

Mild TBI: Effects of Concussion and Pre-Morbid Personality

Ronald M. Ruff, PhD, ABPP

MILD TBI: EFFECTS OF CONCUSSION PRE-MORBID PERSONALITY

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Conflict of Interest Disclosure

Ronald Ruff, Ph.D.

- Royalty: *Author of 4 Neuropsychological Tests*
Psychological Assessment Resources, Inc.

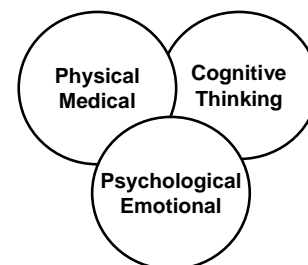
Ruff Figural Fluency Test
Ruff 2&7 Selective Reminding Test
Ruff-Light Trail Light Learning Test
Ruff Neurobehavioral Inventory

Overview

- Brain-based Emotional Regulation
- Differential Diagnosis of Emotions
 - Personality Characteristics
 - Mood
- Role of Premorbid Personality Styles
- Postconcussional Disorder

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Brain Functions



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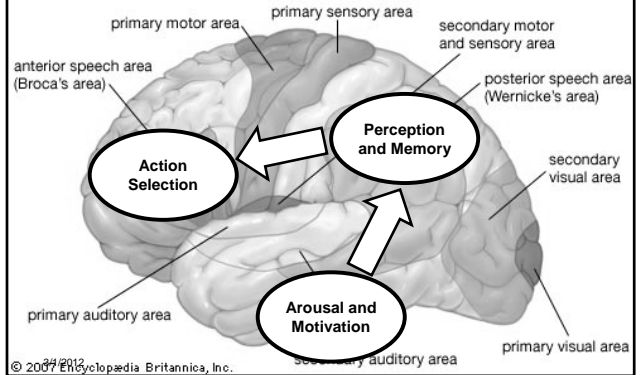
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Emotional Systems of the Brain

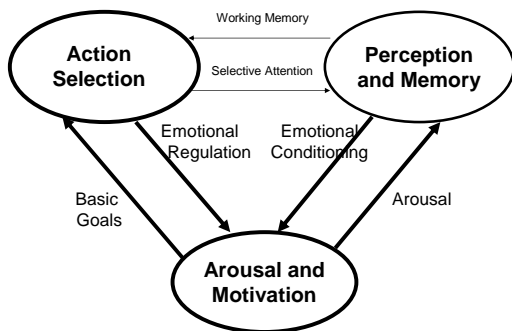
- ▣ Arousal Motivation System – cortical, limbic and brain-stem components
- ▣ Perceptual & Memory System – posterior neocortex and hippocampal formation
- ▣ Action Selection System – frontal neocortex, basal ganglia and parts of the thalamus

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Functional Systems

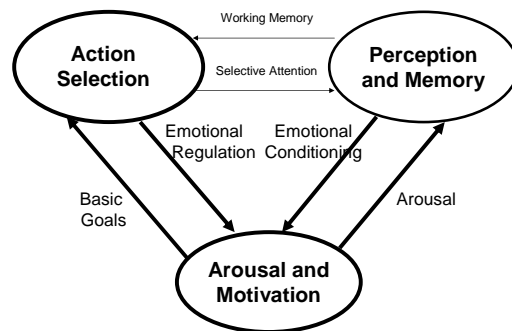


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B. Pennington (2000) The Development of Psychopathology



