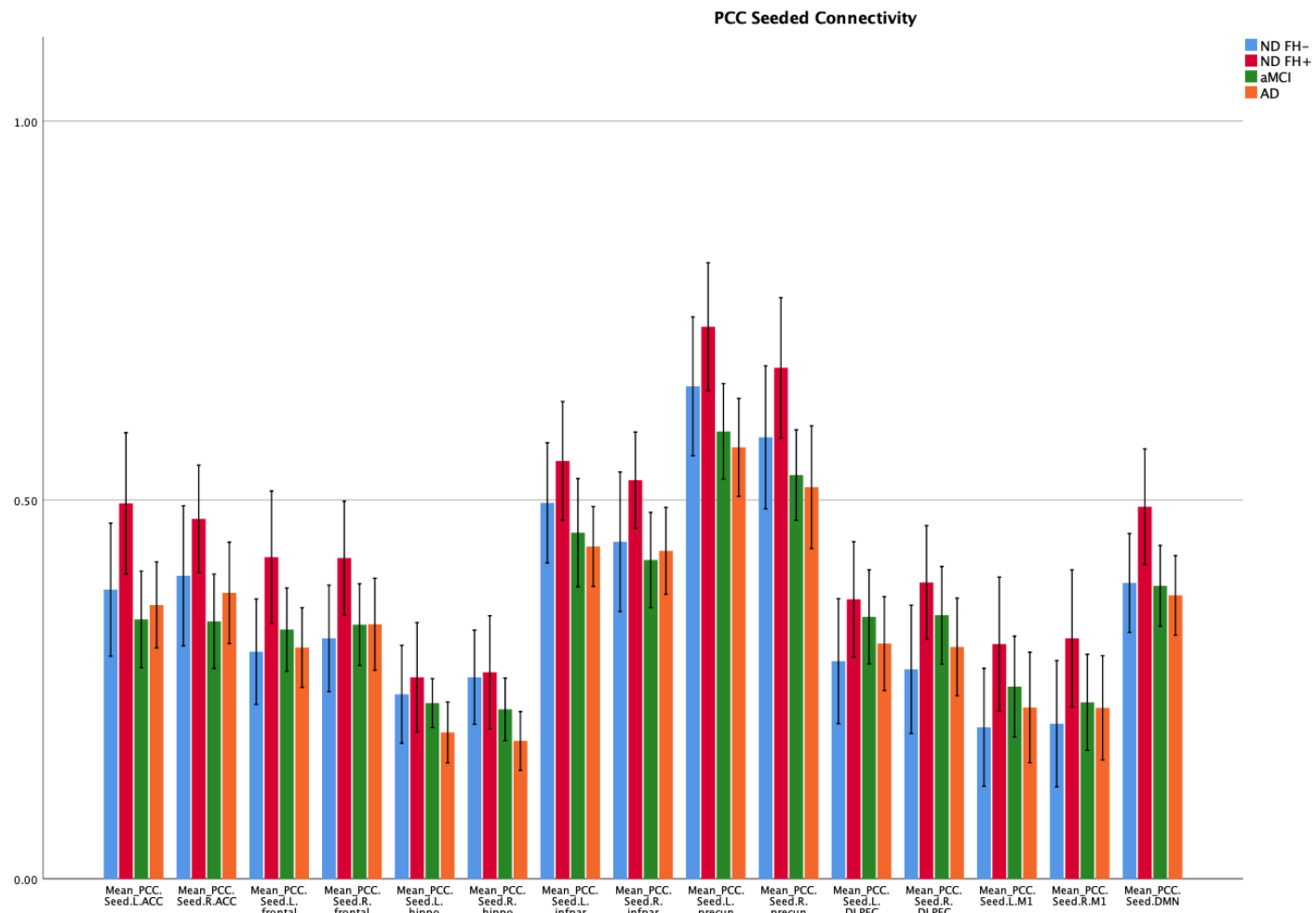