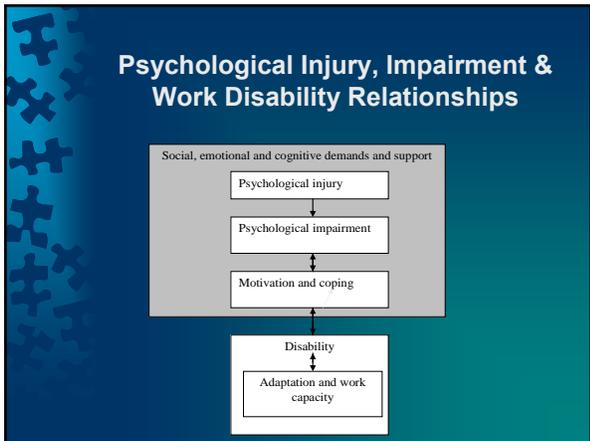


Predicting Occupational Disability Outcomes from Psychological and Neuropsychological Assessment Data

Izabela Z. Schultz
Ph.D., R.Psych., ABPP, ABVE
Professor, University of British Columbia
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Predicting Vocational Outcomes

- What predicts vocational outcomes and what does not?
- Research has been accumulating...
- How clinicians and vocational experts can use science of prediction in increasingly evidence-based courtroom debate?

Does Diagnosis Predict Outcomes?

1. Length and outcomes of hospitalization?
2. Level of care?
3. Service needs?
4. Work performance?
5. Receipt of benefits?
6. Social integration?

(Peterson, 2005)

Problems with Translating Psychological Impairment into Work Disability
TRUE OR FALSE?

1. More impairment implies more disability
2. More symptoms - more functional limitations
3. Psychological factors are more important than workplace, job-related and other environmental and contextual factors

Problems with Translating Psychological Impairment into Work Disability (cont'd)

4. Occupational disability equals or exceeds general disability (e.g. inability to meet personal and social demands)
5. Secondary gains are more important than secondary losses in disability prediction
6. Perception of disability is less important than real disability

Problems with Translating Psychological Impairment into Work Disability (cont'd)

- 7. We know predictive (ecological) validity of most psychological and neuropsychological measures?
- 8. Assessors should be relying primarily on their experience?
- 10. We should rely on published standards or guidelines for psychological functional capacity evaluation?

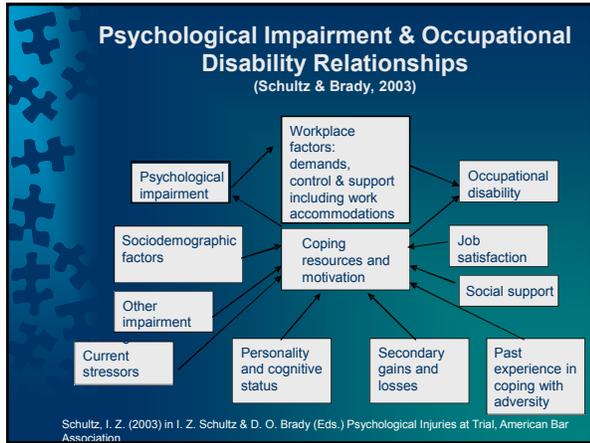
Problems with Translating Psychological Impairment into Work Disability (cont'd)

- 11. Psychologists routinely measure work functions and functional limitations
- 12. There is a clear commonly accepted operational definition of occupational disability:

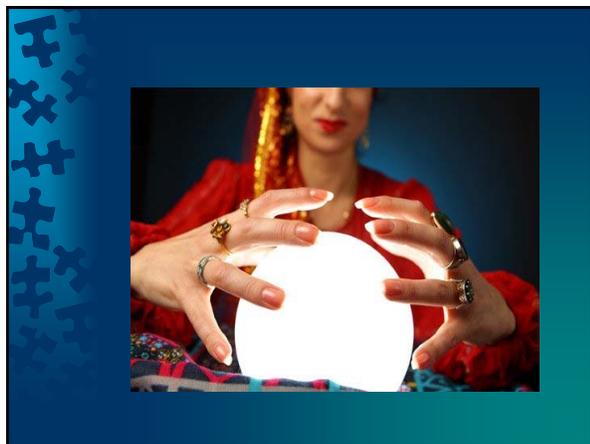
loss of earnings?	return to pre-injury employment? employer?
disability duration?	work with modifications or accommodations?
employability, competitive edge, any job?	repeated pattern of work absences? productivity?

