NEURO INSTITUTE

Continuing Education for Rehabilitation Professionals

The Art and Science of Neurorehabilitation: Converging Person Centered Care with Evidence Based Modeling

NeuroInstitute CE Learning Series

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National Clinical Outcomes

About the Speakers

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- NeuroInstitute Faculty
- Academic Affiliation: Medical College of Georgia Faculty.
- Research: Rehabilitation Outcomes; evidenced based modeling with active rehabilitation programs; Behavior methods.

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- NeuroInstitute Faculty
- Academic Affiliation: Florida State University, College of Medicine Faculty.
- Research: Rehabilitation Outcomes; evidenced based modeling with active rehabilitation programs; Traumatic brain injury.

Learning Objectives

1. Participants will learn person centered care principles.

2. Participants will learn about evidenced
   based modeling of rehabilitation.

3. Participants will learn about a pathway to care model.

Person Centered Care Concepts

Be yourself!

Person Centered Care

According to the *Health Innovation Network South London*…

"Person-centered care is a way of thinking and doing things that sees the people using health and social services as equal partners in…

- Planning
- Developing
- Monitoring care

…. to make sure it meets their needs.

Essentially, the care places participants and their families at the center of decisions, working alongside professionals to get the best outcome.

Person Centered Care

Person centered care also involves…

- Considering people's desires
- Values
- Family situations
- Social circumstances
- Lifestyles

It is seeing the person as an individual, and working together to develop appropriate solutions.

Professionals' attitudes and relationships are critical to care.

Person Centered Care

Prior methods attempted to "fit" participants into a program and then have measured outcomes that were determined by the team or professional(s).
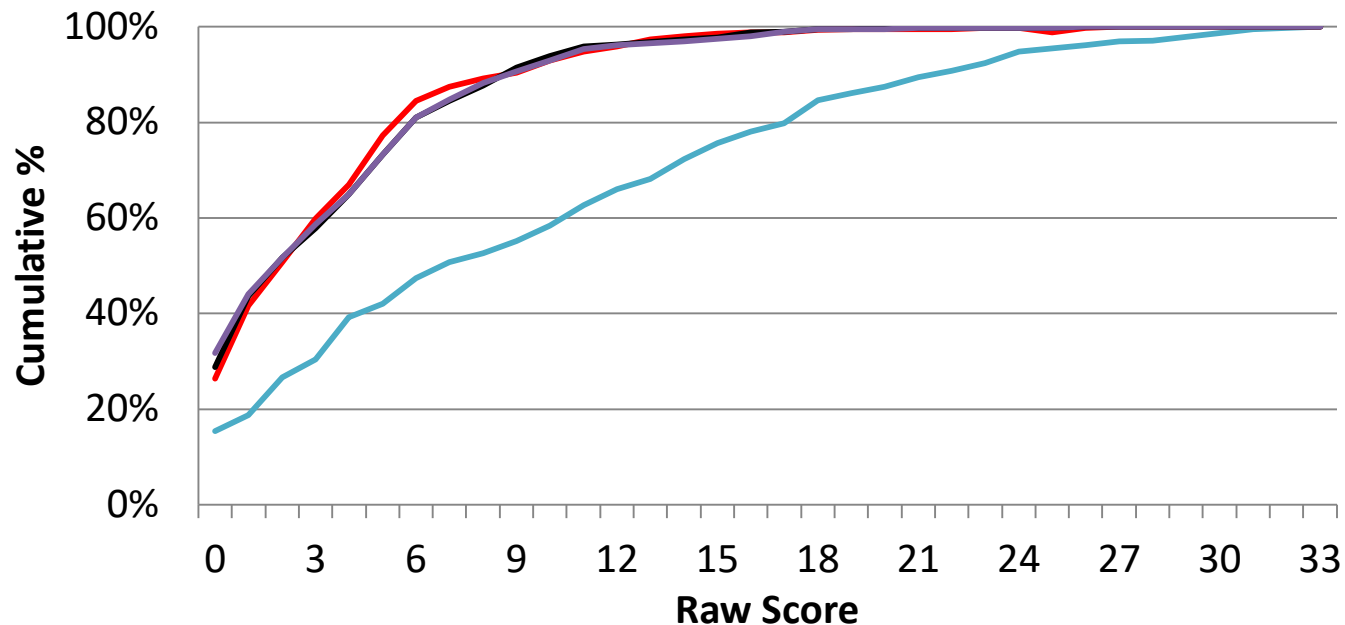
Person Centered Care

The former models included the concept of providing treatment "to" them.

