



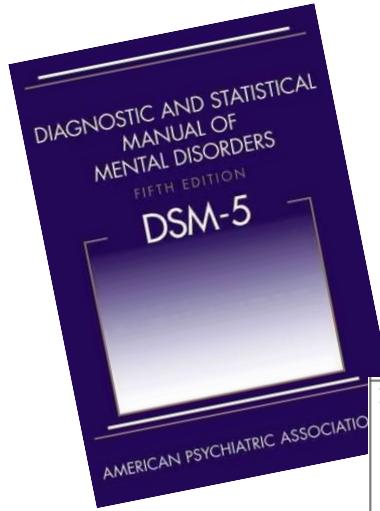
# Multidomain deficits

## (NX-423)

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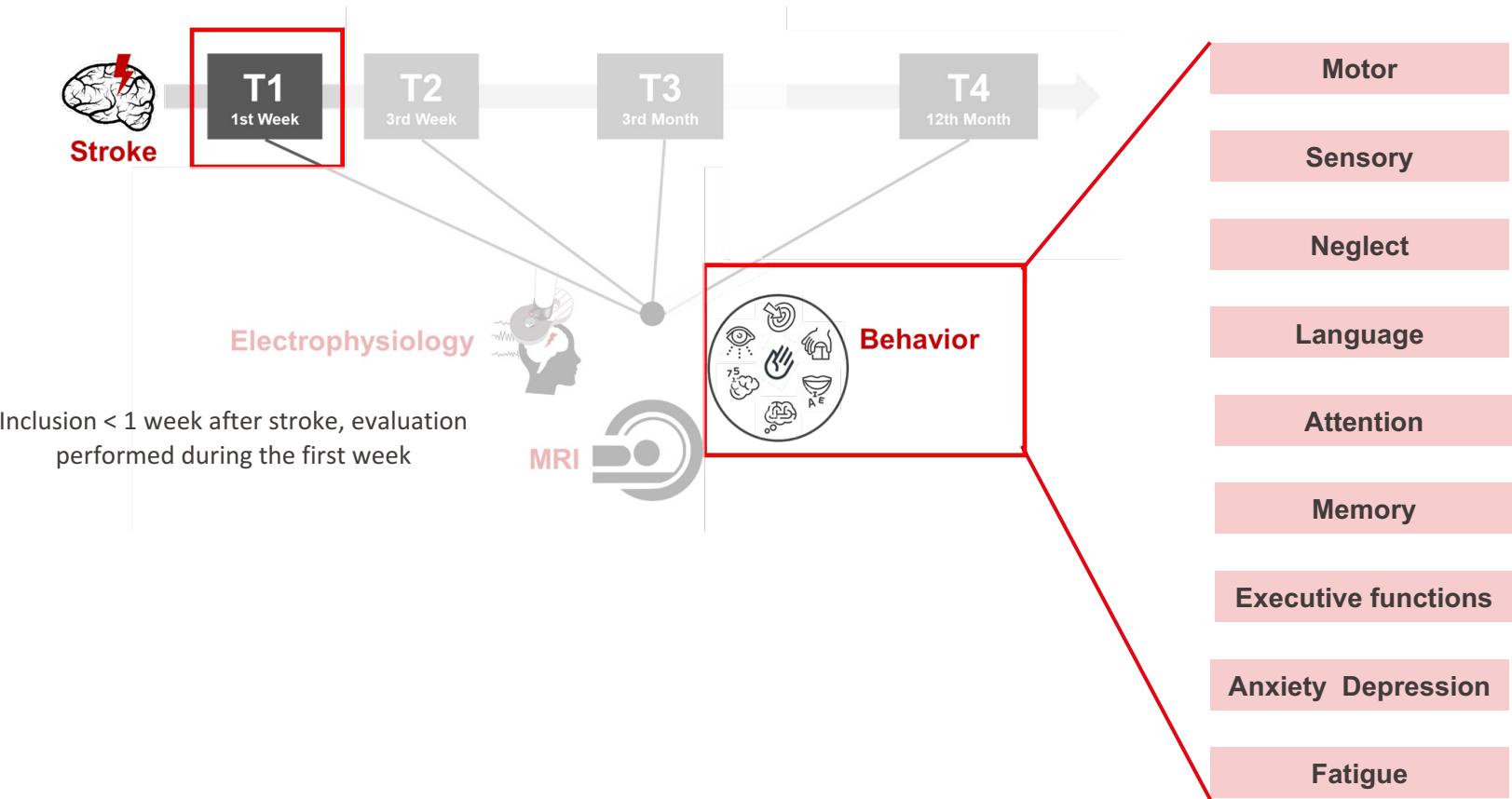


