

STANDARDIZED ASSESSMENT TO PLAN POST-HOSPITAL BRAIN INJURY REHABILITATION

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BOTTOM LINE

- *Outcome measures aren't just for measuring outcome*
- *A standardized assessment can be useful in rehabilitation planning*
 - ... and for measuring outcome*

VALUE OF A STANDARDIZED ASSESSMENT

- *Assures a typical range of problems are addressed*
- *Gives the big picture*
- *Facilitates prioritizing and sequencing goals*
- *Provides a common “language” for the provider team and participants to identify strengths, limitations, and goals*
- *Facilitates communication between team members and participants regarding progress*
- *Provides a quantitative metric for assessing outcomes for individuals and program*

MAYO-PORTLAND ADAPTABILITY INVENTORY: MPAI-4

- *Structure for neuropsychological or team outpatient evaluation*
- *Outcome and program evaluation*
- *Input from patient and significant other*
- *Available in English, Spanish, Danish, French, German, Swedish, Portuguese, Hebrew, Dutch*
- *www.tbims.org/combi/mpai*

A COMPREHENSIVE MEASURE: MPAI-4

- *Current version is product of over 20 years of research*
- *30-items*
- *Three subscales: Ability, Adjustment, Participation*
- *Psychometric properties established using classic and modern psychometric techniques*

MPAI-4: ABILITY INDEX

- *Mobility*
- *Use of hands*
- *Audition*
- *Vision*
- *Motor speech*
- *Dizziness*
- *Verbal Communication*
- *Nonverbal Communication*
- *Memory*
- *Attention/
concentration*
- *Fund of information*
- *Novel Problem-solving*
- *Visuospatial abilities*

MPAI-4: ADJUSTMENT INDEX

- Anxiety
- Depression
- Irritability, anger, aggression
- Pain/headache
- Fatigue
- Sensitivity to mild symptoms
- Inappropriate social interaction
- Impaired self-awareness
- Family/significant relationships
- Initiation
- Social contact
- Leisure activities

MPAI-4: PARTICIPATION INDEX

- *Initiation*
- *Social contact*
- *Leisure activities*
- *Self care*
- *Residence*
- *Transportation*
- *Employment*
- *Managing Money*

MPAI-4

CO-MORBIDITIES

- *Alcohol/other substance abuse or dependency*
- *Legal issues*
- *Other disabling conditions*

MEASUREMENT METHODOLOGY: CLASSICAL VS. RASCH

- *Analysis of measure is at item level not the scale level*
- *Identifies items ordinally related to each other and to people as described by a linear construct*
- *Each item represents a level on the construct*
- *Misfitting or redundant items are discarded*
- *Quantitative relationship among items can be translated to a parametric equivalent measure*