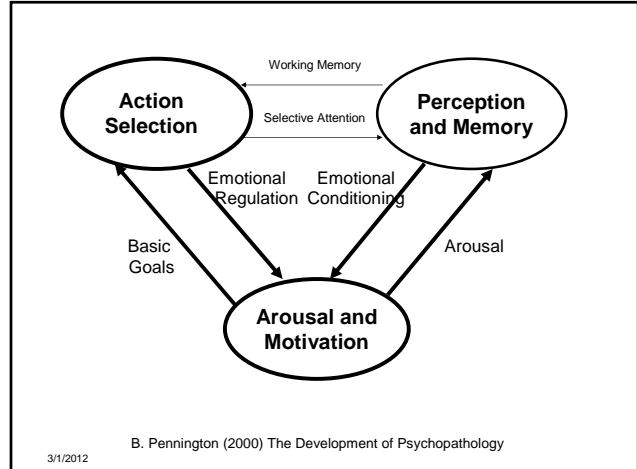
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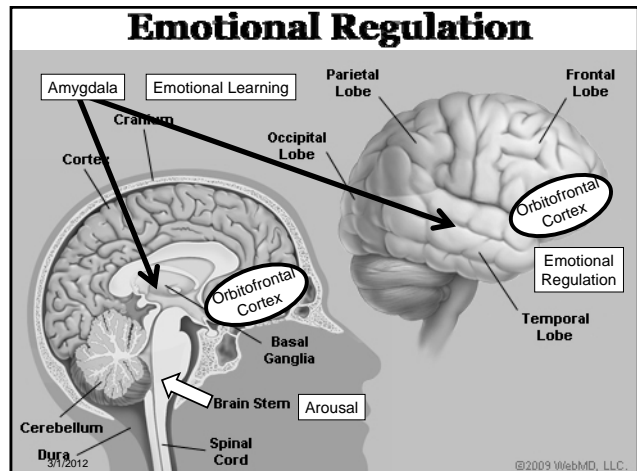
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- Disorder of Arousal-Motivation
 - Depression and Dysthymia
 - Bipolar Disorder
 - Posttraumatic Stress Disorder



- ▣ Disorder of Action and Selection
 - Conduct Disorder
 - Attention Deficit Hyperactivity
 - Obsessive-Compulsive Disorder
 - Schizophrenia
 - Tourette Disorder



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Potential Predictors of Brain Based Emotional Impairment

- Location of Brain Damage
 - Orbitofrontal lobe damage can result in “acquired sociopathy” (Blair and Cipolotti, 2000)
 - Left orbitofrontal lobe damage can lead to poor interpretations of social situations (Cicerone and Tanenbaum, 1997)
 - Ventral frontal lobes is associated with poor recognition of emotional expression (Hornak, Rolls and Wade, 1996)

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Summary

<u>Location</u>	<u>Emotional Functioning</u>
Cortical <i>Orbitofrontal</i>	•Maintaining motivational during activity •Switching motivational contingencies •Permitting flexibility
Limbic <i>amygdala</i>	•Emotional learning including classical conditioning of fear response (PTSD, anxiety syndromes, phobias)
Brainstem	7 Core Emotions Rage, fear, panic, lust, care, seeking & play

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Overview

- Brain-based Emotional Regulation
- **Differential Diagnosis of Emotions**
 - **Personality Characteristics**
 - **Mood**
- Role of Premorbid Personality Styles
- Postconcussional Disorder

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WE ALL HAVE CERTAIN LONGSTANDING PERSONALITY CHARACTERISTICS

**At the same time we also have
different daily mood states**

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Emotional Problems – DSM IV

- ☐ Acute Status – Axis I
current emotional functioning or mood, e.g., anxious, depressed - if severe leads to Disorder
- ☐ Personality Traits – Axis II
longstanding personality characteristics, e.g., paranoid, histrionic, schizoid, narcissistic – we all a features or trait but if severe leads to Disorder

DSM = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition
American Psychiatric Association (1994)

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Expect Problems after TBI in either or both Axis I & II

- ☐ Acute Status – Axis I
 - Major Depression
 - Adjustment Disorder
 - Anxiety Disorder
- ☐ Personality – Axis II
 - Personality Change due to Medical Condition

DSM = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition
American Psychiatric Association (1994)

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DSM IV 310.1 Personality Change due to TBI

