



EPICREHAB

CLINICAL RESEARCH CONSORTIUM

**Methods to Evaluate Vocationally-
Relevant Executive Dysfunction**



February 2, 2011

DEFINITIONS

- Executive function is the ability to integrate various component cognitive abilities to produce meaningful task performance.
- Executive dysfunction is the relative inability to devise novel responses, suppress habitual responses, identify and correct errors, and plan, organize, and initiate new solutions to challenging tasks.

WHY *VOCATIONALLY-RELEVANT*?

- Why not just consider ED in terms of:
 - Instrumental Activities of Daily Living (EFPT)
 - Community Tasks (Multiple Errands Task)
- Because *vocational executive function* has special characteristics that are not found in non-vocational activities.

DISTINCTIVE VOCATIONAL CHARACTERISTICS

- Range of difficulty.
- Level of complexity.
- Range of complexity.
- Simultaneous cognitive demands.
- Competing resource demands.
- Time urgency.
- Error consequences.
- Mission criticality.
- Judgment and creativity.

VOCATIONAL EXECUTIVE FUNCTION

- To the degree that the task demands require judgment and creativity, with complexity and time urgency, executive functions are increasingly important.

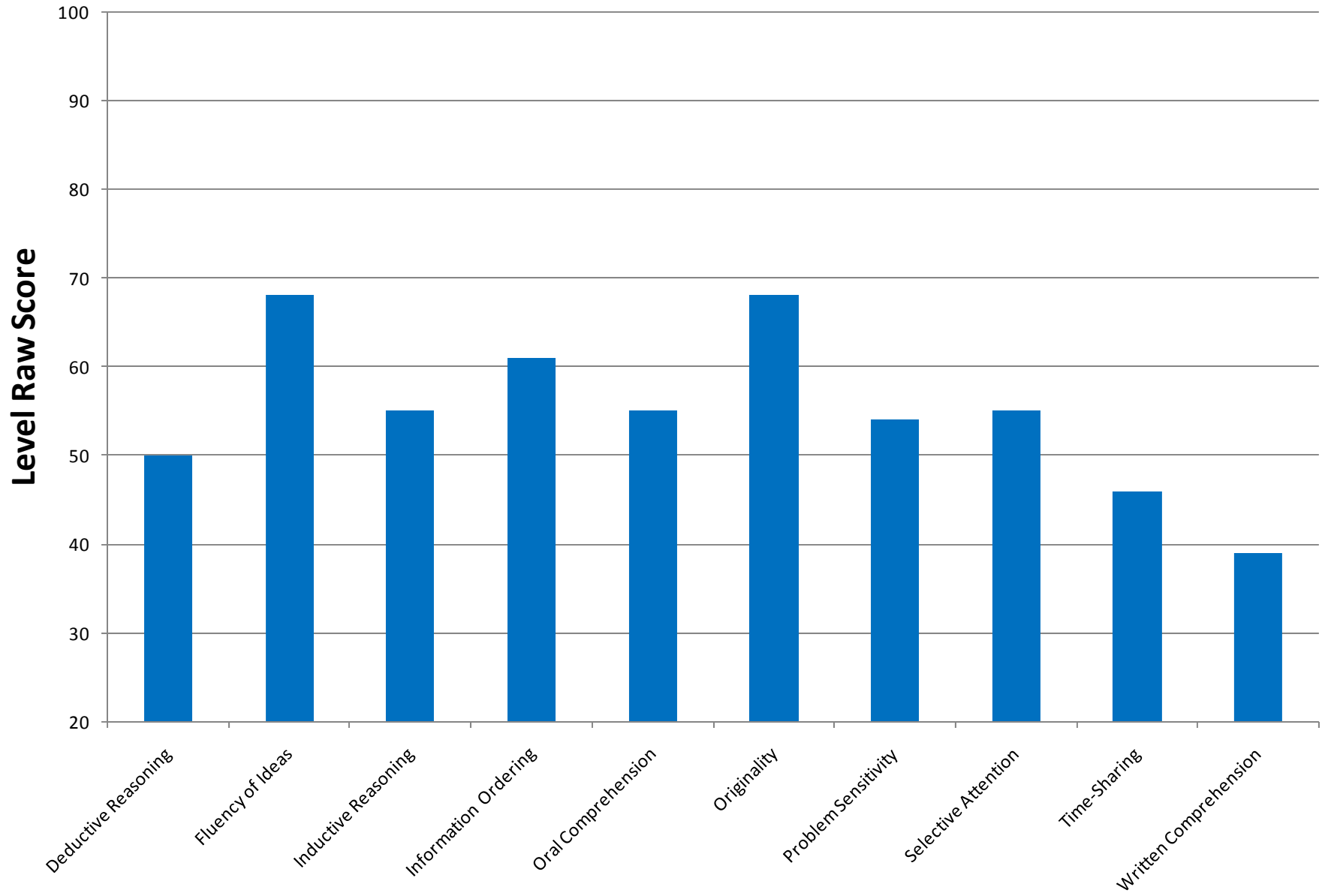
VOCATIONAL EXECUTIVE FUNCTION

- Compare cooking a simple dish in a home kitchen with working as a chef in a modern restaurant.
 - Multitasking.
 - Numerous interruptions.
 - Time-pressured performance.
 - Remuneration based on performance.

