

Title	Characterising a stress-sensitive default mode network (DMN) deficit in major psychiatric disorders
Authors	King, S.;Zhang, Z.;Robinson, L.;Whelan, R.;Nees, F.;Bobou, M.;Banaschewski, T.;Barker, G.J.;Bokde, A.L.W.;Flor, H.;Grigis, A.;Garavan, H.;Gowland, P.;Heinz, A.;Brühl, R.;Martinot, J.-L.;Martinot, M.-L.P.;Artiges, E.;Poustka, L.;Hohmann, S.;Holz, N.;Baeuchl, C.;Smolka, M.N.;Vaidya, N.;Walter, H.;Winterer, J.;Broulidakis, M.J.;van Noort, B.M.;Stringaris, A.;Zhang, Y.;Sinclair, J.;Schumann, G.;Schmidt, U.;Desrivieres, S.;Cotter, D.;Young, A.H.;Donohoe, G.;Wolsztynski, E.
Publication date	2026-02-25
Original Citation	King, S, Zhang, Z, Robinson, L, Whelan, R, Nees, F, Bobou, M, Banaschewski, T, Barker, G J, Bokde, A L W, Flor, H, Grigis, A, Garavan, H, Gowland, P, Heinz, A, Brühl, R, Martinot, J-L, Martinot, M-LP, Artiges, E, Poustka, L, Hohmann, S, Holz, N, Baeuchl, C, Smolka, M N, Vaidya, N, Walter, H, Winterer, J, Broulidakis, M J, van Noort, B M, Stringaris, A, Zhang, Y, Sinclair, J, Schumann, G, Schmidt, U, Desrivieres, S, Cotter, D, Young, A H, Donohoe, G & Wolsztynski, E 2026, 'Characterising a stress-sensitive default mode network (DMN) deficit in major psychiatric disorders', Commun. Biolog., vol. 9, no. 1, 603. https://doi.org/10.1038/s42003-025-09400-1
Type of publication	Article (peer-reviewed)
Link to publisher's version	https://www.scopus.com/pages/publications/105037755781 - 10.1038/s42003-025-09400-1 https://www.scopus.com/pages/publications/105037755781?origin=resultslist
Rights	Publisher Copyright: © The Author(s) 2026. - https://creativecommons.org/licenses/by/4.0/
Download date	2026-10-28 17:56:01
Item downloaded from	https://hdl.handle.net/10468/18764



University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Supplementary Table 1 - Demographic, Clinical, Environmental, and Neuropsychological Data

