

Assessing Potential for Work Among Individuals with Mild to Moderate Stroke

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SCHOOL OF MEDICINE

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

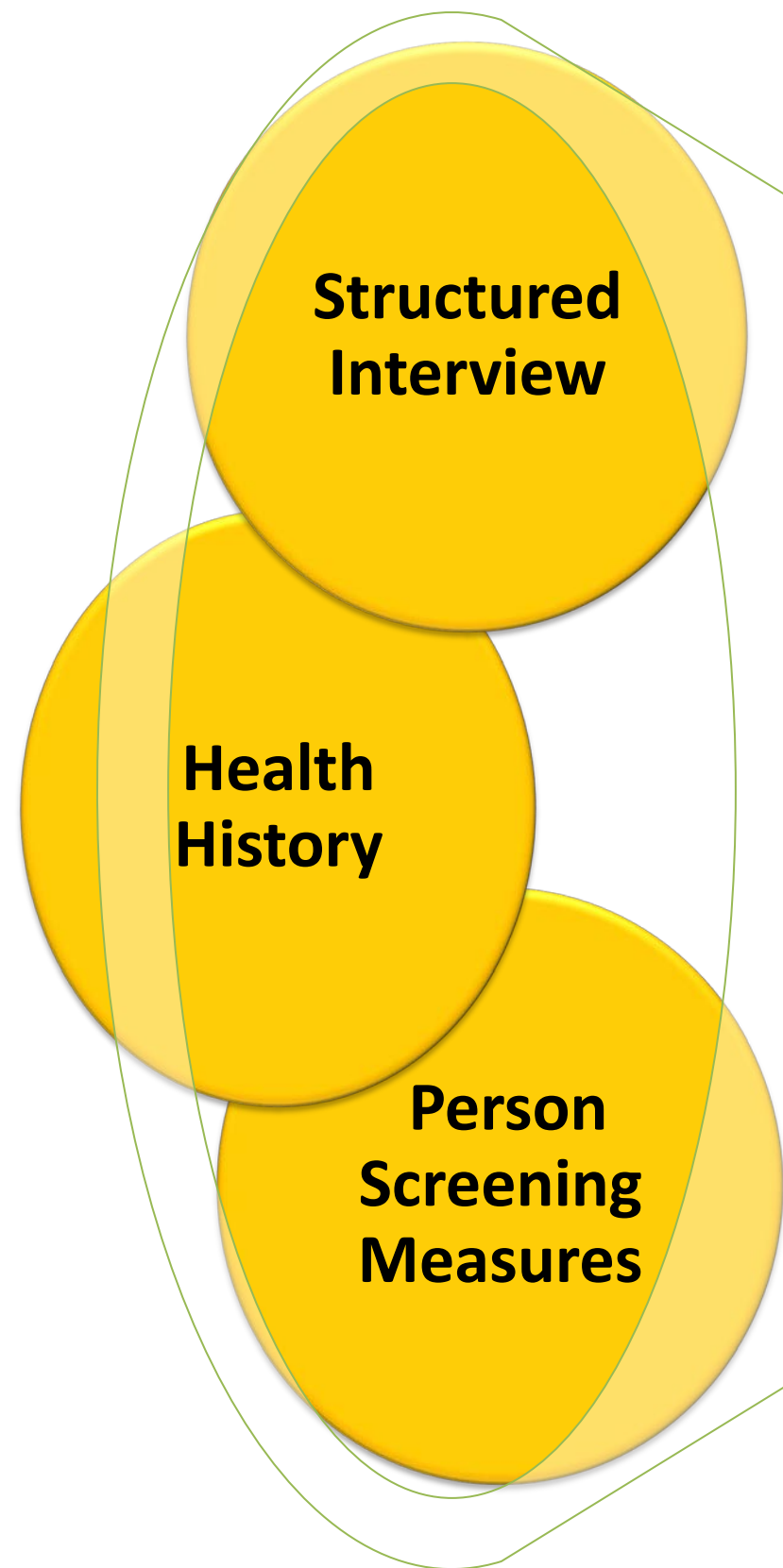
Constructs for FCE

- 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

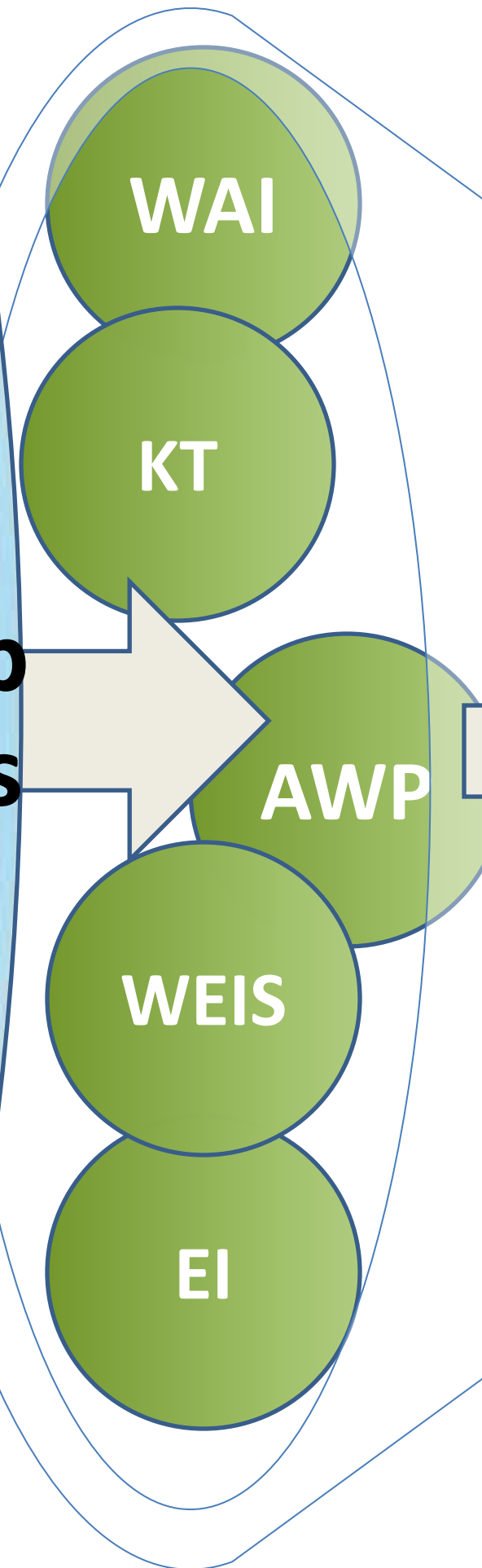
- Select assessments that measure top-rated constructs
 - Appropriate for individuals with mild to moderate stroke
 - Available through public domain or at a minimal fee
 - Standardized administration/scoring, reliable & valid
 - Safely administered in a clinic setting
 - Screens functions important 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



