

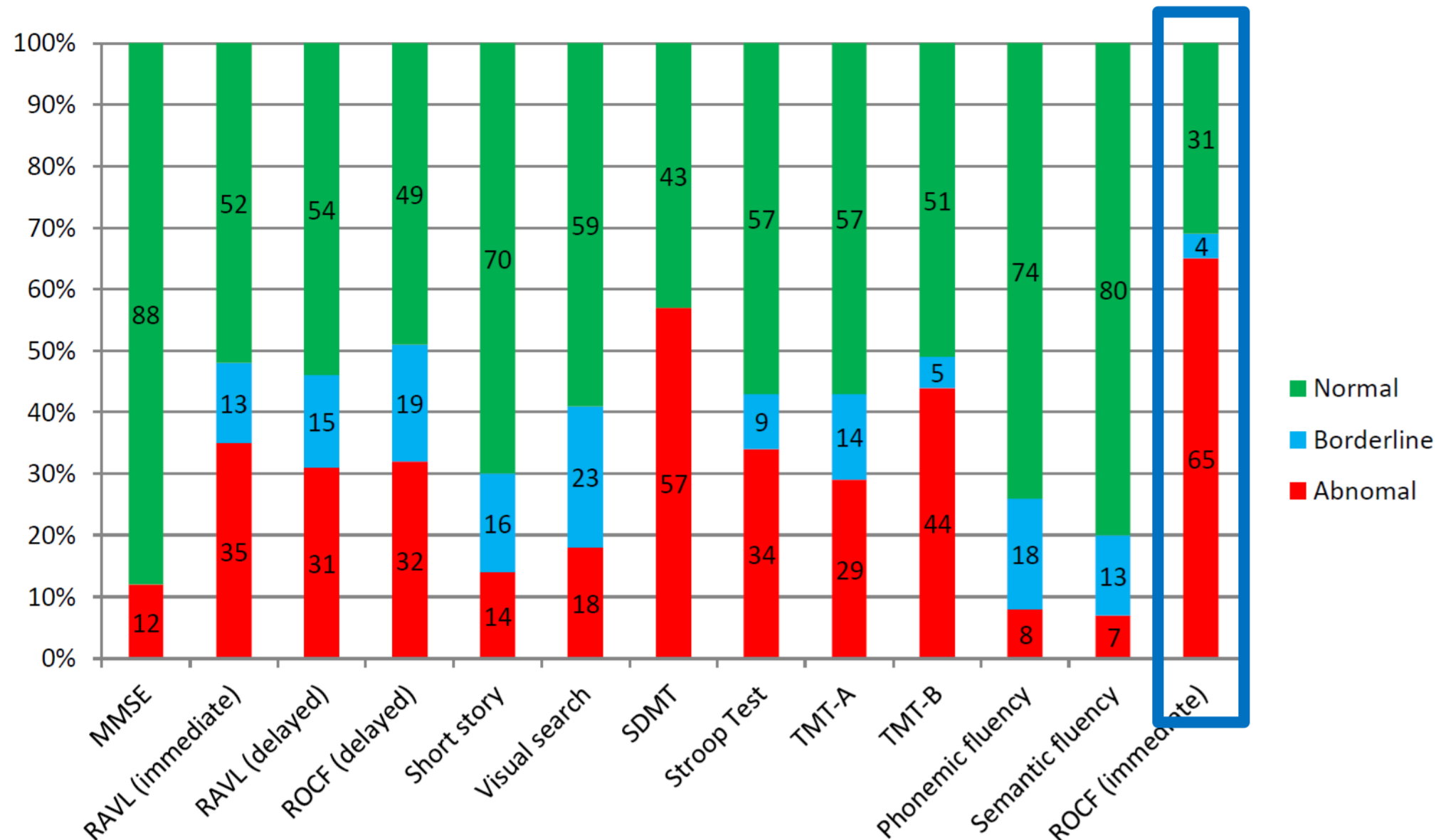
# The immediate copy of the Rey-Osterrieth Complex Figure as a measure of executive functioning in vascular and neurodegenerative MCI patients.