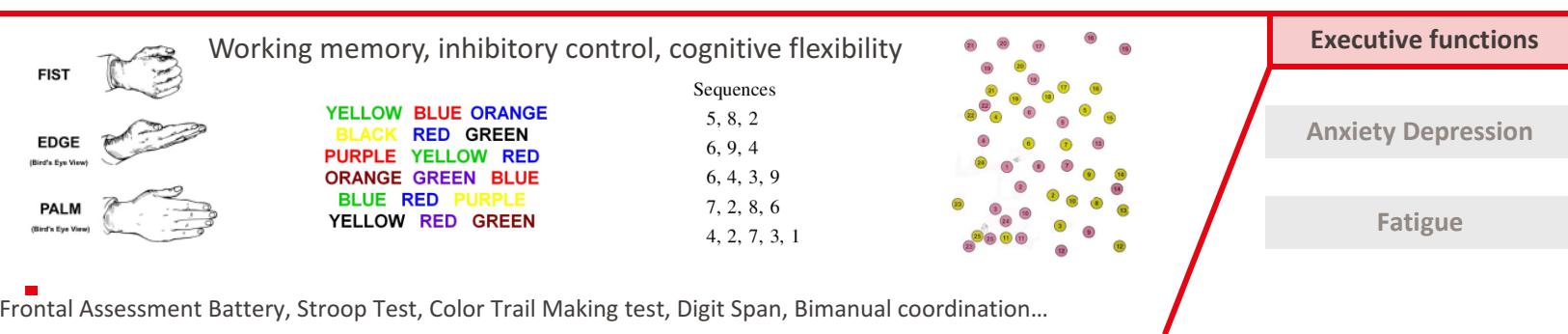
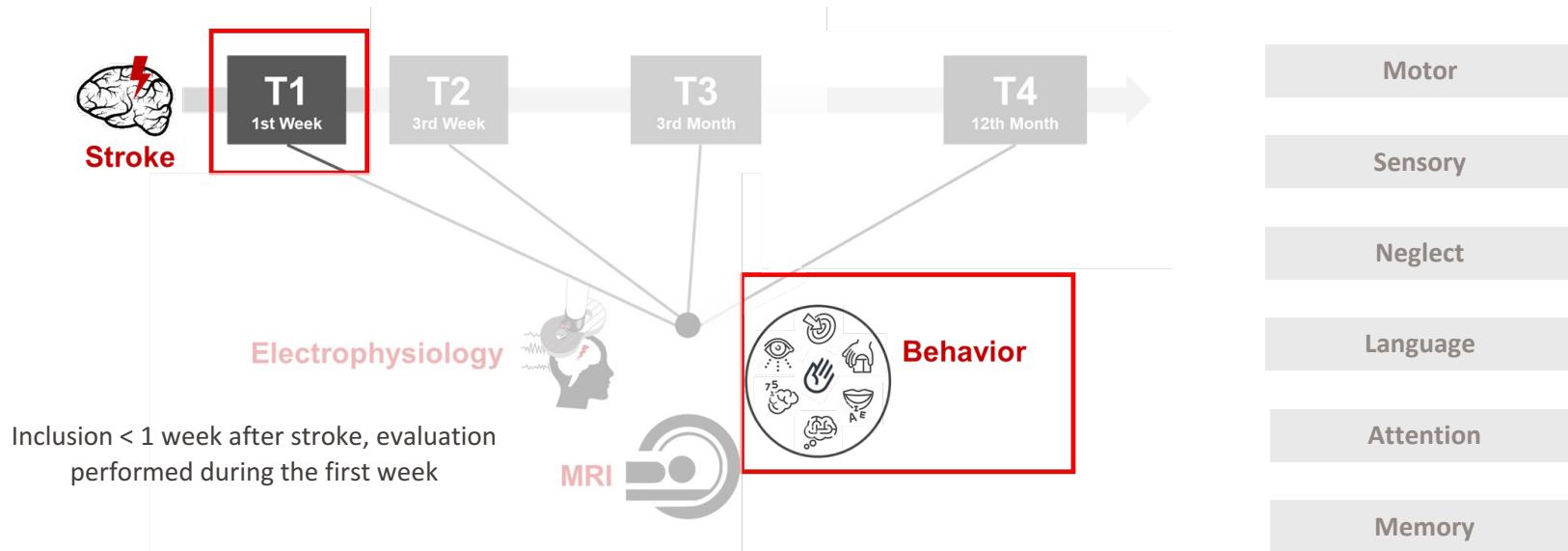
*Evidence of significant cognitive decline from a previous level of performance in one or more cognitive domains (complex attention, **executive function**, learning and memory, perceptual-motor or social cognition)*