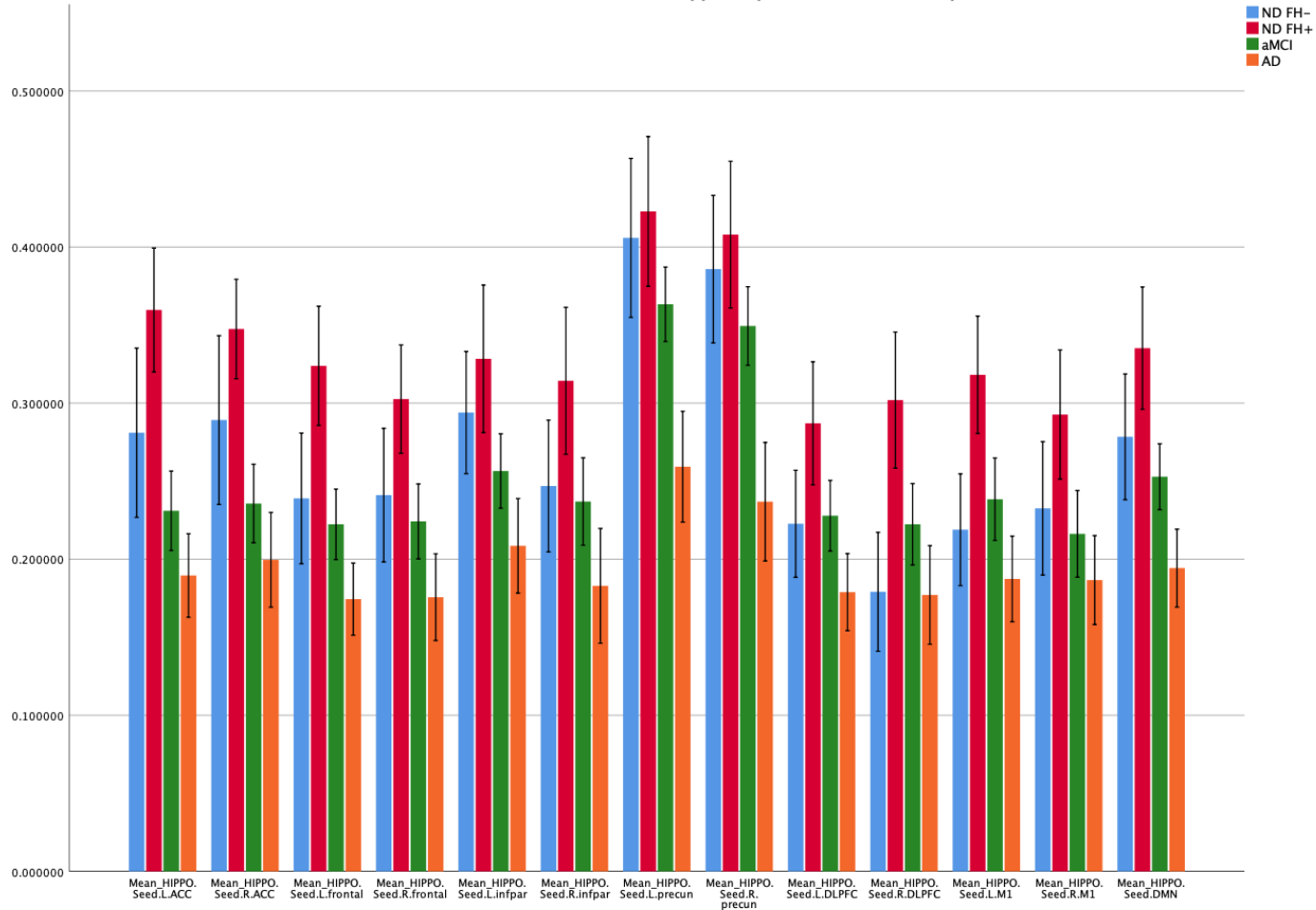# Supplementary Material