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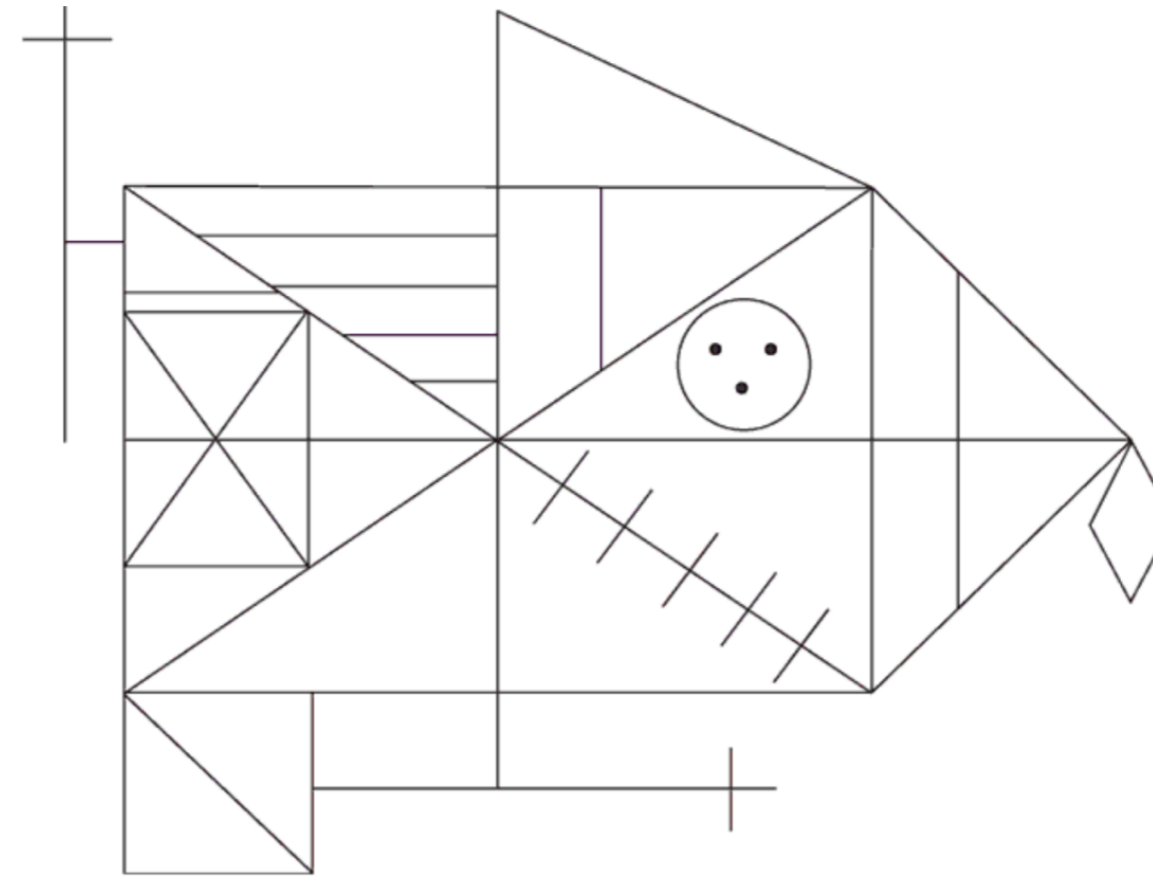
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## The starting point: the VMCI-Tuscany study

N=201 patients with MCI and small vessel disease  
(moderate to severe degrees of white matter changes on MRI)



Rey-Osterrieth Complex Figure (ROCF)



Immediate copy of the ROCF

Visuo-constructional abilities

The complexity of the figure involves also executive functions, such as planning and organizational strategies

The Boston Qualitative Scoring System (BQSS) provides qualitative ratings specifically developed for the evaluation of the executive functions

**Aims** We aimed at examining whether qualitative features of the immediate copy of the ROCF:

- 1) differ between vascular (v-MCI) and degenerative (d-MCI) mild cognitive impairment patients
- 2) can at least partly explain the high rate of abnormal ROCF immediate copy performances seen in v-MCI patients

