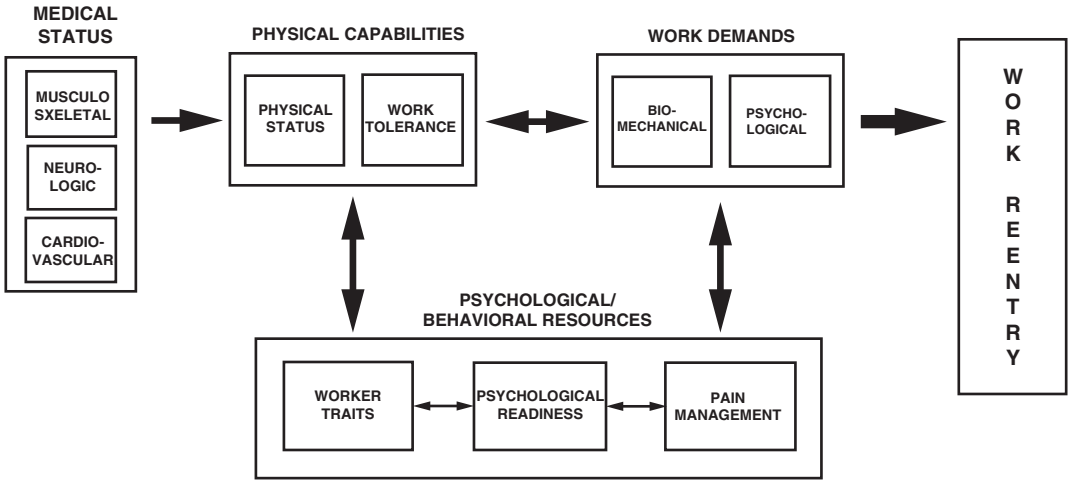

Fig. 2.2 Multiple factors potentially affecting RTW (Feuerstein 1991)

(Weiner 2008) or imply that common health problems may be viewed as more complex than necessary. In this vein, Waddell and Aylward (2010) argued that:

> "Biopsychosocial problems are sometimes implied to be so complex that they can only be managed by (multidisciplinary teams of) health professionals. Yet most patients with common health problems can be managed satisfactorily in primary care by following a few basic principles. Only more difficult issues need referral to other professionals and only the most complex require a multidisciplinary team." (p. 28)

2.4 Current Perspectives

Schultz et al. (2007) identified key features of recent RTW models. Namely:

- Psychosocial model evolution: The traditional, psychiatric model has been replaced by the broader psychosocial model, emphasis on adaptation, individual cognitions on disability within a social context, and cognitively mediated motivational factors.
- Stage-based models of RTW: These models have shown greater articulation of the RTW process including temporal elements and disablement patterns such as psychosocial factors interacting with time and medical recovery.
- Ecological/case management model changes: This model has expanded to include reciprocal interactions between stakeholders such as the employer, insurance systems, healthcare, society, and the worker.
- Reduced role of biomedical and forensic models: The traditional forensic model has been narrowed in its application to forensic applications within the court system. For insurance systems, the forensic model has evolved to shift away from questions of compensability to greater effectiveness in managing the health-care costs. This change shows greater compatibility with the ecological/case management model. In addition, greater importance on complex relationships between individual factors including motivation, social systems, and cognition shows a shift toward the biopsychosocial model.
- Macrosystem perspective on economic elements: With the development and persistence of occupational disability, a greater focus on the macrosystem of economic factors is noted.
- Greater reliance and support for the biopsychosocial model: Evidence-based support in RTW literature and healthcare and greater awareness and work toward operationalization of the interactions between individuals and systems and the depth of the multidimensional system.

The Institute of Medicine (NRC and IOM 2001), the World Health Organization (WHO 2001), and Faucett (2005) have proposed models of RTW that integrate the most salient features of the aforementioned models. The model presented by the IOM, which was proposed by a group of clinicians and scientists from a wide range of disciplines, integrated certain factors that could potentially impact pain and disability (Wunderlich et al. 2002). Masala and Petretto (2008) asserted advantages of this model over the ICF: it more clearly conceptualizes disablement as a "here-and-now" dynamic process when environmental and societal needs collide with personal limitations, offers a transdisciplinary versus a multidisciplinary perspective, and provides a fuller analysis of the links between factors, such as environmental and societal. However, a greater understanding of epidemiological, laboratory, and clinical research is needed to obtain a more complete view of work-related musculoskeletal disorders (NRC and IOM 2001). See Fig. 2.3.