Occupations & Environment

**Filter Thru Job
Requirements**



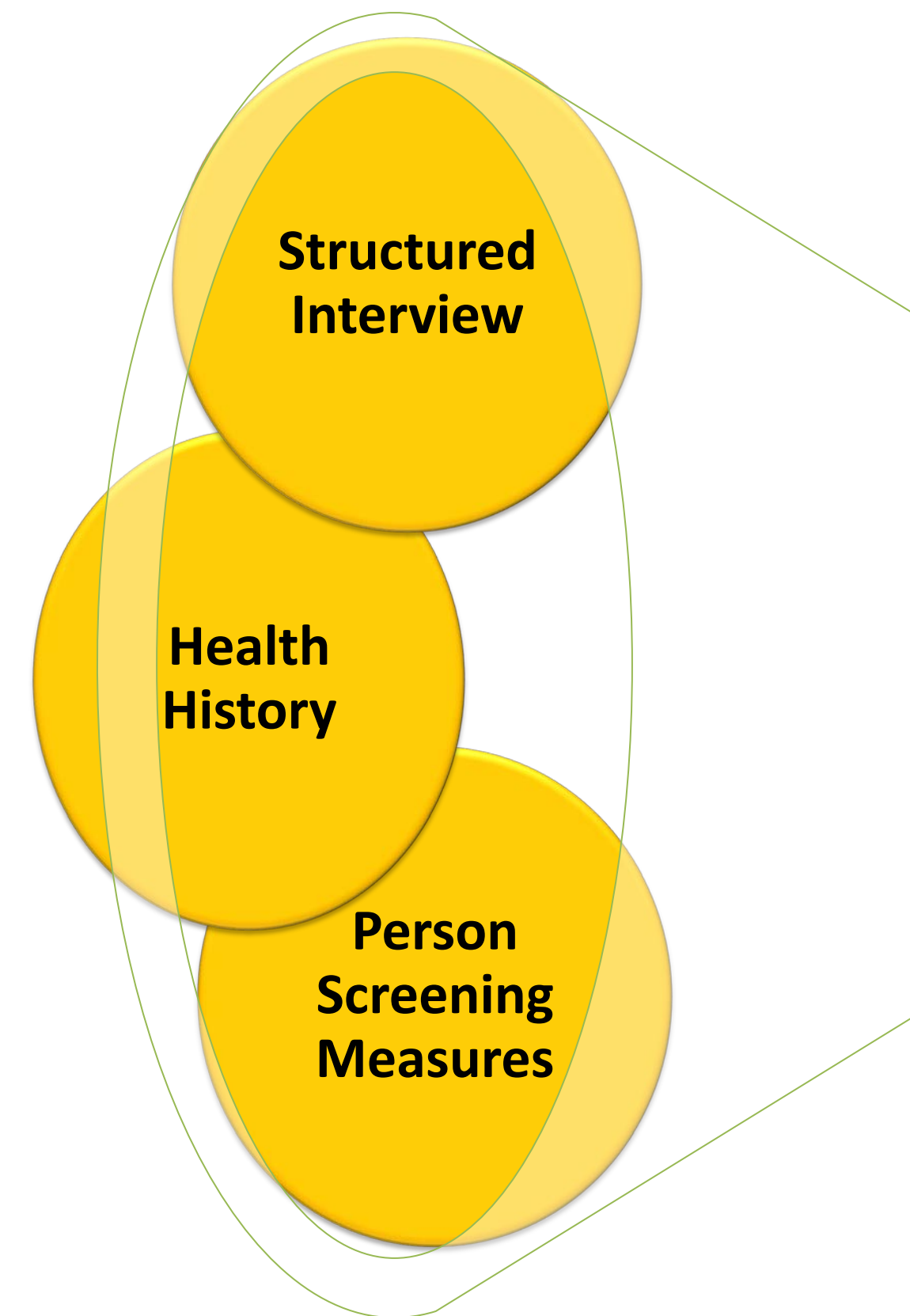
**Determine
RTW**

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



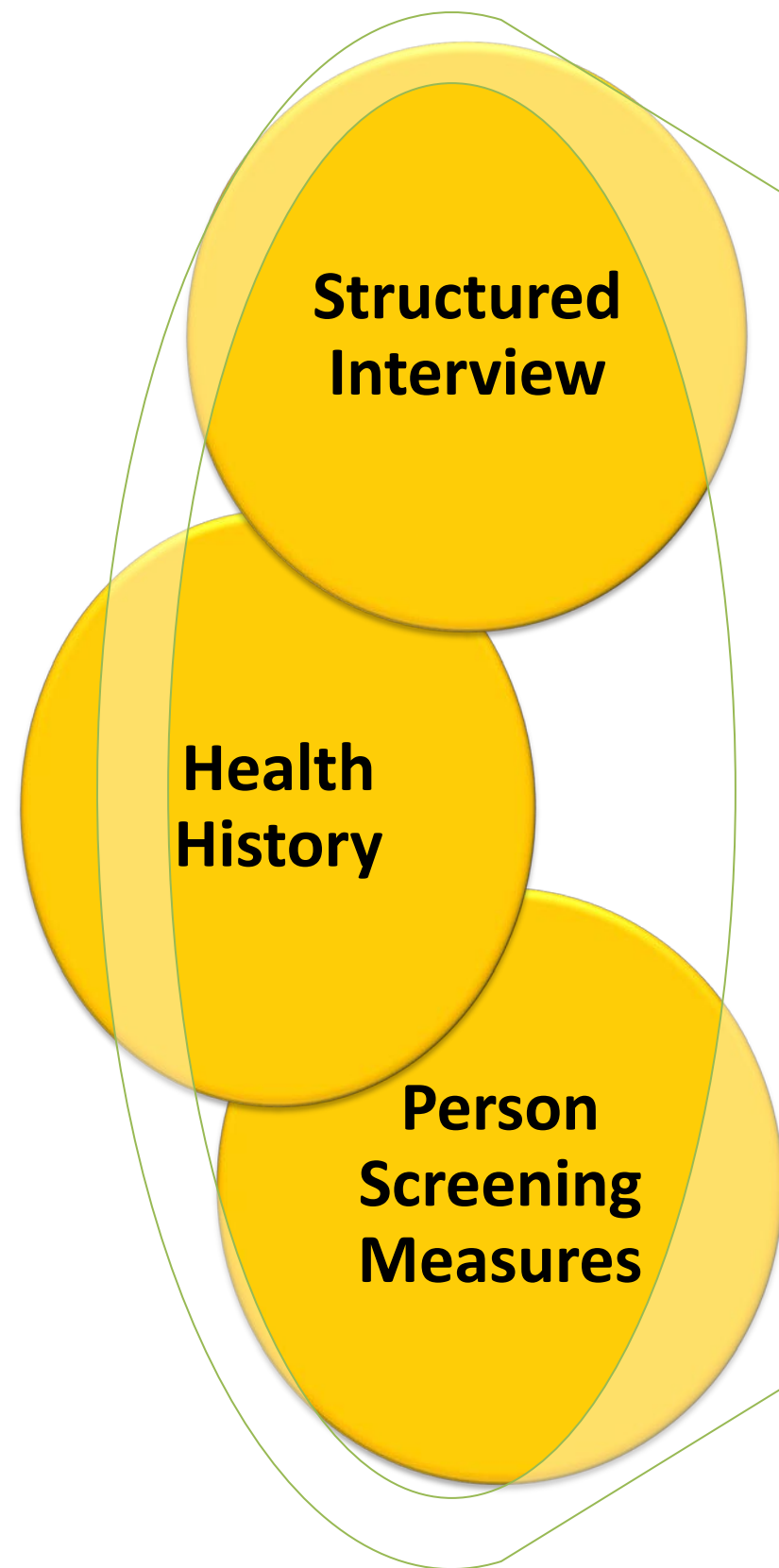
Job Performance Measure (JPM)