- ☐ Labile Type (Emotional)
- ☐ Disinhibited Type (Poor impulse control, e.g. sexual)
- ☐ Aggressive Type
- ☐ Apathetic Type
- ☐ Paranoid Type
- ☐ Other Type
- ☐ Combined Type
- ☐ Unspecified Type

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DSM IV: Personality Change due to Medical Condition (ABI)

- ☐ Personality is changed from pre-injury personality
- ☐ Evidence that disturbance is direct result of brain damage
- ☐ Disturbance causes significant distress or impairments in social/occupational functioning
 - Disturbance not better accounted for by another mental disorder
 - Disturbance does not occur exclusively during a delirium

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▣ **Brain Based Emotional Changes**

- Orbito-frontal damage will likely result in permanent emotional and psychosocial problems
- Avoid rendering an optimistic prognosis (just as you would with a developmental disorder such as autism or Asperger's syndrome)
- Examine level of dysfunction in therapeutic context vs. the "real world"

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Consequences of Emotional Disturbances

- ▣ Impoverished social relationships
- ▣ Inability to return to work

Brooks, McKinley, Symington et al, 1987; Malia, Powell, Torode, 1995

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Consequences of Emotional Disturbances

- ▣ For relatives emotional disturbances are often a greater burden than physical and cognitive impairments

Brooks, Campsie, Symington et al, 1986; Kinsella, Packer, Oliver, 1991
Koskinen, 1998

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Overview

- ▣ Brain-based Emotional Regulation
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- ▣ **Role of Premorbid Personality Styles**
- ▣ Postconcussional Disorder

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Cause of Postconcussive Disorder

NON-BELIEVER
PSYCHOGENIC

BELIEVERS
NEUROGENIC

- ▣ Persistent problems following a Mild TBI are caused by psychological factors
- ▣ The psychological factors can be either premorbid and/or post- accident

- ▣ Mild TBI can cause neuropathology that engenders symptoms
- ▣ In some patients this results in permanent problems

Emotional Risk Factors and Postconcussional Disorder (PCD)

- ▣ 129 (PCD) patients examined for Axis I & II disorders according to following the Millon Clinical Multiaxial Inventory
- ▣ 4 subgroups emerged:
 - 36.4% no psychopathologies
 - 4.7% Axis I disorder
 - 24.8% Axis II disorder
 - 24.0% Axis I & II disorders

Evered, L., Ruff, R.M., Baldo, J.V. and Isomura, A. "Emotional risk factors and postconcussional disorder." *Assessment* 10, 420-427. (2003)

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Emotional Risk Factors and Postconcussional Disorder (PCD)

Axis II Disorder	Axis II only	Axis I & II
Schizoid	1	2
Dependent	0	1
Depressive	0	5
Histrionic	8	1
Narcissistic	7	2
Sadistic	0	2
Compulsive	9	3
Negativistic	1	2
Paranoid	0	1
Multiple Axis II	6	12

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Emotional Risk Factors and Postconcussional Disorder (PCD)

- ▣ 63.5% endorsed emotional pathologies
- ▣ Individuals with Axis I & II pathologies (24%)
 - greatest number of emotional complaints in a clinical interview
 - lowest neurocognitive test scores
 - ▣ motor skills
 - ▣ verbal abilities
 - ▣ memory

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Conclusions

- ▣ *Combination of both Axis I and II psychopathology leads to greater impairment following MTBI*
- ▣ *No significant differences were identified between litigants and non-litigants*
- ▣ *36.4% of individuals with PCD had psychopathologies*

Evered, L., Ruff, R.M., Baldo, J.V. and Isomura, A. "Emotional risk factors and postconcussional disorder." *Assessment* 10, 420-427. (2003)