- *Concern of the individual*
- *Interference with independence in everyday activities*
- *Not occurring during delirium, not explained by another mental disorder (e.g. depression)*
- *Documented by standardized neuropsychological testing*

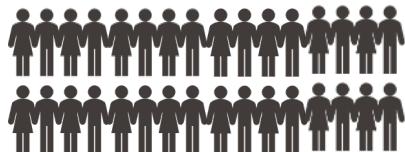
Executive function (planning, decision making, working memory, responding to feedback/error correction, overriding habits/inhibition, mental flexibility)	<p><i>Major:</i> Abandons complex projects. Needs to focus on one task at a time. Needs to rely on others to plan instrumental activities of daily living or make decisions.</p> <p><i>Mild:</i> Increased effort required to complete multistage projects. Has increased difficulty multitasking or difficulty resuming a task interrupted by a visitor or phone call. May complain of increased fatigue from the extra effort required to organize, plan, and make decisions. May report that large social gatherings are more taxing or less enjoyable because of increased effort required to follow shifting conversations.</p>	<p><i>Planning:</i> Ability to find the exit to a maze; interpret a sequential picture or object arrangement.</p> <p><i>Decision making:</i> Performance of tasks that assess process of deciding in the face of competing alternatives (e.g., simulated gambling).</p> <p><i>Working memory:</i> Ability to hold information for a brief period and to manipulate it (e.g., adding up a list of numbers or repeating a series of numbers or words backward).</p> <p><i>Feedback/error utilization:</i> Ability to benefit from feedback to infer the rules for solving a problem.</p> <p><i>Overriding habits/inhibition:</i> Ability to choose a more complex and effortful solution to be correct (e.g., looking away from the direction indicated by an arrow; naming the color of a word's font rather than naming the word).</p> <p><i>Mental/cognitive flexibility:</i> Ability to shift between two concepts, tasks, or response rules (e.g., from number to letter, from verbal to key-press response, from adding numbers to ordering numbers, from ordering objects by size to ordering by color).</p>
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■ *Alzheimer's disease, Frontotemporal lobar degeneration, Lewy body disease, **Vascular disease**, Traumatic brain injury, substance/medication use, HIV, Parkinson's disease, Huntington's disease....*





In-detail and multi-domain evaluation with 50+ tests, clinical scales and questionnaires



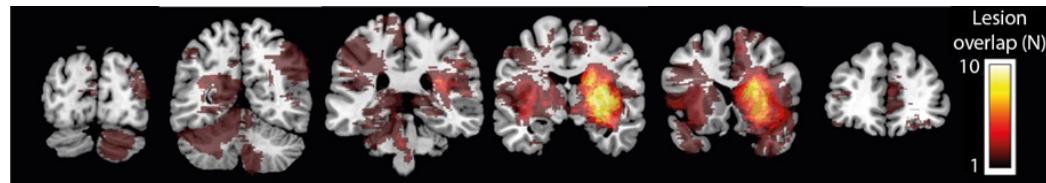
- Principal inclusion criteria: **upper-limb motor deficit**
- **Age =  $67,3 \pm 13,3$ , males = 69%**
- Days since stroke at inclusion : median **day 5** (day 1- day 12)

