Supplemental Material for:

Genetic effects on the cerebellar role in working memory: same brain, different genes?

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Supplementary Table 1. Test-retest reliability, twin correlations, and univariate variance component estimates for sphere BOLD percent signal change measures.

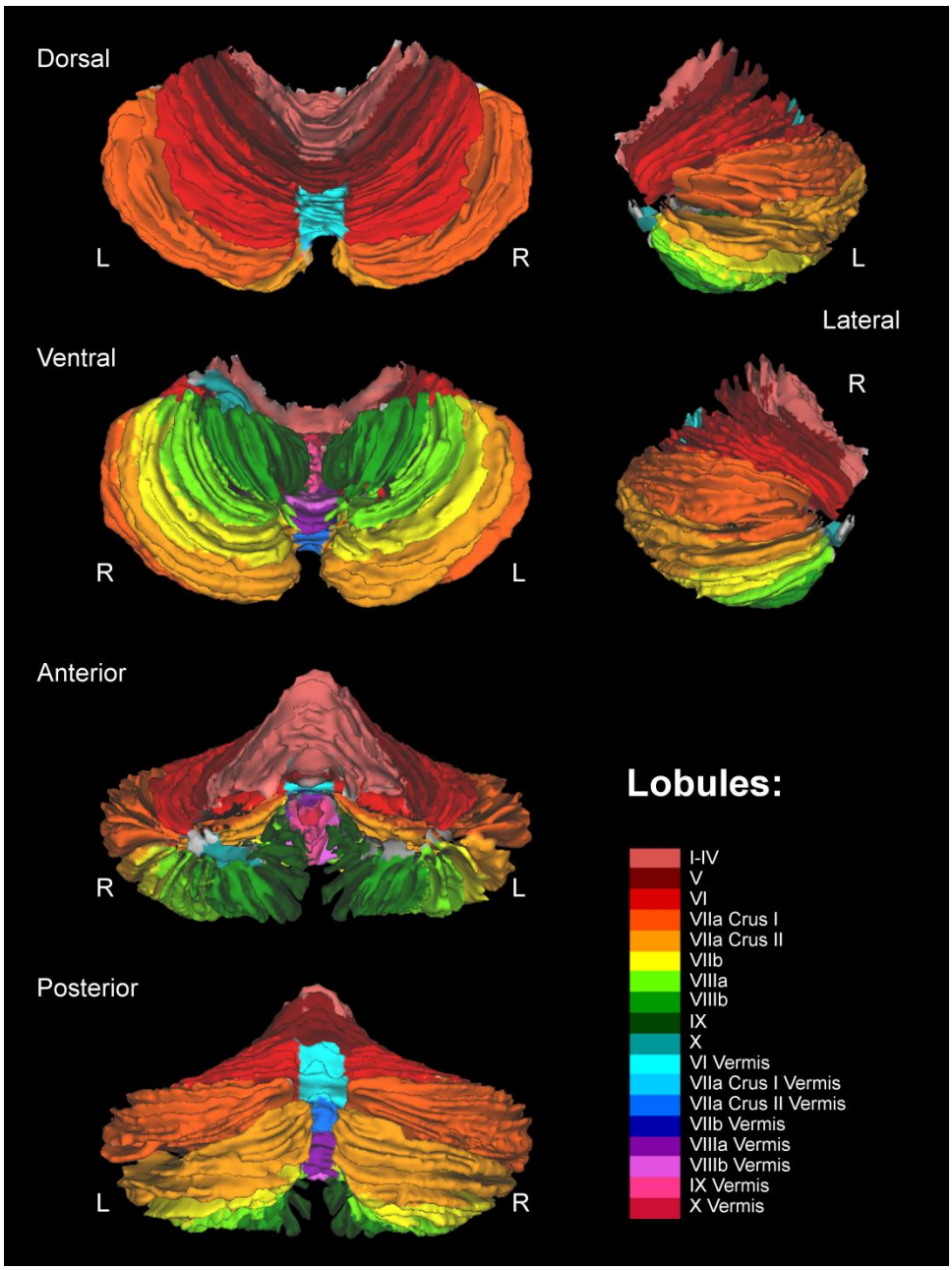
Area[a]	Centre of mass (MNI coordinates: *x;y;z*)	Test-retest reliability	Twin correlations *(95% CI)*[b]		AE variance component estimates *(95% CI)*[b]	
		ICC (95% CI)	r_{MZ}	r_{DZ}	*A%*	*E%*
L SFG (BA6)	-15;6;63	.40 (.01; .64)*	.25 (-.04; .48)	.09 (-.12; .30)	.23 (.00; .44)	.77 (.56; 1.00)
L Caudate	-18;9;15	.41 (.06; .67)*	.56 (.35; .70)	.13 (-.10; .35)	.52 (.30; .68)***	.48 (.32; .70)
L MFG	-24;9;51	.80 (.62; .90)***	.34 (.03; .56)	.19 (-.03; .38)	.35 (.11; .55)**	.65 (.45; .89)
L MFG	-27;3;51	.54 (.23; .75)**	.36 (.13; .54)	.14 (-.12; .37)	.34 (.13; .52)**	.66 (.48; .87)
L Insula	-33;21;0	.46 (.13; .70)**	.24 (-.08; .49)	.03 (-.17; .23)	.18 (.00; .41)	.82 (.59; 1.00)
L IFG pTri	-39;24;24	.85 (.71; .93)***	.25 (.01; .46)	.11 (-.13; .33)	.25 (.03; .44)*	.75 (.56; .97)
L IFG pTri	-42;24;30	.78 (.58; .89)***	.44 (.18; .62)	-.10 (-.32; .14)	.29 (.03; .52)*	.71 (.48; .97)
R Caudate	18;15;12	.54 (.22; .75)**	.49 (.24; .66)	.04 (-.18; .25)	.40 (.15; .60)**	.60 (.40; .85)
R Putamen	27;21;3	.43 (.09; .68)**	.25 (-.02; .46)	.16 (-.08; .38)	.26 (.04; .46)*	.74 (.54; .96)
R IFG pTri	45;30;27	.64 (.36; .81)***	.37 (.11; .57)	.01 (-.21; .23)	.28 (.04; .50)*	.72 (.50; .96)
R IFG pTri	48;27;30	.79 (.61; .90) ***	.28 (-.01; .51)	-.07 (-.28; .15)	.16 (.00; .40)	.84 (.60; 1.00)
R PreCG	48;6;45	.77 (.56; .88) ***	.02 (-.28; .31)	.41 (.23; .56)	.27 (.05; .46)*	.73 (.54; .95)