Person centered is accomplishing goals "with" the person needing services. The newest model incorporates the concept of treatment with the individual and with an evidence-based process that is *flexible and adaptable.*

Evidenced-based Model of Rehabilitation

Use of outcome statistics to determine what and when.

Theory to Application

Rehabilitation Modeling:

Rasch Analysis for evidenced-based care in post-hospital neurological rehabilitation

Traditional Methods of Rehabilitation

A key element is the perspective of the "evidence".

Traditional methods show the following treatment method:

Patient -> Assess -> Plan -> Implement -> Examine, e.g., measure and analyze outcomes (better, worse, same). This method provides the potential for translational programming – IF, follow up research is performed.

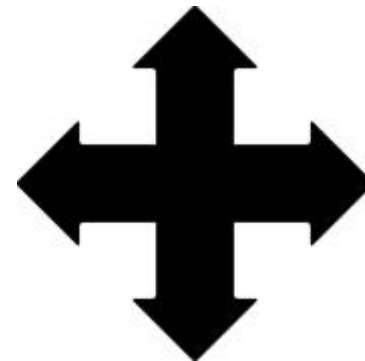- "Neurological rehabilitation is a doctor-supervised program designed for people with diseases, trauma, or disorders of the nervous system. Neurological rehabilitation can often improve function, reduce symptoms, and improve the well-being of the patient."

- The goal is a disease model of thinking, with outcome expectations showing a difference from the start of treatment to the end of treatment.

(Johns Hopkins Medicine, 2016)

Disruption…

The world-wide healthcare needs have changed.

If we consider the problem

from a different angle, then

maybe we will see things in a

way that leads to discovery.

Our changing healthcare industry requires "evidence" to measure and validate…

But mostly importantly… discovering things that work for reasons that may not always be apparent at first!

Rasch Review

Rasch analysis was conducted for purposes of determining reliability and construct validity of the MPAI-4 as a measure of disability following brain injury.

The model compares <u>expected</u> from the <u>actual</u> values of an item.

In other words…

Do the actual results conform to what would be expected from a reliable measure of the construct?

Rasch Review

More specifically, this analysis has been used to demonstrate two important concepts with measures such as the MPAI-4: item and person fit.

How items contributing to a measure represent the underlying construct (disability),

… and …

How well the items provide a range of indicators that reliably differentiate among people rated with the measure."

(Malec & Lezak, 2008)

Rasch Review

Brief Review... Infit and Outfit

Rasch Infit and Outfit statistics indicate each items unique contribution to the construct being measured (level of disability for individuals being evaluated in the post-hospital setting).

Infit values that are nearest to 1.0 indicate minimal distortion, and values between +0.5 and +1.5 are considered productive for measurement use (Linacre, 2002).

Rasch Review

Other key measures are Person and Item Reliability and Person and Item Separation.

Person **Reliability** indicates how well a measure's items distinguish among individuals (e.g. discriminate persons into levels or strata sufficient for the population of interest – example: 3 or 4 levels).

Item **Reliability** refers to whether test items relate to each other in a consistent way in describing a disparate group of individuals (e.g., easy to difficult items, wide difficulty range needed for high item reliability).

Rasch Review

***Person* Reliability**

A coefficient of **0.80** or greater is considered acceptable for Person Reliability.

***Item* Reliability**

A coefficient of at least **0.90** is optimal for Item Reliability.

(Bond & Fox, 2001).

Evidenced-based Rehabilitation

Additional Separation:

Person Separation – the extent to which items distinguish among people (distinguishing between high and low performers on items).

Item Separation – the extent to which items are distinct from each other (clear item hierarchy on difficulty)

A separation of at least 2 is desired.

(Malec, Kragness, Evans, Finlay, et al., 2003, p. 483).

Results of current study:

Person Reliability Coefficient: 0.90 (Separation = 2.94) - Acceptable

Item Reliability Coefficient: 1.00 (Separation = 25.44) - Acceptable

Pardon my Digression...

"Depression Following Traumatic Brain Injury: Impact on Post-Hospital Residential Rehabilitation Outcomes"

(Lewis & Horn, *NeuroRehabilitation -* In press 2017)

Rasch analysis was used to...

