Assessing Potential for Work Among Individuals with Mild to Moderate Stroke

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Stroke & Work

• Mild to moderate stroke is increasing in adults < 65

• Assistance for this population is lacking
  – Rehabilitation services are rarely provided
  – Initially unaware of their deficits and affect on performance
  – No assessment of work performance for this population
  – Problems evident in those who do return to work

• Long-term unemployment and disability
  – Negative consequences on the person and family
  – Financially burdening the long-term disability system
Assessments of Work Performance

• Functional capacity evaluation (FCE)
  – Battery of standardized tests
  – Clients with musculoskeletal disorders
  – 4-hour long test administered by therapist

• Benefits of FCE
  – Client learns about impairments & abilities
  – Physician has knowledge to make decisions
  – May prevent injury, job loss, work disability
Specific Aims

• Develop a FCE to assess work performance of individuals with mild to moderate stroke using a battery of standardized measures of the person, occupation, and environment

• Determine the ability of this FCE to discriminate stroke survivors who successfully returned to work and those who failed their return to work attempt
Constructs for FCE

• Identify constructs in literature, frameworks, taxonomies

• Modified Delphi survey constructed
  – Constructs coded as Person, Environment, & Occupation
  – Importance rated on 7-point semantic differential scale

• 13 Subject Matter Experts (SME)
  – Faculty members with expertise in Person (cognition, language, and motor), Environment, and Occupation

• Identify top constructs
  – Calculated mean rating for each construct
  – Top quartile of constructs targeted for the battery
  – 53% person, 28% occupation, 19% environment
Assessments for FCE

• Select assessments that measure top-rated constructs
  – Appropriate for individuals with mild to moderate stroke
  – Available through public domain or at a minimal fee
  – Standardized administration/scoring, reliable & valid
  – Safely administered in a clinic setting
  – Screens functions important for work
  – Measures job-specific work performance
  – Registered OT can administer without special certification
  – Time to administer battery is 4 hours

• Crosswalk constructs to assessments to ensure complete

• Organize assessments into a battery driven by theory

• Present battery to SME for their feedback & suggestions
Person Constructs

- Structured Interview
- Health History
- Person Screening Measures

Filter Thru Job Requirements

Occupations & Environment

- WAI
- KT
- AWP
- WEIS
- EI

Determine RTW
SME Feedback

• Good mix of general and job-specific measures

• Ordering of assessments maintains safety during testing

• Measured all constructs important for work in effective manner
  – 100% of Environment & Occupation constructs, 83% of Person constructs
  – Job-specific testing will catch Person constructs not specifically tested
  – Some Person assessments may have a ceiling effect

• Feedback to target the Employer Interview developed for project

• Battery has potential to be a valid measure of work performance
Person Construct Measures

- Structured Interview – modified OPC
- Health History – Modified Cornell Index
- Person Screening Measures
  - Vital signs & Borg’s Perceived Exertion
  - Double Simultaneous Stimulation - sensory
  - Snellen / Lighthouse Visual Acuity
  - Montreal Cognitive Assessment (MOCA)
    - Visuospatial, executive function, naming, attention, language, short term memory, abstraction, orientation
    - Score of > 25 is considered normal
  - Multidimensional Fatigue Inventory (MFI)
    - Dimension: general, physical, mental, motivation, and activity
    - Higher scores indicate higher levels of fatigue
  - Berg Balance Scale (BBS)
    - General mobility and balance
    - >40 high fall risk, 21-40 medium fall risk, >20 low fall risk
  - Center for Epidemiological Studies Depression Scale (CES)
    - <15 normal, 15-21 moderate depression, >21 major depression
Job Performance Measure (JPM)

- Measure developed by the investigator
- Identifies essential tasks of job using O*NET
- Measures frequency of performance 1 to 7 scale
- Self-perceived rating of current ability to perform specific work tasks on 1 to 10 scale
- Administered prior to & after job-specific testing
- Currently used in practice and research
- Sensitive to change in work performance
Filter Thru Job Requirements

Person Constructs
- Structured Interview
- Health History
- Person Screening Measures

Occupations & Environment
- WAI
- KT
- WEIS
- EI

Determine RTW
Work Ability Index (WAI)

- Self-report measure of work performance used in health assessments, workplace surveys, and outcome research