The WHO's most recent disability model is the International Classification Functioning, Disability, and Health Model of Disability (ICF; Dahl 2002; Steiner et al. 2002; WHO 2001). It places emphasis on health and functioning, rather than on disability. It describes the unique situation of the individual under evaluation using health and health-related domains; thus, similar health conditions do not imply similar functions.

Major themes related to this model include qualitative and quantitative applications (e.g., use of medical, statistical, and experiential data in research and practice), recognition of nonlinear,

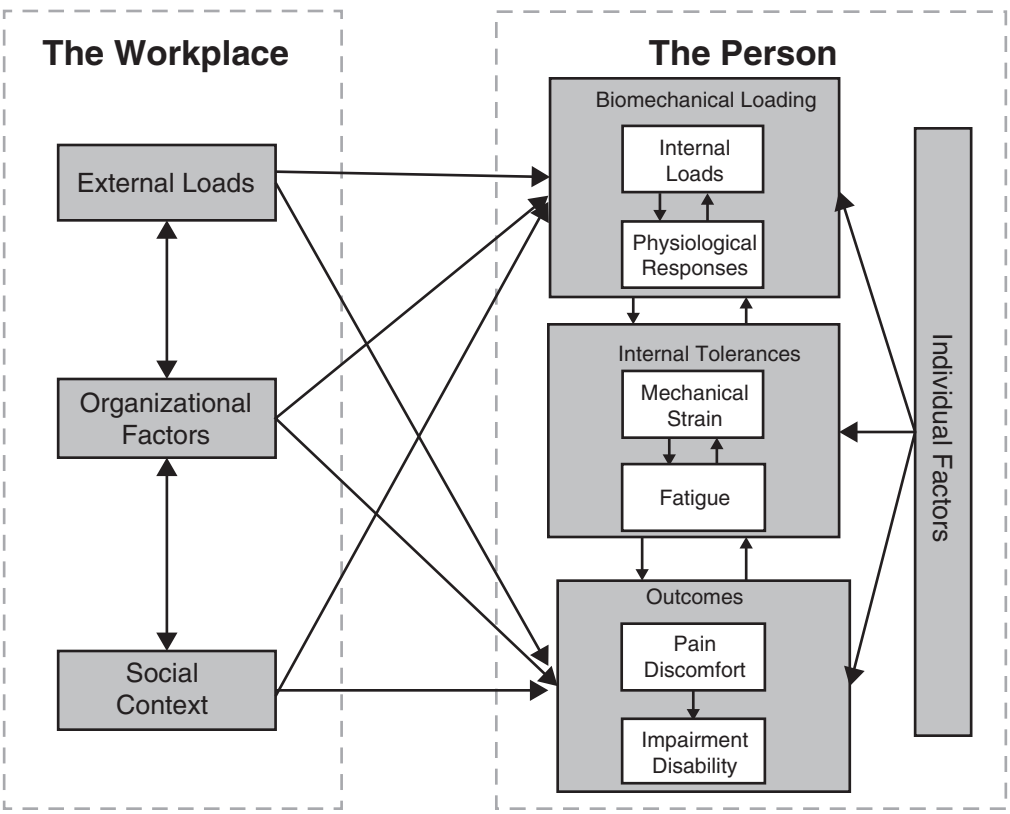

Fig. 2.3 Institute of Medicine Model of Disability (IOM 2001)