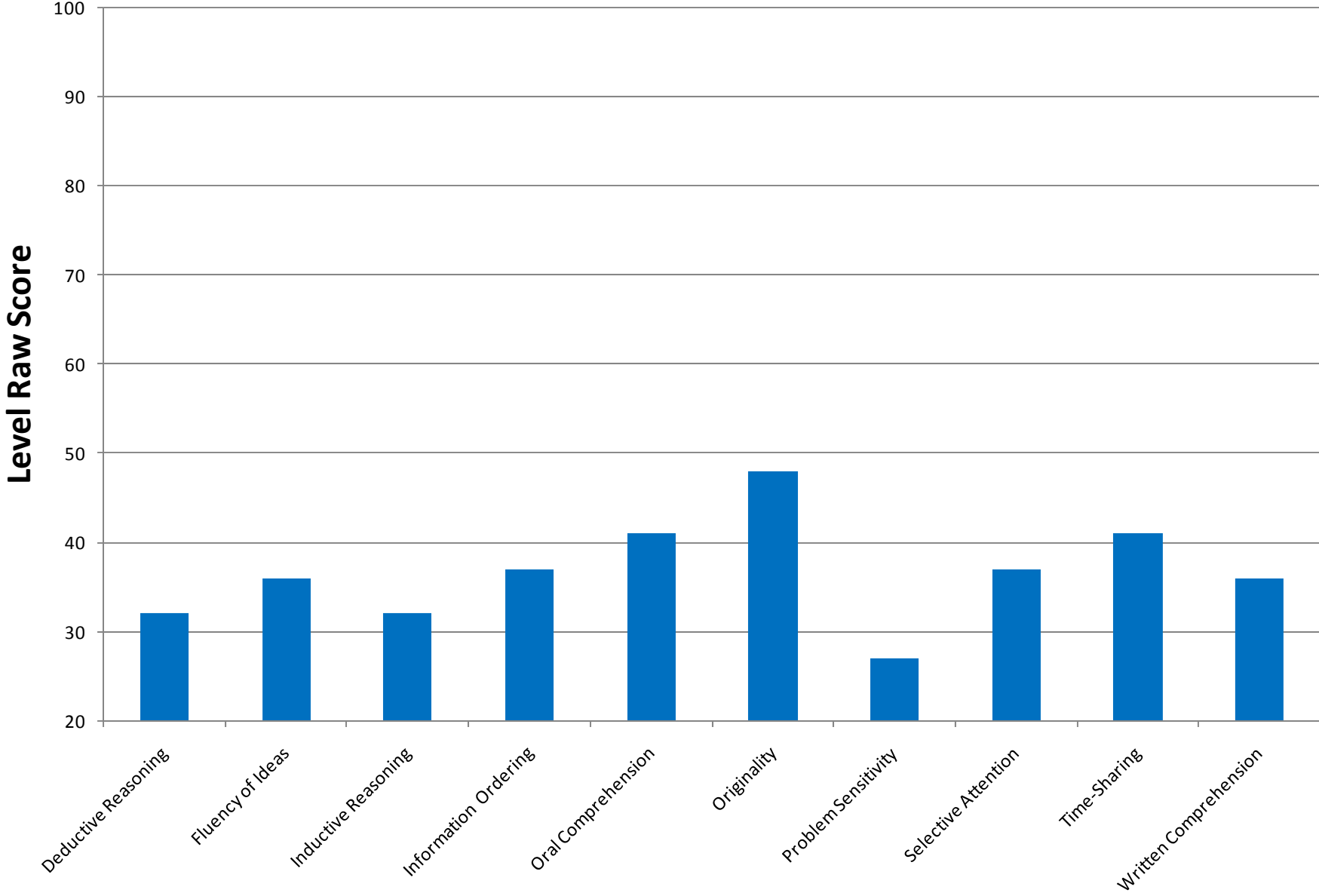
VOCATIONAL EXECUTIVE FUNCTION

- The importance of executive functions in a job follows a positively accelerating curve as a function of job complexity and the number of simultaneous or rapidly occurring tasks, usually requiring generally higher levels of ability.

