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35 social contact mode and 15-year episodic memory trajectories in older adults with and without hearing loss: the Elsa study

Supplementary File 1. Tables and Figures

Supplementary Figure 1 Modes of social network engagement among participants over time. Source: ELSA waves 1-8.

Supplementary Table 1 Associations between number of social contact modes and episodic memory. Source: ELSA waves 1-8.

	Total sample [a]	No hearing loss [a]	Hearing loss [a]
Social engagement mode, reference: Infrequent			
Frequent use of 1 mode	0.05 (0.10)	-0.15 (0.11)	0.56 (0.22)*
Frequent use of 2 modes	0.25 (0.09)**	0.03 (0.11)	0.90 (0.20)***
Frequent use of 3 modes	0.70 (0.09)***	0.49 (0.11)***	1.36 (0.21)***
Hearing loss	-0.24 (0.03)***	-	-
Sociodemographic factors			
Age	-0.09 (0.00)***	-0.08 (0.00)***	-0.11 (0.00)***
Female	0.75 (0.04)***	0.75 (0.04)***	0.66 (0.07)***
Marital status, reference: married			
Single	-0.07 (0.07)	-0.13 (0.08)	0.04 (0.15)
Separated/divorced	0.02 (0.05)	0.04 (0.05)	0.05 (0.11)
Widowed	-0.19 (0.04)***	-0.21 (0.05)***	-0.05 (0.09)
Education, reference: less than high school			
High school	1.34 (0.05)***	1.32 (0.06)***	1.20 (0.10)***
College or higher	1.70 (0.04)***	1.68 (0.04)***	1.56 (0.08)***
Income, reference: 1st quintile (lowest)			
2nd	0.12 (0.03)***	0.17 (0.04)***	-0.01 (0.08)
3rd	0.34 (0.04)***	0.39 (0.04)***	0.22 (0.08)*
4th	0.48 (0.04)***	0.53 (0.04)***	0.40 (0.09)***
5th quintile *(highest)*	0.58 (0.04)***	0.62 (0.05)***	0.65 (0.10)***
Work, reference: employees			
Volunteers	0.33 (0.04)***	0.32 (0.04)***	0.30 (0.10)**
None of them	0.00 (0.03)	-0.02 (0.03)	-0.03 (0.08)
Lifestyle factors			
Smoking, reference: non-smoker			
Past smoker	-0.05 (0.03)	-0.05 (0.04)	0.03 (0.07)
Current smoker	-0.22 (0.05)***	-0.23 (0.05)***	-0.15 (0.10)
Drink regularly	0.09 (0.03)**	0.10 (0.03)**	0.12 (0.07)
Moderate physical activity	0.30 (0.02)***	0.29 (0.02)***	0.38 (0.05)***
Vigorous physical activity	0.16 (0.03)***	0.15 (0.03)***	0.27 (0.07)***
Comorbidity			
Hypertension	0.02 (0.03)	0.03 (0.03)	-0.02 (0.06)
Heart disease	-0.03 (0.03)	-0.02 (0.04)	-0.05 (0.07)
Diabetes mellitus	-0.06 (0.05)	-0.12 (0.05)*	-0.04 (0.09)
Stroke	-0.77 (0.07)***	-0.74 (0.08)***	-0.72 (0.13)***
Intercept	9.44 (0.11)***	9.65 (0.13)***	8.86 (0.24)***

Note: [a] Presented are coefficients and standard errors. * $p < .05$; ** $p < .01$; *** $p < .001$.

Supplementary Table 2 Associations between social contact mode, social network size, and episodic memory. Source: ELSA waves 1-8.