PSYCHOLOGY OF OCCUPATIONAL DISABILITY

- IMPAIRMENT DOES NOT EQUAL DISABILITY...
- RELATIONSHIP BETWEEN IMPAIRMENT AND DISABILITY IS MULTIFACTORIAL AND DYNAMIC
- PSYCHOSOCIAL PREDICTORS OF DISABILITY LEAD THE WAY



How do Psychologists & Neuropsychologists Assess Work Capacity?



Problems with Psychological & Neuropsychological Assessments

1. Usually one time behavioral sample only
2. Excessive reliance on client self-report
3. Excessive reliance on tests of unknown predictive ("ecological") validity
4. Limited collateral information
5. Not using specific tests to measure work-relevant psychological function

Problems with Psychological & Neuropsychological Assessments

6. Work records rarely sought and/or reviewed; limited understanding of work functions and workplace
7. Timidity in describing vocational impact or sweeping generalizations
8. Baseline rates of different psychological conditions and symptoms: psychologists may overpathologize and focus excessively on dysfunction ignoring coping and context

Measurement of Impact of Psychological Impairment on Work Functioning: Towards a Psychological Impairment Scale

1. Work performance/disability measurement problems:
 - Affective versus work functioning
 - Self-report
 - Collateral information
 - Clinician ratings
 - Administrative (HR) data bases; absenteeism and lost productivity
 - Manager ratings
 - Labor relations records

Measurement of Impact of Psychological Impairment on Work Functioning: Towards a Psychological Impairment Scale

2. Rating scales tied to the existing methods for determination of permanent impairment
3. Psychometrically sound and well-validated tools:
 - Work Ability Index (van den Berg, Elders & de Zwart, et al., 2008)
 - Work Limitations Questionnaire (Lerner et al., 2001)
 - WHODAS-2 (WHO, 2010)

Systematic Review of the Effects of Work-related & Individual Factors on Work Ability Index (WAI)

Predictors of poor WAI (20 studies)

- lack of leisure-time vigorous physical activity
- poor musculoskeletal capacity
- older age
- obesity
- high mental work demands
- lack of autonomy
- poor physical work environment
- high physical work load

(van den Berg, Elders & de Zwart, et al., 2008)

PREDICTIVE FACTORS

WORKER FACTORS:

- Demographic, psychosocial, health/medical
- Modifiable-nonmodifiable

WORKPLACE FACTORS:

- Support, demands, autonomy, fairness
- Modifiable-nonmodifiable

OTHER SYSTEMIC FACTORS

PREDICTING DISABILITY

MUSCULOSKELETAL PAIN



WORKER RELATED FACTORS: NONMODIFIABLE

1. DEMOGRAPHICS

- Older age (White et al., 2015)
- Gender (female) (e.g. Crook et al., 2002; Hendricks et al., 2005; Brede et al., 2012)
- Job tenure (Crook et al., 2002)

2. PSYCHOSOCIAL FACTORS

- Lack of work experience and education (White et al., 2015)
- Negative family feedback regarding illness (Kuijjer et al., 2006); family strain (Cote & Coutu, 2010)
- Comorbidity; antisocial personality (Brede et al., 2012)
- Employer's and insurance company's response/perceptions of support (Schultz et al., 2002; 2005)

WORKER RELATED FACTORS: NONMODIFIABLE

3. HEALTH FACTORS

- Overweight (Steenstra, 2005)
- Poor general health (Steenstra, 2005)
- Comorbid injuries (White et al., 2015)
- History of low back pain (Truchon & Fillion, 2000)
- Widespread pain (Grotle et al., 2010)
- History of sick leave (White et al., 2015)
- Opiate dependence (Brede et al., 2012)

**WORKER FACTORS:
MODIFIABLE**

1. Clinical predictors:

- Lack of early intervention (Kuijer et al., 2006)
- Chronicity
- Sleep disturbance (Hendriks et al., 2005)
- Anxiety and depression?