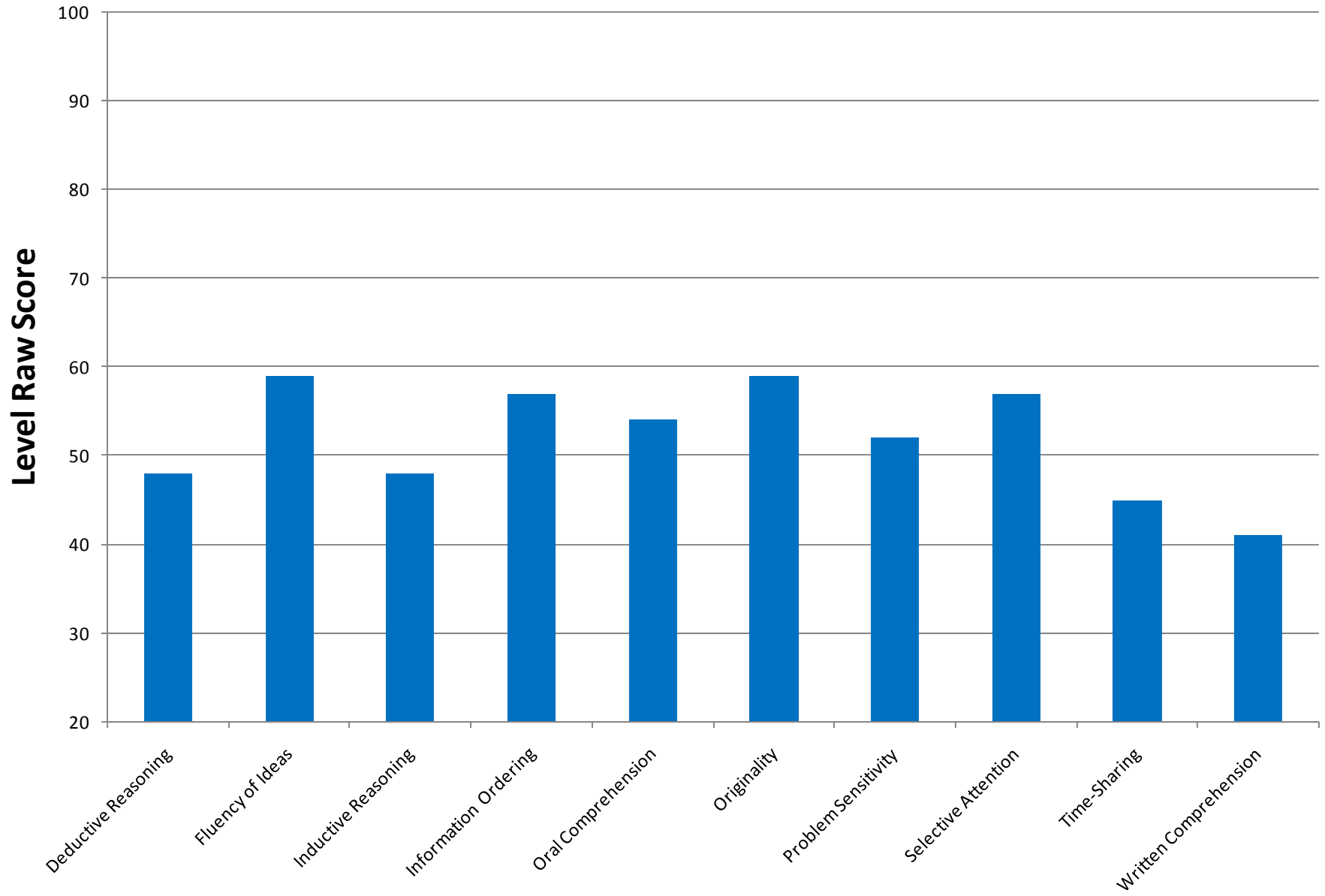
Aerospace Engineers



Cement Masons and Concrete Finishers



Occupational Therapists



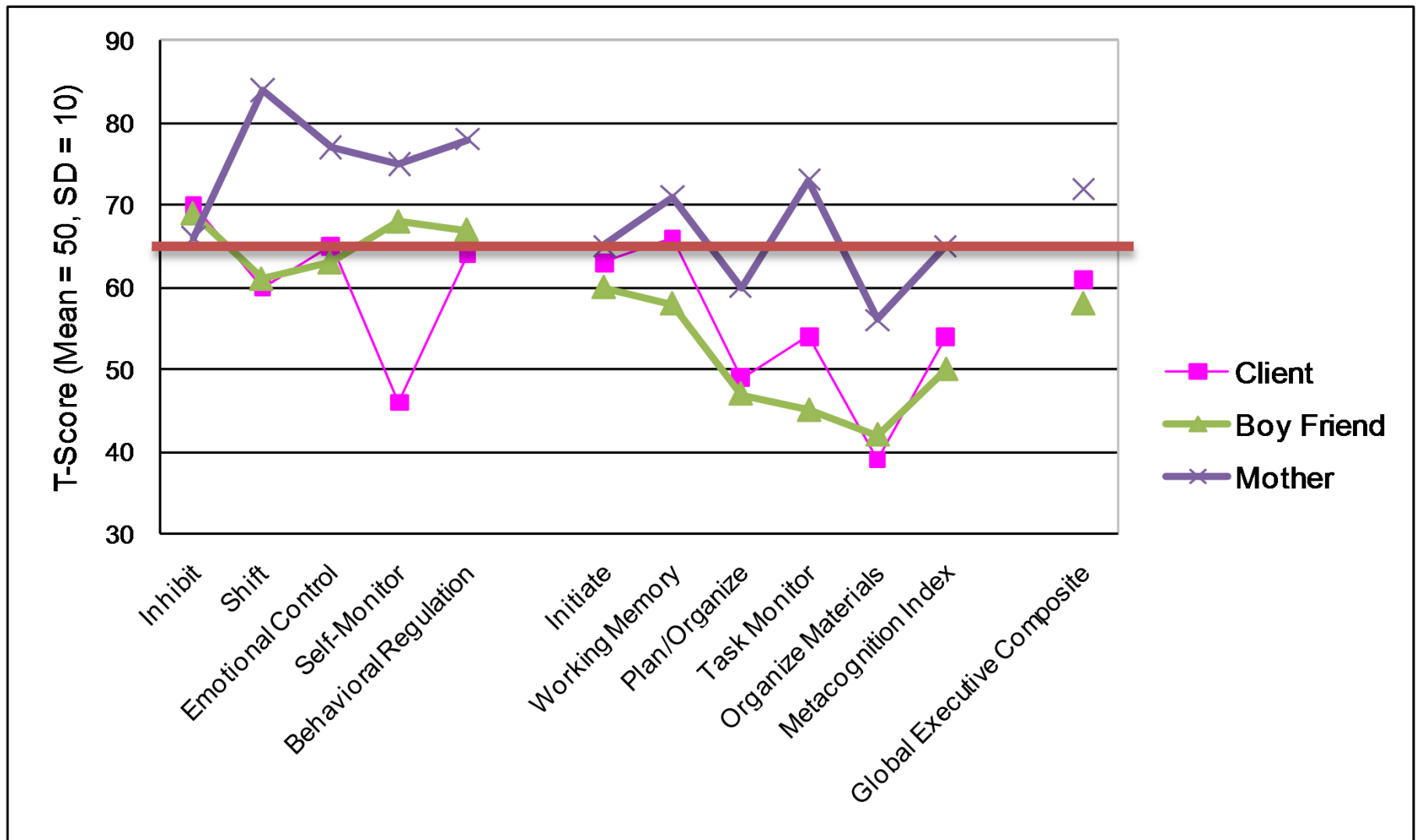
ED WORK SIMULATION CRITERIA

- Graded and Adjustable Demand
 - Wide range of demands, selectable to pose a “just-right challenge”.
- Low-Demand Entry
 - Easily-understood task that can be quickly accomplished.
- High-Demand Ceiling
 - Versions of task increase demand.
 - Complexity multiplies the challenge.