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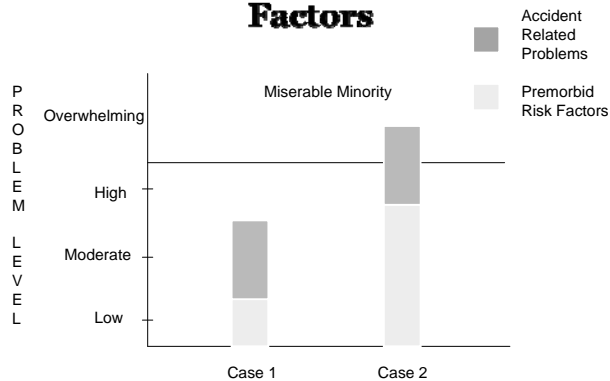
Predisposing Factors in Mild TBI patients

- ▣ Psychiatric Conditions (e.g. depression)
- ▣ Personality Traits (e.g. perfectionist)
- ▣ Coping Abilities (e.g. poor stress management)
- ▣ Intelligence Level (e.g. lower IQ, Learning Dis.)
- ▣ Demographic Characteristics (e.g. > 50 years)
- ▣ Medical Conditions (e.g. pain, previous TBI)

Vanderploeg, Belanger, & Curtiss (2006) MTBI: Neuropsychological Causality Modelling (Chapter 16) *Psychological Knowledge in Court*. New York: Springer

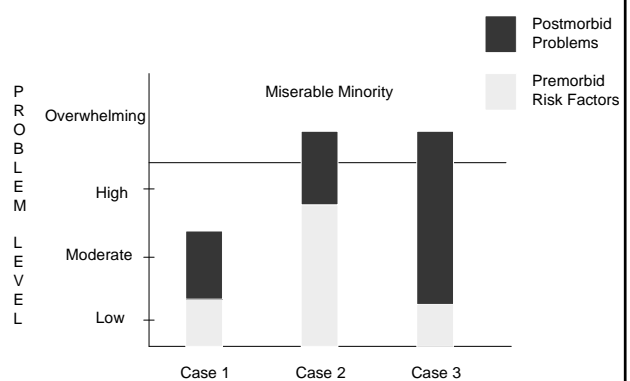
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Combination of Pre-morbid Risk Factors



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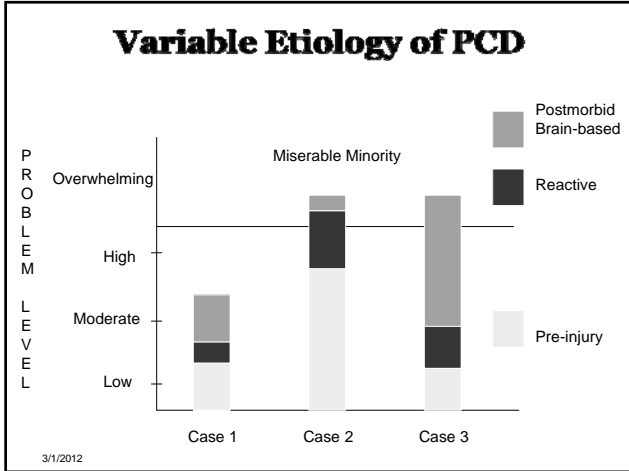
Psychological Problems



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CLINICAL OBSERVATION

Personality styles color symptoms presentation

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Personality Disorders – Axis II

- ▣ Antisocial Personality Disorder
 - Pervasive pattern of disregard for and violation of the rights of others occurring since age 15 with 3 (or more) of the following:
 - A that are grounds for arrest
 - Conning other for personal profit or pleasure
 - Impulsivity or failure to plan ahead
 - Physical fights or assaults
 - Reckless disregard for safety of self and others
 - Lack of consistent work or financial responsibility
 - Lack of remorse and rationalizing poor behavior

Personality Disorders – Axis II

- ▣ Histrionic Personality Disorder
 - Pattern of excessive emotionality and attention seeking beginning in early adulthood with 5 (or more) of the following features:
 - Uncomfortable if not the center of attention
 - Inappropriate sexual seductiveness
 - Rapidly shifting & shallow expression of emotions
 - Using physical appearance to draw attention
 - Impressionistic communications with lack of detail
 - Theatrical and exaggerated expression of emotions
 - Easily influenced by others
 - Considers relationships as more intimate than they actually are

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How can personality disorders color symptom presentations?