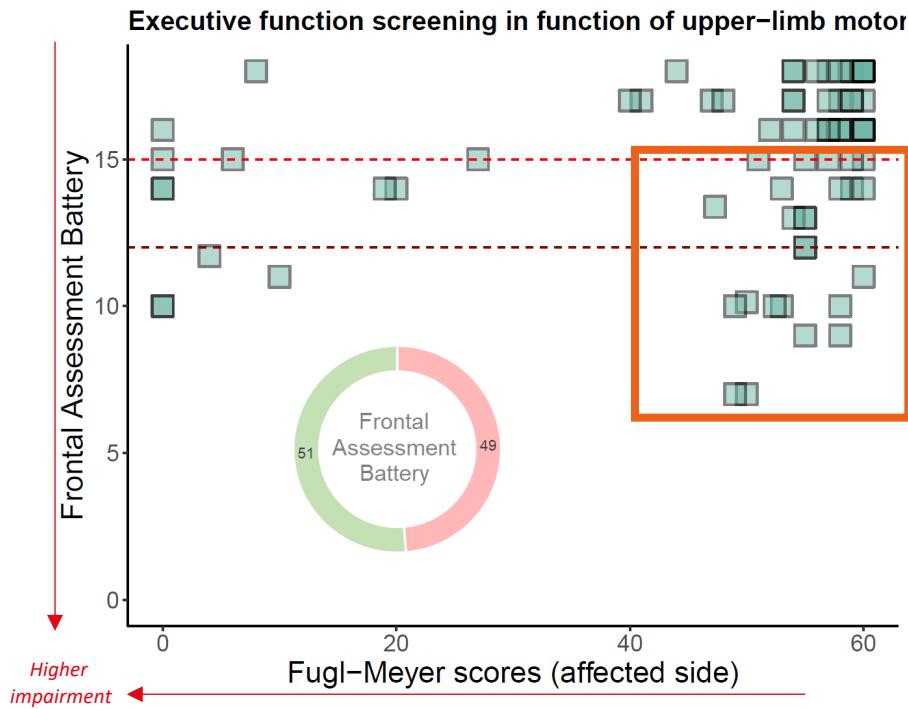
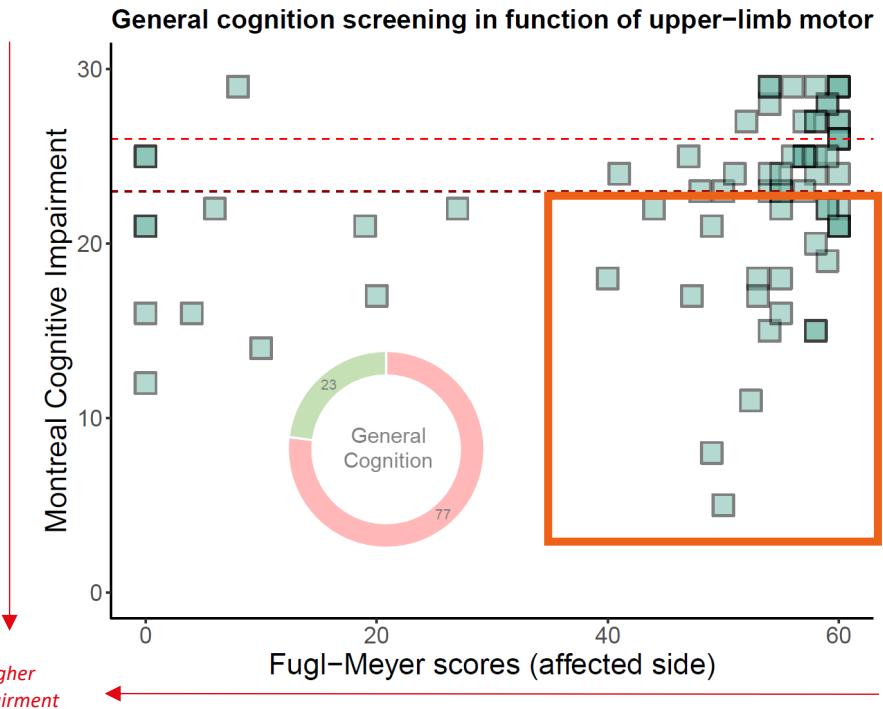