**WORKER FACTORS:
MODIFIABLE**

2. Personality and coping:

- Expectations of recovery (Gross & Battie, 2010; Iles et al., 2008; Kuijer et al., 2006; Schultz et al., 2004)
- Negative health and disability perceptions (Wagner et al., 2014)
- Fear avoidance and fear of pain/distress (Iles et al., 2008; Wideman & Sullivan, 2011)
- Catastrophizing (Fedoroff et al., 2014; Sullivan et al., 2012; Sullivan & Stanish, 2003)
- Perception of injustice (Sullivan et al., 2009)
- Pain and guarding (Schultz et al., 2002)

**WORKER FACTORS:
MODIFIABLE**

3. Other vulnerability factors:

- Life stressors; worrying about life and health (Iles et al., 2008)
- Burnout and work stress (Wagner et al., 2014)
- Low work-related activity at baseline
- Motivation: sense of involvement and desire to remain employed (Wagner et al., 2014)

WORKPLACE FACTORS: MODIFIABLE

- Job satisfaction (Iles et al., 2008; Truchon & Fillion, 2000; White et al., 2013)
- Perceived support (White et al., 2013)
- Job accommodation (Crook et al., 2002)
- Workplace characteristics (White et al., 2013)
- Perception of fairness (Davey et al., 2009, Hepp et al., 2011)

Work Disability Predictors in Musculoskeletal Pain Disorders: AN INTEGRATIVE APPROACH

Research Syntheses: White, Wagner, Schultz et al. (2013); Wagner, White, Schultz et al. (2013)

PREDICTING DISABILITY IN DEPRESSION

**WORKER FACTORS:
NON-MODIFIABLE**

1. SOCIODEMOGRAPHIC FACTORS

- Single parent
- Lack of social support
- Lower education (Lerner et al., 2004)
- Married workers: presenteeism; unmarried workers: absenteeism (Duijts et al., 2007; Cocker et al., 2011)
- Older age (Dewa et al., 2002; Lagerveld et al., 2010; Wang, 2007)
- Non-Caucasian patients tend to drop out of treatment (Lagerveld et al., 2010)

**WORKER FACTORS:
NON-MODIFIABLE**

2. Health

- Poor general physical health (Lerner, 2010)
- Presence of comorbid medical condition: cancer, pain, diabetes, asthma, hypertension (Ervasti et al., 2015)
- Previous sick leave (Lagerveld et al., 2010)
- Substance use (Wagner et al., 2014)

**WORKER FACTORS:
NON-MODIFIABLE**

3. Psychosocial factors:

- Life stressors and threats of violence (Duijts et al., 2007)
- Social support (Duijts et al., 2007)

**WORKER FACTORS:
MODIFIABLE**

1. MENTAL HEALTH PREDICTORS

- Severity of depression (Lagerveld et al., 2010; Lerner et al., 2010; Karpansalo, 2005) and comorbidity (Ervasti et al., 2015; Hees et al., 2012)
- Atypical or Psychotic Symptoms (Gnam 2005)
- Length of illness (Lagerveld et al., 2010)
- Sense of hopelessness (Kruijshaar et al., 2003)
- Timely treatment (Schoenbaum et al., 2002)

**WORKER FACTORS:
MODIFIABLE**

2. PERSONALITY AND COPING

- Conscientiousness (Verboom et al., 2011; Hees at al., 2012)
- Openness (Verboom et al., 2011)
- Extraversion (de Vries et al., 2015)
- Neuroticism (de Vries et al., 2015; Hees et al., 2012)
- Pessimism, external locus of control and passive withdrawal (de Vries et al., 2015; Lagerveld et al., 2010)