R IFG pOp	51;12;12	.63 (.36; .81) ***	.33 (.08; .53)	.16 (-.07; .37)	.33 (.11; .52)**	.67 (.48; .89)
R IFG pOp	51;12;18	.50 (.18; .73)**	.19 (-.09; .43)	.09 (-.14; .30)	.19 (.00; .40)	.81 (.60; 1.00)
L IX	-10;-56;-41	.52 (.20; .74)**	.40 (.11; .60)	.21 (.00; .40)	.41 (.17; .59)**	.59 (.41; .83)
L IX	-12;-52;-47	.68 (.43; .83)***	.30 (.05; .50)	.29 (.07; .48)	.35 (.15; .53)**	.65 (.47; .85)
L VIIa Crus II	-26;-70;-45	.73 (.51; .86)***	.29 (.03; .50)	.18 (-.05; .38)	.30 (.08; .49)**	.70 (.51; .92)
L VIIa Crus II	-28;-64;-39	.40 (.05; .66)*	.34 (.10; .53)	.22 (-.02; .42)	.36 (.15; .53)**	.64 (.47; .85)
L VI	-30;-40;-37	.49 (.16; .72)**	.27 (-.01; .49)	.27 (.03; .46)	.33 (.10; .51)**	.68 (.49; .90)
L VIIa Crus II	-34;-64;-47	.75 (.54; .87)***	.30 (.07; .48)	.11 (-.16; .36)	.29 (.08; .47)**	.71 (.53; .92)
L VI	-4;-80;-23	.54 (.23; .75)**	.28 (-.01; .50)	.02 (-.19; .24)	.21 (.00; .44)	.79 (.57; 1.00)
Vermis L VIIIa	-6;-64;-33	.40 (.17; .52)*	.34 (.07; .55)	.11 (-.11; .32)	.31 (.08; .51)*	.69 (.49; .92)
L IX	-8;-54;-45	.67 (.42; .83)***	.48 (.24; .64)	.15 (-.06; .35)	.44 (.22; .62)***	.56 (.38; .78)
L VI	-8;-76;-27	.43 (.09; .68)**	.37 (.07; .58)	-.02 (-.22; .19)	.23 (.00; .47)	.77 (.53; 1.00)
Vermis VIIIa	0;-58;-31	.41 (.06; .67)*	.37 (.12; .56)	.08 (-.16; .30)	.33 (.09; .52)**	.67 (.48; .91)
R VIIa Crus II	34;-62;-45	.68 (.42; .83)***	.41 (.16; .59)	.21 (-.06; .43)	.41 (.19; .58)**	.59 (.42; .81)
R VIIa Crus I	36;-60;-31	.47 (.14; .71)**	.36 (.10; .55)	.24 (.00; .44)	.38 (.16; .56)**	.62 (.44; .84)
R VIIa Crus I	38;-58;-39	.60 (.32; .79)***	.47 (.23; .63)	.32 (.08; .52)	.49 (.29; .64)***	.51 (.36; .71)
R VI	8;-76;-27	.46 (.12; .70)**	.47 (.22; .64)	-.06 (-.27; .16)	.32 (.07; .54)*	.68 (.46; .93)