- 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



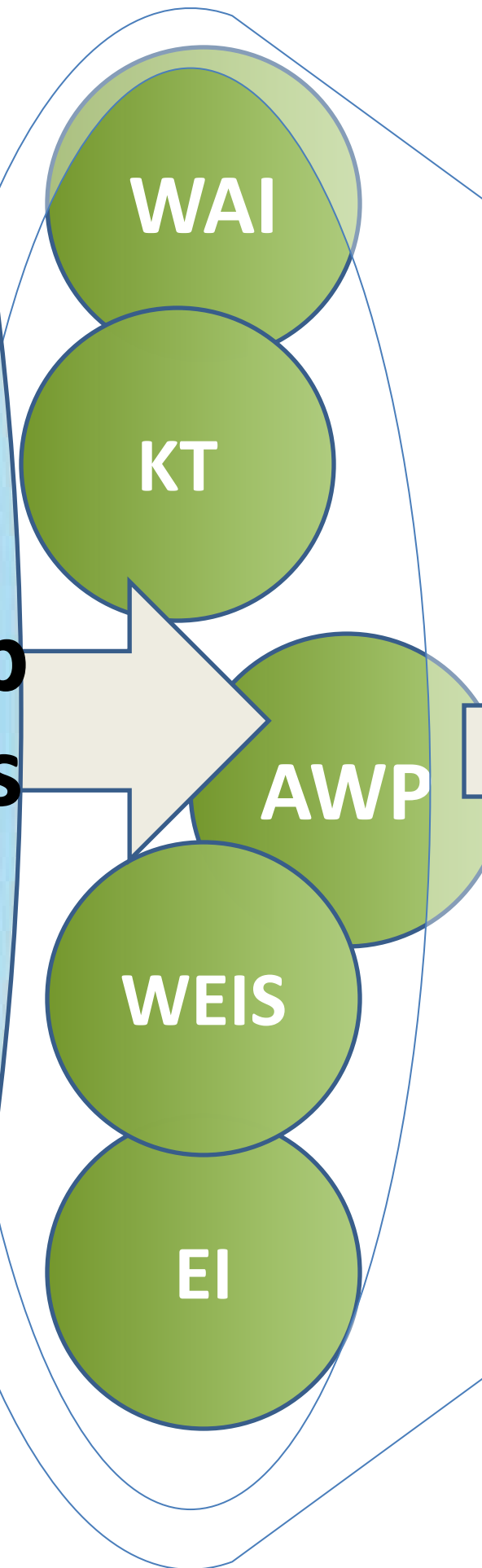
Filter
Thru
Job
Require-
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Person Constructs



Occupations & Environment

**Filter Thru Job
Requirements**



**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

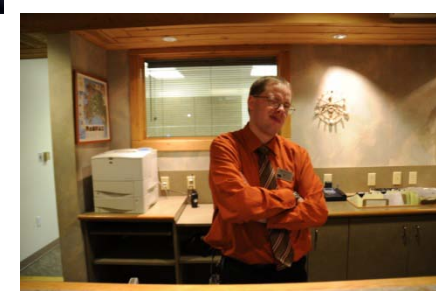
- Previous history or current co-morbid mental health or neurological disorders
- Severe aphasia, dysarthria or neglect, score ≥ 2 on NIHSS neglect & language items
- Physician's restrictions on physical activities due to medical condition
- Non-fluent in English