**WORKPLACE FACTORS:
NON-MODIFIABLE**

- High psychological demands
- High physical demands
- Low control
- Low decision latitude
- Low flexibility
- Unsupportive supervisory factors: ambiguities, lack of communication
- (Duijts et al, 2007; Lagerveld et al., 2010; Lerner et al., 2010; Michie & Williams, 2003; White et al., 2013 & 2015)

WORKPLACE FACTORS: MODIFIABLE

- Imbalance between effort and reward at work (Duijts et al., 2007)
- High work stress (Verboom et al., 2011)
- Job satisfaction (Duijts et al., 2007)

OTHER FACTORS

Treatment quality
(Gham, 2005; Greco et al., 2004; Lerner et al., 2004; 2010; Wang et al., 2007)

PREDICTING DISABILITY IN POSTTRAUMATIC STRESS DISORDER



**WORKER FACTORS:
NONMODIFIABLE**

1. Demographics:
 - Older age (Toien et al., 2012)
 - Female gender (Hodgins et al., 2001)
2. Medical history:
 - Previous history of sick leave (Regehr et al., 2002)
 - Comorbid health conditions and pain (Matthews & Chinnery, 2005; van Erp et al., 2014)
 - Severity of injury (Matthews et al., 2009; Toien et al., 2012)
 - Alcohol dependence (Palmu et al., 2015)
3. Social support

**WORKER FACTORS:
MODIFIABLE**

1. Clinical factors:
 - Comorbid depression (Palmu et al., 2015; Toien et al., 2012)
 - Higher levels of PTSD (Matthews & Chinnery, 2005)
 - Re-experiencing and hyperarousal (Taylor et al., 2006)
2. Personality factors:
 - Agreeableness and Conscientiousness (Hodgins et al., 2001)
 - Trait dissociation (Hodgins et al., 2001)
 - Mistrust, suspiciousness, and controlling traits (Regehr et al., 2002)

**WORKER FACTORS:
MODIFIABLE**

3. Coping
 - Passive coping (Matthews et al., 2009; Toien et al., 2012)
 - Pessimistic attitude & negative cognitions about the world (Matthews et al., 2009)
 - Accepting pain (Cook et al., 2015)
 - Anger (Evans et al., 2006)

WORKPLACE FACTORS: NONMODIFIABLE

Limited research:

- Compensation seeking (Matthews & Chinnery, 2005)
- Less skilled positions (Matthews & Chinnery, 2005)

WORKPLACE FACTORS: NONMODIFIABLE (cont'd)

- Poor workplace support, low work satisfaction and job insecurity (Carrier, Labertz & Gersons, 1997; Palmu et al., 2015)
- Stigma and discrimination (Wald & Taylor, 2009)
- Negative attitudes towards one's occupation and the work environment (Hodgins et al., 2001)

PREDICTING DISABILITY IN BRAIN INJURY



**WORKER FACTORS:
NONMODIFIABLE**

1. Demographics:

- Older age (e.g. Flanagan et al., 2005; Wilemse-van Son et al., 2006)
- Gender: inconsistent evidence
- Unmarried status
- Poorer work outcomes for minority status; TBI exacerbates market inequalities

**WORKER FACTORS:
NON-MODIFIABLE**

- Higher education
- Higher socio-economic status
- Pre-Injury employment

(Cancelliere et al., 2014; Cuthbert et al., 2015; Guilmette, 2005; Keyser-Marcus et al., 2002; Klonoff et al., 2005; Kreutzer et al., 2003; Nakase-Richardson, Yablon, & Sherer, 2007; Ponsford, 2013; Wagner et al., 2002)

**WORKER FACTORS:
NONMODIFIABLE**

2. INJURY CHARACTERISTICS:

- Injury severity: PTA, GCS, Glasgow Outcome Scale; delirium (deGuise et al., 2006; Fleming et al., 1999; Forslund et al., 2014; Guilmette, 2005; Jourdan et al., 2013; Nakase et al., 2007; Rassovsky et al., 2015; Sigurdardottir, et al., 2009)
- Right hemispheric injuries (Klonoff et al., 2006)
- Violent and non-accidental circumstances (Wagner et al., 2002; Greenspan et al., 1996)