<i>Cambridge Gambling Task (CGT)</i>																
CGT Delay Aversion	.22 (.21)	.17 (.14)			0.26	0.161	0.351	1719	.22 (.18)	.17 [.07, .26]	.26 (.22)	.05 [-.05, .14]	.2 (.24)	.26 [.17, .36]	.2 (.21)	.08 [-.02, .17]
CGT Deliberation Time	1605.6 (523.8)	1709.2 (4961.2)	<.001	4.3	-0.03	-0.12	0.068	1719	1647.9 (547.6)	-.02 [-.11, .08]	1512.0 (303.2)	.02 [-.11, .08]	1573 (477.5)	.02 [-.11, .08]	1525 (468.2)	0 [-.1, .09]
CGT Risk Adjustment	1.5 (.98)	1.9 (1.0)	<.001	-7.1	-0.34	-0.435	-0.244	1719	1.6 (.96)	.19 [.07, .26]	1.4 (.98)	.05 [-.05, .14]	1.7 (1.0)	.26 [.17, .36]	1.5 (.90)	.08 [-.02, .17]
<i>Intra-Extra Dimensional Shift (IED)</i>																
IED Total Trials	80.6 (19.3)	77.6 (17.2)	0.005	2.8	0.14	0.049	0.239	1719	82.9 (20.1)	.17 [.07, .27]	81.3 (19.9)	.02 [-.12, .08]	76.9 (16.9)	.1 [.01, .2]	78.5 (18.8)	.06 [-.04, .15]
IED Total Trials Adjusted	89.9 (37.0)	86.2 (36.9)	0.081	1.7	0.08	0.01	0.17	1719	94.5 (35.3)	.14 [.03, .24]	92.4 (46.5)	.12 [.05, .15]	81.6 (26.6)	.09 [0, .15]	85.6 (25.2)	.06 [.01, .11]
IED Total Errors	17.1 (11.6)	15.6 (10.3)	.021	2.2	-0.12	0.02	0.21	1719	18.63 (12.2)	.18 [.07, .28]	17.8 (12.9)	.16 [.1, .23]	14.6 (9.6)	.05 [.01, .11]	16.5 (10.5)	.13 [.05, .19]
IED Stages completed	8.6 (.91)	8.7 (.86)	0.13	-.78	-0.04	-0.13	0.05	1719	8.49 (.84)	-.11 [-.21, -.007]	8.6 (.98)	.11 [.01, .19]	8.8 (.59)	.13 [.06, .22]	8.5 (.76)	-.01 [-.04, .0. .18]
<i>Spatial Working Memory (SWM)</i>																
Between Errors	19.69 (17.3)	12.7 (12.8)	<.001	7.3	0.42	0.321	0.512	1719	20.4 (16.6)	.32 [.22, .42]	22.8 (19.9)	.11 [0, .19]	15.2 (14.2)	.36 [.27, .46]	19.5 (16.5)	.12 [.02, .21]
SWM Strategy	30.8 (6.2)	27.8 (6.2)	<.001	8.3	0.4	0.305	0.496	1719	30.8 (5.8)	.28 [.19, .38]	31.8 (6.7)	.32 [.22, .41]	29.8 (6.0)	.18 [.08, .27]	30.1 (6.1)	.07 [-.03, .17]

IED set shift test: number of stages completed = a higher score is better; errors = a lower score is better; SWM errors scale (i.e., a higher score means more errors) and SWM strategy (i.e., a higher score indicates a less effective strategy); d = Cohens d statistic; CI = CI low, CI high

Supplementary Table 2 – Comparisons in DMN connectivity between patients and controls

	MNI		Voxels		Peak T	Height threshold <i>P</i> value uncorrected
	x	y	z			
Medial PFC Seed						
1756 voxels (24%) covering 25% of atlas.FP l (Frontal Pole Left) 1418 voxels (20%) covering 18% of atlas.FP r (Frontal Pole Right) 686 voxels (10%) covering 26% of atlas.AC (Cingulate Gyrus, anterior division) 626 voxels (9%) covering 46% of atlas.PaCiG r (Paracingulate Gyrus Right) 625 voxels (9%) covering 48% of atlas.PaCiG l (Paracingulate Gyrus Left) 330 voxels (5%) covering 34% of atlas.MedFC (Frontal Medial Cortex) 94 voxels (1%) covering 3% of atlas.SFG l (Superior Frontal Gyrus Left) 79 voxels (1%) covering 3% of atlas.SFG r (Superior Frontal Gyrus Right) 56 voxels (1%) covering 5% of atlas.SubCalC (Subcallosal Cortex) 40 voxels (1%) covering 2% of atlas.FOrb l (Frontal Orbital Cortex Left) 1464 voxels (20%) covering 0% of atlas.not-labeled	+ 0 0	+5 6	+ 0 0	7174		<.001 (FWE)
MPFC						
277 voxels (35%) covering 12% of atlas.PC (Cingulate Gyrus, posterior division) 40 voxels (5%) covering 3% of atlas.Thalamus l 9 voxels (1%) covering 0% of atlas.AC (Cingulate Gyrus, anterior division) 4 voxels (1%) covering 0% of atlas.Thalamus r 468 voxels (59%) covering 0% of atlas.not-labeled	- 0 4	- 22	+ 2 2	798		<.001(FWE)
MPFC						
205 voxels (52%) covering 9% of atlas.TP l (Temporal Pole Left) 48 voxels (12%) covering 17% of atlas.aSTG l (Superior Temporal Gyrus, anterior division Left) 20 voxels (5%) covering 3% of atlas.IFG oper l (Inferior Frontal Gyrus, pars opercularis Left)	- 5 6	+1 6	- 1 8	394		<.001 (FWE)