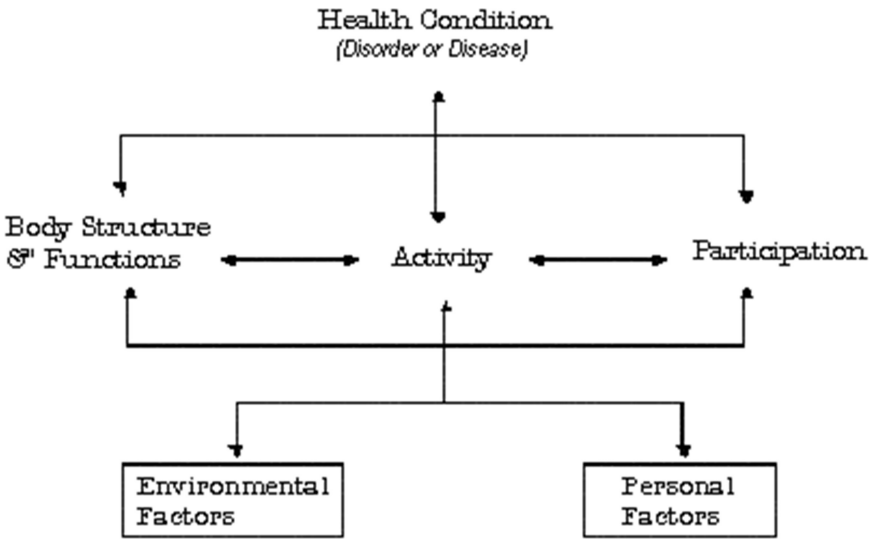

Fig. 2.4 The World Health Organization International Classification of Functioning, Disability, and Health (ICF) Model of Health (WHO 2001)

reciprocal, and dynamic interactions for optimizing health, societal factors, environmental barriers, and a person-centered approach. The ICF model includes factors not traditionally considered in healthcare while using individualized, innovative, and nontraditional interventions and a health outcomes measurement approach (Peterson 2011; Peterson and Threats in press). In addition, this model represents a significant health-care development; it can be used as a standard in concept definition, relationship hypothesis, construct building, and a proposal of new theories (Peterson 2005). See Fig. 2.4.

The main intent of the model is its biopsychosocial nature; however, interestingly, societal elements appear to be emphasized even though medicine is at the core of the model (WHO 2012). This model implicitly conceptualizes disability with medical, biological, and social functions.

The ICF places notions of "health" and "disability" into a new framework by examining these factors at both the individual and population levels. Disability is normalized as well. Any individual is susceptible to declines in health and functioning and therefore prone to experiencing some degree of disability in their life: disability viewed as something that can happen to anyone (WHO 2012). The model also attempts to shift the focus from cause to impact, comparing health conditions equally across one metric.

The ICF has been touted to have a range of applications. At the individual level, the ICF may be used to assess the individual, plan treatment, evaluate the treatment or other intervention, and communicate among health-care providers and for self-evaluation (WHO 2002). For example, for adaptation to medical settings, over 1400 codes organized into more than 30 Core Sets have been applied to this model (Peterson and Threats in press; WHO 2001). The ICF may be applied institutionally for educational and training purposes, resource development and planning, quality improvement, management, and outcome evaluation. At the societal level, the ICF may be used to determine eligibility requirements for entitlements, social security benefits, disability pensions, and workers' compensation and insurance, social policy development, needs assessments, and environmental assessments. The ICF may assist scientific research by providing a framework for interdisciplinary research on disability and making research comparable and facilitate intervention studies that compare out-

comes on similar populations (WHO 2002). The flexibility of this model extends usage in any setting, culture, and context (Escorpizo et al. in this Handbook).

Escorpizo and colleagues (Escorpizo et al. 2011a, b; Escorpizo et al. in this Handbook) have aligned the ICF model by reframing vocational rehabilitation, a multi-professional approach for sustained RTW, within the ICF model. This approach supports further application and operationalization of the ICF within vocational rehabilitation and RTW functions; the development of a comprehensive ICF Core Set for the use within vocational rehabilitation follows (Escorpizo et al. 2010). Please see the chapter by Escorpizo et al. in this handbook for further details.

Criticisms of the ICF model include its failure to specify the content of biopsychosocial theory that underlies it, an atheoretical definition of impairment (Schultz et al. 2007; Van der Ploeg et al. 2004), and difficulty in operationalization and application (Dahl 2002; Steiner et al. 2002; Van der Ploeg et al. 2004). That said, this model enjoys a general acceptance from many professionals and advocacy groups (Peterson and Paul 2009).