**WORKER FACTORS:
NONMODIFIABLE**

3. Length of hospital stay and disability at discharge (Cifu et al., 1997; Devitt et al., 2006; Fleming et al., 1999; Gary et al., 2009; Keyser-Marcus et al., 2002; Kreutzer et al., 2003 Van Velzen et al., 2009; Wilemse-van Son et al., 2007)
4. Premorbid substance abuse and behavioral problems (Bogner et al., 2001; Guilmette, 2005; Wagner et al., 2002; Wilemse-van Son et al., 2007)

**MODIFIABLE WORKER FACTORS?
Predicting Work Disability in Brain Injury
from Neuropsychological Data**

- Neuropsychological test results most valid in predicting employability when they address specific abilities necessary for specific jobs or occupations
- Global performance not predictive
- Behavioral and social problems as well as emotional maladjustment – as gleaned from patient and collateral report - decrease employability

**Predicting Work Disability in Brain Injury
from Neuropsychological Data (cont'd)**

- Insight and awareness appear to play important role in return to work
- Multiple factors associated with RTW cannot be accounted for by neuropsychological data, injury severity, or premorbid characteristics that affect RTW and cannot always be measured or anticipated

(Guilmette, 2005)

**MODIFIABLE WORKER PREDICTORS
IN BRAIN INJURY**

1. Executive functions (Devitt et al., 2006; Hanks et al., 1999; Onsworth & McKenna, 2004; Spitz et al., 2013)
2. Awareness and acceptance of disability (Sherer et al., 1998; Wehman et al., 2005)
3. Behavioral problems (Benedictus et al., 2010; Cattelani et al., 2002; Falvo, 2014; Ricker, 2010)
4. Psychiatric factors: depression and anxiety (Felmingham et al, 2001; Whelan-Goodinson et al., 2008)

**MODIFIABLE WORKER PREDICTORS
(Cont'd)**

5. Social isolation and low social support (Oddy & Humphrey, 1980; Ruffolo et al., 1999; Devitt et al., 2006)
6. Community participation (Nightingale et al., 2007)
7. Driving independence and access to vehicle (Klonoff et al., 2006; Devitt et al., 2006) (also Ownsworth & McKenna, 2004)

**WORKPLACE PREDICTORS IN BRAIN
INJURY: NONMODIFIABLE**

1. Those employed in higher status occupations and those with jobs that allow greater independent decision making have higher RTW rates than those in lower status occupations (Flemming, Tooth et al., 1999; Ruffolo, Froiedland et al., 1999)
2. Absence of current functional and everyday problems (Guilmette 2005)
3. Absence of current behavioral and social problems as well as emotional maladjustment (Guilmette, 2005).

Empirical Support for Predictors of Employment in TBI
(Ownsworth & McKenna, 2004)

- Pre-injury occupational status: moderate evidence
- Functional status at discharge: strong support
- Executive functioning: moderate to strong support
- General intellectual functioning: moderate support
- Perceptual or visual-spatial ability: moderate support
- Rehabilitation and vocational support services: moderate support
- Emotional status: moderate support

WORKPLACE & VR FACTORS: MODIFIABLE

- Vocational rehabilitation (Kendall et al., 2006)
- Workplace and employer support (Bonnetterre et al., 2013)
- Job modification and accommodation (Guilmette, 2005)
- Program based VR, supported employment and case coordination

CAUTION RE RTW PREDICTION IN TBI

- In TBI research, no strong evidence of prediction of vocational outcomes was demonstrated likely due to methodological limitations of studies (Saltychev et al., 2013)
- Yet, clinically we are asked to prognosticate

Cross-diagnostic predictors of RTW in accidental injuries

- RTW is best predicted by patient's own appraisals of injury severity and ability to cope with accidental injury – systematic review across conditions (Hepp et al., 2011)
- Assess readiness to return to work
- Limitations of research data:
 - is your client represented in the research model?
 - studies limited to specific sample and context; generalizability problems
 - lack of research on comorbid conditions
 - limited research on diverse populations