16 voxels (4%) covering 4% of atlas.aMTG l (Middle Temporal Gyrus, anterior division Left)						
15 voxels (4%) covering 1% of atlas.FOrb l (Frontal Orbital Cortex Left)						
9 voxels (2%) covering 1% of atlas.IFG tri l (Inferior Frontal Gyrus, pars triangularis Left)						
7 voxels (2%) covering 2% of atlas.PP l (Planum Polare Left)						
5 voxels (1%) covering 0% of atlas.PreCG l (Precentral Gyrus Left)						
3 voxels (1%) covering 1% of atlas.FO l (Frontal Operculum Cortex Left)						
66 voxels (17%) covering 0% of atlas.not-labeled						
MPFC						
160 voxels (45%) covering 7% of atlas.TP r (Temporal Pole Right)	+	+1	-			<.001 (FWE)
33 voxels (9%) covering 2% of atlas.FOrb r (Frontal Orbital Cortex Right)	5	4	.			
23 voxels (6%) covering 8% of atlas.aSTG r (Superior Temporal Gyrus, anterior division Right)	4		0			
11 voxels (3%) covering 2% of atlas.IFG oper r (Inferior Frontal Gyrus, pars opercularis Right)			4			
7 voxels (2%) covering 1% of atlas.IFG tri r (Inferior Frontal Gyrus, pars triangularis Right)						
7 voxels (2%) covering 2% of atlas.aMTG r (Middle Temporal Gyrus, anterior division Right)						
4 voxels (1%) covering 0% of atlas.IC r (Insular Cortex Right)						
2 voxels (1%) covering 0% of atlas.PreCG r (Precentral Gyrus Right)						
1 voxels (0%) covering 0% of atlas.FP r (Frontal Pole Right)						
106 voxels (30%) covering 0% of atlas.not-labeled						

Brain Area	MNI		Voxels		Peak T	Height threshold <i>P</i> value uncorrected
	x	y	z			

LLP Seed						
2728 voxels (46%) covering 55% of atlas.sLOC l (Lateral Occipital Cortex, superior division Left) 524 voxels (9%) covering 55% of atlas.AG l (Angular Gyrus Left) 468 voxels (8%) covering 10% of atlas.sLOC r (Lateral Occipital Cortex, superior division Right) 307 voxels (5%) covering 29% of atlas.pSMG l (Supramarginal Gyrus, posterior division Left) 192 voxels (3%) covering 3% of atlas.Precuneous (Precuneous Cortex) 111 voxels (2%) covering 21% of atlas.Cuneal l (Cuneal Cortex Left) 105 voxels (2%) covering 3% of atlas.PostCG l (Postcentral Gyrus Left) 105 voxels (2%) covering 11% of atlas.aSMG l (Supramarginal Gyrus, anterior division Left) 93 voxels (2%) covering 4% of atlas.OP l (Occipital Pole Left) 82 voxels (1%) covering 3% of atlas.PC (Cingulate Gyrus, posterior division) 73 voxels (1%) covering 4% of atlas.iLOC l (Lateral Occipital Cortex, inferior division Left) 66 voxels (1%) covering 8% of atlas.toMTG l (Middle Temporal Gyrus, temporooccipital part Left) 58 voxels (1%) covering 4% of atlas.SPL l (Superior Parietal Lobule Left) 43 voxels (1%) covering 1% of atlas.PreCG l (Precentral Gyrus Left) 38 voxels (1%) covering 7% of atlas.PO l (Parietal Operculum Cortex Left) 38 voxels (1%) covering 7% of atlas.PT l (Planum Temporale Left) 26 voxels (0%) covering 4% of atlas.Cuneal r (Cuneal Cortex Right) 25 voxels (0%) covering 1% of atlas.OP r (Occipital Pole Right) 19 voxels (0%) covering 1% of atlas.pMTG l (Middle Temporal Gyrus, posterior division Left) 8 voxels (0%) covering 1% of atlas.IFG oper l (Inferior Frontal Gyrus, pars opercularis Left) 7 voxels (0%) covering 0% of atlas.AG r (Angular Gyrus Right) 6 voxels (0%) covering 2% of atlas.aSTG l (Superior Temporal Gyrus, anterior division Left) 3 voxels (0%) covering 1% of atlas.pSTG l (Superior Temporal Gyrus, posterior division Left) 2 voxels (0%) covering 0% of atlas.Ver45 (Vermis 4 5)	- 4 0	- 68	+ 2 4	5688		<.001 (FWE)