MEASUREMENT METHODOLOGY: CLASSICAL VS. RASCH

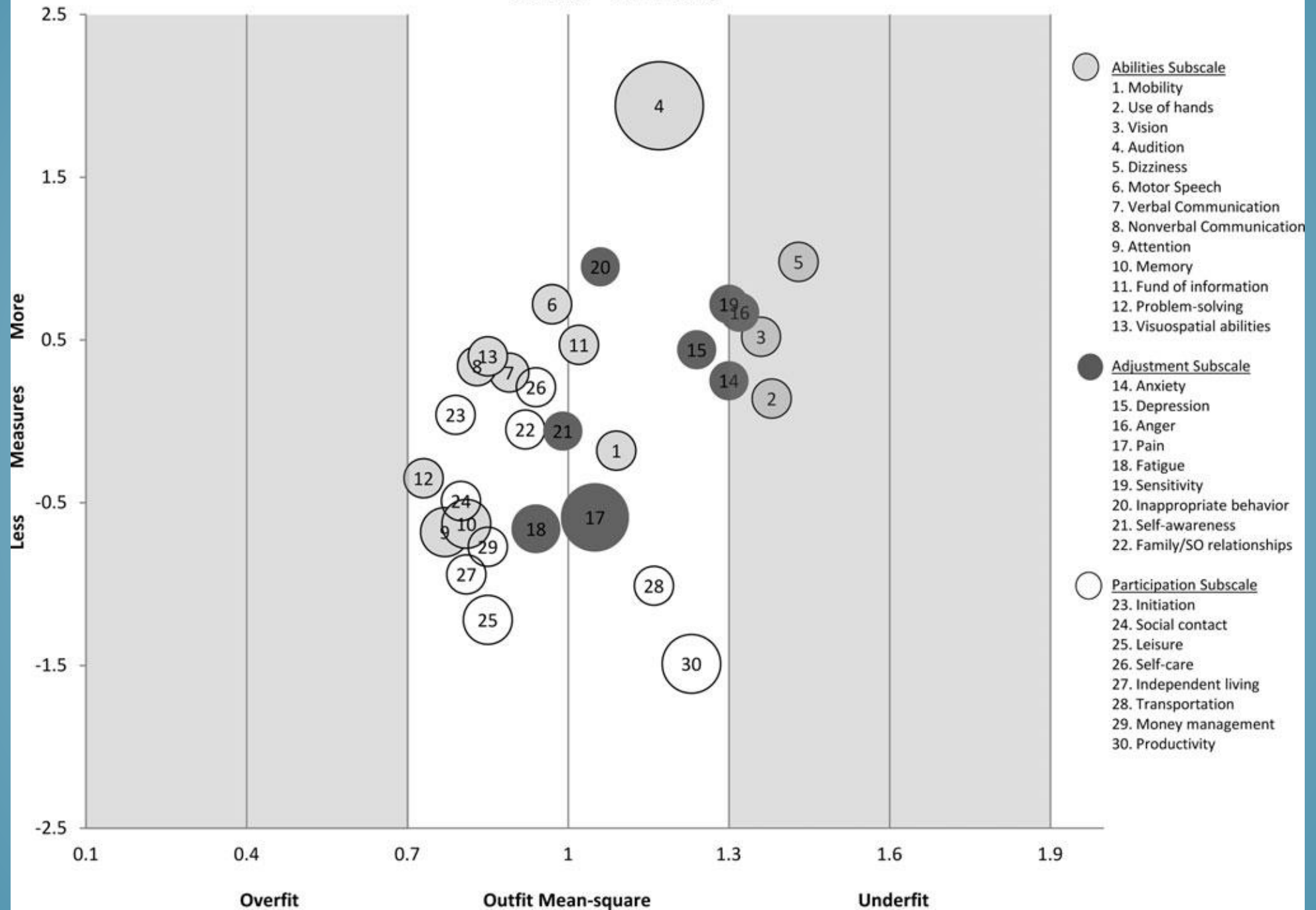
Classical:

- Relationship of numbers to other numbers
- Typically assumes items have same value and are additive

Rasch:

- How numbers distinguish among people
- Items may have varying impact in describing a linear dimension