EXECUTIVE DYSFUNCTION MEASURES

- Self-Report / Informant Report
 - Behavior Rating Inventory of Executive Function
 - Ruff Neurobehavioral Inventory
- Performance / Observation
 - Executive Function Performance Task
 - Structured Work Activity Group #1
 - Comprehensive Task Performance Assessment
 - Behavioral Assessment of Vocational Skills
 - Doll Chair Assembly Task

BRIEF CLIENT SCORES – 28 YRS FEMALE



WORK SAMPLE VS. SIT ASSESSMENT

- Both are “work simulations”.
- Work Sample is more structured, with a normative numerical output, such as seconds, percentile, etc.
- Situational Assessment is less structured, with data collected that describe the behavior in more narrative terms, while adhering to work standards as much as possible.

Executive Function Performance Test (EFPT): Form B

TASK: Simple Cooking	Independent 0	Verbal Guidance 1	Gestural Guidance 2	Verbal Direct Instruction 3	Physical Assistance 4	Do For Subject 5
INITIATION: <i>beginning the task.</i>						
Upon your request to start, subject moves to table to gather tools/materials for making oatmeal.						
EXECUTION: <i>carrying out the actions of the task through the use of organization, sequencing, and judgment.</i>						
Organization: <i>arrangement of the tools/materials to complete the task.</i> Subject retrieves the items needed (pan, pot holder, measuring cup, oats, instructions, spoon).						
Sequencing: <i>execution of steps in appropriate order.</i> Subject performs steps in appropriate sequence, e.g., measures water, puts water into pan, turn on stove, sets heat according to what is needed, boils water, measures oats, puts oats into boiling water, stirs, turns off stove, uses pot holder to lift hot pan, and pours oats into bowl.* Subject does not confuse steps, e.g., turns off stove before water boils, replacing oats in cupboard before measuring some out, etc. * Variations of this order are fine as long as they don't interfere with task performance.						
Judgment & Safety: <i>avoidance of dangerous situation.</i> Subject prevents or avoids danger, e.g., turns water off, does not lay pot holder near burner, turns burner off, uses pot holder to lift hot pan, etc.						
COMPLETION: <i>termination of task.</i>						
Subject knows he/she is finished, e.g., pours oatmeal into bowl and moves away from pot. If subject washed dishes, he/she moves away from the sink, doesn't continue to scrape the pan, etc.						

Employability Rating

Competitive	Does not require accommodation, cueing, or assistance that is not available to other workers performing similar tasks. Works at a speed and with productivity and an error rate that is consistent with other workers.
Environmental Accommodation	Accommodations and/or modifications of the task are used that do not require input from other workers or supervisors. With these accommodations and modifications, works at a speed and with productivity and an error rate equal to other workers.
Personnel Accommodation	Even with accommodations, cueing and guidance from workers or supervisors is necessary. With these accommodations, modifications, cueing and guidance, works at a speed and with productivity and an error rate equal to other workers.
Personnel Assistance	Even with accommodations, modifications, cueing and guidance, assistance is necessary to complete tasks. Works more slowly and/or with a higher error rate than other workers.
Unable	Even with accommodations, modifications, cueing, guidance, and assistance to complete tasks, is unable to complete the activity.

NEXT MONTH ...

- Executive Function and Capacity Approximation
- Natural Development of Executive Function
 - Executive function develops throughout childhood and adolescence in response to challenges.
- Minimizing Executive Function Deficits after ABI
 - When executive function is disrupted, occupational disability results even if intelligence and other cognitive processing capacities are preserved.

COGNITIVE WORK CAPACITY

- George Miller

- Magical number 7, plus or minus 2.
- Miller, G. A. (1956). "The magical number seven, plus or minus two: Some limits on our capacity for processing information". *Psychological Review* 63 (2): 343–355. <http://psychclassics.yorku.ca/Miller/>.

- Nelson Cowan

- 4 discrete chunks, if not able to use rehearsal.
- Cowan, N. (2001). The magical number 4 in short-term memory: A reconsideration of mental storage capacity. *Behavioral and Brain Sciences*, 24, 87-185.