Increased Functional Connectivity of the Precuneus in Individuals with a Family History of Alzheimer's Disease

Supplementary Figures 1 (PCC), 2 (Precuneus), and 3 (Hippocampal) All Seed-Based Functional Connectivity Comparisons
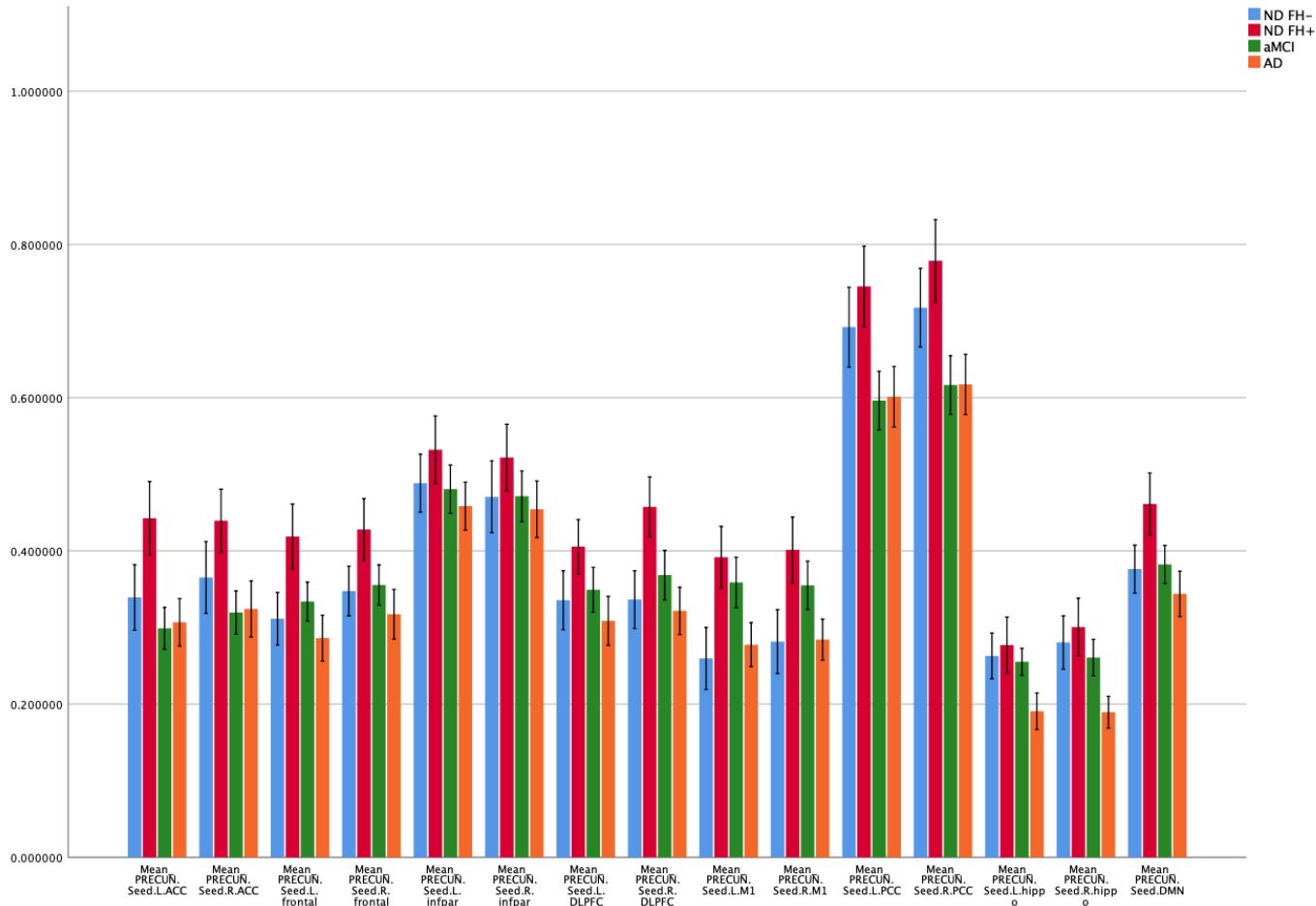
Hippocampus Seeded Connectivity

Error Bars: +/- 1 SE

Precuneus Seeded Connectivity

Resting state regional connectivity in fifteen different regions between cognitively healthy FH- (blue) and FH+ (red) individuals, along with MCI (green) and AD (purple). Bar graphs display the mean z-transformed correlation coefficients (y axis) for participants. PCC, posterior cingulate cortex; hippo, hippocampus; PreC, precuneus; M1, primary motor cortex; ACC, anterior cingulate cortex; frontal, middle and superior frontal cortex; DLPFC, dorsolateral prefrontal cortex; DMN, default mode network.