	Total sample [a]	No hearing loss [a]	Hearing loss [a]
Social engagement mode, reference: Infrequent			
Frequent offline only	0.26 (0.20)	0.05 (0.24)	0.68 (0.39)
Frequent offline and online	0.78 (0.20)***	0.58 (0.24)*	1.19 (0.40)**
Large network size	-0.05 (0.03)	-0.03 (0.03)	-0.20 (0.08)*
Hearing loss	-0.28 (0.03)***	-	-
Sociodemographic factors			
Age	-0.08 (0.00)***	-0.08 (0.00)***	-0.10 (0.00)***
Female	0.69 (0.04)***	0.70 (0.05)***	0.67 (0.09)***
Marital status, reference: married			
Single	0.06 (0.18)	-0.07 (0.19)	0.84 (0.45)
Separated/divorced	0.04 (0.06)	0.04 (0.06)	0.09 (0.13)
Widowed	-0.23 (0.05)***	-0.22 (0.06)***	-0.15 (0.12)
Education, reference: less than high school			
High school	1.21 (0.06)***	1.21 (0.07)***	1.12 (0.13)***
College or higher	1.54 (0.05)***	1.53 (0.05)***	1.51 (0.10)***
Income, reference: 1st quintile (lowest)			
2nd	0.12 (0.04)***	0.17 (0.05)**	-0.06 (0.10)
3rd	0.31 (0.05)***	0.36 (0.05)***	0.12 (0.11)
4th	0.47 (0.05)***	0.50 (0.05)***	0.41 (0.11)***
5th quintile *(highest)*	0.59 (0.05)***	0.62 (0.06)***	0.60 (0.12)***
Work, reference: employees			
Volunteers	0.31 (0.05)***	0.30 (0.05)***	0.27 (0.13)*
None of them	-0.01 (0.03)	-0.03 (0.04)	-0.07 (0.09)
Lifestyle factors			
Smoking, reference: non-smoker			
Past smoker	-0.09 (0.04)*	-0.08 (0.05)	-0.08 (0.09)
Current smoker	-0.28 (0.06)***	-0.30 (0.06)	-0.21 (0.13)
Drink regularly	0.09 (0.04)*	0.10 (0.04)*	0.16 (0.09)
Moderate physical activity	0.29 (0.03)***	0.27 (0.03)***	0.34 (0.07)***
Vigorous physical activity	0.16 (0.03)***	0.15 (0.04)***	0.29 (0.09)***
Comorbidity			
Hypertension	0.04 (0.04)	0.06 (0.04)	-0.03 (0.08)
Heart disease	-0.03 (0.04)	-0.02 (0.05)	-0.01 (0.09)
Diabetes mellitus	-0.04 (0.06)	-0.08 (0.07)	-0.02 (0.12)
Stroke	-0.69 (0.09)***	-0.70 (0.11)***	-0.52 (0.17)**
Intercept	9.59 (0.21)***	9.76 (0.26)***	9.24 (0.42)***

Note: [a] Presented are coefficients and standard errors. * $p < .05$; ** $p < .01$; *** $p < .001$.

Supplementary Table 3 Associations between social contact mode, sensory loss, and episodic memory. Source: ELSA waves 1-8.

	Coeff (SE)[a]
Social engagement mode, reference: Infrequent	
Frequent offline only	0.23 (0.09)*
Frequent offline and online	0.70 (0.09)***
Single sensory loss	-0.20 (0.02)***
Dual sensory loss	-0.52 (0.05)***
Sociodemographic factors	
Age	-0.09 (0.00)***
Female	0.76 (0.04)***
Marital status, reference: married	
Single	-0.07 (0.07)
Separated/divorced	0.03 (0.05)
Widowed	-0.18 (0.04)***
Education, reference: less than high school	
High school	1.32 (0.05)***
College or higher	1.68 (0.04)***
Income, reference: 1st quintile (lowest)	
2nd	0.12 (0.03)***
3rd	0.33 (0.04)***
4th	0.48 (0.04)***
5th quintile *(highest)*	0.57 (0.04)***
Work, reference: employees	
Volunteers	0.33 (0.04)***
None of them	0.01 (0.03)
Lifestyle factors	
Smoking, reference: non-smoker	
Past smoker	-0.04 (0.03)
Current smoker	-0.20 (0.05)***
Drink regularly	0.09 (0.03)**
Moderate physical activity	0.29 (0.02)***
Vigorous physical activity	0.16 (0.03)***
Comorbidity	
Hypertension	0.03 (0.03)
Heart disease	-0.02 (0.03)
Diabetes mellitus	-0.06 (0.05)
Stroke	-0.76 (0.07)***
Intercept	9.46 (0.11)***

Note: [a] Presented are coefficients and standard errors.* $p < .05$; ** $p < .01$; *** $p < .001$.

Supplementary Table 4 Growth curve models predicting episodic memory scores in participants with interactions between hearing loss and each of the covariate. Source: ELSA waves 1-8.