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

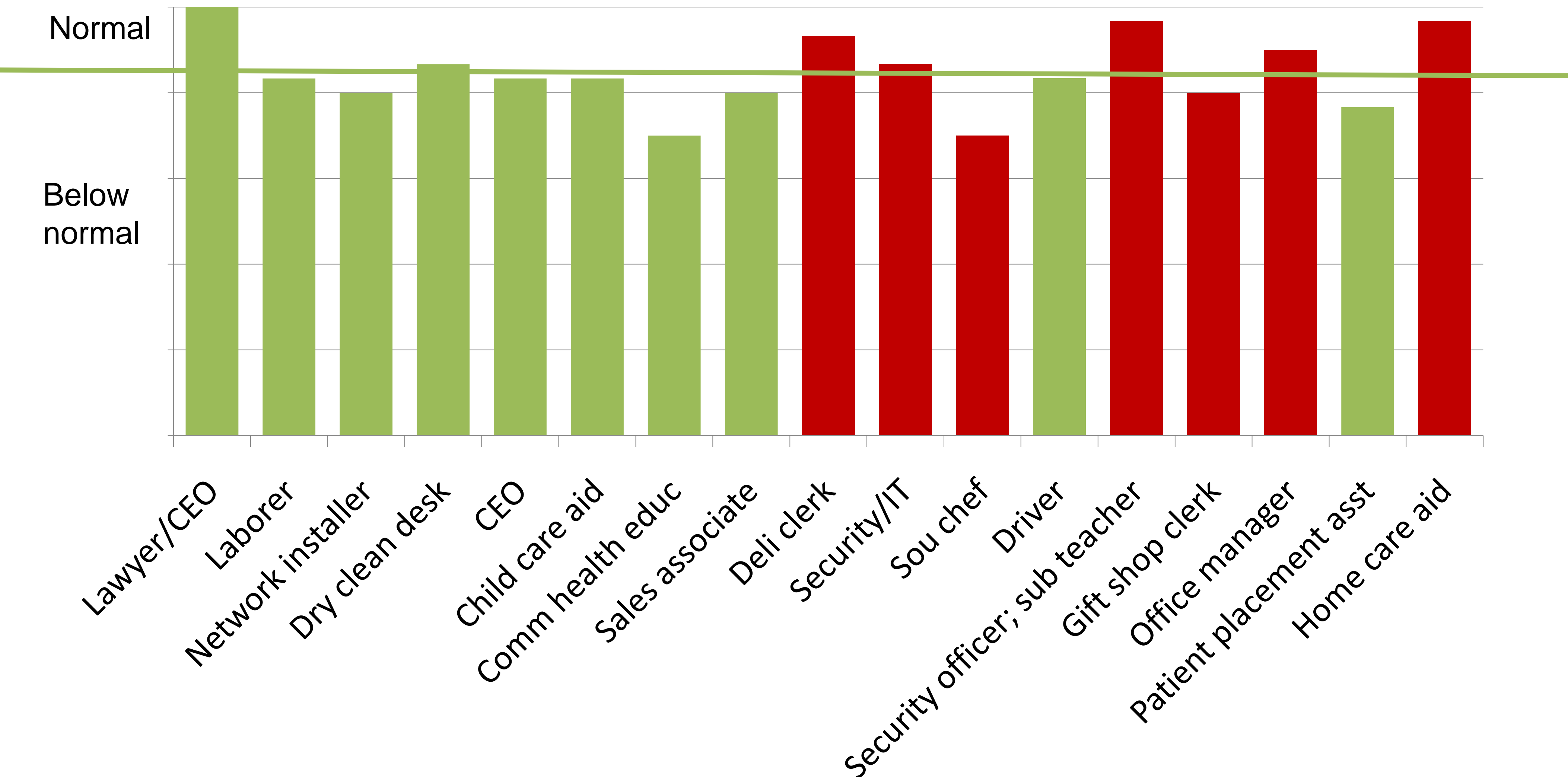


Cognitive Load

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

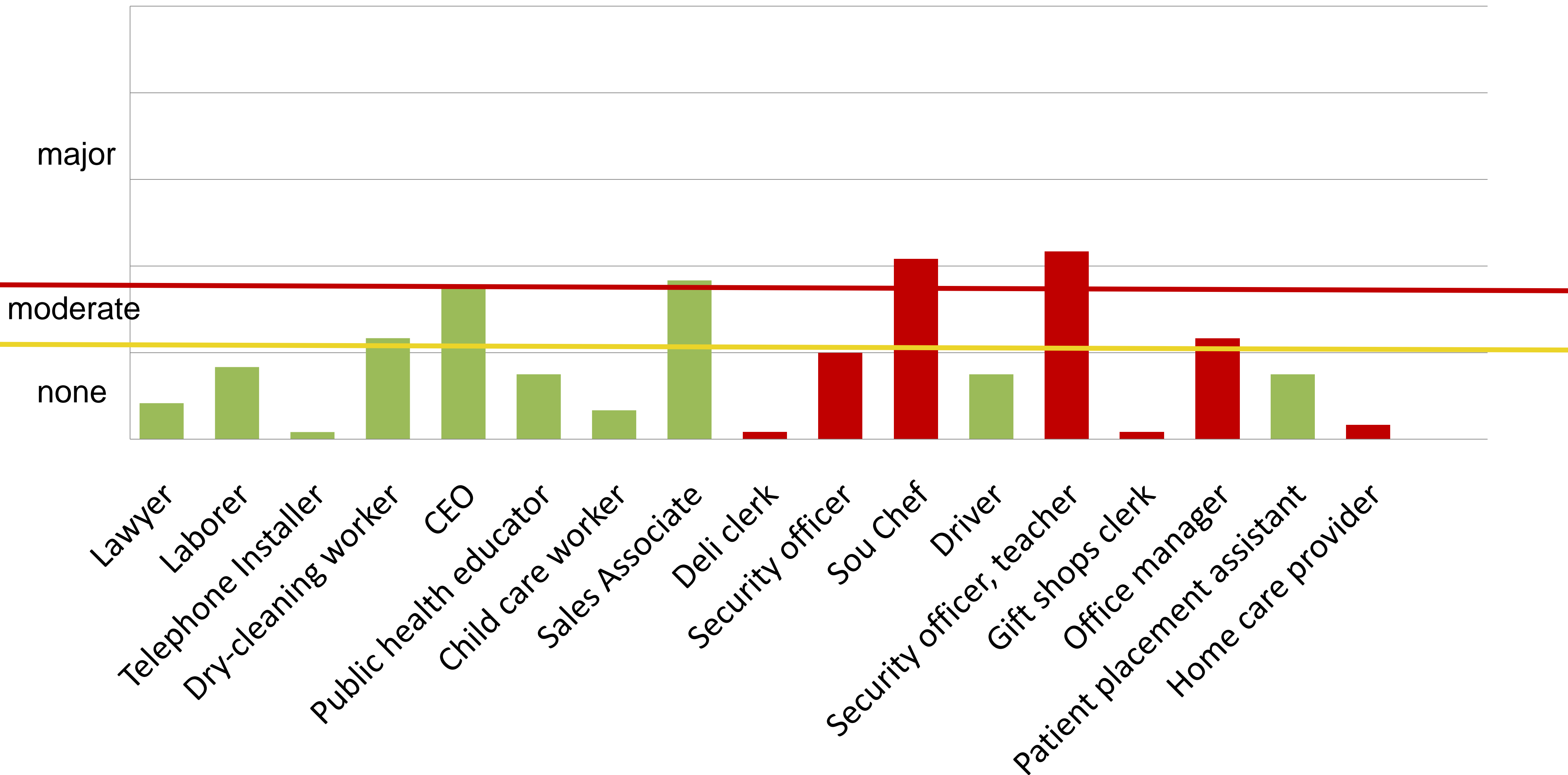
High Load		Low Load	
78.9	Chief Executive Officer	51.6	Sales Associate
77.5	Lawyer	51.6	Gift Shop Clerk
71.0	Office Manager	50.7	Driver
65.8	Sous Chef	49.1	Security Officer
64.9	Public Health Educator	49.1	Security Officer
62.8	Infrastructure Data Network Installer	48.9	Airport Laborer
60.4	Child Care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

