



EXECUTIVE FUNCTION IN THE ADULT STROKE SURVIVOR: EVIDENCE BASED ASSESSMENT AND INTERVENTION

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WHAT IS EXECUTIVE FUNCTION?

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“ those functions that enable a person to engage successfully in independent, purposive, self-serving behavior.”
(Lezak, 2004)

Support engagement in daily life activities and participation in the community, most important during new, non-routine, complex and unstructured situations.
(Spikman, Deelman & Van Zomeren, 2000)



- Goal setting
- Planning
- Sequencing complex actions
- Prioritizing
- Initiating
- Problem solving
- Divided attention
- Working memory
- Shifting (task switching)
- Self monitoring/correction
- Decision making
- Generating Strategies
- Modifying behavior in light of new information
- Inhibition

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INCIDENCE

- Approximately 795,000 strokes will occur this year, one occurring every 40 seconds (Stroke.org)
- Reported executive dysfunction occurrence of up to 75% of patients post-stroke (Poulin et al., 2012)
- Risk of developing vascular dementia is 10 times greater (EBRSR)

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- approximately 16 –20% of patients with cognitive impairment improve.
- Most *spontaneous* improvements occur in the first three months, recovery may continue for at least the first-year post stroke.

(EBRSR)

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COGNITIVE IMPAIRMENT POST-STROKE:

- Associated with a 3-fold increase in risk for mortality
- Associated with decreased ADL and IADL function
- Patients may require longer-term, ongoing rehabilitation
- Associated with major depression, negative affect and anxiety

(EBRSR)

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WHAT MIGHT CARE PARTNERS REPORT?

- “Lazy” Doesn't do anything (decreased initiation)
- Doesn't finish anything (decreased sustained attention)
- Doesn't let go- gets stuck on the small things (perseveration)
- Impatient, restless, easily agitated (decreased inhibition)
- States things that are inappropriate (decreased inhibition)
- Self centered- only cares about self (decreased mental flexibility)

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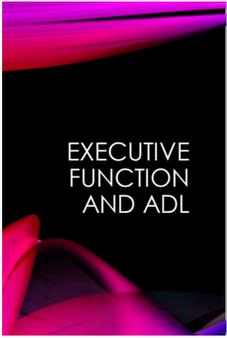


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HOW MAY THESE BEHAVIORS AFFECT TREATMENT?

- Poor planning – unsafe physical maneuvers/increased risk of falls
- Deficits in initiation and persistence - reduced capacity to initiate, sequence, and sustain a series of exercises

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Plan and choose a menu based on budget

Identify needed items and make a shopping list

Shopping and locating specific items in the store

Using the internet/smart phone

Paying bills

Horizontal lines for notes

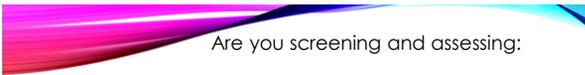


ASSESSMENT



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Horizontal lines for notes



Are you screening and assessing:

- during presentation to emergency when cognitive, perceptual or functional concerns are noted
- upon admission to acute care
- upon discharge home from acute care or during early rehabilitation if transferred to inpatient rehabilitation setting
- periodically during in-patient rehabilitation
- periodically following discharge to the community

(strokengine.ca)

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Horizontal lines for notes

AND THE ISSUE IS...

- Manifests itself in unstructured, novel circumstances experienced in daily life
 - How will you measure it? How are you measuring it?
- Assessment & rehabilitation takes place almost exclusively in controlled, structured environments
- At present, there is no gold standard for the diagnosis and assessment of vascular cognitive impairment.