- Considers physical and mental demands of work and worker’s health status and resource
  - Number of diagnosed health conditions
  - Amount of sick leave during past year
  - Estimation of work impairment
  - Work ability compared to job & lifetime best
  - Prognosis of work ability 2 years from now
  - Mental resources

- Identify supports needed and can predict threat of work disability
  - 2-22 = poor work ability, 23-31 = moderate, 32-38 = good, 39-45 = excellent
Kettle Test (KT)

- Structured observation of IADL task performance
- Incorporates novel problem solving
- Taps broad range of cognitive skills within a functional context
- Performance rated for 13 discrete steps of task on a 5-point scale
- Clear cueing guidelines described
- Higher score means more assistance & problems (scores inverted for graphs)
- Observe interaction & physical skills
Assessment of Work Performance (AWP)

- Measures simulated job task performance
- Person measures screen substrate constructs to ensure safety
- JPM targets tasks, client and evaluator jointly choose tasks
- Evaluator involved in testing through role play
- Skill performance rated for 14 items
  - Motor skills
    - posture, mobility, coordination, strength, physical energy
  - Process skills
    - mental energy, knowledge, adaptation, organization of space/objects/time
  - Communication & Interaction skills
    - physicality, language, relations, information exchange
- Ratings: Incomplete, Limited, Unsure, Competent (Percentage of competence rating computed)
- Therapist’s overall rating of task competence
Work Environment Impact Scale (WEIS)

• A semi-structured interview of the client’s perception of how well 17 characteristics of the physical, social, temporal, and supervisory work environments support work performance, satisfaction and well-being

• The evaluator rates the level of support or interference on the individual’s ability to return to work after illness
  – 4= strongly supports, 3=supports, 2=interferes, 1= strongly interferes
Employer Interview

• Telephone interview to confirm job tasks & understand prior job performance
  – Physical and mental job demands, work procedures and rules, and productivity and time demands
  – Uses rating scale similar to the Work Ability Index

• Explores employer’s prior experience and perceived willingness to modify physical work environment, work schedule, work duties, and acquire equipment

• Deferred during pilot testing for temporal reasons
Piloting the Battery

- 5 healthy working aged young adults paid $25
- Explore feasibility of the battery
  - Environmental set-up
  - Safety concerns
  - Consistency of administration
  - Explore validity in this population
  - Time of administration
  - Practice scoring and interpreting results
- Observations logged by Research Assistant
- Participants administered post-test interview
  - PEO, job demands, performance, real-world
Pilot Results

• All subjects’ scores on all measures were WNL
• Mean time to complete FCE = 2.5 hours
• Safety was maintained at all times
• Test measured demands & skills needed for job
  – Fatigue experience of work shift not simulated
  – Environment simulated, but not like work environment
• Varying levels of comfort with role play
• Recommendations identified
  – Reformat self-report surveys to improve readability
  – Organization of testing materials into a manual
  – Perform at least 1 hour of job-simulated testing (AWP
Inclusion Criteria

- Participants in the Stroke Clinical Core of the Cognitive Rehabilitation Research Group
- 6-18 months post stroke
- Experienced a mild to moderate stroke
  - Admission score of 0-15 on NIHSS
- Traditional working age
  - 18 to 65 years old
- Held a full-time job for at least 1 year prior to stroke
- Attempted to return to work in the past year
  - Goal was 10 people working and 10 people not working
- Able to participate in physical capacities testing
Exclusion criteria

• Previous history or current co-morbid mental health or neurological disorders

• Severe aphasia, dysarthria or neglect, score ≥ 2 on NIHSS neglect & language items

• Physician’s restrictions on physical activities due to medical condition

• Non-fluent in English
Work Success

• Work at least 3 months after RTW

• Challenges due to the operational definition
  – Time cut-point
  – Economy
  – Work performance issues
Testing Individuals with Stroke

• Tested 17 subjects
  – 1 moderate stroke & 16 mild strokes (NIHSS)
  – 10 males & 7 females
  – Mean age 53 years (s.d. 8.91 range 32-62 years)
  – Mean time since stroke 1 year
  – 7 working & 10 not working previous job
  – Mean time with employer 13 years (range 0.25 to 40 years)
  – Mean FCE time 3.75 hours (s.d. 29 min., range 170-285 min.)