Future development of this model includes expansion of the ICF research areas beyond high-income, developed countries, simplification of the coding system (as overlaps and redundancies have been identified), further operationalization of activity and participation concepts, standardization of qualifier use that demonstrates the degree of function impact, and additional code development (Peterson and Threats in press).

Finally, Faucett (2005) proposed a comprehensive RTW model for musculoskeletal disorders, an extremely common disability with significant repercussions in financial, work, personal, and social arenas (WHO 2003). This model integrates psychosocial aspects with micro- and mesosystem influences from the job and environment, following a comprehensive review of existing related models and ergonomic theories. Key categories are work barriers, worker perceptions, worker strain and recovery, injury outcomes, work environment, and management systems. Emphasis is placed on management systems and the work environment. The management systems component, which considers functional, physical, temporal, and interpersonal characteristics, is viewed to alter the work environment to enhance workflow. In turn, the work environment, which acknowledges the importance of culture, resources, workforce, decision-making, communications, and operations, directly impacts worker performance, productivity, and outcomes and indirectly impacts work flow barriers, strain, and worker perceptions. A bidirectional relationship between strain and recovery and outcomes is suggested. Managing the work environment is offered as the key solution. An underlying assumption is that the outcomes need to be considered in the context of the worker's organization (Faucett 2005). Empirical validation of this model is needed. See Fig. 2.5.

2.4.1 The Role of Perceived Uncertainty

Research has shown that many factors influence expectations for RTW (Schultz et al. 2002, 2004); expectations influence medical outcomes and prejudice interpretations (Halligan 2006) and may play a role in the RTW process (Sampere et al. 2012; Stewart et al. 2012). In addition, expectations may hinder recovery (Burton et al. 2006).

Literature mostly focuses on the biomedical or forensic models of RTW without considering either problems inherent to the process or other relevant factors (Stewart et al. 2012). Stewart et al. (2012) used a biopsychosocial framework to qualitatively identify a new and important factor that plays a key role in RTW outcomes, *perceived uncertainty*. The investigators defined perceived uncertainty as "an awareness of not knowing what will happen in relation to health, work and life in general" (p. 7) and can consist of "anxiety, despair, and confusion, or hope and opportunity" (p. 11). Perceived uncertainty is the overarching concept constructed from five interrelated sub-constructs: (1) perceived lack of control over the RTW process, (2) perceived lack of recognition by others of the impact of the injury on the worker, (3) perceived inability to perform