Use of Predictors in Expert Opinions on Disability Predictions

1. Establish presence or absence of factors that have moderate to strong evidentiary support as predictors of work disability
2. Review published predictive models of disability and RTW
3. Determine factors predictive of disability based on research and published clinical observations
4. Determine case-specific individual and systemic barriers and facilitators of RTW

Modifiable Workplace Factors Predictive of Work Disability

Strong	Moderate	Limited
Low social support	Non full-time work	↑ Absenteeism tolerance ↑ Time to treatment Reorganizational stress
Low job satisfaction	Poor quality leadership	
Low supervisory support	Low job control	
Low worker control	Low fairness	
↑ Psychological demands	Low managerial involvement	
↑ Job strain		
↑ physical demands		

White , Wagner , Schultz, . et al. (2013)

Nonmodifiable RTW-relevant Factors

- Lower occupational status
- Existence of a worker's compensation claim
- Older age
- Poor personal functioning
- Increased psychological symptoms
- Increased clinical/complicating factors
- Decreased physical functioning
- Overweight status
- Increased emotional distress
- Non-married status
- Female gender (in cases of rheumatoid arthritis & LBP)
- Presence of respiratory conditions

White, Wagner, Schultz, et al. (2013)

Complicating Factors

- Culture and language
- Symptom validity
- Motivation, effort and coping
- Presence of comorbid medical conditions
- Variability of mental disorders
- Presence of multiple comorbid psychological conditions of different causalities
- Medication
- Being a high achiever
- Workplace environment: demands, control & support
- Social support
- Presence of acute stressors
- Effects of compensation

Data Collection: Multimethod Approach

- Take detailed history of pre- and post-injury paid or unpaid work, focus on work duties and performance
- Obtain pertinent job descriptions
- Obtain work records: attendance, performance appraisals, training and education, labor-relations correspondence, job applications and career track data

**Data Collection:
Multimethod Approach (cont'd)**

- Review medical and rehabilitation records for indicators of work function, daily living, recreation, social function, volunteer work, return to work trials
- Review data on predictive validity with respect to work-related outcomes from emotional status and neuropsychological testing; select tests with established ecological validity
- Obtain collateral information on functional levels, including supervisors' and coworkers' evaluations

**Data Collection:
Multimethod Approach (cont'd)**

- Observe factors potentially facilitating or interfering with work performance: impulsivity or reflectivity, trial and error vs. systematic approach, coping with stress, task motivation and persistence, social and communication skills, performance speed, use of compensatory strategies such as verbal self-instructions
- Select tests that are reliable, valid for disability determination purposes and fair for the individual from a given group

Inferences: Determination of Work Capacity / Disability

- Consider worker's diagnosis, personality (e.g. Big 5), coping resources and clinical prognosis
- Integrate work function-related evidence from multiple sources
- Recognize demands, support and control factors in the workplace
- Establish positive and negative predictive factors and balance them out (include modifiable and non-modifiable individual and system factors)
- Apply recognized work function/disability evaluation/rating system; be aware of relevance, applicability and limitations of such systems

Inferences: Determination of Work Capacity / Disability (cont'd)

- Determine readiness to return to work (if individual is employable) and risk for work disability
- Determine current or anticipated work capacity-related strengths and limitations in the following areas: activities of daily living, concentration, persistence and pace, social function, and adaptability to stress
- Consider functional change: pre- versus post-injury status
- Estimate the overall severity and complexity of work disability

Inferences: Determination of Work Capacity / Disability (cont'd)

Determine under what conditions the individual can/cannot work, giving consideration to:

- Structure and predictability
- Environmental factors: light, sound, motion, stimulation
- Amount of work supervision required
- Amount of supervisory or coworker support
- Task demands such as: hours of work, accuracy, speed, complexity, multitasking, volume, ambiguity, conflict, social interaction, language and literacy
- Decision latitude and skill discretion
- Job accommodations: flexibility
- Optimistic, pessimistic and realistic employment scenarios

