Supplementary File

APOE e4-Genotype and Lifestyle Interaction on Cognitive Performance: Results of the LIFE-Adult-Study

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Table A.1. Effect estimates of the generalized linear models for each lifestyle factor separately on the level of cognitive performance in the TMT B and the VFT, adjusted for APOE e4-allele, APOE e2 allele, age, gender, education, stroke, and heart attack.

Lifestyle factors	Trail Making Test[§]					Verbal Fluency Test				
	BIC	ß (CI95%)	SE	Wald x^2	p	BIC	ß (CI95%)	SE	Wald x^2	p
Model on Smoking[$]										
Nonsmoker	72,309	REF				48,432	REF			
Yes, former smoker		-3.60 (-5.16; -2.04)	0.796	20.441	<0.001		0.50 (0.18; 0.83)	0.167	9.098	0.003
Yes, current smoker		4.82 (3.03; 6.61)	0.913	27.895	<0.001		-0.36 (-0.73; 0.01)	0.189	3.697	0.055
APOE e4, No		REF					REF			
APOE e4, Yes		0.54 (-1.06; 2.14)	0.816	0.437	0.508		-0.31 (-0.35; 0.29)	0.165	0.034	0.853
Model on Physical Activity (PA)[$]										
Less than moderate PA	72,279	REF				48,424	REF			
At least moderate PA		-10.63 (-13.1; -8.20)	1.238	73.749	<0.001		0.95 (0.52; 1.38)	0.219	18.627	<0.001
APOE e4, No		REF					REF			
APOE e4, Yes		0.75 (-0.86; 2.35)	0.816	0.833	0.361		-0.03 (-0.35; 0.29)	0.165	0.027	0.870
Model on Overweight[$]										
Normal weight	72,361	REF				48,453	REF			
Overweight		0.87 (-0.55; 2.32)	0.732	1.466	0.226		-0.17 (-0.47; 0.14)	0.154	1.163	0.281
APOE e4, No		REF					REF			
APOE e4, Yes		0.57 (-1.04; 2.18)	0.822	0.484	0.487		-0.02 (-0.35; 0.30)	0.165	0.016	0.899
Model on Occupational attainment (OA)[$]										
Low OA	72,311	REF				48,401	REF			
High OA		-5.57 (-7.08; -4.06)	0.771	52.206	<0.001		1.17 (0.86; 1.49)	0.160	53.537	<0.001
APOE e4, No		REF					REF			
APOE e4, Yes		0.49 (-1.11; 2.09)	0.818	0.358	0.550		-0.01 (-0.34; 0.31)	0.165	0.006	0.939

Notes: § - higher scores indicate a poorer performance, $ - adjusted for APOE e4-allele, APOE e2 allele, age, gender, education, stroke, and heart attack (estimates of confounding variables not shown), ß – coefficient, BIC – Bayesian Information Criteria, CI95% - 95% confidence interval, n – number of individuals, p – level of significance, SE – standard error, Wald x^2 – Wald chi-square of the estimate of the respective lifestyle factor.

Table A.2. Estimates of interaction effects between each lifestyle factors separately and the APOE e4-allele on the level of cognitive performance in the TMT B and the VFT, as predicted by the generalized linear models, adjusted for APOE e2 allele, age, gender, education, stroke, and heart attack.