Determine the distinction between actual symptoms of depression and neurogenic impairments that mirror depressive symptoms but are not actually reflective of the patient's emotional state.

Pardon my Digression... Findings

ITEM	Admission MPAI-4		Discharge MPAI-4	
	Infit Value	Outfit Value	Infit Value	Outfit Value
Depression	1.08	1.17	1.11	1.13
Attention	.62	.63	.58	.57
Memory	.69	.69	.65	.69
Novel Problem	.65	.65	.56	.55
Anxiety	1.11	1.16	1.14	1.17
Fatigue	.86	.87	.89	.88
Initiation	.84	.81	.74	.72

Admission MPAI-4 Rasch Statistics
Person Separation: 2.73
Person Reliability: 0.88
Item Separation: 17.24
Item Reliability: 0.99

Discharge MPAI-4 Rasch Statistics
Person Separation: 3.72
Person Reliability: 0.93
Item Separation: 17.51
Item Reliability: 0.99

Back on Track… Current Study

Demographics

Age: Mean = 43.46 years (Range = 17 -89, SD = 14.5)

Biological Sex: 77% male/23% female

Chronicity Average = 37.8 months

(Range = 1 month – 772 months; SD = 82.85 months)

Average Length of Stay: Mean = 7.0 months

(Range = 1-103 months, SD = 10.65 months)

Diagnosis:

TBI = 71%

CVA = 12%

Anoxia = 6%

Tumor = 2%

Other neurological disease = 9%

Research Design

Design: Prospective analysis of admission scores when entering a post-hospital rehabilitation program.

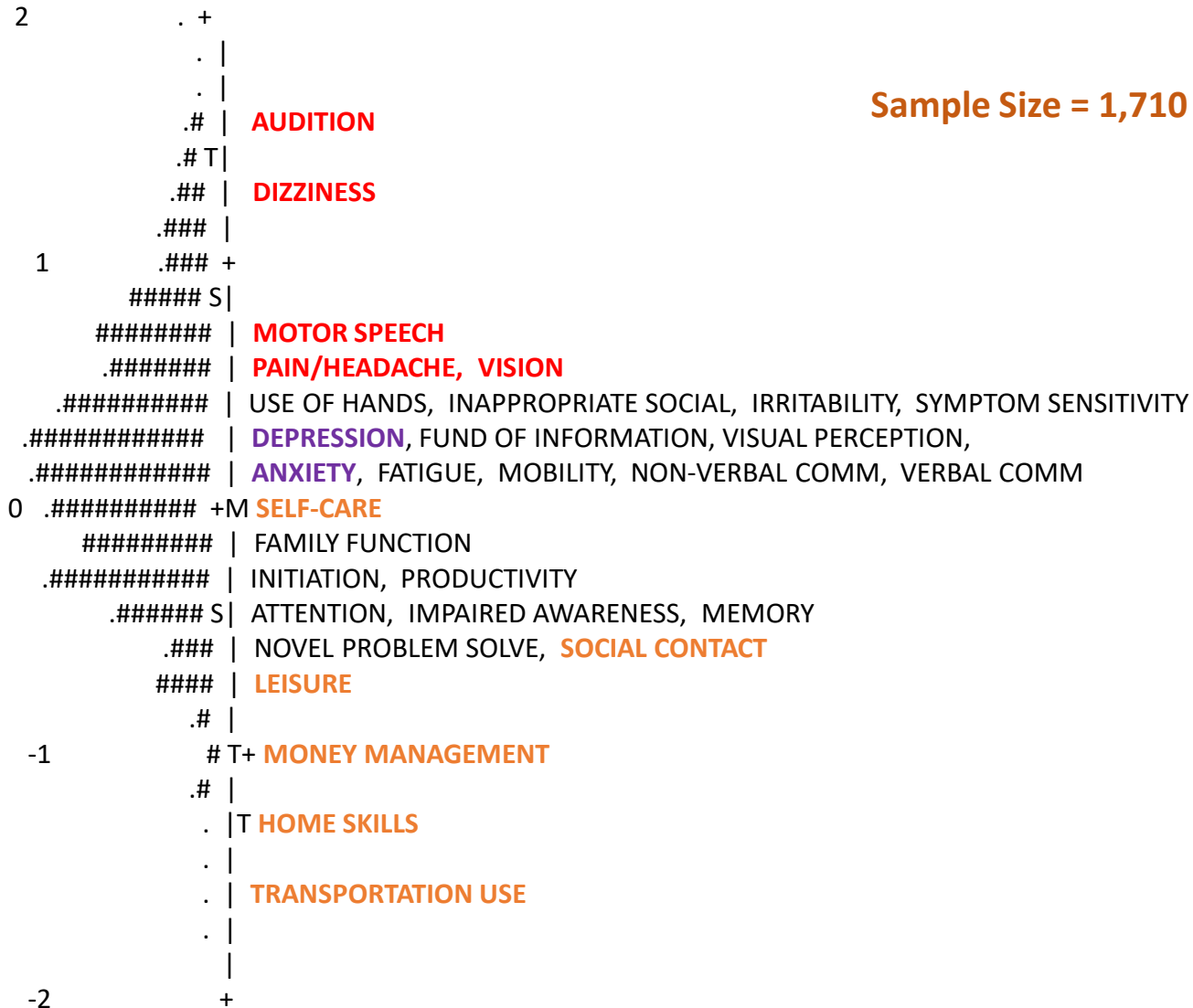**Setting:** 44 post-hospital inpatient rehabilitation facilities across 21 states in the US.