Ischemic stroke : 96%  
First-ever stroke : 86,5 %  
Right hemisphere affected : 55%  
NIHSS : 5 (0-24)



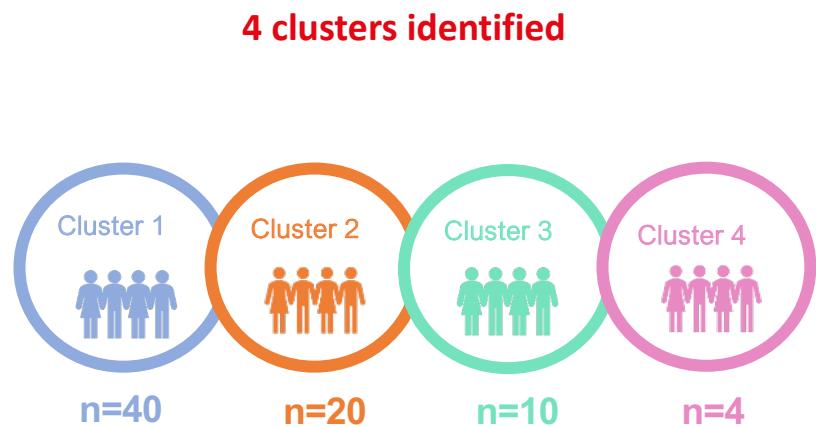
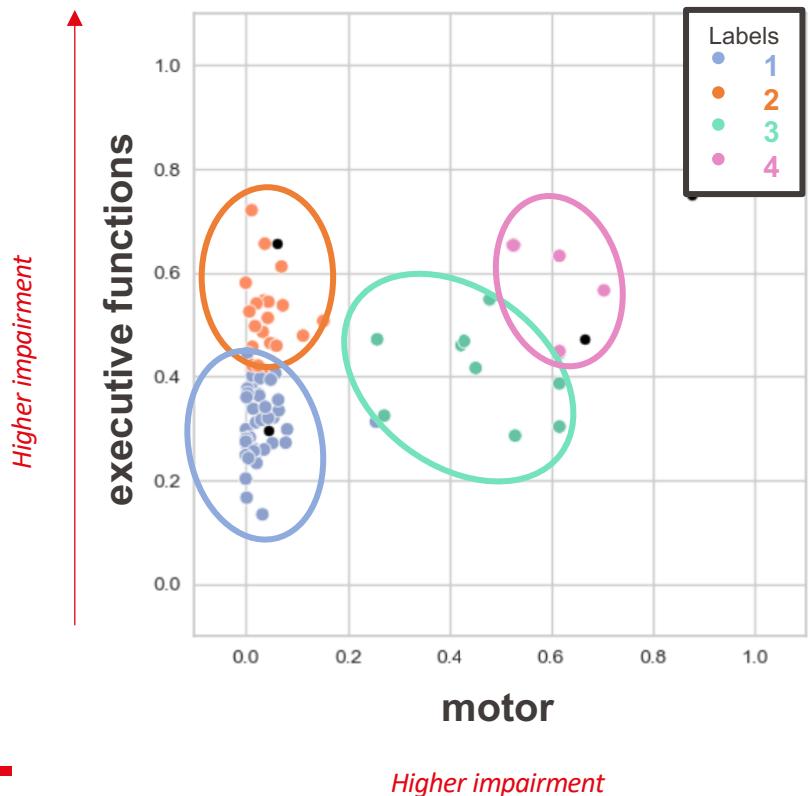
Cortical : 6,8 %  
Subcortical – mixed : 73 %  
Cerebellum : 4%  
Brainstem : 14,9%