MPAI-4 ITEMS



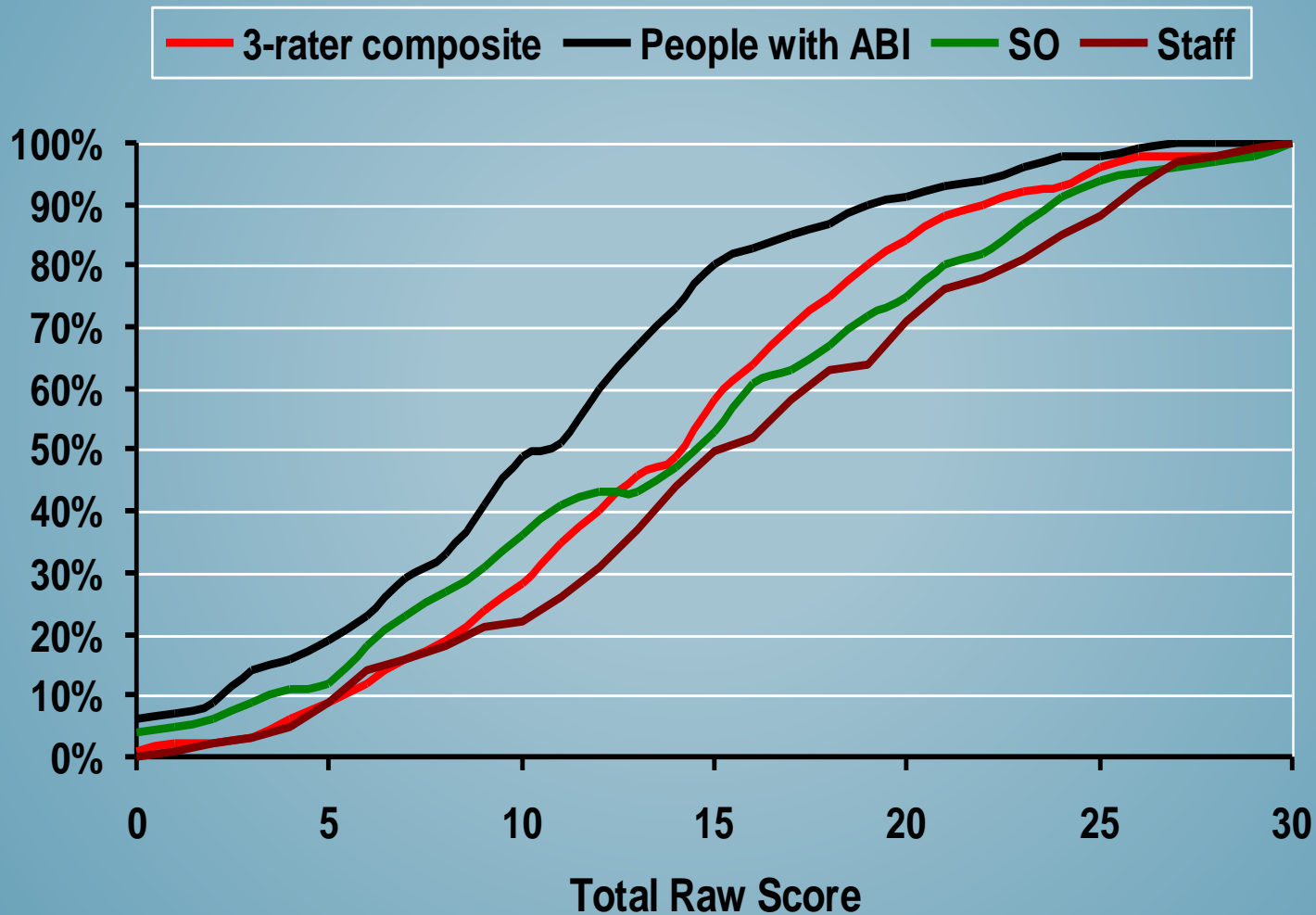
MPAI-4: CONCURRENT AND PREDICTIVE VALIDITY

- *Disability Rating Scale, Rancho scale, neuropsychological measures, and MPAI completed by a significant other* (Bohac, Malec, & Moessner, 1997; Malec & Thompson, 1994)
- *Outcome of Comprehensive Day Rehabilitation Program* (Malec, 2001)
- *Outcome of Specialized Vocational Services* (Malec, Buffington, Moessner, & Degiorgio, 2000)
- *Intensity of outpatient rehabilitation required for return to work* (Malec & Degiorgio, 2002)

LEVELS OF MEASUREMENT: FOCUSED

- *Participation Index*
- *Represents last and most meaningful challenges for rehabilitation*
- *Perspectives of person with TBI, SO, staff*
 - *vs. rater bias*
- *3-rater Participation Index correlates highly with Full Scale ($r = .76$)*
- *Minimal ceiling effects*

Cumulative Distributions of Participation Index Total Raw Scores by Rater Group and 3-Rater Composite




MPAI-4 DATABASE PROJECT

- *Small Business Technology Transfer Program (STTR)*
 - *Tom Murphy, PI/CEO Inventive Software Solutions, Philadelphia*
 - *John Seeley, Jeff Gau, Brian Danaher: Oregon Research Institute, Portland*
 - *Jim Malec: Rehabilitation Hospital of Indiana/IU School of Medicine*


MPAI-4 DATABASE PROJECT

- *A Web-Enabled Client/Person Served Outcomes Reporting Service for any size provider (HIPAA compliant)*
- *Each organization's data is protected and secured*
- *Allow individual organizations to compare and analyze their internal data to regional or national data*
- *Developing normative data for post-hospital brain injury*
- *Can add tools/scales in addition to MPAI-4*

INJURY INFORMATION SAMPLE SCREEN






CLINICAL OUTCOME MEASURE ANALYSIS SOFTWARE

created by 

Log O

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Clients

New Save Save and Close Save and New Delete Cancel Validate Refresh Help Show in Report

First NameCheryl

Middle Name

Last NameDougherty

☐ Exclude from Collaborative

Demographics

Personal InfoInjury InfoMedical InfoResidence/ServicesPsych InfoVocational/Educational InfoDischarge

Injury Date Info

Injury Date7/24/1987

Age at Inj28

Age At Inj Cat19-29 Age Cat.