P-values: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

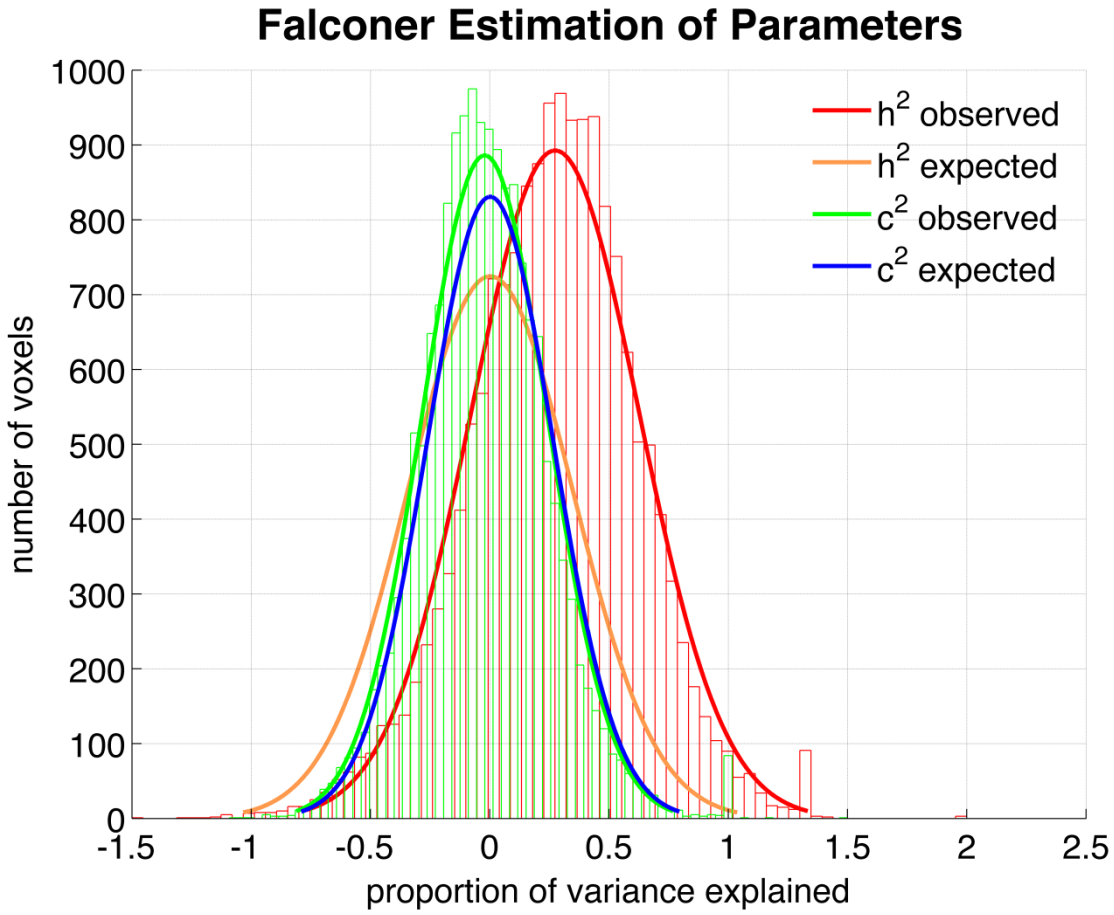
[a]Activation peaks were labeled using an image-based probabilistic atlas of the human cerebellum (Diedrichsen et al., 2009). Sphere size for all ROIs was 5 mm diameter (n voxels, n mm3).