Supplementary Table 1. All Seed-Connectivity Analyses between Groups

	CH FH-	CH FH+	aMCI	AD	p FH- versus FH+	p Linear	p Nonlinear
n	11	14	32	21			
Mean_PCC.Seed.L.ACC	0.382 (0.15)	0.496 (0.17)	0.342 (0.18)	0.362 (0.13)	0.094	--	--
Mean_PCC.Seed.R.ACC	0.402 (0.15)	0.475 (0.13)	0.340 (0.18)	0.378 (0.15)	0.171	--	--
Mean_PCC.Seed.L.frontal	0.309 (0.12)	0.425 (0.16)	0.329 (0.15)	0.305 (0.12)	**0.041**	--	--
Mean_PCC.Seed.R.frontal	0.317 (0.12)	0.423 (0.14)	0.336 (0.15)	0.336 (0.14)	0.053	--	--
Mean_PCC.Seed.L.hippo	0.244 (0.11)	0.266 (0.14)	0.232 (0.09)	0.193 (0.09)	0.563	--	--
Mean_PCC.Seed.R.hippo	0.266 (0.10)	0.273 (0.14)	0.224 (0.12)	0.182 (0.09)	0.841	--	--
Mean_PCC.Seed.L.infpar	0.496 (0.13)	0.552 (0.15)	0.457 (0.20)	0.439 (0.12)	0.268	--	--
Mean_PCC.Seed.R.infpar	0.445 (0.15)	0.526 (0.12)	0.421 (0.18)	0.433 (0.13)	0.139	--	--
Mean_PCC.Seed.L.precun	0.651 (0.15)	0.729 (0.16)	0.591 (0.18)	0.569 (0.15)	0.221	--	--
Mean_PCC.Seed.R.precun	0.583 (0.16)	0.675 (0.17)	0.533 (0.17)	0.517 (0.19)	0.182	--	--
Mean_PCC.Seed.L.DLPFC	0.287 (0.14)	0.369 (0.14)	0.346 (0.18)	0.311 (0.14)	0.157	--	--
Mean_PCC.Seed.R.DLPFC	0.277 (0.14)	0.391 (0.14)	0.348 (0.18)	0.306 (0.15)	0.055	--	--
Mean_PCC.Seed.L.M1	0.200 (0.13)	0.310 (0.17)	0.254 (0.19)	0.226 (0.17)	0.073	--	--
Mean_PCC.Seed.R.M1	0.205 (0.14)	0.317 (0.17)	0.233 (0.18)	0.226 (0.16)	0.070	--	--

	CH FH-	CHFH+	aMCI	AD	p FH- versus FH+	p Linear	p Nonlinear
Mean_PCC.Seed.DMN	0.390 (0.11)	0.491 (0.14)	0.387 (0.15)	0.374 (0.12)	0.059	--	--

	CH FH-	CHFH+	aMCI	AD	p FH- versus FH+	p Linear	p Nonlinear
n	11	14	32	21			
Mean_HIPPO.Seed.L.ACC*	0.281 (0.18)	0.360 (0.15)	0.231 (0.14)	0.190 (0.12)	0.194	0.056	**0.004**
Mean_HIPPO.Seed.R.ACC	0.289 (0.18)	0.348 (0.12)	0.236 (0.14)	0.207 (0.14)	0.247	--	--
Mean_HIPPO.Seed.L.frontal*	0.239 (0.14)	0.324 (0.14)	0.222 (0.13)	0.174 (0.11)	0.142	0.088	**0.004**
Mean_HIPPO.Seed.R.frontal	0.241 (0.14)	0.303 (0.13)	0.224 (0.14)	0.176 (0.13)	0.234	--	--
Mean_HIPPO.Seed.L.infpar	0.294 (0.13)	0.328 (0.18)	0.257 (0.13)	0.209 (0.14)	0.508	--	--
Mean_HIPPO.Seed.R.infpar	0.247 (0.14)	0.314 (0.18)	0.237 (0.16)	0.183 (0.17)	0.224	--	--
Mean_HIPPO.Seed.L.PCC	0.401 (0.18)	0.419 (0.19)	0.343 (0.14)	0.299 (0.14)	0.738	--	--
Mean_HIPPO.Seed.R.PCC	0.411 (0.18)	0.416 (0.18)	0.355 (0.15)	0.285 (0.13)	0.868	--	--
Mean_HIPPO.Seed.L.precun*	0.406 (0.17)	0.423 (0.18)	0.363 (0.13)	0.259 (0.16)	0.776	**0.022**	**0.009**
Mean_HIPPO.Seed.R.precun*	0.386 (0.16)	0.408 (0.18)	0.349 (0.14)	0.237 (0.17)	0.714	**0.018**	**0.006**
Mean_HIPPO.Seed.L.DLPFC	0.223 (0.11)	0.287 (0.15)	0.228 (0.13)	0.179 (0.11)	0.201	--	--
Mean_HIPPO.Seed.R.DLPFC	0.179 (0.13)	0.302 (0.16)	0.222 (0.15)	0.177 (0.14)	**0.027**	--	--
Mean_HIPPO.Seed.L.M1*	0.219 (0.12)	0.318 (0.14)	0.238 (0.15)	0.187 (0.13)	0.087	0.205	**0.010**

