Supplemental Table S1. Voxel-based whole brain SPM analysis: brain regions showing significant main effects in terms of hemodynamic responses to different working memory loads; 1, 2, and 3 back (P < 0.05, FWE cluster-level corrected across the whole brain with minimum cluster size 20 voxels)

			Coordinates				
Brain region	**BA**	**Laterality**	**x**	**y**	**z**	**Cluster size (voxels)**	**Z value**
1 back>0 back							
Inferior parietal lobule	40	R	46	-46	44	121	6.61
		L	-44	-42	38	754	6.31
Middle frontal gyrus	46	L	-46	32	30	153	6.42
		R	52	36	30	256	6.30
Middle frontal gyrus	6	R	32	6	62	47	5.97
2 back>0 back							
Inferior parietal lobule	40	R	40	-48	44	231	7.90
		L	-36	-52	46	190	7.75
Middle frontal gyrus	46	R	46	32	28	544	7.03
	9	L	-42	8	28	968	6.64
Anterior cingulate gyrus	32	R	8	18	48	354	6.88
		L	-4	10	58		
Insula	13	R	34	24	-2	151	6.47
Middle frontal gyrus	6	R	30	8	58	414	6.12
3 back>0 back							
Inferior parietal lobule	40	R	50	-42	42	287	8.01
		L	-48	-48	48	263	7.98
Middle frontal gyrus	9	L	-48	26	30	800	8
	46	R	48	40	30	542	7.99
Anterior cingulate gyrus	32	L	-10	26	30	333	7.53
		R	8	20	28		
Insula	13	L	-34	22	0	680	6.99
Thalamus	-	L	-12	-10	6	142	6.44
Inferior frontal gyrus	10	L	-44	46	2	319	5.98
	47	R	34	20	0	572	5.67

MNI coordinates denote the distance in mm from the anterior commissure, with positive x=right of midline, positive y=anterior to the anterior commissure, and positive z=dorsal to a plane containing both the anterior and the posterior commissures; BA=Brodmann area; L=left; R=right; FWE=Familywise Error; SPM, Statistical Parametric Mapping

Relationship of NEO-PI domain scores to effective connectivity in the 2-back experimental condition

Image processing, conventional fMRI analysis, volume of interest selection and model specification proceeded as described in the main manuscript. In the section to follow, model comparison and all subsequent analyses are restricted to the 2-back vs. 0-back condition that is often used in clinical populations.

As we have already shown (Dima et al., 2014), Bayesian Model Selection (BMS; Stephan et al., 2009) within the 2-back experimental condition identified two acceptable models. The winning model was the same as in the 3-back condition, with WM modulation being significant for the forward connection from the right PAR to the right DLPFC. However, the exceedance probability of this model in the 2-back condition was 60%. The second best fitting model, with exceedance probability of 40%, differed from the winning model only in terms of laterality as the WM modulation was significant for the forward connection from the left PAR to the left DLPFC. We then used random effects Bayesian Model Averaging (BMA) to obtain average connectivity estimates across all models for each participant (Penny et al., 2010) as BMA accommodates uncertainty about models when estimating the consistency and strength of connections

We conducted two regression analyses, one for each of the two best fitting models. In the first regression analysis, we used the BMA connectivity estimates of the forward connection from the right PAR to the right DLPFC of the winning model as a dependent variable in a forced regression model with age, sex, IQ and NEO-PI scores of all five personality domains as factors. This analysis showed that higher neuroticism scores were associated with reduced WM modulation of the connection from the right PAR to the right DLPFC (β=-0.77, $p<0.001$), while the opposite was the case for conscientiousness (β=0.84, $p < 0.001$). Agreeableness (β=-0.10, $p>0.3$), Extraversion (β=0.11, $p>0.3$), Openness to Experience (β=0.15, $p>0.3$), age (β=-0.09, $p>0.3$), sex (β=-0.12, $p>0.3$), and IQ (β=0.13, $p>0.3$), were not significant. The overall model fit was $R^2 = 0.44$.

In the second regression analysis, we used the BMA connectivity estimates of the forward connection from the left PAR to the left DLPFC of the second-best model as a dependent variable in a forced regression model with age, sex, IQ and NEO-PI scores of all five personality domains as factors. Again we found that higher neuroticism scores were associated with reduced WM modulation of the connection from the left PAR to the left DLPFC (β=-0.89, $p=0.001$), while the opposite was the case for conscientiousness (β=0.71, $p = 0.001$). Agreeableness (β=-0.01, $p>0.2$), Extraversion (β=0.02, $p>0.2$), Openness to Experience (β=0.17, $p>0.2$), age (β=-0.01, $p>0.2$), sex (β=-0.26, $p>0.2$), and IQ (β=0.03, $p>0.2$), were not significant. The overall model fit was $R^2 = 0.40$.

References

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