[b]Twin correlations and variance component estimates are corrected for sex, age, and performance accuracy on 0-back and 2-back condition. Assumption testing supported homogeneity of means and variances across birth order and zygosity.

Abbreviations: A, genetic variance; AG, angular gyrus; BA, Brodmann area; E, unshared environmental variance; IFG, inferior frontal gyrus; IPL, inferior parietal lobule; L, left; MFG, middle frontal gyrus; MNI, Montréal Neurological Institute; MOG, middle occipital gyrus; MTG, middle temporal gyrus; PCG, precentral gyrus; PCUN, precuneus; POp, pars opercularis; PTr, pars triangularis; R, right; r_{DZ}, DZ twin correlation; r_{MZ}, MZ twin correlation; ROI, region of interest; SFG, superior frontal gyrus; SMA, supplementary motor area; SMG, superior medial gyrus; SOG, superior occipital gyrus; SPL, superior parietal lobule.



Supplementary Figure 1. Cerebellum lobular atlas.
Cerebellar regions are rendered in the space of the SUIT and SUIT* templates (e.g. Diedrichsen, 2006) on the Colin Cerebellar flatmap (Van Essen, 2002) using Caret (Van Essen Laboratory, Washington University School of Medicine, Saint Louis, Missouri, USA), separately for dorsal, ventral, lateral, anterior, and posterior views. Left-right orientation is indicated with L for left hemisphere and R for right hemisphere.



Supplementary Figure 2. Observed and expected sampling distributions for genetic and environmental parameters, where h^2 observed = [2*(r_{MZ} – r_{DZ})] and c^2 observed = [(2*r_{DZ}) – r_{MZ}] (Falconer and Mackay, 1996). Both h^2 and c^2 expected are normal distributions with a mean of zero and an expected sampling variance estimated as [4*((1 – r_{MZ}^2)^2 /m + (1 – r_{DZ}^2)^2 /n)] for h^2, and [(4*(1 – r_{DZ}^2)^2)/n + ((1 – r_{MZ}^2)^2 /m)] for c^2. Here, n and m refer to the numbers of MZ and DZ twin pairs, respectively, and r_{MZ} and r_{DZ} are set to zero under the null hypothesis of no heritability and no common environmental influence (Visscher, 2004).