Toolbox for Work Disability Prediction

- Custom made from existing research and case characteristics
- Musculoskeletal disorders: Research supported:
- For example: *Orebro Musculoskeletal Pain Questionnaire* (OMPQ) used to predict long term disability and failure to RTW due to personal and environmental factors, with a higher score equal to higher risk:
 - ≤ 105 = low risk; 105-130 = moderate risk; ≥ 130 = high risk (Linton, Nicholas et al., 2011)
- Caution: Existing instruments are designed for screening and not diagnosis

META-CONCLUSIONS

1. TO BE DEFENSIBLE, FORENSIC ASSESSMENT MUST REST ON CURRENT RESEARCH EVIDENCE AND BEST PRACTICES
2. INTEGRATE CLINICAL AND RESEARCH DETERMINANTS OF DISABILITY TO MAKE BEST PREDICTIONS FOR YOUR CASE

META-CONCLUSIONS (CONT'D)

3. TRANSLATE MULTIVARIATE OUTCOME PREDICTION METHODOLOGY INTO CLINICAL CASE APPLICATION
4. INTEGRATE INDIVIDUAL AND SYSTEMIC FACTORS: VENTURE BEYOND FAMILIAR RESEARCH TERRITORY

META-CONCLUSIONS (CONT'D)

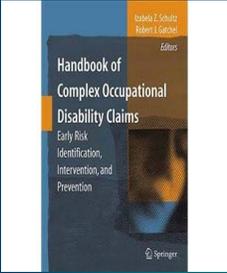
5. WHAT IS MODIFIABLE AND WHAT IS NOT: DESIGN INTEGRATED CLINICAL AND OCCUPATIONAL INTERVENTION TARGETING MODIFIABLE RISK FACTORS
6. DRAW FROM PSYCHOLOGY OF STRENGTHS, RESOURCES AND PERFORMANCE
7. RTW INTERVENTION LITERATURE IS PRIMARILY PSYCHOLOGICAL: GO BEYOND PATHOLOGY AND DEFICIT FRAMEWORK

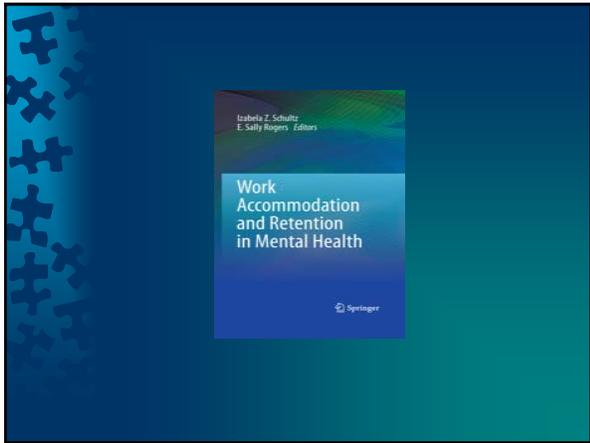
READY FOR THE COURTROOM?



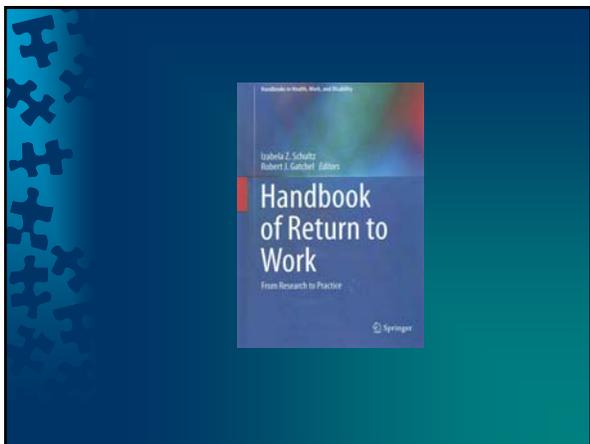
WOULD YOU RATHER?













Thank you.

Please contact:

izabela.schultz@cortexcentre.com
604-221-4199

CORTEX Centre for Advanced Assessment
affiliated with the *University of British Columbia*
Vancouver Canada