Interventions: Multidisciplinary treatment by physicians, nursing, PTs, OTs, SLPs, and Psychology with admission Mayo Portland Adaptability Inventory-4 measurement.

Main Outcome Measures: Mayo Portland Adaptability Inventory (MPAI-4). Analyses were conducted with WINSTEPS V.3.81 and other analyses were conducted with SPSS.V.22.

Results of Rasch

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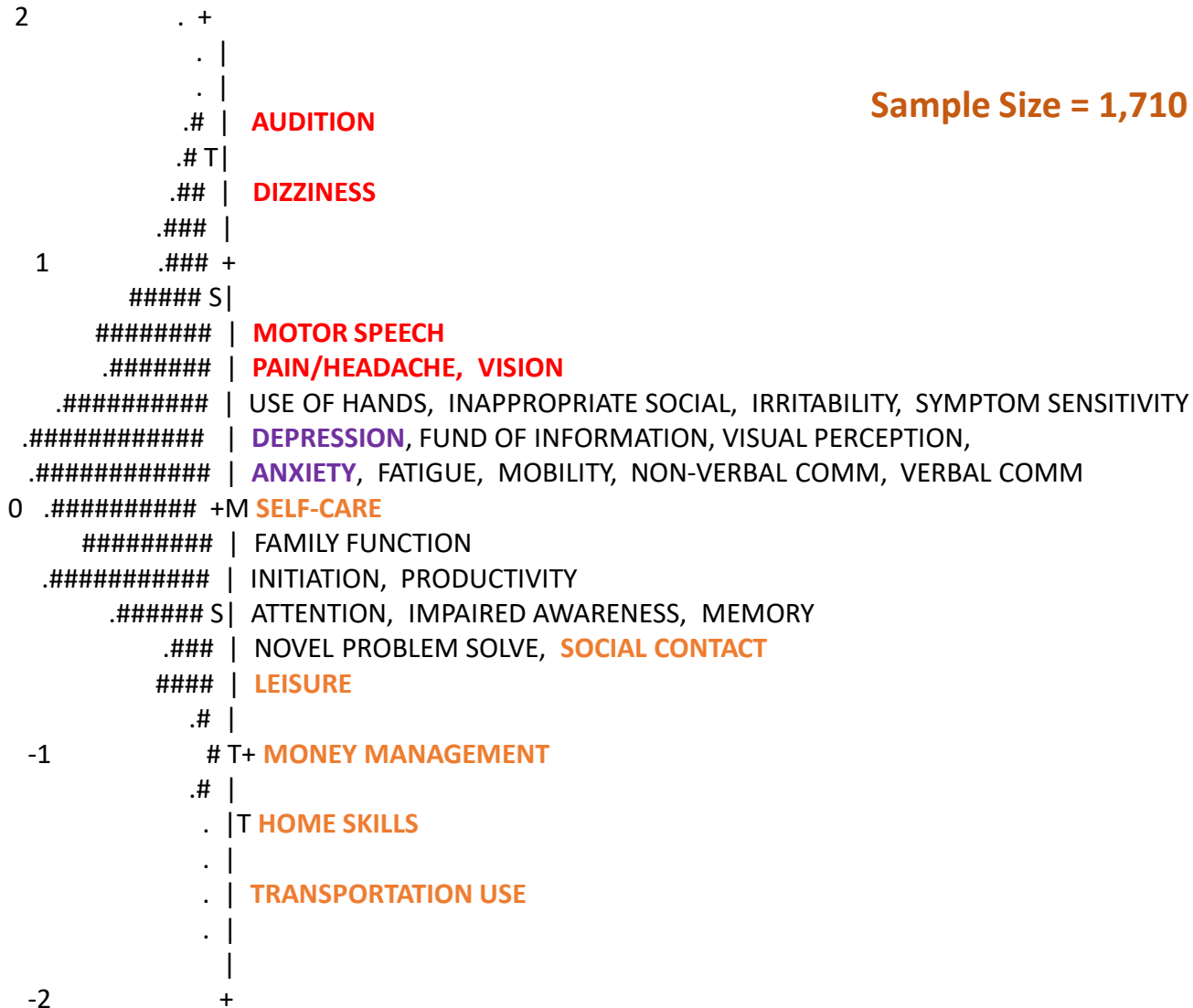
Sample Size = 1,710 persons