	All respondents
Hearing loss	-0.68 (0.23)**
Social engagement mode, reference: Infrequent	
Frequent offline only	0.02 (0.11)
Frequent offline and online	0.52 (0.11)***
Frequent offline only*hearing loss	0.82 (0.21)***
Frequent offline and online*hearing loss	0.73 (0.21)***
Sociodemographic factor	
Age	-0.09 (0.00)***
Age*hearing loss	-0.01 (0.00)**
Female	0.77 (0.04)***
Female*hearing loss	-0.04 (0.06)
Marital status, reference: married	
Single	-0.14 (0.08)
Separated/divorced	0.02 (0.05)
Widowed	-0.17 (0.05)***
Single*hearing loss	0.26 (0.13)
Separated/divorced*hearing loss	0.00 (0.10)
Widowed*hearing loss	-0.01 (0.08)
Education, reference: less than high school	
High school	1.33 (0.06)***
College or higher	1.71 (0.04)***
High school*hearing loss	0.05 (0.09)
College or higher*hearing loss	-0.06 (0.07)
Income, reference: 1st quintile (lowest)	
2nd	0.17 (0.04)***
3rd	0.37 (0.04)***
4th	0.52 (0.04)***
5th quintile (highest)	0.59 (0.04)***
2nd *hearing loss	-0.17 (0.08)*
3rd *hearing loss	-0.14 (0.08)
4th *hearing loss	-0.14 (0.09)
5th quintile (highest) *hearing loss	0.01 (0.09)
Work, reference: employees	
Volunteers	0.33 (0.04)***
None of them	0.00 (0.03)
Volunteers*hearing loss	-0.04 (0.10)
None of them*hearing loss	-0.00 (0.07)
Lifestyle factors	
Smoking, reference: non-smoker	
Past smoker	-0.06 (0.04)
Current smoker	-0.22 (0.05)***
Past smoker*hearing loss	0.03 (0.06)
Current smoker*hearing loss	0.03 (0.09)
Drink regularly	0.09 (0.03)**

Drink regularly*hearing loss	-0.00 (0.07)
Moderate physical activity	0.29 (0.02)***
Moderate physical activity*hearing loss	0.04 (0.05)
Vigorous physical activity	0.15 (0.03)***
Vigorous physical activity*hearing loss	0.09 (0.07)
Comorbidity	
Hypertension	0.04 (0.03)
Hypertension*hearing loss	-0.08 (0.06)
Heart disease	-0.02 (0.04)
Heart disease*hearing loss	-0.06 (0.07)
Diabetes mellitus	-0.08 (0.05)
Diabetes mellitus*hearing loss	0.04 (0.09)
Stroke	-0.80 (0.08)***
Stroke*hearing loss	0.10 (0.12)
Intercept	9.56 (0.12)***

Note: [a] Presented are coefficients and standard errors. * $p < .05$; ** $p < .01$; *** $p < .001$

Supplementary Table 5 Effects of social contact variables and other covariates on episodic memory scores. Source: ELSA waves 1-8.
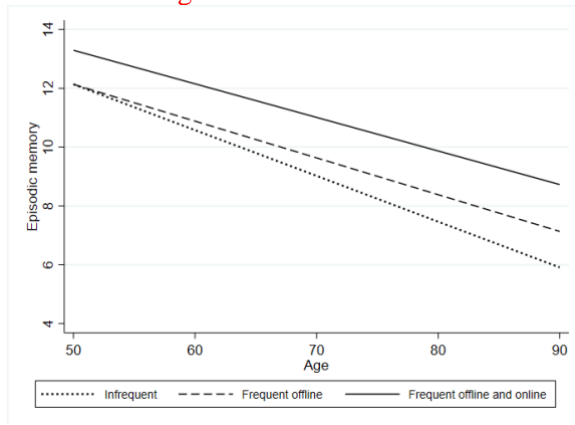
	Cohen's d (SE)
Social engagement mode, reference: Infrequent	
Frequent offline only	0.06 (0.007)
Frequent offline and online	0.19 (0.008)
Hearing loss	-0.07 (0.007)
Sociodemographic factors	
Age (reference: 50-59 years old)	
60-69	-0.06 (0.008)
70-79	-0.30 (0.009)
$\geq$80	-0.66 (0.01)
Female	0.22 (0.007)
Marital status, reference: married	
Single	-0.007 (0.01)
Separated/divorced	0.006 (0.01)
Widowed	-0.06 (0.01)
Education, reference: less than high school	
High school	0.39 (0.01)
College or higher	0.50 (0.007)
Income, reference: 1st quintile (lowest)	
2nd	0.01 (0.01)
3rd	0.07 (0.009)
4th	0.11 (0.009)
5th quintile (highest)	0.13 (0.009)
Work, reference: employees	
Volunteers	0.006 (0.01)
None of them	-0.07 (0.007)
Lifestyle factors	
Smoking, reference: non-smoker	
Past smoker	-0.01 (0.007)
Current smoker	-0.04 (0.01)
Drink regularly	0.03 (0.009)
Moderate physical activity	0.08 (0.008)
Vigorous physical activity	0.05 (0.009)
Comorbidity	
Hypertension	-0.01 (0.007)
Heart disease	-0.02 (0.009)
Diabetes mellitus	-0.03 (0.01)
Stroke	-0.22 (0.01)