Cognition – MOCA



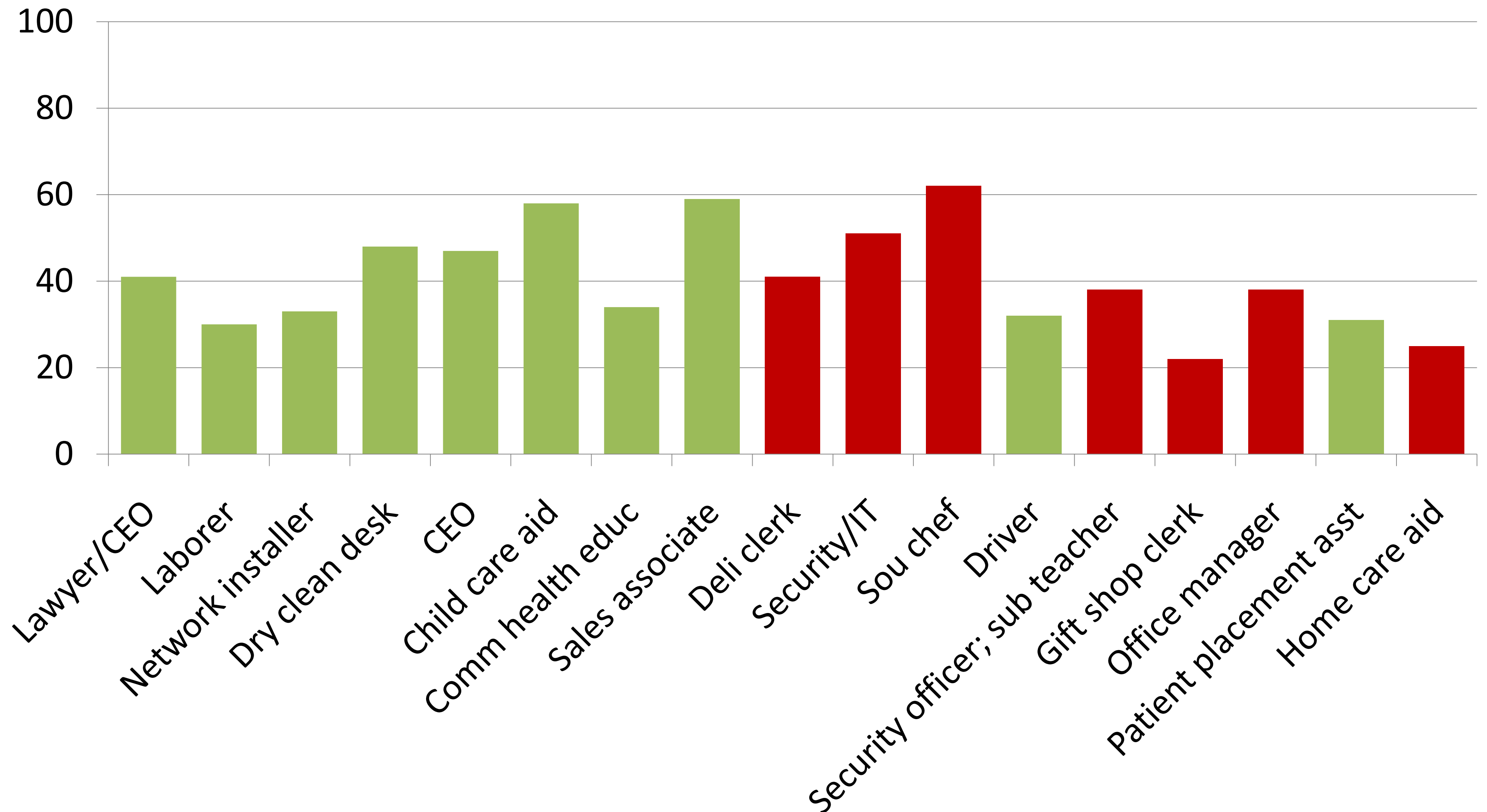
Green – succeeded initial RTW attempt
Red – failed initial RTW attempt

Depression - CESD



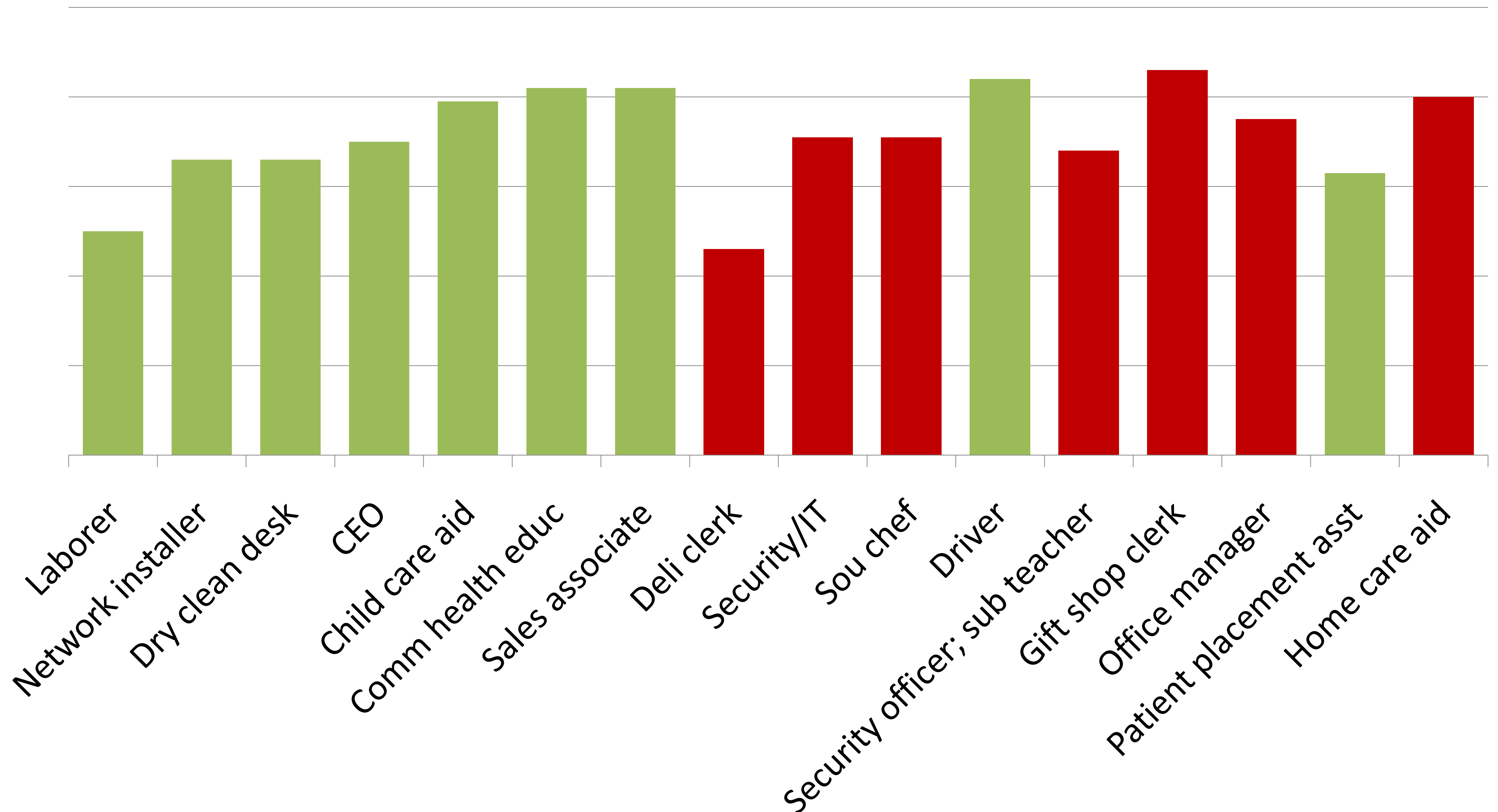
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Fatigue- MFI