Coma Info

☐ Coma/LOC (Loss of Consciousness)

Injury Type and Cause

Patient TypeBI Patient

Injury TypeAnoxia

Type of Injury Other

Cause Of InjuryOther

Cause of Injury Other

Cause of Injury #2

SAMPLE DATA MPAI-4 SCREEN

Rating Form Help

Rating Manual

Page 1

Page 2

Page 3

Part A. Abilities

1. Mobility

None

0

1

2

3

4

2. Use of Hands

None

0

1

2

3

4

3. Vision

None

0

1

2

3

4

4. Audition

None

0

1

2

3

4

5. Dizziness

None

0

1

2

3

4

6. Motor Speech

None

0

1

2

3

4

7A. Verbal

None

0

1

2

3

4

7B. Nonverbal

None

0

1

2

3

4

8. Attention

None

0

1

2

3

4

9. Memory

None

0

1

2

3

4

10. Fund of Information

None

0

1

2

3

4

11. Novel Problem-solving

None

0

1

2

3

4

Part B. Adjustment

13. Anxiety

None

0

1

2

3

14. Depression

None

0

1

2

3

15. Irritability, anger, aggression

None

0

1

2

3

16. Pain and headache

None

0

1

2

3

17. Fatigue

None

0

1

2

3

18. Sensitivity to mild symptoms

None

0

1

2

3

19. Inappropriate social interaction

None

0

1

2

3

20. Impaired self-awareness

None

0

1

2

3

21. Family/significant relationships

None

0

1

2

3

LINKING THE MPAI-4 TO THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING (ICF)

- *Lexell J, Malec J, Jacobsson LM. Mapping the Mayo-Portland Adaptability Inventory to the International Classification of Functioning, Disability, and Health. J Rehab Med 2012;44:65–72.*

LINKING THE MPAI-4 TO THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING (ICF)

- *Each item links to specific functional areas that may be targeted for intervention*
- *Linkage is more specific for Ability and Participation than Adjustment*

ICF LINKING EXAMPLES: VERBAL COMMUNICATION

- d325 Communicating with - receiving - written messages
- d330 Speaking
- d340 Producing messages in formal sign language
- d345 Writing messages
- d3600 Using telecommunication devices
- d3601 Using writing machines
- d3602 Using communication techniques
- b1670 Reception of language
- b1671 Expression of language
- b1672 Integrative language functions
- d166 Reading
- d170 Writing
- d310 Communicating with - receiving - spoken messages
- d320 Communicating with - receiving - formal sign language messages

ICF LINKING EXAMPLES: RESIDENCE

- d2301 Managing daily routine
- d2302 Completing the daily routine
- d2303 Managing one's own activity level
- d5700 Ensuring one's physical comfort
- d5701 Managing diet and fitness
- d5702 Maintaining one's health
- d6300 Preparing simple meals
- d6301 Preparing complex meals
- d6400 Washing and drying clothes and garments
- d6401 Cleaning cooking area and utensils
- d6402 Cleaning living area
- d6403 Using household appliances
- d6404 Storing daily necessities
- d6405 Disposing of garbage
- d6500 Making and repairing clothes
- d6501 Maintaining dwelling and furnishings
- d6502 Maintaining domestic appliances
- d6503 Maintaining vehicles
- d6504 Maintaining assistive devices
- d6505 Taking care of plants, indoors and outdoors
- d6506 Taking care of animals

ICF LINKING EXAMPLES: ANXIETY, DEPRESSION

- *b1520 Appropriateness of emotion*
- *b1521 Regulation of emotion*
- *b1522 Range of emotion*

**Malec JF, Kean J. Post-inpatient
Brain Injury Rehabilitation
Outcomes: Report from the
National OutcomeInfo Database. J
Neurotrauma, epub ahead of print,
doi: 10.1089/neu.2015.4080.**