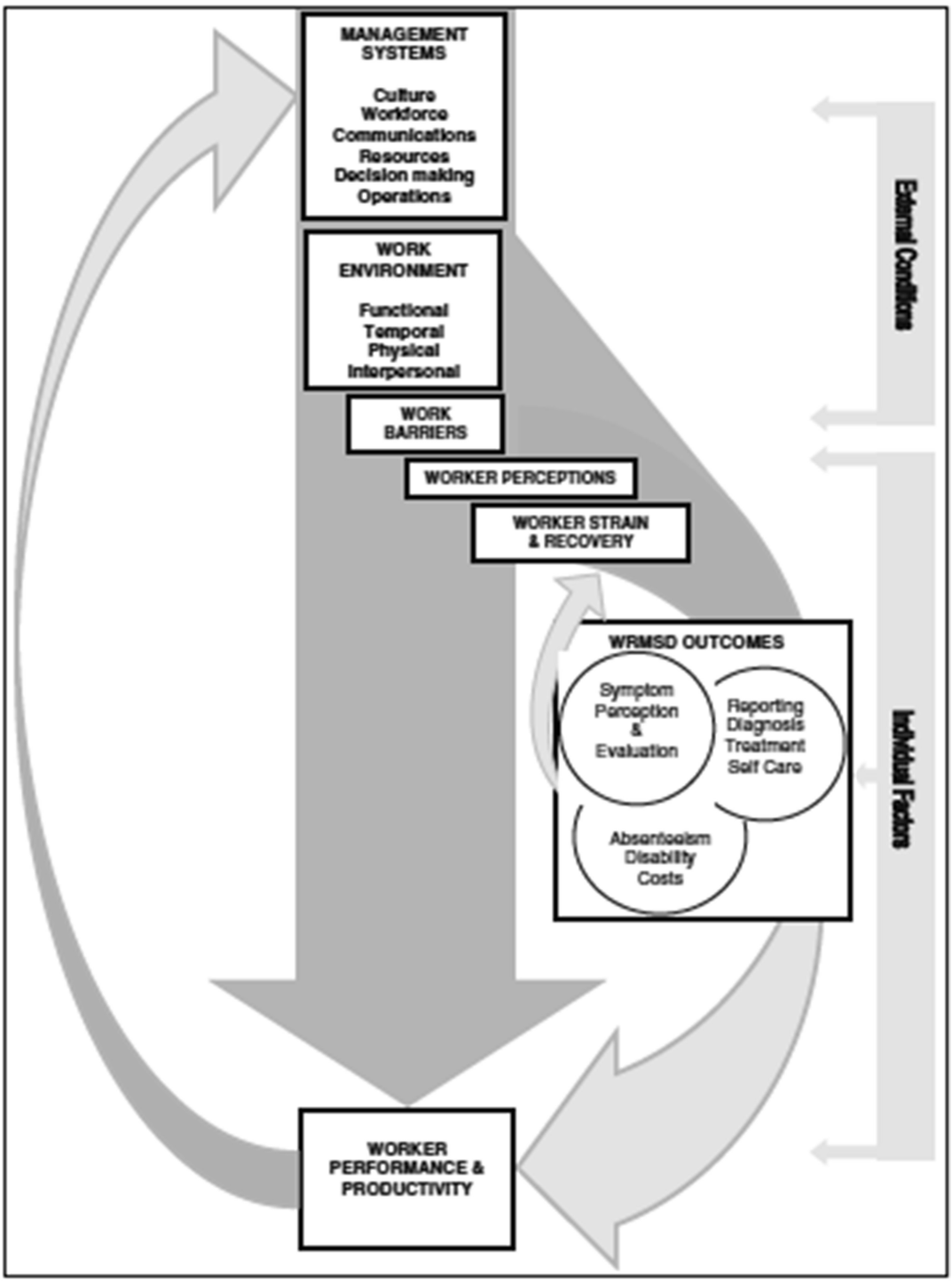

Fig. 2.5 Integrated model (Faucett 2005)

pre-injury job(s), (4) perceived (lack of) workplace accommodation, and (5) fear of movement/(re)injury. Some of the key elements to the constructs of perceived uncertainty are: (1) the ability of each element to interact with the other; (2) in regard to the biopsychosocial model, each construct that can be individually influenced; and (3) perceived uncertainty in one construct that may lead to increased perceived uncertainty in another construct.

Stewart et al. (2012) found that most participants, who had subacute back pain and had been off work between 3 to 6 months, were reluctant to articulate expectations for RTW because of uncertainty regarding the RTW process and ability to return to pre-injury work status; this evidence provides empirical support for the role of perceived uncertainty in the RTW process. Sampere et al. (2012) argued that RTW expectations are an important factor in the RTW process for workers on long-term, non-work-related sick leave. In addition, Tjulin et al. (2010) found that workplace uncertainty impacts how coworkers of the injured individual act during the RTW process. Future research may be aimed at examining the interaction between the constructs of perceived uncertainty, how they influence expectations of RTW, and how they play a role in the work place among coworkers. Table 2.7 lists the categories, properties, dimensions, and examples of the core concepts of perceived uncertainty. Figure 2.6 represents the relationship of perceived uncertainty to the formation of expectations of RTW.

2.5 Research and Practice Challenges

Research and practice challenges are numerous for developing an effective RTW model. Current models do not yet allow for consistent research validation; they are evolving and are not yet constructed soundly. Further research around the utility, efficiency, internal consistency, and generalizability is required. Definitions of RTW require further clarification and consistent operationalization for dependency on a relevant stakeholder and the system (Krause et al. 2001a. These definitions need to be situated around patterns rather than single episodes and require additional information, such as cost and disability duration. These aspects, however, are rarely found in RTW and occupational disability models (Linton et al. 2005).