Results of Rasch

Results: The use of the MPAI-4 with the current sample **provided high person reliability (.90) and excellent item reliability (1.00)**. This sample provided similar statistical findings to the original work by Malec & Lezak (2008), but in a post-hospital residential sample providing additional evidence of core construct of outcome after acquired brain injury.

Translation: A **clinical model of care** was developed from this analysis to **prioritize** therapeutic interventions. The model produced provides a new approach to rehabilitation for those with acquired neurological impairments.

Results of Rasch

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Sample Size = 1,710 persons

New Evidenced Based Model

High Impact/Low Probability Barriers

Medium Impact / Medium Probability Barriers

Integrated Treatment – Remediation & Compensation

Skills Application Phase – I-ADLs

The model that was statistically derived provides a pathway of care.

Where the model incorporates person centered care is that each person enters the model at *different* levels. Also, specific participant goals are developed at each level for that individual to progress toward their outcome. The model provides a course of outcome that is *measurable and flexible* enough to adapt to the individual at all levels.

New Evidenced Based Model – Phase A

High Impact/Low Probability Barriers

Audition, Dizziness, Motor Speech, Pain/Headache, Vision, and Hands

In this first level of care, the focus is on symptom management with reduction. These symptoms are considered "high impact - low probability". This means that they are not likely to occur based on the model findings. However, when they are present, any of these symptoms are likely to create a significant functional impairment (e.g., disruption) causing greater dysfunction, and likely a longer length of stay than the overall impact of the injury alone.

In particular, the symptoms of Audition (hearing impairment) and Dizziness have the highest impact on rehabilitation outcomes.

New Evidenced Based Model – Phase A

High Impact/Low Probability Barriers

Audition, Dizziness, Motor Speech, Pain/Headache, Vision, and Hands

Therefore, the team that assesses the individual for rehabilitation goal setting would conclude that this is the first level of deficit to address.

By addressing these concerns (if they exist), then other concerns are secondary until either the dysfunction is remediated or compensatory strategy use is well underway.

Goal: Focus for ALL Therapies: remediate with compensatory strategy use until this level can reduce to a mild level of functional impact (e.g., <25% of the time the limitation is present).

New Evidenced Based Model – Phase B

Medium Impact / Medium Probability Barriers

Inappropriate Social Awareness, Irritability, and Sensitivity to Symptoms

In this second level, the focus is based on neurobehavioral concerns. Research by Lewis and Horn (2014) revealed that behavioral impairments have a substantial impact upon recovery. In fact, the impact can cause 2-3xs increased length of stay within a similar sample.

Further, a neurobehavioral profile was developed that significantly separated those with behavioral impairments from those with greater neurorehabilitation needs without significant behavioral disturbances.

New Evidenced Based Model – Phase B

Medium Impact / Medium Probability Barriers

Inappropriate Social Awareness, Irritability, and Sensitivity to Symptoms

By addressing these concerns as proactively as possible, then the largest level of care can remain on target for successful discharge.

Goal: Focus for ALL Therapies: remediate with compensatory strategy use until this level can reduce to a mild level of functional impact (e.g., <25% of the time the limitation is present).