MPAI-4 Total Score by Program Type

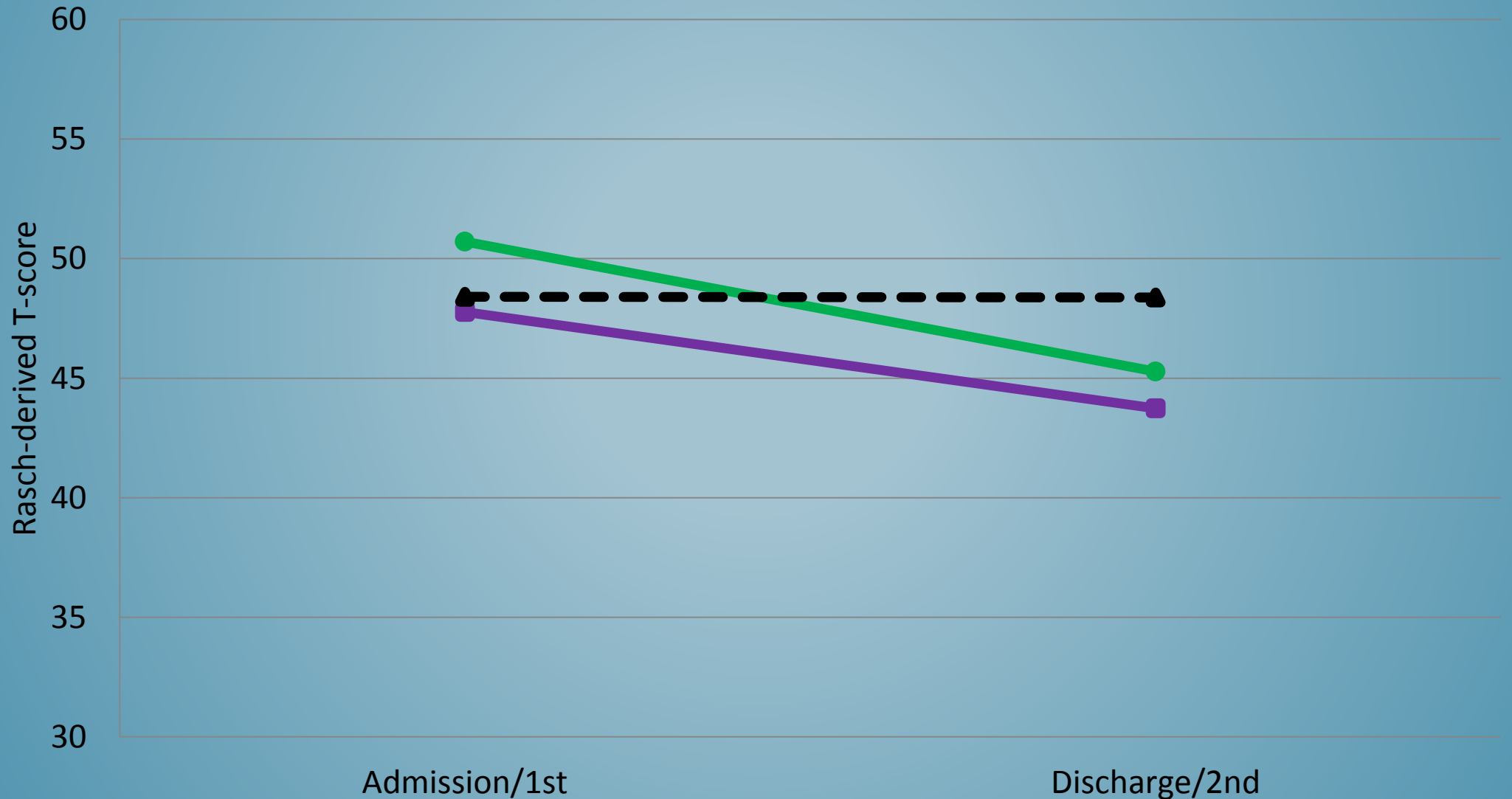


CHRONIC COHORT

Admission > 365 days post-injury

MPAI-4 Total Score by Program Type for Participants Admitted > 1 Year Post-injury

Intensive Residential Intensive Community Supported Living



PROGRAMMATIC DIFFERENCES IN OUTCOME EXPECTATIONS

- *Stability = Goal of Residential and Supported Living Programs*
- *Progress = Goal of Intensive Programs*
- *Goals appropriately adjusted for chronicity and severity of disability*