Note: [a] Presented are Cohen's d (Standard Errors) values as indicators of effect size.
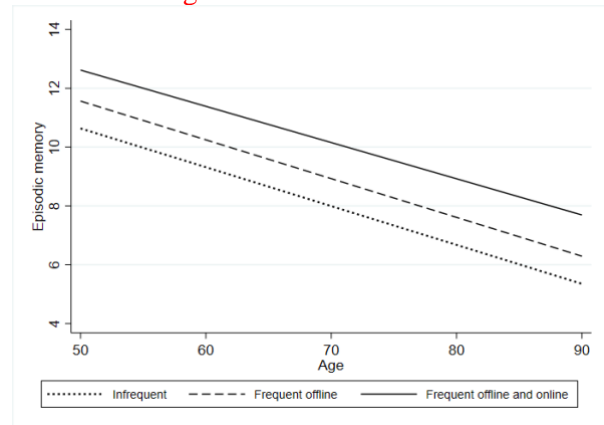
Supplementary Figure 2 Trajectories of unadjusted episodic memory scores and fully-adjusted episodic memory scores for participants with and without hearing loss. *Source: ELSA waves 1-8.*
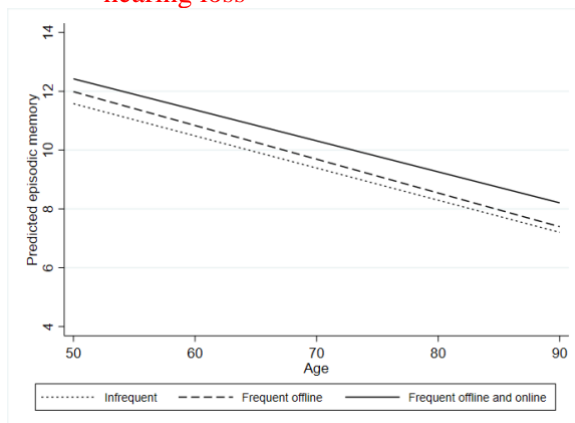
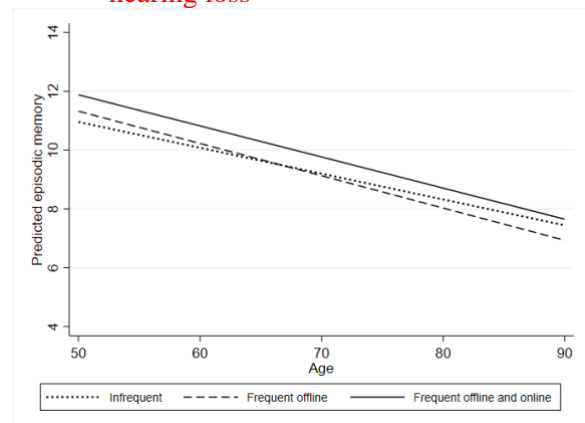A. Trajectory of unadjusted episodic memory score of respondents without hearing loss

B. Trajectory of unadjusted episodic memory score of respondents with hearing loss

C. Trajectory of fully-adjusted episodic memory score of respondents without hearing loss

D. Trajectory of fully-adjusted episodic memory score of respondents with hearing loss

Note: Figures C and D episodic memory sores as predicted by age, gender, education, income, health behaviour and the presence of comorbidities.