Lifestyle factor	Trail Making Test B[§]					Verbal Fluency Test				
	Model	Effect estimates of lifestyle factor				Model	Effect estimates of lifestyle factor			
	BIC	ß (CI95%)	SE	Wald x^2	p	BIC	ß (CI95%)	SE	Wald x^2	p
Model on Smoking[$]										
Currently Smoking[1]	72,313	4.17 (2.17; 6.18)	1.025	16.582	<0.001	48,450	-0.42 (-0.83; 0.00)	0.213	3.806	0.051
Former Smokier		-3.77 (-5.55; -1.99)	0.909	17.24	<0.001		0.46 (0.08; 0.83)	0.191	5.74	0.017
APOE e4[1]		-0.33 (-2.65; 1.99)	1.184	0.076	0.783		-0.14 (-0.61; 0.33)	0.239	0.396	0.566
APOE e4*Currently Smoking		2.88 (-1.29; 7.05)	2.129	1.826	0.177		0.23 (-0.61; 1.06)	0.427	0.285	0.594
APOE e4*Former Smoker		0.78 (-1.85; 4.41)	1.669	0.179	0.672		0.19 (-0.56; 0.93)	0.427	0.240	0.624
Model on Physical Activity[$]										
Moderate physical activity[2]	72,287	-10.90 (-13.64; -8.16)	1.397	60.90	<0.001	48,433	0.98 (0.49; 1.47)	0.249	15.366	<0.001
APOE e4[1]		0.433 (-6.02; 5.16)	2.652	0.023	0.879		0.09 (-0.86; 1.05)	0.488	0.039	0.843
APOE e4*moderate physical activity		1.28 (-4.54; 7.10)	2.971	0.185	0.667		-0.14 (-1.15; 0.88)	0.518	0.072	0.788
Model on Occupational Attainment[$]										
High occupational attainment[3]	72,319	-5.27 (-6.94; -3.41)	0.851	38.280	<0.001	48,399	1.16 (0.81; 1.51)	0.178	42.606	<0.001
APOE e4[1]		1.15 (-1.10; 3.41)	1.150	1.003	0.317		-0.19 (-0.47; -0.04)	0.220	0.026	0.872
APOE e4*high occupational attainment		-1.34 (-4.51; 1.84)	1.620	0.683	0.408		0.19 (-0.59; 0.05)	0.329	0.025	0.875

Notes: § - higher scores indicate a poorer performance, $ - adjusted for APOE e4-allele, APOE e2 allele, age, gender, education, stroke, and heart attack (estimates of confounding variables not shown), 1 – reference category is "no"; 2 – reference category is "less than moderate", 3 – reference category is "low", ß – coefficient, BIC – Bayesian Information Criteria, CI95% - 95% confidence interval, n – number of individuals, p – level of significance, SE – standard error, Wald x^2 – Wald chi-square of the estimate of the respective lifestyle factor.

Table A.3. Estimates of interaction effects between each lifestyle factors separately, the APOE e4-allele, and age on the level of cognitive performance in the TMT B and the VFT, as predicted by the generalized linear models, adjusted for APOE e2 allele, gender, education, stroke, and heart attack.