856 voxels (14%) covering 0% of atlas.not-labeled						
LLP Seed						
69 voxels (74%) covering 3% of atlas.PC (Cingulate Gyrus, posterior division) 24 voxels (26%) covering 0% of atlas.Precuneous (Precuneous Cortex)	- 1 0	- 48	+ 1 4	93		<.001(FWE)
LLP Seed						
18 voxels (40%) covering 2% of atlas.pSMG l (Supramarginal Gyrus, posterior division Left) 12 voxels (27%) covering 1% of atlas.aSMG l (Supramarginal Gyrus, anterior division Left) 8 voxels (18%) covering 0% of atlas.PostCG l (Postcentral Gyrus Left) 7 voxels (16%) covering 0% of atlas.not-labeled	- 5 6	- 42	+ 5 2	45		<.001 (FWE)
LLP Seed						
19 voxels (86%) covering atlas.Precuneous (Precuneous Cortex) 3 voxels (14%) covering 0% of atlas.not-labeled	- 1 0	- 58	+ 4 6	22		<.001 (FWE)
Brain Area	MNI		Voxels		Peak T	Height threshold <i>P</i> value uncorrected
	x	y	z			
RLP Seed						
1649 voxels (32%) covering 34% of atlas.sLOC r (Lateral Occipital Cortex, superior division Right) 777 voxels (15%) covering 53% of atlas.AG r (Angular Gyrus Right) 397 voxels (8%) covering 32% of atlas.pSMG r (Supramarginal Gyrus, posterior division Right) 226 voxels (4%) covering 19% of atlas.toMTG r (Middle Temporal Gyrus, temporooccipital part Right) 180 voxels (4%) covering 22% of atlas.aSMG r (Supramarginal Gyrus, anterior division Right)	- 4 6	- 54	+ 2 0	5089		<.001 (FWE)

115 voxels (2%) covering 6% of atlas.iLOC r (Lateral Occipital Cortex, inferior division Right) 98 voxels (2%) covering 3% of atlas.PostCG r (Postcentral Gyrus Right) 78 voxels (2%) covering 14% of atlas.PO r (Parietal Operculum Cortex Right) 40 voxels (1%) covering 6% of atlas.Cuneal r (Cuneal Cortex Right) 35 voxels (1%) covering 8% of atlas.PT r (Planum Temporale Right) 33 voxels (1%) covering 2% of atlas.SPL r (Superior Parietal Lobule Right) 24 voxels (0%) covering 0% of atlas.Precuneous (Precuneous Cortex) 21 voxels (0%) covering 5% of atlas.pSTG r (Superior Temporal Gyrus, posterior division Right) 14 voxels (0%) covering 1% of atlas.pMTG r (Middle Temporal Gyrus, posterior division Right) 9 voxels (0%) covering 1% of atlas.ICC r (Intracalcarine Cortex Right) 7 voxels (0%) covering 1% of atlas.CO r (Central Opercular Cortex Right) 1386 voxels (27%) covering 0% of atlas.not-labeled						
RLP Seed						
98 voxels (13%) covering 10% of atlas.AG l (Angular Gyrus Left) 24 voxels (3%) covering 5% of atlas.Cuneal l (Cuneal Cortex Left) 4 voxels (1%) covering 0% of atlas.Precuneous (Precuneous Cortex) 1 voxels (0%) covering 0% of atlas.pSMG l (Supramarginal Gyrus, posterior division Left) 1 voxels (0%) covering 0% of atlas.iLOC l (Lateral Occipital Cortex, inferior division Left) 508 voxels (67%) covering 0% of atlas.not-labeled	- 3 4	- 58	+ 2 4	760		<.001(FWE)
RLP Seed						
193 voxels (39%) covering 8% of atlas.PC (Cingulate Gyrus, posterior division) 110 voxels (22%) covering 2% of atlas.Precuneous (Precuneous Cortex) 14 voxels (3%) covering 3% of atlas.Cuneal l (Cuneal Cortex Left) 6 voxels (1%) covering 0% of atlas.Thalamus r	- 0 2	- 46	+ 2 0	494		<.001 (FWE)