TAKE HOME POINTS

- *The MPAI-4 and the Client Info System are based on state-of-the-art psychometric and database technologies*
- *Standardized assessment methods, such as these, support:*
 - *Rehabilitation program evaluation referencing national benchmarks*
 - *Rehabilitation program planning and monitoring in individual cases*
 - *Data for advocacy and policy development*

CASE 1: SHAREEN

- *29-year-old African-American woman*
- *MVA 3 ½ years ago*
- *In good health at time of the injury; no prior history of significant medical conditions, psychiatric or substance abuse disorders*
- *College graduate*
- *Communications specialist for a multinational corporation prior to injury*
- *Never married*
- *Mother is primary caregiver; mother divorce when Shareen was 5; no subsequent contact with father*

CASE 1: SHAREEN

- *Left lower extremity fracture*
- *Severe brain injury*
 - *Glasgow Coma Scale in ER = 6*
 - *Posttraumatic amnesia = approximately 2 months*
 - *Single seizure in ER; no subsequent seizure history*
 - *Initial CT scan: contusions and small hematomas in the frontal lobes bilaterally; no surgical intervention required*
 - *MRI two years after injury: bilateral encephalomalacia in the frontal lobes and temporal poles bilaterally*
- *Tegretol for irritability and aggression; minimally effective per mother*

MPAI-4 POSITIVE ITEMS & PLAN

Problem Area	Current Status	Intervention	Goal
Mobility	Mild problem but does <u>not</u> interfere with activities; uses assistive device		
Use of hands	Mild problem; interferes with activities 5-24% of the time		
Motor speech	Mild problem; interferes with activities 5-24% of the time		

Problem Area	Current Status	Intervention	Goal
Mobility	Mild problem but does <u>not</u> interfere with activities; uses assistive device	None	No further improvement expected
Use of hands	Mild problem; interferes with activities 5-24% of the time	None	No further improvement expected
Motor speech	Mild problem; interferes with activities 5-24% of the time	Individual Speech therapy	Mild problem but does <u>not</u> interfere with activities

Problem Area	Current Status	Intervention	Goal
Verbal communication (word finding)	Mild problem but does <u>not</u> interfere with activities; uses assistive device		
Nonverbal and pragmatic communication skills	Moderate problem; interferes with activities 25-75% of the time		
Fund of information	Mild problem but does <u>not</u> interfere with activities		

Problem Area	Current Status	Intervention	Goal
Verbal communication (word finding)	Mild problem but does <u>not</u> interfere with activities; uses assistive device	None	No further improvement expected
Nonverbal and pragmatic communication skills	Moderate problem; interferes with activities 25-75% of the time	Social-communication group	Mild problem; interferes with activities 5-24% of the time
Fund of information	Mild problem but does <u>not</u> interfere with activities	None	No further improvement expected

Problem Area	Current Status	Intervention	Goal
Novel problem-solving	Severe problem; interferes with activities more than 75% of the time		
Attention	Moderate problem; interferes with activities 25-75% of the time		
Memory	Moderate problem; interferes with activities 25-75% of the time		

Problem Area	Current Status	Intervention	Goal
Novel problem-solving	Severe problem; interferes with activities more than 75% of the time	Training in systematic problem-solving; Goal Management Training; Engagement in Goal Attainment Scaling (GAS) development process	Mild problem; interferes with activities 5-24% of the time; Develop GAS
Attention	Moderate problem; interferes with activities 25-75% of the time	Attention Process Training	Mild problem; interferes with activities 5-24% of the time
Memory	Moderate problem; interferes with activities 25-75% of the time	Memory notebook development and training	Mild problem; interferes with activities 5-24% of the time

GAS GOAL: PARTICIPANT ROUTINELY USES PROBLEM-SOLVING AND GOAL MANAGEMENT STRATEGIES TO SOLVE PROBLEMS IN EVERYDAY LIFE

Much better than expected: Participant learns and uses problem-solving and goal management strategies in addressing life problems almost all the time independently

Better than expected: Participant learns and uses problem-solving and goal management strategies in addressing life problems about 75% of the time independently

Expected Outcome: Participant learns and uses problem-solving and goal management strategies in addressing life problems 75% of the time with prompting

Less than expected: Participant has not learned and does not use problem-solving and goal management strategies

Much less than expected: Participant refuses to engage in systematic problem-solving

Problem Area	Current Status	Intervention	Goal
Social interaction	Moderate problem; interferes with activities 25-75% of the time		
Irritability	Moderate problem; interferes with activities 25-75% of the time		
Impaired self-awareness	Moderate problem; interferes with activities 25-75% of the time		