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TRAIL MAKING TEST

- Used to assess executive function in patients with stroke
- Predictive of on the road driving outcomes
- https://www.nmr.mgh.harvard.edu/~bradd/Trail_Making_Test.pdf

	Average	Deficient	Rule of thumb
Trails A	29 seconds	>78 seconds	Most in 90 seconds
Trails B	75 seconds	>273 seconds	Most in 3 minutes

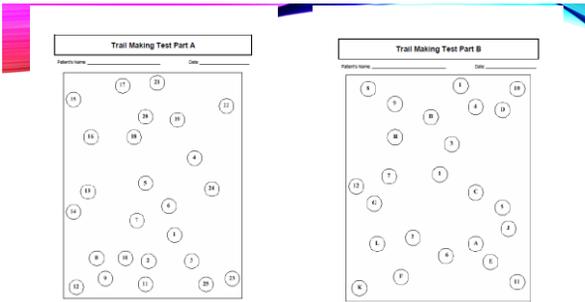
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Trails A and B

• Tombaugh, T. N. (2004). Trail Making Test A and B: normative data stratified by age and education. *Archives of clinical neuropsychology*, 19(2), 203-214.

Age group	Mean (seconds)	
	Trails A	Trails B
18-24	22	47
25-34	23	50
35-44	26	58
45-54	31	64
55-59	32	73
60-64	32	68
65-69	37	76
70-74	38	97
75-79	46	115
80-84	52	133
85-89	54	138

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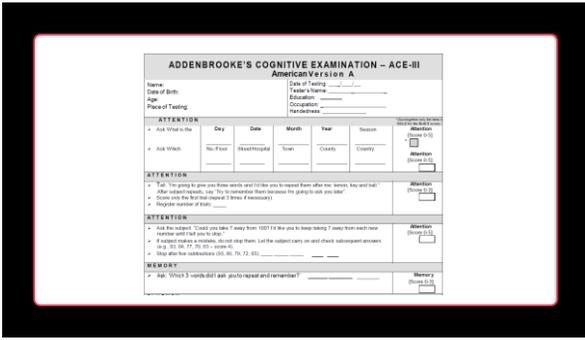
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ACE-III

- Looks at domains of
 - Attention
 - Memory
 - Fluency
 - Language
 - Visuospatial
- 3 Versions and multiple languages available
- <https://www.sydney.edu.au/brain-mind/resources-for-clinicians/dementia-test.html>

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The EFPT is a top-down performance assessment designed to examine cognitive integration and functioning.

Highly recommended secondary to the use of real-world tasks

<http://www.ot.wustl.edu/about/resources/executive-function-performance-test-efpt-308>

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The assessments requires participants to complete the following tasks (in order):

- Hand Washing
- Oatmeal Preparation
- Telephone
- Taking Medication
- Paying Bills

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- The EFPT assesses the client's ability to complete three executive function components of the task:
 - Task initiation
 - Task execution (comprising organization, sequencing, and judgment and safety)
 - Task completion

• The EFPT uses a standardized cueing system that enables use with individuals of varying ability

(Baum, 2011)

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MULTIPLE ERRANDS TASK

- Buy the following 3 items in the gift shop (e.g. candy, flower etc.)
 - Obtain the following information and write it down
 - Headline from today's paper
 - Closing time of library on Saturday
 - Price of 1 pound of tomatoes
 - Meet under the clock in 20 minutes
- Sample rules: Spend no more than \$1; can use any thing you want to figure this out but can't ask therapist

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Good predictor of impairments evident during everyday function

Both Community and hospital-based versions available

An Assessment *and* a Treatment Activity!!

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SCORING OF THE MET

- Task Failures
 - Failure to complete a task
 - Incorrect price, times recorded
- Inefficiencies (example)- a more effective strategy could have been used
 - Wrote down 2 headlines, purchased a newspaper
 - Purchased items bought in same shop separately
 - Ran out of money
- Rule Breaks
- Interpretation Failure – Requirements of the task are misunderstood

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RULES

- You must carry out all these tasks but may do so in any order
- You should spend no more than \$1.00
- You should stay within the hospital
- No shop should be entered other than to buy something
- You should not go back into a shop you have already been in
- Take as little time to complete this exercise without rushing excessively
- You can use anything in the environment to help you but you cannot ask the person observing you any questions

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MET SCORING PRACTICE

INSTRUCTIONS

In this exercise you should complete the following three tasks:

- You should buy 3 items from the gift shop
- You should obtain the following information and write it down in the spaces below
 - What is a headline from today's Journal Gazette?
 - What is the closing time of volunteer services?
 - What is the forecast for tomorrow?
- You must meet me under the clock 20 minutes after you have started this task and tell me the time.