2 voxels (0%) covering 0% of atlas.ICC l (Intracalcarine Cortex Left)						
1 voxels (0%) covering 0% of atlas.Ver45 (Vermis 4 5)						
168 voxels (34%) covering 0% of atlas.not-labeled						
RLP Seed						
22 voxels (100%) covering 0% of atlas.Precuneous (Precuneous Cortex)	+ 0 0	- 66	+ 3 6	22		<.001 (FWE)

Brain Area	MNI		Voxels	Peak T	Height threshold <i>P</i> value uncorrected
	x	y	z		
PCC Seed					
5412 voxels (15%) covering 96% of atlas.Precuneous (Precuneous Cortex) 2302 voxels (6%) covering 96% of atlas.PC (Cingulate Gyrus, posterior division) 965 voxels (3%) covering 19% of atlas.sLOC l (Lateral Occipital Cortex, superior division Left) 947 voxels (3%) covering 20% of atlas.sLOC r (Lateral Occipital Cortex, superior division Right) 903 voxels (2%) covering 52% of atlas.LG r (Lingual Gyrus Right) 803 voxels (2%) covering 53% of atlas.LG l (Lingual Gyrus Left) 764 voxels (2%) covering 24% of atlas.PostCG r (Postcentral Gyrus Right) 749 voxels (2%) covering 51% of atlas.SPL r (Superior Parietal Lobule Right) 645 voxels (2%) covering 51% of atlas.Thalamus r 629 voxels (2%) covering 46% of atlas.Thalamus l 614 voxels (2%) covering 42% of atlas.SPL l (Superior Parietal Lobule Left) 583 voxels (2%) covering 93% of atlas.Ver45 (Vermis 4 5) 547 voxels (1%) covering 15% of atlas.PostCG l (Postcentral Gyrus Left) 522 voxels (1%) covering 69% of atlas.ICC r (Intracalcarine Cortex Right) 513 voxels (1%) covering 80% of atlas.ICC l (Intracalcarine Cortex Left) 459 voxels (1%) covering 11% of atlas.PreCG r (Precentral Gyrus Right)	- 0 4	- 56	+ 2 8	36384	<.001 (FWE)