Work outcomes need standardization of operational definitions (Young et al. 2005) and require consensus on which dimensions of RTW taxonomy provide the most valid measures. Relatedly, within the ICF model, operationalizing the concepts of participation and activity (e.g., Avila et al. 2010), addressing the atheoretical definition of impairment (Schultz et al. 2007; Van der Ploeg et al. 2004), and expanding the participants used to validate the model for further cross-cultural use, coding complexities, and lack of language standardization require additional attention (Peterson and Threats in press). The validation work of Faucett (2005) and IOM (NRC and IOM 2001) is required to allow for a more in-depth analysis.

A multi-perspective and multimethod approach in measuring RTW outcomes (e.g., self-report, economic measures, and behavioral measures) likely will prove the most effective in addressing these time-dependent, multidimensional, and complex constructs (Friesen et al. 2001). Finally, the emerging methodology of multisystem interactions requires further articulation; using qualitative and qualitative approaches in addition to statistical modeling and path analysis is recommended (Friesen et al. 2001; Schultz et al. 2007).

An effective RTW model appears to include certain qualities that are useful for key stakeholders, including workers, clinicians, and researchers. Evaluation of future models may consider the following criteria:

- Parsimonious. A balance of delineating potential relationships between risk factors and an appropriate complexity to allow for testing a

Table 2.7 Categories, properties, and dimensions of perceived uncertainty in the formation of expectations of return to work for injured workers with subacute back pain (Stewart et al. 2012)

Category	Properties	Dimensions	Examples
Perceived uncertainty	Awareness of ambiguity about present and future options in relation to RTW and life in general	Individual differences regarding tolerance of perceived uncertainty; interpersonal relationship stressors; systemic powerlessness	*Micro*: physical abilities, pain management, recovery timeline home life, leisure activities *Meso*: rehabilitation services, financial concerns, coworkers, accommodations; stigma *Macro*: future employment, labor market, retirement plans
Perceived (lack of) control over the RTW process	(Lack of) participation in decision-making processes related to rehabilitation and RTW	Degree of collaboration in RTW process; relative power or powerlessness; feelings of self-worth; (lack of) voice; being suspected of malingering	*Micro*: (in)ability to manage pain, medications, sleep, concentration *Meso*: coordinating appointments; mobility challenges, changing family roles/tasks (lack of) workplace accommodations *Macro*: rehab timelines, rights re accommodations; insurance policies re objective findings
Perceived (lack of) recognition by others of impact of injury on worker	Invisible nature of back injury; sudden, unexpected event; subjective nature of pain; being suspected of malingering	Self-doubt about extent of injury; feeling blamed/guilty re cause of injury; disclosure and accommodation concerns; stigma, discrimination	*Micro*: feel guilty while off work *Meso*: concern about RTW too early; high-risk job demands; changing family roles; unsympathetic friends, coworkers *Macro*: stigma; accommodations; future employment prospects; need for objective findings
Perceived (lack of) ability to perform pre-injury job	Level of confidence in relation to work tasks; future employment possibilities	Self-doubt re physical and psychological capabilities; being judged by others; changing identity; concerns re future prospects	*Micro*: stamina; strength; fear of pain, safety concerns *Meso*: concerns re adequacy of work simulation at rehab clinic; coworker resentments; employment termination *Macro*: stigma; work history
Fear of movement/(re) injury	Fear of dangerous workplace; high-risk job demands; fear of pain; avoidance behaviors	Pain experience; physical limitations; fear of permanent disability/dependence	*Micro*: previous injury; pain management *Meso*: workplace safety, financial pressure; changing roles at home *Macro*: accountability re GRTW, accommodations; concerns re long-term disability

(continued)

Table 2.7 (continued)