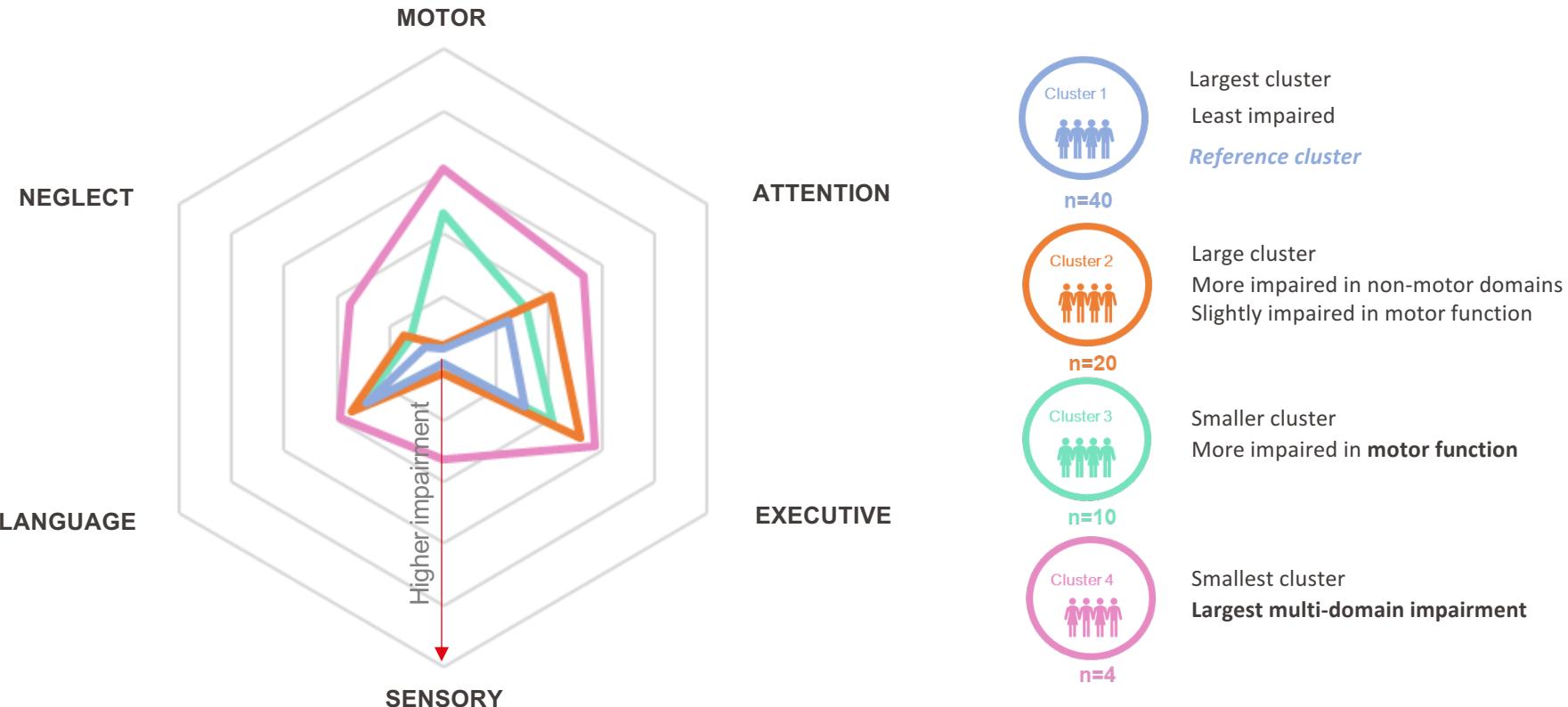


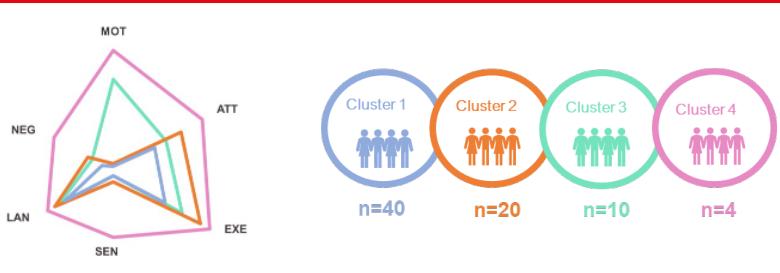
Substantial proportion of patients with impaired cognition and **executive dysfunction** even when motor deficit is mild

