The association between performance on a test of motor sequencing and language abilities in neurodegenerative disorders.

The association between performance on a test of motor sequencing and language abilities in neurodegenerative disorders

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1. Introduction

The Edinburgh Motor Assessment Scale (EMAS) is a brief motor screening test, composed of 33 items in 4 domains: Extrapyramidal, Amyotrophic, Cerebellar, Complex[1].

Luria three-step examination is a well-established test to assess motor sequencing and has been incorporated in the Complex domain. The Luria three-step test can distinguish FTD from other disorders, as it reflects damage to the frontal area of the brain[2]. Evidence from different directions (evolution of language, language development in infants and language disorders) indicate the presence of a relationship between language and complex motor functions. The focus of this study was to explore this interaction.

2. Methods

. 223 dementia patients (99 females) of the Anne Rowling Regenerative Neurology Clinic.
. Complex motor functions assessment: Luria three-step test score (0 -3) from first EMAS
. Language functions assessment (obtained at the same time of patients' first EMAS):
-Clinical letters: presence and type of language impairment (word finding difficulties, frequent spelling mistakes, motor speech problem).
-ACE-III and ECAS subdomains
. Diagnosis obtained from clinical files.

3. Clinical Letters

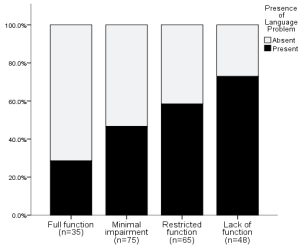
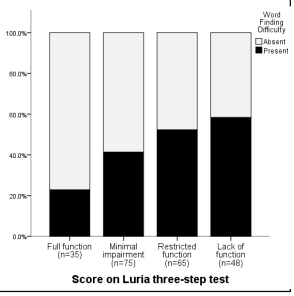


Figure 1: Analysis on the presence of a language impairment (n=223): Language problems are more often present when performance on the Luria three-step test is abnormal (χ^2=18.01, p<0.001, Cramer's V=0.284).

Figure 2: Analysis on the type of language impairment (n=223): A significant association was found between *word finding difficulties* and performance on the Luria test (χ^2=12.17, *p*=0.007, Cramer's V=0.234). There was no significant relationship between Luria score and the other two types of language impairment.



4. ACE-III and ECAS

ACE-III Subdomain	Kruskal-Wallis *H(3)*	*p-value*
Language	2.735	0.434
Fluency	9.970	0.019
Visuospatial	20.449	<0.001
Attention	18.564	<0.001
Memory	10.255	0.017

Table 1: Results from the ACE-III subdomains analysis (n=92): ACE-III Language was the only not significantly different ACE-III subdomain across the four categories of Luria performance.

ECAS Subdomain	Kruskal-Wallis *H(3)*	*p-value*
Language	8.936	0.030
Fluency	14.335	0.002
Visuospatial	18.011	<0.001
Executive	31.632	<0.001
Memory	14.797	0.002

Table 2: Results from the ECAS subdomains analysis (n=92): All ECAS subdomains correlated with language reports, but interestingly the correlation with language subtest was the weakest.

5. Clinical letters vs. cognitive tests

ACE-III Subdomain	Mann-Whitney *U*	*p-value*
Language	623	0.002
Fluency	534	<0.001
Visuospatial	515	<0.001
Attention	496.5	<0.001
Memory	787	0.077

Table 3: Analysis on data from cognitive letters and ACE-III (n=92): Patients performed worse on four ACE-III subdomains when language problems were reported in clinical letters, with the exception of Memory.

ECAS Subdomain	Mann-Whitney *U*	*p-value*
Language	593	0.001
Fluency	539	<0.001
Visuospatial	619	0.001
Executive	468.5	<0.001
Memory	822	0.135

Table 4: Analysis on data from cognitive letters and ECAS (n=92): Language problems are related to all ECAS subdomains, except in the case of ECAS Memory.

6. Conclusions

I. Analysis of clinical letters shows a particular relation between the Luria three-step test and language functions.
-Luria three-step examination is mainly related to higher-level motor sequencing rather than peripheral motor dysfunction.
II. The Language subdomains of ACE-III and ECAS seem to be measuring different aspects of language than those reported in clinical letters.
III. This could be due to the difference between word finding difficulties occurring in spontaneous speech (clinical letters) and confrontation naming (main part of ACE-III and ECAS Language subdomains).

Future directions:
. Investigate the relationship between language and other types of complex motor functions
. Compare the Luria three=step test to Boston Cookie Description (free speech)

7. References

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