Problem Area	Current Status	Intervention	Goal
Social interaction	Moderate problem; interferes with activities 25-75% of the time	Social communication group	Mild problem but does <u>not</u> interfere with activities; Develop GAS
Irritability	Moderate problem; interferes with activities 25-75% of the time	Neuropsychiatric evaluation for pharmacologic treatment; Group and individual anger management training	Mild problem but does <u>not</u> interfere with activities; Monitor with Irritability scale of NPI
Impaired self-awareness	Moderate problem; interferes with activities 25-75% of the time	Patient/family education; Self-awareness intervention; Work trials	Mild problem; interferes with activities 5-24% of the time

Problem Area	Current Status	Intervention	Goal
Limited social contact	No or rare involvement with others (less than 25% of normal interaction for age)		
Limited leisure/recreational activities	No or rare participation (less than 25% of normal participation for age)		

Problem Area	Current Status	Intervention	Goal
Limited social contact	No or rare involvement with others (less than 25% of normal interaction for age)	Address emotional and social problems that are obstacles to new relationships; Social Communication Group	Mildly limited involvement with others (75-95% of normal interaction for age)
Limited leisure/ recreational activities	No or rare participation (less than 25% of normal participation for age)	Leisure Skills Group	Mildly limited participation (75-95% of normal participation for age)

Problem Area	Current Status	Intervention	Goal
Self-Cares: Needs occasional prompts from mother to complete	Mild problem but does <u>not</u> interfere with activities; dependent on mother for cuing		
Residence: Unable to live independently	Requires moderate assistance or supervision from others (25-75% of the time)		
Transportation: Unable to travel around town independently	Requires moderate assistance or supervision from others (25-75% of the time); cannot drive		

Problem Area	Current Status	Intervention	Goal
Self-Cares: Needs occasional prompts from mother to complete	Mild problem but does <u>not</u> interfere with activities; dependent on mother for cuing	Individual OT to develop self-cuing system	Normal functioning
Residence: Unable to live independently	Requires moderate assistance or supervision from others (25-75% of the time)	Address cognitive, emotional, and social issues and transition to group home situation	Requires a little assistance or supervision from others (5-24% of the time)
Transportation: Unable to travel around town independently	Requires moderate assistance or supervision from others (25-75% of the time); cannot drive	Training in limited use of public transportation	Requires a little assistance or supervision from others (5-24% of the time); cannot drive

Problem Area	Current Status	Intervention	Goal
Money Management	Requires a little help or supervision (5-24% of the time) with large finances; independent with small purchases		
Paid employment	Unemployed		

Problem Area	Current Status	Intervention	Goal
Money Management	Requires a little help or supervision (5-24% of the time) with large finances; independent with small purchases	Counseling with mother and daughter to develop long term plan for financial management support	No change in patient status expected; Goal is to develop more viable, long term, external support system for participant in managing her financial affairs
Paid employment	Unemployed	Individual vocational counseling; Resource facilitation; Work trials	Full-time or part-time with support; Develop GAS

Problem Area	Current Status	Intervention	Goal
Family relationships: Strained relationship with mother	Mild stress that interferes with family functioning 5-24% of the time		

Problem Area	Current Status	Intervention	Goal
Family relationships: Strained relationship with mother	Mild stress that interferes with family functioning 5-24% of the time	Counseling/behavioral rehearsal with mother and daughter; Training mother to prompt/reinforce daughter's anger management and improved social interaction; Transition to group home	Normal stress within family

KEY REFERENCES

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- Malec JF. The Mayo-Portland Participation Index (M2PI): A brief and psychometrically-sound measure of brain injury outcome. Arch Phys Med Rehabil 2004;85:1989-96.

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www.tbims.org/combi/mpai

www.clientinfo.inventivesoftware.net

GAS GOAL: PARTICIPANT IS IN PART-TIME PAID EMPLOYMENT WITH SUPPORT

Much better than expected: Participant works full-time for pay independently without support

Better than expected: Participant works part-time for pay independently without support

Expected Outcome: Participant works part-time for pay with intermittent support from work peers and vocational counselor

Worse than expected: Participant is unemployed but interested in employment

Much worse than expected: Participant is unemployed and not interested in employment