New Evidenced Based Model – Phase C

Integrated treatment – Multifocal Remediation & Compensation

DEPRESSION, FUND OF INFORMATION, VISUAL PERCEPTION,
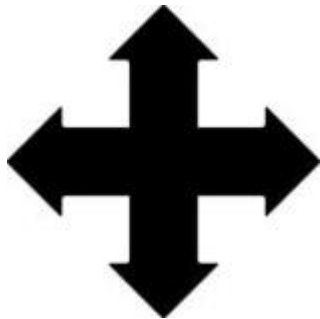*ANXIETY, FATIGUE, MOBILITY, NON-VERBAL COMM, VERBAL COMM*
SELF-CARE
FAMILY FUNCTION
INITIATION, PRODUCTIVITY
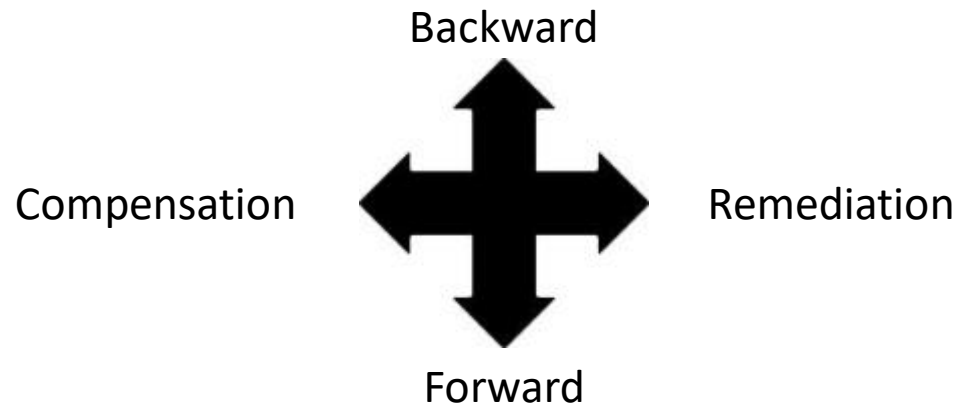*ATTENTION, IMPAIRED AWARENESS, MEMORY*
NOVEL PROBLEM SOLVE, SOCIAL CONTACT

These variables are goals that move toward improvement, rather than being seen as barriers to recovery. The only exceptions are depression and anxiety – both have been found to reduce the total gains made in treatment (Lewis & Horn, 2016).

New Evidenced Based Model – Phase C

Integrated treatment – Multifocal Remediation & Compensation

By addressing these concerns using the same methodology as noted in Phase A (e.g., treat in order of levels), then successful outcomes can be achieved. The goal is that multiple disciplines integrate the rehabilitation focus.

Backward

Compensation   Remediation

Forward

<u>**Goal:**</u> Focus for ALL Therapies: remediate with compensatory strategy use until this level can reduce to a mild level of functional impact (e.g., <25% of the time the limitation is present).

New Evidenced Based Model – Phase D

Skills Application Phase

Leisure, Money Management, Home Skills, and Transportation Use

This phase is based on the construct of Instrumental Activities of Daily Living.

These are the skills that tend to be resistant to change, which is one of the reasons why the prior levels must be either underway or achieved to make a significant change in this phase.

In addition, self-care and initiation, both factor into this phase of community success (Lewis & Horn, 2015).

Pathway to Care Model

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       .########## |   USE OF HANDS,  INAPPROPRIATE SOCIAL,  IRRITABILITY,  SYMPTOM SENSITIVITY
    .############# |   DEPRESSION, FUND OF INFORMATION, VISUAL PERCEPTION,
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   .########### |   INITIATION,  PRODUCTIVITY
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Sample Size = 1,710 persons

Discussion

Conclusions

The current results conclude that the MPAI-4 provides an excellent method of assessing disability in various neurological samples.

Aside from external validation for the original MPAI-4 Rasch Analysis (2008), this analysis also assisted in developing a pathway to care which focuses rehabilitation interventions.

The refinement of the approach may lead to improved outcomes and reduced length of stay at each level of care. Each level and phase of care can flexibly adapt by using remediation and compensatory strategy development as a person progresses in treatment. The goal is to have deficits continuously addressed until a deficit falls in the mild range of impairment or better.

References

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Questions

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