

## **Education Modulates the Impact of White Matter Lesions on the Risk of Mild Cognitive Impairment and Dementia.**

Marion Mortamais, Florence Portet, Adam Brickman, Frank Provenzano, Jordan Muraskin, Tasnime Akbaraly, Claudine Berr, Jacques Touchon, Alain Bonafé, Emmanuelle Le Bars, et al.

► **To cite this version:**

Marion Mortamais, Florence Portet, Adam Brickman, Frank Provenzano, Jordan Muraskin, et al.. Education Modulates the Impact of White Matter Lesions on the Risk of Mild Cognitive Impairment and Dementia.. American Journal of Geriatric Psychiatry, Elsevier, 2014, 22 (11), pp.1336-45. 10.1016/j.jagp.2013.06.002 . inserm-00916473

**HAL Id: inserm-00916473**

**<https://www.hal.inserm.fr/inserm-00916473>**

Submitted on 10 Dec 2013

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

## Education modulates the impact of white matter lesions on the risk of mild cognitive impairment and dementia

Marion Mortamais, M.Sc.<sup>1,2</sup>, Florence Portet, M.D.<sup>1,3,4</sup>, Adam M. Brickman, Ph.D.<sup>5</sup>, Frank A. Provenzano, Ph.D.<sup>5</sup>, Jordan Muraskin, Ph.D.<sup>5</sup>, Tasnime N Akbaraly, Ph.D.<sup>1,2,6</sup>, Claudine Berr, Ph.D.<sup>1,2</sup>, Jacques Touchon, M.D.<sup>1,2</sup>, Alain Bonafé, M.D.<sup>2,7</sup>, Emmanuelle le Bars, Ph.D.<sup>2,7</sup>, Nicolas Menjot de Champfleury, Ph.D.<sup>2,7</sup>, Jerome Maller, Ph.D.<sup>8</sup>, Chantal Meslin, Ph.D.<sup>9</sup>, Robert Sabatier, Ph.D.<sup>2</sup>, Karen Ritchie, Ph.D.<sup>1,2,10</sup>, Sylvaine Artero, Ph.D.<sup>1,2</sup>

<sup>1</sup>*Inserm, U1061, La Colombière Hospital, Montpellier, France*

<sup>2</sup>*University of Montpellier 1, Montpellier, France*

<sup>3</sup>*Unité transversale des troubles neurologiques du sujet âgé, CHU Caremeau, Centre Ruffi, Pôle de Gériatrie, CHU Nîmes, France*

<sup>4</sup>*Montpellier University Hospital, University Department of Adult Psychiatry, La Colombière Hospital, CHU de Montpellier, Montpellier, France*

<sup>5</sup>*Taub Institute for Research on Alzheimer's Disease and the Aging Brain, Columbia University College of Physicians and Surgeons, New York, United States*

<sup>6</sup>*Department of Epidemiology and Public Health, University College London, United Kingdom*

<sup>7</sup>*CHRU Montpellier, Montpellier, France*

<sup>8</sup>*Monash Alfred Psychiatry Research Centre, The Alfred & Monash University School of Psychology and Psychiatry, Melbourne, Australia*

<sup>9</sup>*Centre for Mental Health Research, Australian National University, Canberra, Australia*

<sup>10</sup>*Faculty of Medicine, Imperial College, St Mary's Hospital, United Kingdom*

### Corresponding Author

Sylvaine Artero  
Inserm U1061, Nervous System Pathologies: Epidemiological and  
Clinical Research,  
La Colombière Hospital,  
34093 Montpellier cedex 5, France  
Tel: +33 4 99 61 45 68  
Fax: +33 4 99 61 45 79

Email: [sylvaine.artero@inserm.fr](mailto:sylvaine.artero@inserm.fr)

**Table 1, Supplemental Material.** Influence of education on the relationship between WML load and risk of MCI during the 7-year follow-up (Cox proportional hazard model), n=486, n. of events=121. .... 3

**Table 2, Supplemental Material.** Influence of education on the relationship between WML load and risk of dementia during the 7-year follow-up (Cox proportional hazard model), n=637, n. of events=30. .... 4

**Table 1**, Supplemental Material. Influence of education on the relationship between WML load and risk of MCI during the 7-year follow-up (Cox proportional hazard model), n=486, n. of events=121.

In order to examine the influence of education on relationship between WML and MCI, the MCI baseline cases and the dementia cases were excluded.