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TASK FAILURE, INEFFICIENCY, RULE BREAK OR INTERPRETATION FAILURE?

- The patient buys a piece of candy, gets the change and then goes back to buy a pack of gum
- The patient walks into a gift shop, looks around and walks back out
- The patient writes down a headline from the Tab instead of Journal Gazette
- Patient does not meet therapist under the clock

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WAYS TO GRADE MULTIPLE ERRANDS TASKS

- Specific written instructions no rules
- Specific written instructions with written rules
- Written instructions with written rules and time constraint
- Written instructions with verbal rules
- Verbal instructions and verbal rules

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ASSESSMENT OF BILL PAY



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INTERVENTION

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RESTORATIVE APPROACHES

- Goal: to restore underlying functions that have been impaired by a stroke
- Systematic practice in activities that are designed to improve underlying cognitive skills
- No evidence to support the use of cognitive exercises and drills in isolation- lack of generalization

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COMPENSATORY APPROACH

- Establishing new patterns of cognitive activity or methods to compensate for impairments
- Cueing strategies, external aides, strategy and awareness training

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STRATEGY TRAINING

- Focus on the "process" not the content
- Goal is not to develop specific skills or isolated strategy but to develop general strategies to be applied across situations
- Repeated practice across a variety of situations is key
 - Generalization
 - Complexity/grading
 - Assuring safe discharge

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STRATEGIES

- External strategies
 - Checklists
 - Voice recorders, alarms
 - Smart phone
 - **Other people
 - Notebook
 - Stimuli reduction methods (ear plugs etc.)
- Internal strategies
 - Self talk
 - Cognitive check offs or mnemonics
 - Mental rehearsal or mental imagery

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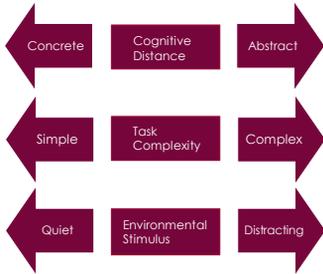
IMPORTANT INGREDIENTS IN COGNITIVE REHAB

- Patient actively involved in choosing goals, activities and strategies
- Activities are meaningful and relevant
- Training in self regulation and self monitoring
- Opportunity for practice across a wide range of situations
- Therapeutic relationship

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GRADING COGNITIVE TASKS



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MANAGING MULTI-STEP ACTIVITIES



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• Check and make a list of the missing supplies (Inventory)

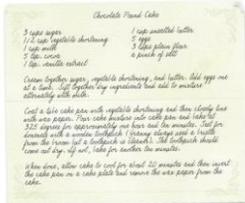


- 2 - 1" binders
- 1 - 2" binder
- 10 index cards
- 3 boxes paper clips
- 1 glue
- 4 pads of paper
- 7 pens
- 8 pencils

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Recipe: Check the kitchen and make a list of any missing ingredients



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1. Plan a vacation. Include Dates
2. \$5000 budget for family of 4
3. 2 weeks
4. Choose location
5. Transportation
6. Lodging
7. Food
8. Activities

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OTHER IDEAS:

- Grocery shopping: Which section of the grocery, make a list, compare prices of items versus amount of money available
- Wayfinding
- Menus: (simple versus drink menus versus T.G.I.Friday's)
- Dual task training: bounce ball while voicing items from specific categories; address additional impairments with balance tasks
- Stations – Interval training

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MEDICATION MANAGEMENT

- Filling pill boxes using medication bottles filled with "pills" (aka colored beads)
- Mark each pill bottle with the name of the drug (e.g. Xanax 2mg)
- Write medication schedule on note card
 - Easy: AM only or PM only
 - Medium: Doses written in # of pills
 - Hardest: Fill both AM and PM with doses written in mg (e.g. AM Xanax 6mg – PM Xanax 4mg)
 - Can also grade with number of meds used

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INTERVENTIONS AVAILABLE AT
WWW.ANGIEREIMER.COM



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