- ▣ Pain presentation of a **antisocial** patient:
"I got in a fight and really hurt the other person and all that happened to me was that I fell and busted my knee."
- ▣ Pain presentation of a **histrionic** patient:
"I almost was killed in this terrible accident, and now my leg hurts as if someone had jammed an ice pick into my knee."

Personality Style	Pre-TBI Character	Post-TBI Reaction
Dependency	Excessive need to be taken care of; submissive behavior; fear of separation	Paralyzed by symptoms, if critical erosion occurs to further reduces independence
Borderline	Pattern of instability in interpersonal relationships & self perception with fear of abandonment	Exacerbation of personality organization, including despair, panic, impulsiveness, self-destructive acts

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Personality Style	Pre-TBI Character	Post-TBI Reaction
Perfectionist	Sense of self derived accomplishment, which is frequently obsessive	Catastrophic if drop in performance is perceived
Narcissistic	Overestimate of abilities and inflating accomplishments, need for admiration & lack of empathy	Minimization of denial of symptoms; if failure results, crash of self-esteem can result in catastrophic reaction

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Personality Style	Pre-TBI Character	Post-TBI Reaction
Somatic	Preoccupation with physical well being, while being reluctant to accept psychological conflicts	Dramatic flavor to symptom presentation, including blaming behavior if source is not objectified
PTSD	Prior stressors produced an emotional reaction to fear and	Decreased coping ability; effect of traumas with exaggerated reaction to current crisis

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- ☐ Role of Premorbid Personality Styles
- ☐ **Postconcussional Disorder**

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Definition: Postconcussional Disorder DSM – IV Diagnostic Criteria

- ☐ Multidimensional symptoms:
 - **Cognitive**
 - **Physical**
 - **Emotional**
- ☐ 3 or more months post-accident
- ☐ Effects on educational and vocational functioning

American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders (4th ed.)*. Washington, D.C.: Author.

Estimate of Pre-TBI Functioning

Moderate-severe TBI	Mild TBI
<ul style="list-style-type: none"> • Deficits are pronounced • Pre-injury estimate is relevant but less essential 	<ul style="list-style-type: none"> • Deficits are more subtle • Pre-morbid estimate is essential

Causes for Poor Outcome

- ☐ Neurogenic
- ☐ Psychogenic
- ☐ Co-morbid Medical or Emotional complications
- ☐ Pre-morbid factors
- ☐ Financial gain (malingering)
- ☐ Any combination of the above

Ruff, R.M., Camenzuli, L.F. and Mueller, J. "Miserable Minority: Emotional risk factors that influence the outcome of a mild traumatic brain injury." *Brain Injury* 10, 551-565. (1996)

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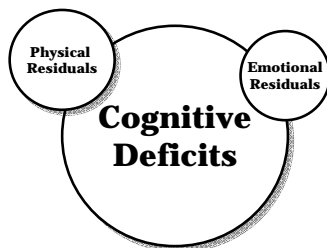
Neuropsychologists Role:
Distinguish between brain vs. non-brain based etiologies

BRAIN BASED	NON-BRAIN BASED
<ul style="list-style-type: none">▣ Neuro-cognitive decline▣ Neuro-emotional dysregulation▣ Neuro-physical signs and symptoms	<ul style="list-style-type: none">▣ Psychogenic▣ Co-morbid Medical or Emotional complications▣ Pre-morbid factors▣ Financial gain (malingering)

Proposed Solution
Modifiers for Postconcussional Disorder

1. PCD with neuro-cognitive features
2. PCD with neuro-emotional features
3. PCD with neuro-physical features (i.e. neurological signs and symptoms)
4. PCD with mixed features