Category	Properties	Dimensions	Examples
Perceived (lack of) workplace accommodations	Level of confidence in relation to requesting accommodations or belief in their likelihood	Previous unsuccessful attempt at RTW; witnessing unmet coworker needs for accommodations; difficulty imagining their implementation	*Micro*: previous RTW attempt *Meso*: communication with employer re accommodations *Macro*: awareness of lack of implementation of accommodations in workplace; stigma: needing accommodations

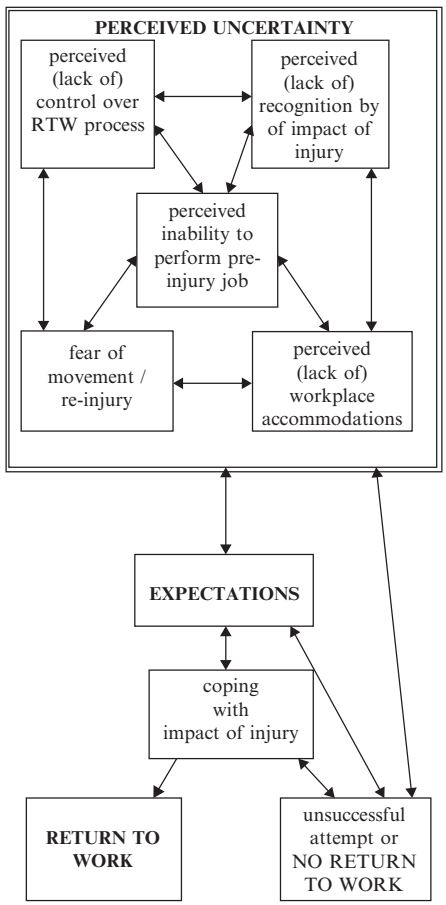

Fig. 2.6 The relationship of perceived uncertainty to the formation of expectations of return to work (Stewart et al. 2012)

model's clinical and theoretical validity using valid measures.

- Multivariable. Inclusion of independent variables that have empirically shown to have a role in occupational disability and RTW. Identification of independent risk factors and their relationships using prospective studies.
- Valid. Scientific rigor within empirical tests, particularly in whether factors in combination explain or predict RTW or occupational disability, is recommended.
- Generalizable. Application to a diverse group of workers in different countries.
- Reliable. Variable relationships within the model need to be observed repeatedly when studied by different research teams within a country and between different countries.
- Ecologically valid. Measures and stakeholders that are important in understanding RTW and occupational disability in real life need to be integrated into variables, measurement, and the interrelationships. This allows for collected information and evolving interventions to be utilized effectively in prevention, evaluation, and rehabilitation of RTW and occupational disability (Schultz et al. 2007).

Despite availability of these criteria for evaluation of conceptual models, they are rarely used in comparative RTW model analysis. This slows the advancement of conceptually and empirically validated RTW approaches, which could stimulate both research and practice.

2.6 Conclusions

Although research advances, such as the role of perceived uncertainty in RTW, support the development of improved injury prevention and reha-

bilitation programs, the need for a transdisciplinary model that addresses the temporal and multidimensional aspects of disability continues to exist. The models recommended for further research focus on the development and application of a multidisciplinary or interdisciplinary approach are integrative, cross-diagnostic, interactive, and translational and explore the interplay between the individual and the systems within which they function. As seen with the ergonomic model, empirical evidence is emerging, and future research will continue to build upon this (see Chap. 17 by Paquette in this handbook). Future research on RTW models should examine and be evaluated using the following criteria: (1) the interaction of factors/constructs within overarching models, (2) multivariate aspects, (3) validity, (4) generalizability, (5) reliability, and (6) ecological validity. Such careful examination will facilitate the advancement of the conceptual RTW models and stimulate quantitative and qualitative methodologies and outcomes capable of expanding and integrating evidentiary basis in the field. It will also lead to the development of effective applied RTW interventions designed for the right time, the right context, and the right people while targeting modifiable clinical, psychosocial, and environmental factors at play.

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http://www.springer.com/978-1-4899-7626-0

Handbook of Return to Work
From Research to Practice
Schultz, I.Z.; Gatchel, R.J. (Eds.)
2016, XVIII, 721 p., Hardcover
ISBN: 978-1-4899-7626-0