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Is age an aggravating factor of cognitive impairment in multiple sclerosis (MS)?

Introduction

Cognitive disorders in MS are characterized by information processing speed (IPS), episodic and executive deficits (Chiaravalotti and DeLucas, 2008). If cognitive impairment in MS is now well documented, the relationships between age and cognitive impairment in MS remain poorly described (Bodling et al., 2009). Indeed, if MS represents a risk factor for the occurrence of cognitive impairment, one can wonder if age represent an aggravating factor on the importance of this impairment.

Objectives

Impact of age on cognition, comparison of MS patients (according to clinical form) and healthy subjects.

Method

Cognitive assessments: Episodic memory (Selective Reminding Test, SRT), IPS (Code), Working memory (digit span, forward/backward), Cognitive flexibility (Categorical and phonemic fluencies)

Table 1. Demographic and clinical characteristics. RR: Relapsing-remitting MS, SP: Secondary progressive, PP: Primary progressive, C: Controls

Sample Mean (SD)	RR (N = 193)	SP (N = 99)	PP (N = 29)	C (N = 258)
Age (years)	38,31 (8.6)	47,95 (9.28)	51,59 (8.53)	42,33 (10.99)
Education (years)	13,39 (2.78)	12,05 (2.65)	11,86 (3)	12,83 (2.65)
Female/male	147/46	66/33	16/13	165/93
Disease Duration	8,52 (7.34)	16,83 (9.2)	5,79 (5.58)	/
EDSS Score	3	6	6	/

Results

1) ANOVA : Age * Groupe (figure 1) :

- Group effect, with lower performance in MS patients, especially in progressive clinical forms, compared to control subjects on all cognitive functions;
- Negative impact of age on IPS, working memory and episodic memory,
 - regardless of the group,
 - regardless of the clinical form of MS,
 - No significant interaction effect between age and group (MS vs control/ among clinical forms of MS).

2) Moderation analyses via hierarchical linear regressions

- Negative impact of MS on all cognitive functions,
- Negative impact of age on learning abilities and IPS (whole sample),
- No significant age*group interaction.

Table 2. Contribution of the clinico-demographic variables to the prediction of cognitive status

Model	Variable	β	t	p
Education	SRT	0.126	3.43	***
	SRT (differed)	0.163	4.136	***
	Forward digit span	0.222	5.195	***
	Backward digit span	0.304	7.361	***
	IPS (Code)	0.266	7.193	***
	Fl. Cat.	0.284	7.18	***
Group	Fl. Ph.	-0.313	7.74	***
	SRT	0.461	13.25	***
	SRT (differed)	0.356	9.532	***
	Forward digit span	0.099	2.445	*
	Backward digit span	0.172	4.402	***
	IPS (Code)	0.378	10.828	***
Age	Fl. Cat.	0.336	8.985	***
	Fl. Ph.	0.272	7.118	***
	SRT	-0.237	-6.434	***
	SRT (differed)	-0.186	-4.693	***
	Forward digit span	-0.52	-1.209	NS
	Backward digit span	-0.067	-1.616	NS
Age * Group	IPS (Code)	-0.219	-5.915	***
	Fl. Cat.	-0.508	-0.508	NS
	Fl. Ph.	0.057	-1.407	NS
	SRT	-0.028	0.817	NS
	SRT (differed)	-0.028	0.740	NS
	Forward digit span	-0.089	-2.182	NS
* Group	Backward digit span	0.02	0.519	NS
	IPS (Code)	-0.033	-0.94	NS
	Fl. Cat.	-0.046	-0.046	NS
	Fl. Ph.	0.013	-0.013	NS

Discussion

While age had a negative impact on cognitive functioning, no differential effect of age was observed either between patients and healthy participants or between the different clinical forms of MS.

Our data support the results obtained in the literature on processing speed (Bodling et al., 2009) and extend these findings to other cognitive domains.

If MS is a risk factor for the occurrence of cognitive disorders, age does not seem to be an aggravating factor on the importance of these disorders.

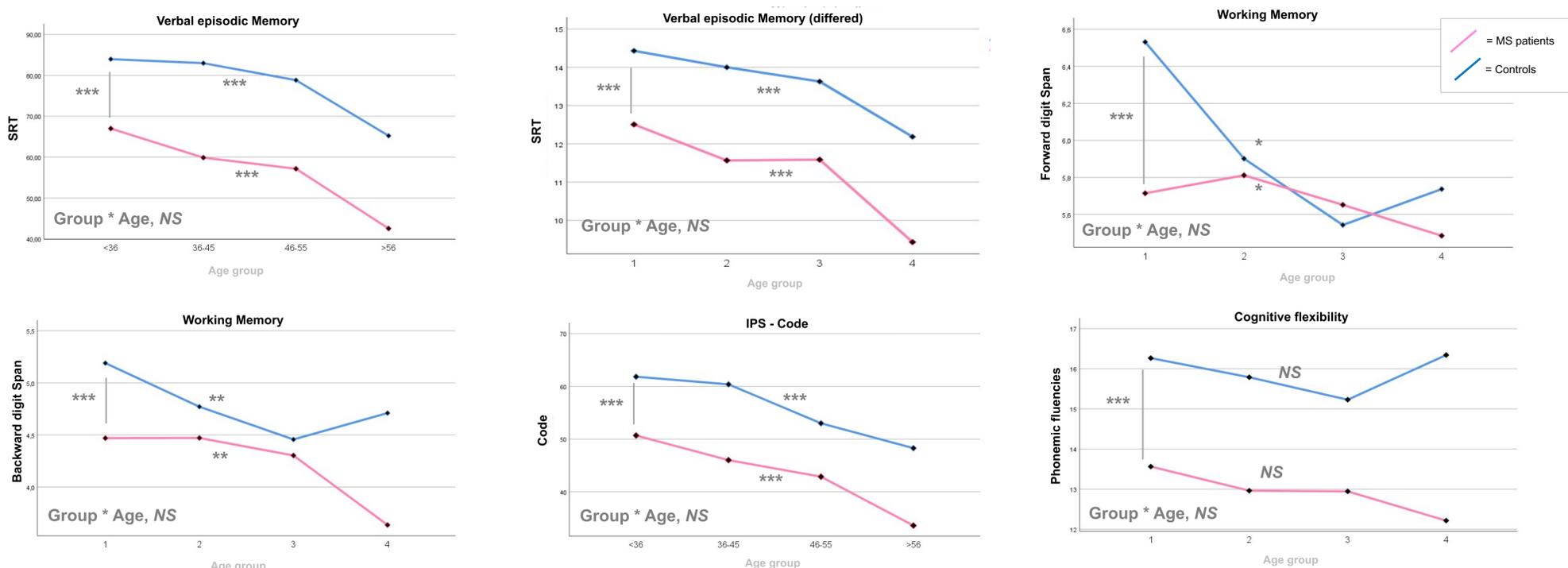


Figure 1. Cognitive performance by age group and group (MS, whole sample versus controls). *p < .05; ** p < .01; *** p < .001, NS : non-significant.

References

- 1, Bodling, A. M., Denney, D. R., & Lynch, S. G. (2009). Cognitive Aging in Patients with Multiple Sclerosis: A Cross-Sectional Analysis of Speeded Processing. *Archives of Clinical Neuropsychology*, 24(8), 761-767.
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