1. PCD with Neurocognitive Features

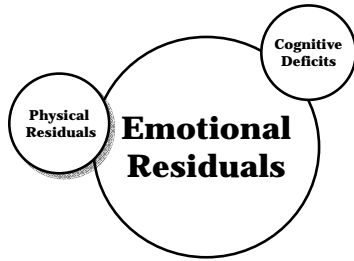


Post-traumatic cognitive clusters includes according to the DSM-IV

- Attention deficits affecting
 - ▣ Concentration
 - ▣ Shifting
 - ▣ Focus of attention
 - ▣ Performing simultaneous cognitive tasks
- Memory deficit affecting
 - ▣ Learning
 - ▣ Recalling information

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2. PCD with Neuro-emotional Features



Post-traumatic psychological Problems according to DSM-IV-TR

- Irritability or aggression on little or no provocation
- Anxiety
- Depression
- Affective lability
- Apathy or lack of spontaneity
- Other changes in personality (e.g., social or sexual inappropriateness)

Emotional Residuals

NEURO-EMOTIONAL

- Affective lability
- Apathy or lack of spontaneity
- Other changes in personality (e.g. social or sexual inappropriateness)
- Endogenous Depression
- Disinhibition

EMOTIONAL REACTIONS

- **Irritability or aggression on little or no provocation**
- **Anxiety**
- **Reactive Depression**
- **Adjustment Disorder with Anxious and Depressive Features**

3. PCD with Neuro-physical or Neurological Features

- ☐ Neurological signs
 - More objective and observable
- ☐ Neurological symptoms
 - More subjective and non-specific

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PCD – Common Post-traumatic Physical Residuals

- | | |
|--|--|
| <ul style="list-style-type: none">□ DSM-IV-TR<ul style="list-style-type: none">▪ Physical fatigue▪ Disordered sleep▪ Headaches▪ Vertigo and dizziness▪ Physical fatigue▪ Seizure Disorder | <ul style="list-style-type: none">□ ICD-10<ul style="list-style-type: none">▪ Disordered sleep▪ Headaches▪ Vertigo and dizziness |
|--|--|

3. PCD with Neuro-physical Features

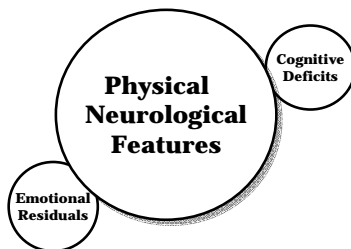
NEUROLOGICAL SIGNS

- Post-traumatic seizure disorder
- Intracranial lesions not requiring surgery
- Anosmia/hyposmia
- Other cranial nerve deficits
- Visual field cuts, diplopia, or other visual symptoms caused by CNS damage
- Acute expressive aphasia (transient)
- Gait/balance problems caused by CNS damage

PHYSICAL SYMPTOMS

- Physical fatigue
- Disordered sleep
- Headaches
- Vertigo or dizziness
- Tinnitus and hyperacusis (increased sensitivity to sounds)
- Photosensitivity
- Reduced tolerance to alcohol or medications

3. PCD with Neuro-physical or Neurological Features



4. PCD with Mixed Features

- A mixture of documented neuro-cognitive deficits
- Brain-based and or reactive emotional residuals
- Neurological signs and symptoms

Challenge 1

Postconcussional symptoms are often examined by different disciplines:

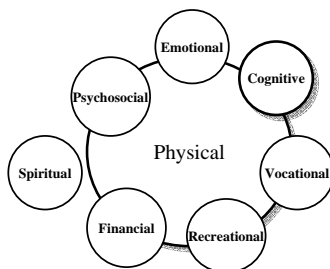
- ▣ Physical symptoms by neurologists
- ▣ Emotional residuals by psychiatrist
- ▣ Cognitive profile by neuropsychologist

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DISCIPLINE VS. PATIENT- BASED PERSPECTIVE