K-means clustering (*based on motor, attention, executive functions, sensory, language*)

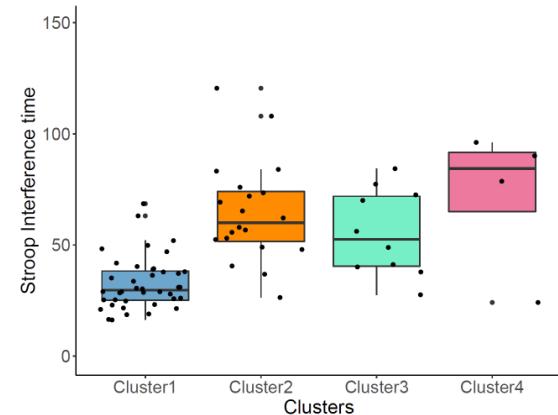


Multi-domain behavioral profiles?

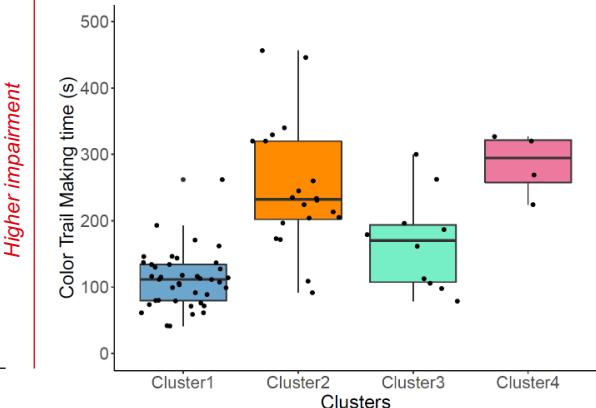




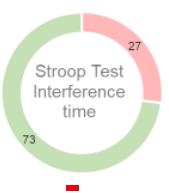
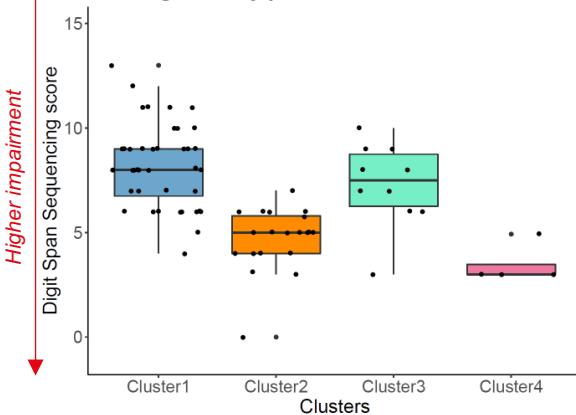
Stroop test – Interference condition



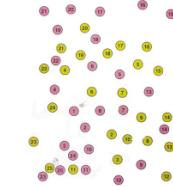
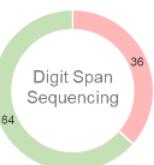
Color Trail Making Test (B) performance



Working memory performance



YELLOW BLUE ORANGE  
BLACK RED GREEN  
PURPLE YELLOW RED  
ORANGE GREEN BLUE  
BLUE RED PURPLE  
YELLOW RED GREEN



Sequences	→
5, 8, 2	2, 5, 8
6, 9, 4	4, 6, 9
6, 4, 3, 9	3, 4, 6, 9
7, 2, 8, 6	2, 6, 7, 8
4, 2, 7, 3, 1	1, 2, 3, 4, 7

- ✓ Substantial incidence of cognitive impairment in acute stroke patients, reflected by **executive dysfunctions**
- ✓ Subgroup of patients with mild stroke/low motor impairment but **large executive deficits**, impaired in all aspects of this domain
- ✓ **Executive dysfunction** impacts **quality of life, return to work, social life**, and could **slow down recovery** in other domains (e.g. motor, language)

Brain stroming in class