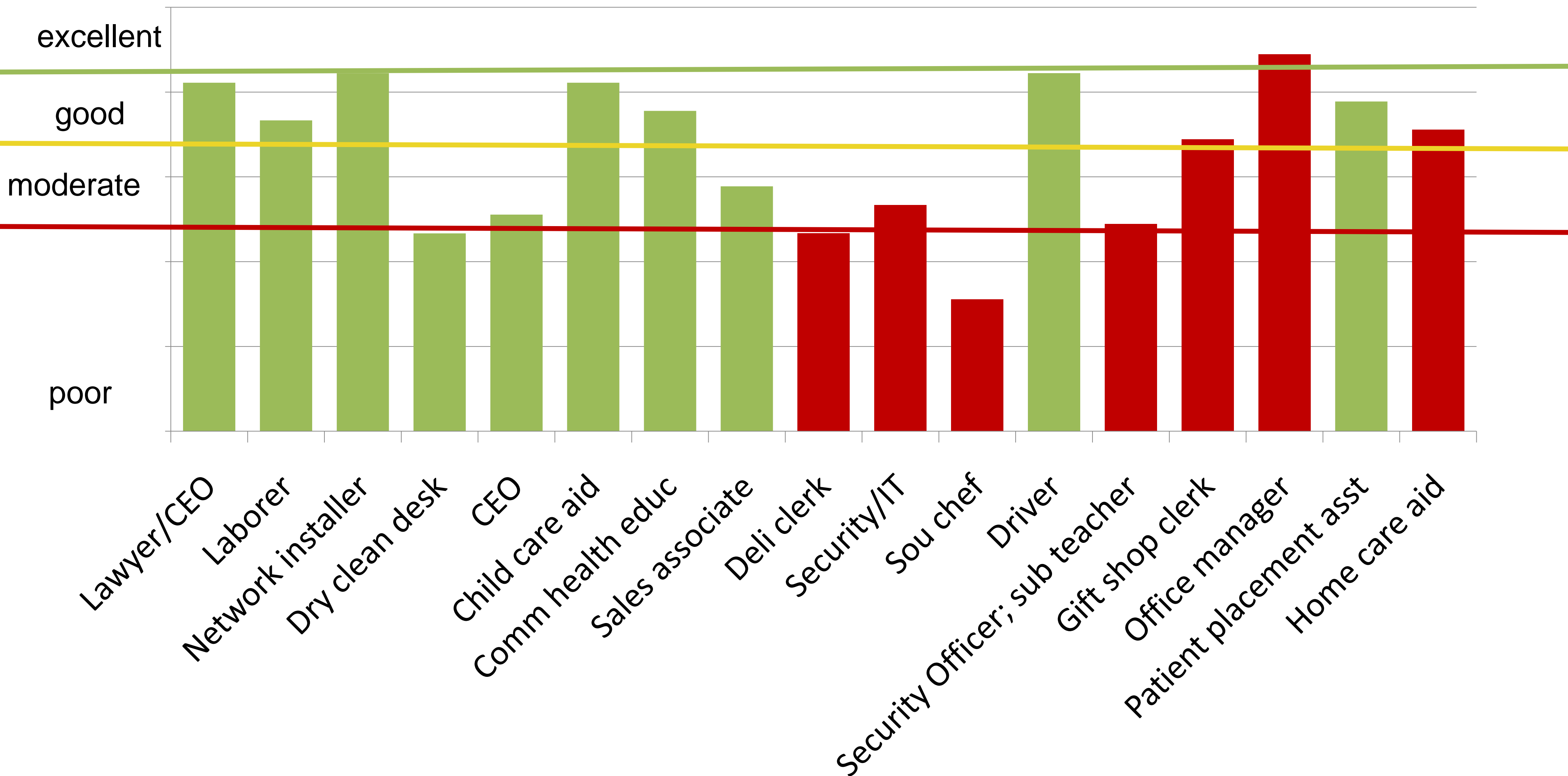
Green – succeeded initial RTW attempt
Red – failed initial RTW attempt

Work Environment - WEIS



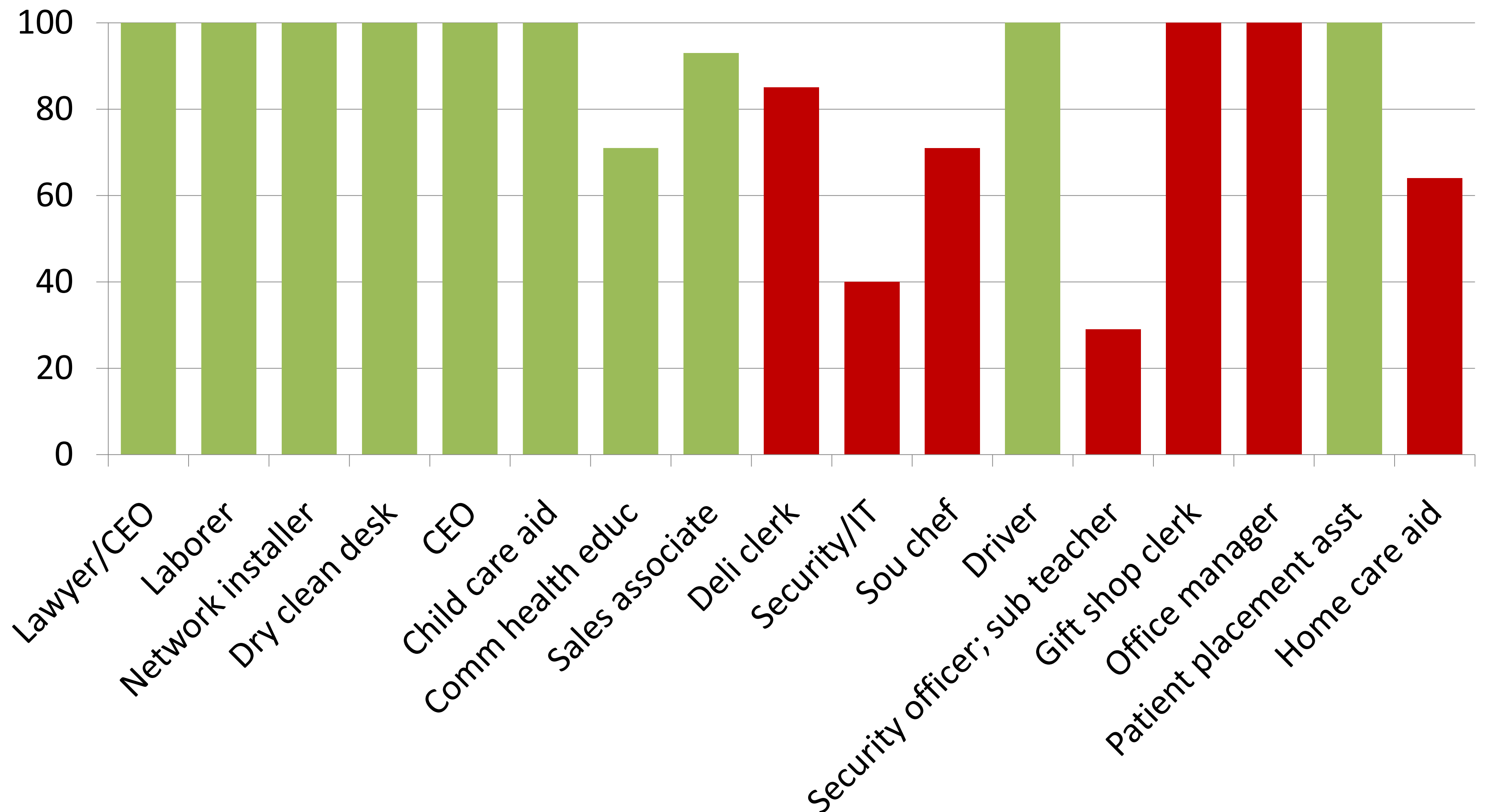
Green – succeeded initial RTW attempt
Red – failed initial RTW attempt