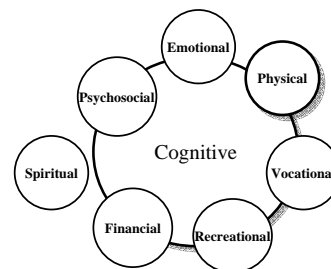
A discipline specific perspective is typically skewed

Medical Model



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Neuropsychological Model

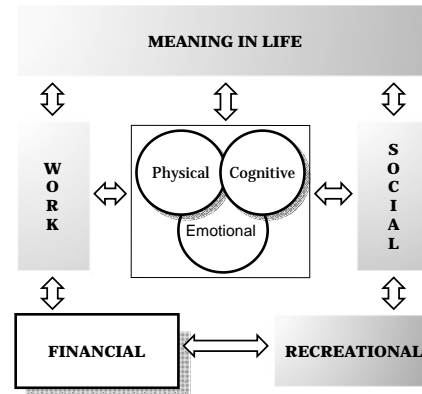


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**MODEL DEVELOPED
WITH MY PATIENTS**

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Patient-based Perspective



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Challenge 2

- ❑ Pre-TBI issues clearly play a role
- ❑ However, the available personality tests such (MMPI, MCMI) do not distinguish between pre-TBI and post-TBI symptoms

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**Rational for Developing a new
Measure**

- ❑ Develop a measure for individuals who have sustained a catastrophic illness
- ❑ Capture emotional, physical, cognitive and quality of life changes
- ❑ Replace discipline-specific focus with patient-oriented approach

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Ruff, R. & Hibbard, K. (2003) Ruff Neurobehavioral Inventory. Lutz, Florida: Psychological Assessment Resources, Inc. (PAR)

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DEFICITS ARE UNDERSTOOD RELATIVE TO PREMORBID ABILITIES

Most concepts emerge in relationship to other concepts
Stinginess vs. Generosity
Moral vs. Immoral

(C.G. Jung)

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RNBI assesses the patient's perception of their premorbid and postmorbid functioning level

- | | |
|--|--|
| <ul style="list-style-type: none">▣ Current Status▪ 4 Cognitive Scales▪ 6 Emotional Scales▪ 3 Physical Scales▪ 5 Quality of Life Scales | <ul style="list-style-type: none">▣ Premorbid Status▪ 4 Cognitive Scales▪ 6 Emotional Scales▪ 3 Physical Scales▪ 5 Quality of Life Scales |
|--|--|

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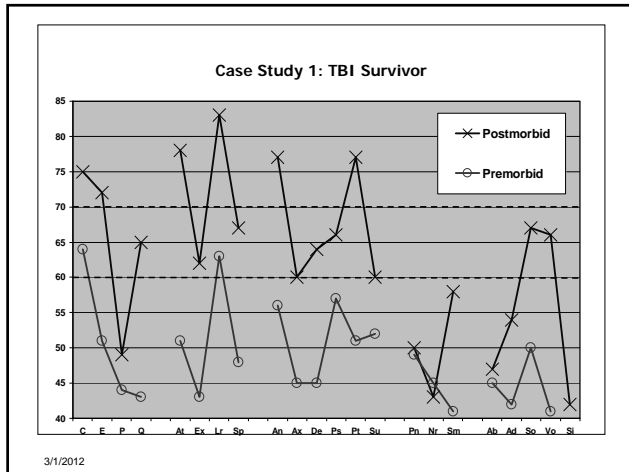
Standardization of the RNBI

- ▣ Normative Sample N = 1024
- ▣ Patient Samples
 - Traumatic Brain Injury N = 52
 - Stroke N = 43
 - Chronic Pain N = 52
 - Spinal Cord Injury N = 37

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Summary

- ❑ Avoid discipline-specific bias
- ❑ Explore interactions among symptoms
- ❑ Diagnostic Framework should identify Current Problems Pre-injury Status

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Summary

- ❑ Separate between
 - Brain-base mood changes
 - Brain-based personality disorder
 - Psychological reactions to the being brain damage
 - Pre-injury mood disorders
 - Pre-injury personality disorders

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