		Trail Making Test B[§]					Verbal Fluency Test				
		Model	Effect estimates of lifestyle factor				Model	Effect estimates of lifestyle factor			
		BIC	ß (CI95%)	SE	Wald x^2	p	BIC	ß (CI95%)	SE	Wald x^2	p
Model on Smoking[$]											
Current Smoker	Yes[1]	72,331	-0.76 (0.54; 12.83)	5.949	4.546	0.898	48,494	-0.99 (-3.56; 1.38)	0.669	0.667	0.414
Former Smoker	Yes[1]		7.08 (-12.42; 10.90)	4.764	0.016	0.137		-0.30 (-2.36; 1.76)	1.052	0.082	0.774
APOE e4	Yes[2]		-18.01 (-29.11; -6.91)	5.662	10.115	0.001		-0.16 (-2.70; 2.38)	1.296	0.016	0.899
Age			1.61 (1.51; 1.71)	0.052	976.433	<0.001		-0.13 (-0.15; -0.11)	0.010	160.052	<0.001
APOE e4*current smoker			10.18 (-12.86; 37.21)	12.771	0.909	0.340		0.41 (-4.65; 5.47)	2.579	0.025	0.873
APOE e4*former smoker			-2.67 (-21.09; 15.75)	9.398	0.081	0.776		0.29 (-3.86; 4.44)	2.117	0.018	0.892
Current smoker*age			0.09 (-0.13; 0.32)	0.115	0.688	0.407		0.01 (-0.03; 0.05)	0.022	0.217	0.641
Former smoke*age			-0.20 (-0.37; -0.03)	0.086	5.414	0.020		0.01 (-0.02; 0.05)	0.018	0.541	0.641
APOE e4*age			0.33 (0.12; 0.53)	0.103	9.865	0.002		0.00 (-0.04; 0.04)	0.021	0.001	0.980
APOE e4*current smoker *age			-0.16 (-0.65; 0.33)	0.250	0.395	0.530		-0.00 (-0.09, 0.09)	0.047	0.005	0.941
APOE e4*former smoker *age			0.06 (-0.27; 0.39)	0.171	0.138	0.711		-0.00 (-0.07; 0.07)	0.035	0.003	0.960
Model on Physical Activity[$]											
Physical activity	At least moderate[3]	72,256	29.55 (16.32; 42.78)	6.749	19.171	<0.001	48,456	-1.58 (-4.16; 1.00)	1.138	1.439	0.203
APOE e4	Yes[2]		-14.86 (-42.17; 12.4)	13.931	1.138	0.286		-3.45 (-8.75; 1.84)	2.701	1.634	0.201
Age			2.19 (1.95; 2.42)	0.120	331.693	<0.001		-0.16 (-0.19; 0.09)	0.021	3.909	<0.001
APOE e4*moderate physical activity			0.35 (-28.95; 28.25)	14.592	0.001	0.981		4.03 (-1.58; 9.64)	2.862	1.978	0.160
Moderate physical activity *age			-0.75 (-0.99; -0.51)	0.126	35.611	<0.001		0.04 (0.00; 0.09)	0.022	3.909	0.048
APOE e4*age			0.24 (-0.26; 0.75)	0.257	0885	0.347		0.06 (-0.03; 0.15)	0.045	1.811	0.178
APOE e4*moderate physical activity *age			-0.59 (-0.47; 0.57)	0.269	0.049	0.825		-0.07 (-0.16; 0.02)	0.048	2.220	0.136
Model on Occupational Attainment[$]											
Occupational attainment	High[4]	72,319	15.02 (6.95; 23.09)	4.117	13.304	<0.001	48,425	1.21 (-0.52; 2.93)	0.881	1.871	0.171
APOE e4	Yes[2]		-9.05 (-20.98; 2.89)	6.089	2.208	0.137		0.02 (-2.35; 2.39)	1.208	0.000	0.985
Age			1.75 (1.64; 1.86)	0.057	952.353	<0.001		-0.13 (-0.15; -0.11)	0.011	142.304	<0.001
APOE e4*high occupational attainment			-11.36 (-27.67; 4.96)	8.325	1.861	0.173		0.16 (-3.37; 3.69)	1.804	0.008	0.928
High occupational attainment *age			-0.38 (-0.53; -0.23)	0.076	25.256	<0.001		-0.00 (-0.03; 0.03)	0.015	0.003	0.959
APOE e4*age			0.19 (-0.03; 0.42)	0.115	2.797	0.094		-0.00 (-0.04; 0.04)	0.021	0.002	0.960
APOE e4*high occupational attainment *age			0.18(-0.12; 0.49)	0.154	1.403	0.236		-0.02 (-0.06; 0.06)	0.031	0.004	0.953

Notes: § - higher scores indicate a poorer performance, $ - adjusted for APOE e4-allele, APOE e2 allele, age, gender, education, stroke, and heart attack (estimates of confounding variables not shown), 1 – reference category is "Nonsmoker", 2 – reference category is "no"; 3 – reference category is "less than moderate", 4 – reference category is "low", ß – coefficient, BIC – Bayesian Information Criteria, CI95% - 95% confidence interval, n – number of individuals, p – level of significance, SE – standard error, Wald x^2 – Wald chi-square of the estimate of the respective lifestyle factor.