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

		Mean Working	Mean Not Working
PERSON	Age	50.80	55.43
	Cognition – MOCA	26.10	23.71
	Fatigue – MFI	41.30	39.57
	Balance – BBS	55.60	52.43
	Depression – CES	10.30	11.57
OCCUPATION	IADL Performance – KT	96.90	90.14
	Work Ability – WAI	32.15	26.29
	Performance – JPM*	9.36	7.59
	Simulated Work – AWP*	96.40	69.86
ENVIRONMENT	Job Cognitive Load	59.80	55.46
	Work Environment – WEIS	78.20	72.00
	Time with Employer	11.95	15.46

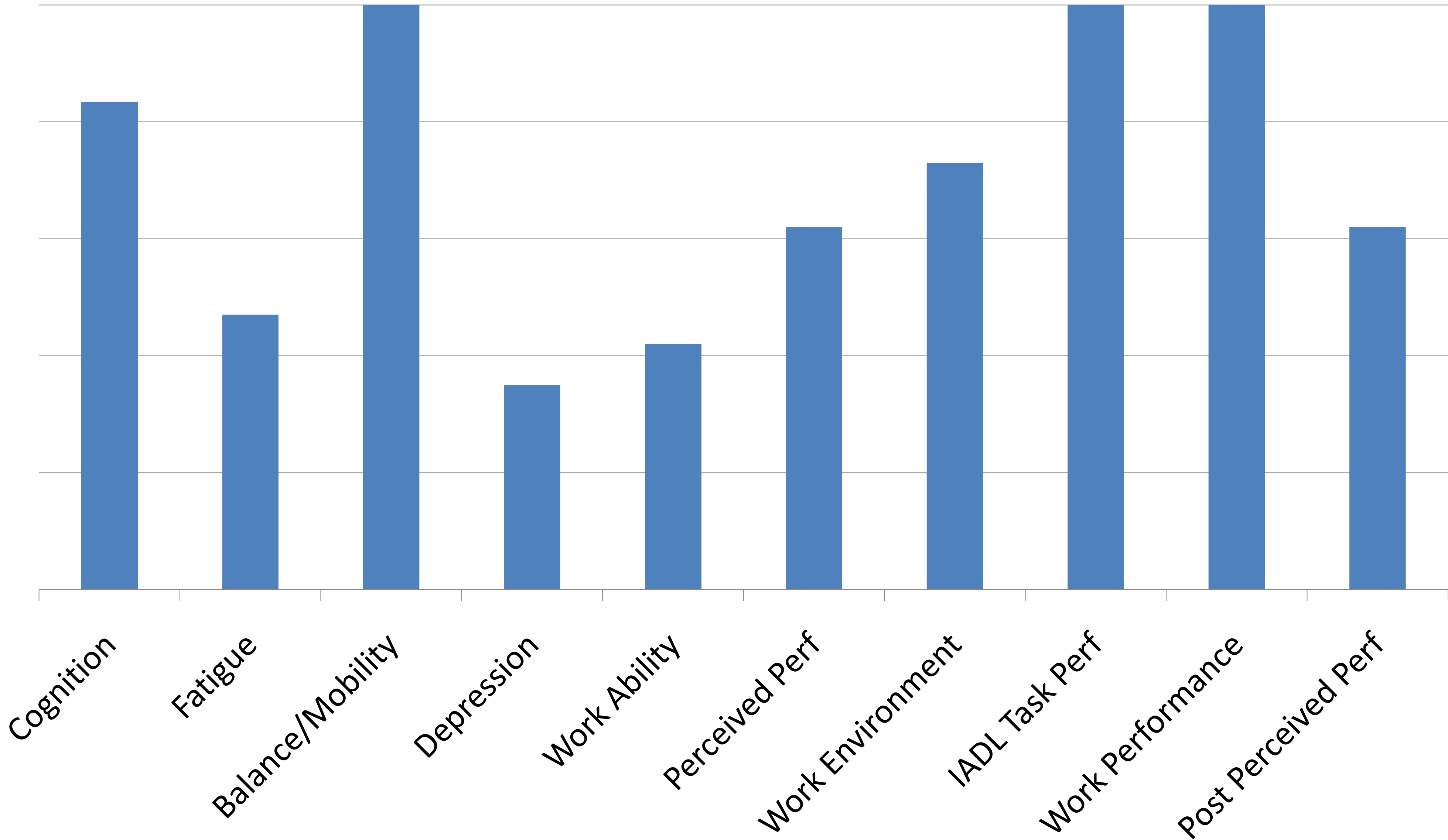
* $p \leq 0.05$ Mann-Whitney U

Job Performance Measure

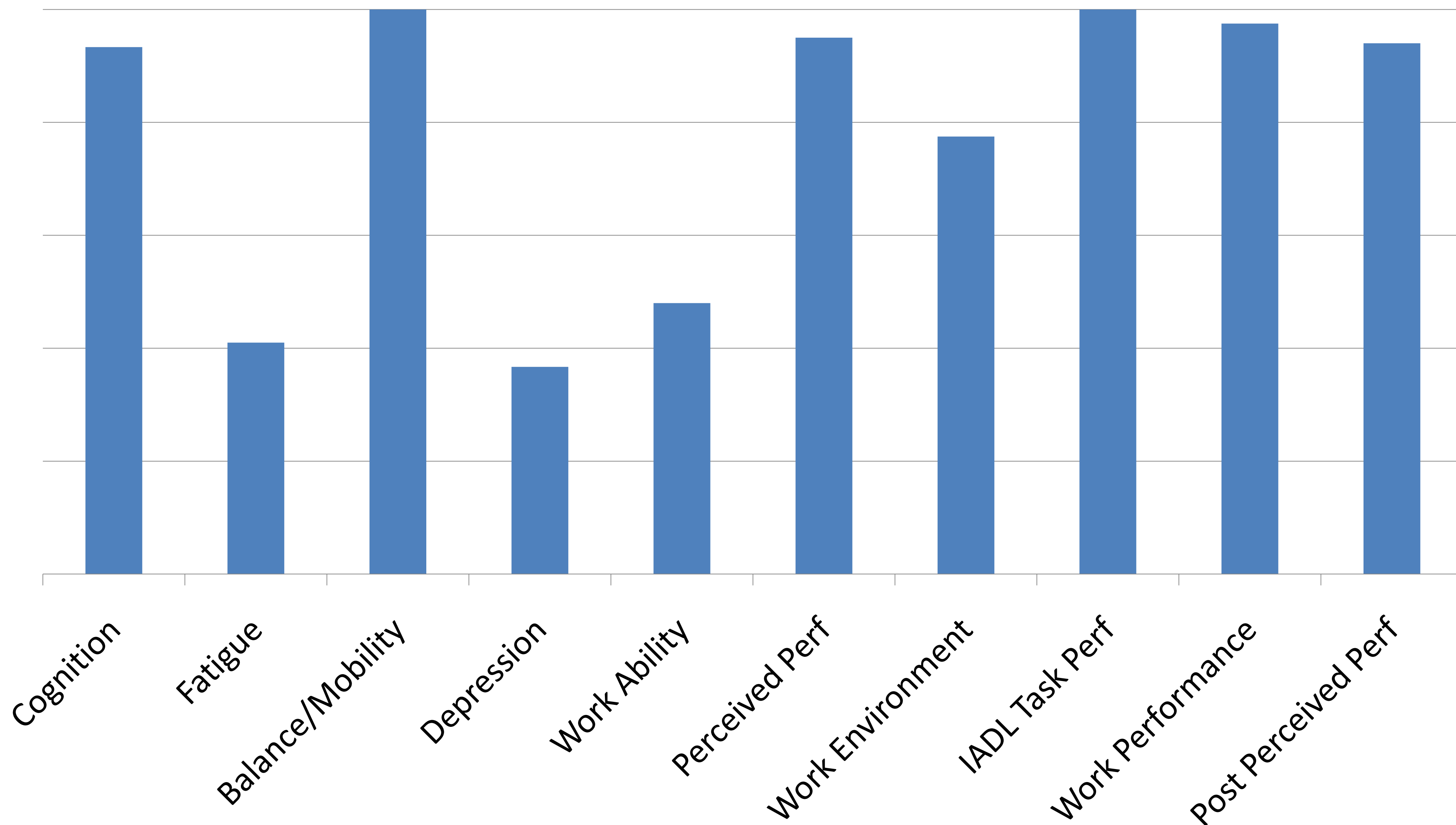
- Administered prior to performance testing and after performance testing
- Compared pre-post results and between those working and not working
 - 9 same rating, 2 lower ratings, 1 higher rating