## Materials and Methods

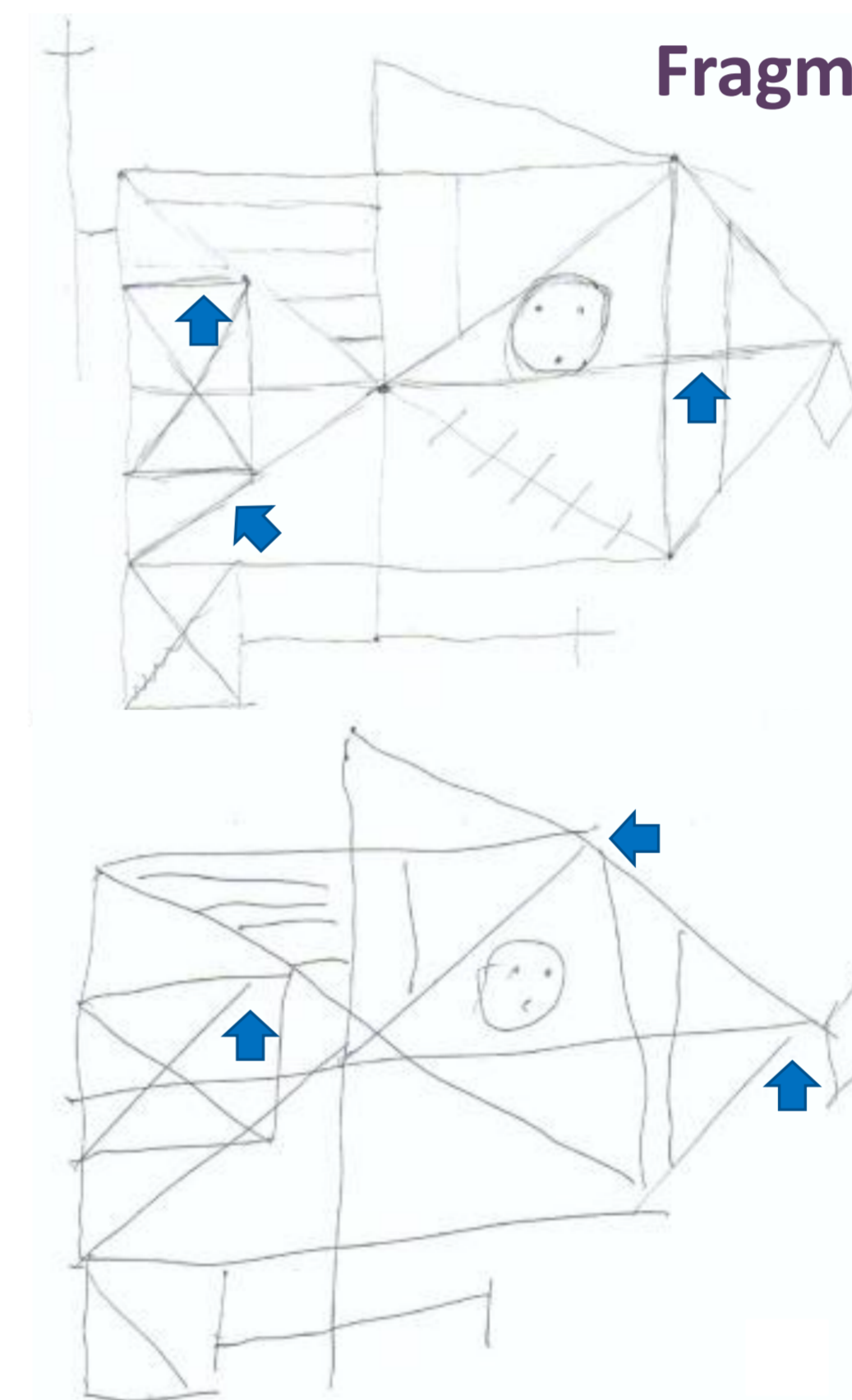
Study samples

**v-MCI:** patients with MCI and moderate to severe white matter changes, a subsample of the VMCI-Tuscany cohort

**d-MCI:** patients affected by MCI due to Alzheimer Disease and enrolled in the outpatient memory clinic of Parma

## BQSS executive scores

- **Fragmentation:** whether individual elements are drawn as whole units
- **Planning:** the order in which elements are drawn and their placement
- **Organization:** arithmetic sum of Fragmentation and Planning
- **Perseveration:** recognizably inappropriate repetitions



Fragmentation additional rules

Hatching of the most part of the lines was considered as a graphic style, and it was not scored as fragmentation.

Lack of conjunctions between different lines of the same element (such as angles and diagonals) was not scored as fragmentation.

## Results

Comparisons of demographic characteristics, global cognitive functioning, and original Osterrieth's scores

	Score range	v-MCI N=27	d-MCI N=30	p
Age, years	(mean±SD)	73.2±6.9	75.2±4.4	.859*
Years of education	(mean±SD)	9.2±3.9	9.0±4.0	.202*
Sex, males	(%)	18 (67%)	11 (37%)	.024#
Mini Mental State Examination	0-30 adjusted score	27.8±2.3	23.9±2.6	.001*
	(% impaired performance)	1 (4%)	12 (41%)	.002#
ROCF Immediate copy	0-36 adjusted score	24.9±7.9	30.6±4.2	.002*
	(% impaired performance)	22 (81%)	12 (40%)	.001#
ROCF Delayed recall	0-36 adjusted score	13.4±5.9	9.9±4.7	.020*
	(% impaired performance)	12 (48%)	14 (47%)	.921#

Comparisons of BQSS executive scores

	Score range	v-MCI N=27	d-MCI N=30	p	d <sup>§</sup> with 95%CI (effect size)	Stroop test (time) N=57
Fragmentation	0-4	1.8±1.3	2.4±0.9	.035*	0.58 (0.05-1.11)	-.142° p=.291
Planning	0-4	1.8±1.0	2.4±0.8	.039*	0.56 (0.03-1.10)	-.285° p=.032
Organization	0-8	3.6±2.1	4.8±1.3	.017*	0.67 (0.14-1.21)	-.239° p=.074
Perseveration	0-4	2.9±1.2	3.5±0.8	.048*	0.55 (0.02-1.08)	.082° p=.542

\* Independent sample t tests

#  $\chi^2$  tests

§ Cohen's d (value and 95% confidence intervals), equal to unbiased Hedge's g

° Non parametric correlations, Spearman's Rho

## Conclusions

Differently from d-MCI, in v-MCI patients, executive dysfunctions seem to affect the performances in the immediate copy of the ROCF.

When analyzing ROCF performances, the use of a qualitative approach offers the possibility to evaluate patients' strategies during the reproduction, and thus to discriminate between executive and visuo-constructional abilities.