					p	p	p
Mean_HIPPO.Seed.R.M1	0.233 (0.14)	0.293 (0.15)	0.216 (0.16)	0.187 (0.13)	0.344	--	--
Mean_HIPPO.Seed.DMN*	0.278 (0.13)	0.293 (0.15)	0.216 (0.12)	0.187 (0.11)	0.284	0.054	**0.005**

	CH FH-	CH FH+	aMCI	AD	p	p	p
n	11	14	32	21	FH- versus FH+	Linear	Nonlinear
Mean_PRECUN.Seed.L.ACC	0.339 (0.14)	0.442 (0.18)	0.299 (0.15)	0.307 (0.14)	0.120	--	--
Mean_PRECUN.Seed.R.ACC	0.365 (0.16)	0.439 (0.15)	0.320 (0.16)	0.324 (0.17)	0.194	--	--
Mean_PRECUN.Seed.L.frontal	0.311 (0.11)	0.419 (0.16)	0.334 (0.14)	0.286 (0.14)	0.070	--	--
Mean_PRECUN.Seed.R.frontal	0.348 (0.11)	0.428 (0.15)	0.355 (0.15)	0.317 (0.15)	0.130	--	--
Mean_PRECUN.Seed.L.infpar	0.488 (0.13)	0.532 (0.17)	0.481 (0.18)	0.458 (0.14)	0.362	--	--
Mean_PRECUN.Seed.R.infpar	0.471 (0.16)	0.522 (0.16)	0.471 (0.19)	0.454 (0.17)	0.368	--	--
Mean_PRECUN.Seed.L.DLPFC	0.336 (0.13)	0.406 (0.13)	0.349 (0.17)	0.309 (0.15)	0.194	--	--
Mean_PRECUN.Seed.R.DLPFC*	0.336 (0.12)	0.457 (0.15)	0.368 (0.18)	0.322 (0.14)	**0.038**	0.391	**0.025**
Mean_PRECUN.Seed.L.M1*	0.260 (0.13)	0.392 (0.15)	0.359 (0.19)	0.278 (0.13)	**0.036**	0.578	**0.045**
Mean_PRECUN.Seed.R.M1	0.282 (0.14)	0.401 (0.16)	0.355 (0.18)	0.284 (0.12)	0.059	--	--
Mean_PRECUN.Seed.L.PCC	0.692 (0.17)	0.745 (0.20)	0.596 (0.22)	0.601 (0.18)	0.491	--	--
Mean_PRECUN.Seed.R.PCC	0.717 (0.17)	0.779 (0.20)	0.616 (0.22)	0.617 (0.18)	0.429	--	--

Mean_PRECUN.Seed.L.hippo	0.263 (0.10)	0.277 (0.14)	0.255 (0.10)	0.191 (0.11)	0.755	--	--
Mean_PRECUN.Seed.R.hippo*	0.280 (0.12)	0.308 (0.14)	0.261 (0.13)	0.189 (0.09)	0.695	**0.039**	**0.045**
Mean_PRECUN.Seed.DMN	0.376 (0.10)	0.461 (0.15)	0.382 (0.14)	0.344 (0.14)	0.102	--	--

Values represent mean z-transformed correlation coefficient (standard deviation) between the seed region and target region. PCC, posterior cingulate cortex; ACC, anterior cingulate cortex; frontal, middle and superior frontal cortex; hippo, hippocampus; infpar, inferior parietal; precun, precuneus; DLPFC, dorsolateral prefrontal cortex; M1, primary motor cortex; DMN, default mode network. $p < 0.05$ in bold. * denotes significance in the omnibus test.