Variables	Education level			
	High*		Low†	
	HR (95% CI)	<i>p</i>	HR (95% CI)	<i>p</i>
<b>WML volume</b>				
1 <sup>st</sup> tertile (<0.3ml)	1.0 (Referent)		1.0 (Referent)	
2 <sup>nd</sup> tertile (0.3-1.5ml)	0.68(0.40-1.16)	0.16	0.75(0.19-2.89)	0.67
3 <sup>rd</sup> tertile (>1.5ml)	1.02(0.58-1.81)	0.93	3.61(1.20-10.88)	0.02
<b>Total brain volume (ml)</b>	1.00(0.99-1.01)	0.40	1.00(0.99-1.01)	0.64
<b>Brain atrophy(%)</b>	1.13(1.04-1.23)	<0.01	1.05(0.86-1.27)	0.65
<b>Hippocampal volume (ml)</b>	1.11(0.81-1.54)	0.52	0.76(0.40-1.46)	0.41
<b>Presence of silent brain infarcts</b>				
No	1.0 (Referent)		1.0 (Referent)	
Yes	1.03(0.64-1.66)	0.90	1.74(0.77-3.91)	0.18
<b>Sex</b>				
Male	1.0 (Referent)		1.0 (Referent)	
Female	0.82(0.52-1.30)	0.41	1.12(0.40-3.10)	0.83
<b>APOE ε4 genotype</b>				
No	1.0 (Referent)		1.0 (Referent)	
Yes	1.26(0.74-2.14)	0.40	1.11(0.42-2.97)	0.83
<b>Depressive symptomatology</b>				
No	1.0 (Referent)		1.0 (Referent)	
Yes	1.76(1.06-2.93)	0.03	3.09(0.96-9.90)	0.06
<b>Previous history of vascular pathology</b>				
No	1.0 (Referent)		1.0 (Referent)	
Yes	1.10(0.49-2.47)	0.82	0.76(0.17-3.45)	0.72
<b>Hypertension</b>				
No	1.0 (Referent)		1.0 (Referent)	
Yes	0.94(0.60-1.46)	0.78	2.06(0.85-5.03)	0.11

\* n=362 , n. of events=92.

† n=122, n. of events=29.

Cox proportional hazard regression models with delayed entry were performed with age as the basic timescale and birth as the time origin.

**Table 2**, Supplemental Material. Influence of education on the relationship between WML load and risk of dementia during the 7-year follow-up (Cox proportional hazard model), n=637, n. of events=30.

In order to examine the influence of education on relationship between WML and dementia, the MCI baseline cases were included. The results should be interpreted with caution, because of the low number of events in each group.

Variables	Education level			
	High *		Low †	
	HR (95% CI)	<i>p</i>	HR (95% CI)	<i>p</i>
<b>WML volume (ml)</b>	1.02(0.99-1.05)	0.19	1.04(1.01-1.07)	0.02
<b>Total brain volume (ml)</b>	1.005(1.001-1.008)	0.01	1.00(0.99-1.01)	0.17
<b>Brain atrophy(%)</b>	1.21(0.97-1.51)	0.09	1.28(0.90-1.84)	0.76
<b>Hippocampal volume (ml)</b>	0.49(0.20-1.16)	0.10	0.18(0.06-0.54)	<0.01
<b>Presence of silent brain infarcts</b>				
No	1.0 (Referent)		1.0 (Referent)	
Yes	1.50(0.39-5.79)	0.55	2.40(0.78-7.39)	0.13
<b>Sex</b>				
Male	1.0 (Referent)		1.0 (Referent)	
Female	1.82(0.54-6.08)	0.33	0.44(0.11-1.84)	0.26
<b>APOE ε4 genotype</b>				
No	1.0 (Referent)		1.0 (Referent)	
Yes	2.39(0.71-8.06)	0.16	5.98(1.61-22.3)	<0.01
<b>Depressive symptomatology</b>				
No	1.0 (Referent)		1.0 (Referent)	
Yes	0.59(0.11-3.31)	0.55	3.31(0.85-12.9)	0.08
<b>Previous history of vascular pathology</b>				
No	1.0 (Referent)		1.0 (Referent)	
Yes	0.63(0.07-5.64)	0.68	3.54(0.67-18.7)	0.14
<b>Hypertension</b>				
No	1.0 (Referent)		1.0 (Referent)	
Yes	0.97(0.30-3.15)	0.96	0.24(0.06-0.98)	0.05

\* n=471 , n. of events=14.

† n=166, n. of events=16.

Cox proportional hazard regression models with delayed entry were performed with age as the basic timescale and birth as the time origin.