• Reliability of assessments close to reported ranges
• Internal consistency: Cronbach’s alpha .499 (MOCA) to .849 (CES)
• Evaluator blinded of work status
Cognitive Load

- Mean O*NET Importance ratings for 10 cognitive abilities
- Cut into high and low cognitive load groups at the mean

<table>
<thead>
<tr>
<th>High Load</th>
<th>Low Load</th>
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<tbody>
<tr>
<td>78.9  Chief Executive Officer</td>
<td>51.6  Sales Associate</td>
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<tr>
<td>77.5  Lawyer</td>
<td>51.6  Gift Shop Clerk</td>
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<td>71.0  Office Manager</td>
<td>50.7  Driver</td>
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<td>65.8  Sous Chef</td>
<td>49.1  Security Officer</td>
</tr>
<tr>
<td>64.9  Public Health Educator</td>
<td>49.1  Security Officer</td>
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<tr>
<td>62.8  Infrastructure Data Network Installer</td>
<td>48.9  Airport Laborer</td>
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<td>60.4  Child Care Worker</td>
<td>43.0  Dry-Cleaner Worker</td>
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<td>59.3  Home Care Provider</td>
<td>42.3  Deli Clerk</td>
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<tr>
<td>59.3  Patient Placement Asst.</td>
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</table>
Cognition – MOCA

Green – succeeded initial RTW attempt
Red – failed initial RTW attempt
Depression - CESD

- Green – succeeded initial RTW attempt
- Red – failed initial RTW attempt
Fatigue - MFI

Green – succeeded initial RTW attempt
Red – failed initial RTW attempt
Work Ability - WAI

Green – succeeded initial RTW attempt
Red – failed initial RTW attempt
Assessment of Work Performance- AWP

Green – succeeded initial RTW attempt
Red – failed initial RTW attempt
Comparing between groups

<table>
<thead>
<tr>
<th>Category</th>
<th>Measure</th>
<th>Mean Working</th>
<th>Mean Not Working</th>
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<tbody>
<tr>
<td>PERSON</td>
<td>Age</td>
<td>50.80</td>
<td>55.43</td>
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<td>Cognition – MOCA</td>
<td>26.10</td>
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<td>Fatigue – MFI</td>
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<td>Balance – BBS</td>
<td>55.60</td>
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<td>OCCUPATION</td>
<td>IADL Performance – KT</td>
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<td>Work Ability – WAI</td>
<td>32.15</td>
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<td>Performance – JPM*</td>
<td>9.36</td>
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<td>Simulated Work – AWP*</td>
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<td>ENVIRONMENT</td>
<td>Job Cognitive Load</td>
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<td>Work Environment – WEIS</td>
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<td>Time with Employer</td>
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* p ≤ 0.05  Mann-Whitney U
Job Performance Measure

- Administered prior to performance testing and after performance testing
- Compared pre-post results and between those working and not working
  - 9 same rating, 2 lower ratings, 1 higher rating

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<tr>
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<th>Mean Score Working</th>
<th>Mean Score Not Working</th>
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<tr>
<td>JPM pre</td>
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<td>8.23</td>
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<tr>
<td>JPM post</td>
<td>9.14</td>
<td>6.90</td>
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</table>
57 yo Chief Executive Office – working
32 yo Sales Associate – not working (RTW, laid off)
54 yo Security Guard/Information Technology not working
## Correlations between Assessments

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>MOCA</th>
<th>MFI</th>
<th>BBS</th>
<th>CES</th>
<th>WAI</th>
<th>JPM</th>
<th>WEIS</th>
<th>KT</th>
<th>AWP</th>
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<td>.714**</td>
<td>-.660**</td>
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</table>

*p < 0.05  
**p < 0.001  
Spearman’s rho
Conclusions

• Constructs reflect priorities and are measured by FCE
• Standardizes assessments showed expected reliability
• Performance testing integral to FCE
  – Job simulation easily set up with few supplies needed
  – Role playing was easy for most participants
  – Participants learned about abilities, especially non-working
• JPM is sensitive to change, good potential as a measure
• Time to administer FCE is reasonable
• Potential to predict return-to-work success in nonworking
• Poor economic conditions may have confounded results
• Small sample size and temporality limit our conclusions
Future Direction

• Explore overlap and gaps in the assessments
• Explore generating overall score for battery
• Standardize the Job Performance Measure
• Pilot test the Employer Interview
• Perform prospective testing in larger sample