	Mean Score Working	Mean Score Not Working
JPM pre	9.12	8.23
JPM post	9.14	6.90

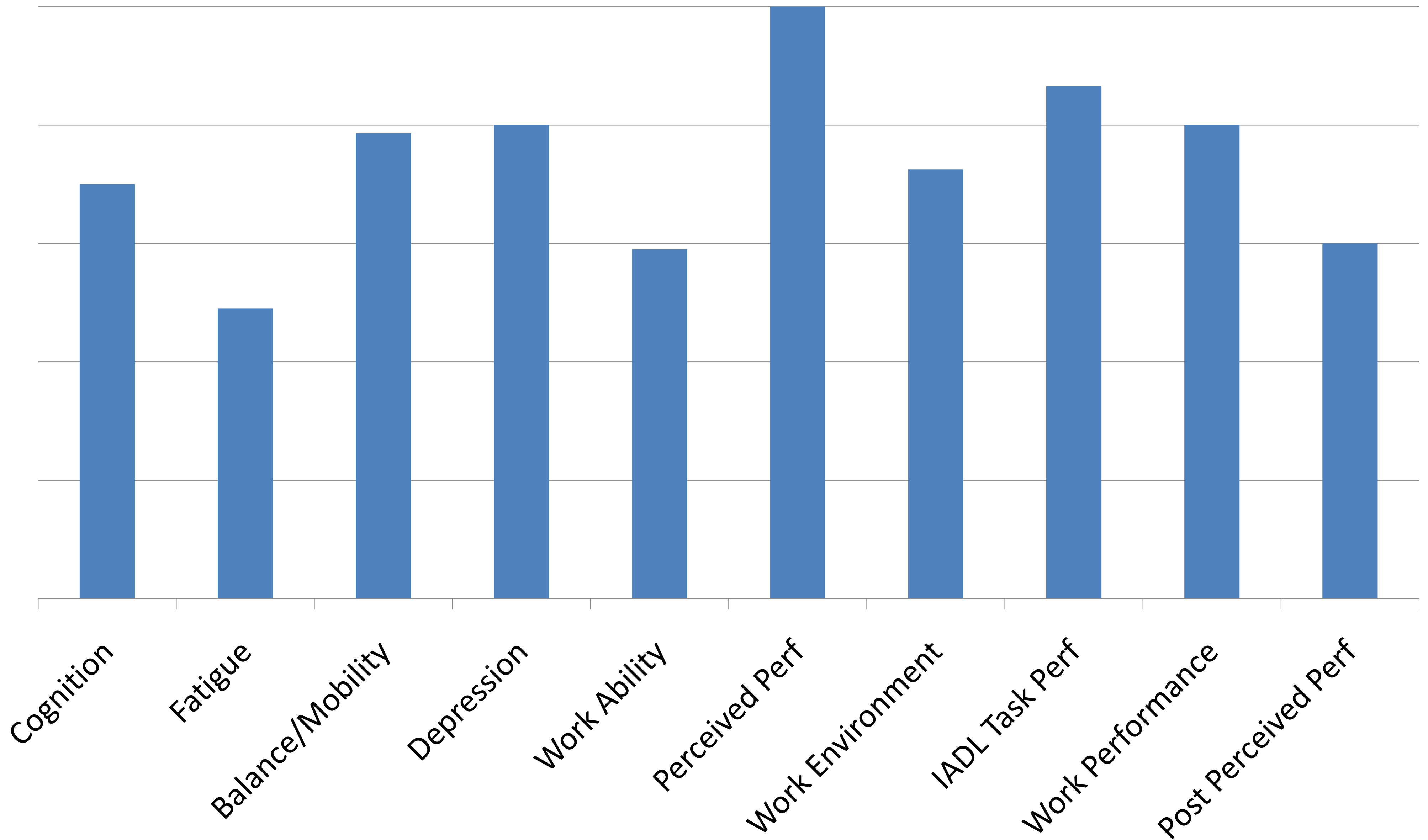
57 yo Chief Executive Office – working



32 yo Sales Associate – not working (RTW, laid off)



54 yo Security Guard/Information Technology not working



Correlations between Assessments

	Age	MOCA	MFI	BBS	CES	WAI	JPM	WEIS	KT	AWP	Yrs job	NIHSS
MOCA	.206	1.00										
MFI	-.157	-.234	1.00									
BBS	-.576*	.163	-.127	1.00								
CES	-.170	-.220	.515*	-.158	1.00							
WAI	-.466	.115	-.470*	.473	-.410	1.00						
JPM	-.115	.524*	-.332	.429	-.422	.566*	1.00					
WEIS	-.415	.162	-.202	.391	-.316	.425	.150	1.00				
KT	-.195	.470	-.313	.331	-.122	-.365	.281	-.061	1.00			
AWP	-.117	.439	-.386	.619**	-.221	.523*	.770**	-.029	.463	1.00		
Yrs job	.323	-.170	.035	-.167	.083	-.030	-.010	-.085	.131	.156	1.00	
NIHSS	.399	.146	.339	-.489*	-.155	-.273	-.141	-.111	-.132	-.260	-.350	1.00
Cog Load	-.046	-.184	.122	.234	.040	.401	.037	.110	.168	.271	.714**	-.660**

* $p \leq 0.05$

** $p \leq 0.001$ 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