438 voxels (1%) covering 10% of atlas.PreCG l (Precentral Gyrus Left) 416 voxels (1%) covering 65% of atlas.Cuneal r (Cuneal Cortex Right) 407 voxels (1%) covering 45% of atlas.Cereb45 l (Cerebelum 4 5 Left) 348 voxels (1%) covering 24% of atlas.AG r (Angular Gyrus Right) 334 voxels (1%) covering 64% of atlas.Cuneal l (Cuneal Cortex Left) 281 voxels (1%) covering 23% of atlas.pSMG r (Supramarginal Gyrus, posterior division Right) 257 voxels (1%) covering 10% of atlas.AC (Cingulate Gyrus, anterior division) 252 voxels (1%) covering 41% of atlas.Cereb45 r (Cerebelum 4 5 Right) 190 voxels (1%) covering 57% of atlas.Ver6 (Vermis 6) 177 voxels (0%) covering 23% of atlas.Hippocampus l 145 voxels (0%) covering 15% of atlas.AG l (Angular Gyrus Left) 140 voxels (0%) covering 17% of atlas.aSMG r (Supramarginal Gyrus, anterior division Right) 124 voxels (0%) covering 87% of atlas.SCC r (Supracalcarine Cortex Right) 124 voxels (0%) covering 3% of atlas.Brain-Stem 122 voxels (0%) covering 53% of atlas.Ver3 (Vermis 3) 119 voxels (0%) covering 22% of atlas.PO r (Parietal Operculum Cortex Right) 107 voxels (0%) covering 15% of atlas.Hippocampus r 95 voxels (0%) covering 24% of atlas.pPaHC l (Parahippocampal Gyrus, posterior division Left) 89 voxels (0%) covering 7% of atlas.Cereb6 l (Cerebelum 6 Left) 75 voxels (0%) covering 3% of atlas.SFG r (Superior Frontal Gyrus Right) 69 voxels (0%) covering 4% of atlas.Cereb6 r (Cerebelum 6 Right) 65 voxels (0%) covering 89% of atlas.SCC l (Supracalcarine Cortex Left) 60 voxels (0%) covering 19% of atlas.pPaHC r (Parahippocampal Gyrus, posterior division Right) 56 voxels (0%) covering 5% of atlas.pSMG l (Supramarginal Gyrus, posterior division Left) 45 voxels (0%) covering 6% of atlas.SMA r (Juxtapositional Lobule Cortex -formerly Supplementary Motor Cortex- Right) 42 voxels (0%) covering 7% of atlas.PT l (Planum Temporale Left)					
--	--	--	--	--	--

37 voxels (0%) covering 4% of atlas.aSMG l (Supramarginal Gyrus, anterior division Left) 34 voxels (0%) covering 6% of atlas.PO l (Parietal Operculum Cortex Left) 34 voxels (0%) covering 26% of atlas.Cereb3 l (Cerebelum 3 Left) 21 voxels (0%) covering 1% of atlas.iLOC r (Lateral Occipital Cortex, inferior division Right) 18 voxels (0%) covering 6% of atlas.Pallidum l 17 voxels (0%) covering 1% of atlas.toMTG r (Middle Temporal Gyrus, temporooccipital part Right) 17 voxels (0%) covering 4% of atlas.PT r (Planum Temporale Right) 15 voxels (0%) covering 8% of atlas.Cereb3 r (Cerebelum 3 Right) 12 voxels (0%) covering 4% of atlas.Pallidum r 11 voxels (0%) covering 2% of atlas.SMA L (Juxtapositional Lobule Cortex -formerly Supplementary Motor Cortex- Left) 11 voxels (0%) covering 1% of atlas.TOFusC r (Temporal Occipital Fusiform Cortex Right) 11 voxels (0%) covering 1% of atlas.Putamen l 10 voxels (0%) covering 0% of atlas.iLOC l (Lateral Occipital Cortex, inferior division Left) 8 voxels (0%) covering 3% of atlas.Ver8 (Vermis 8) 5 voxels (0%) covering 0% of atlas.MidFG r (Middle Frontal Gyrus Right) 5 voxels (0%) covering 3% of atlas.Ver7 (Vermis 7) 4 voxels (0%) covering 1% of atlas.TOFusC l (Temporal Occipital Fusiform Cortex Left) 3 voxels (0%) covering 0% of atlas.IC l (Insular Cortex Left) 3 voxels (0%) covering 0% of atlas.toMTG l (Middle Temporal Gyrus, temporooccipital part Left) 1 voxels (0%) covering 0% of atlas.FP l (Frontal Pole Left) 1 voxels (0%) covering 0% of atlas.IC r (Insular Cortex Right) 1 voxels (0%) covering 0% of atlas.pTFusC r (Temporal Fusiform Cortex, posterior division Right) 1 voxels (0%) covering 0% of atlas.Cereb8 r (Cerebelum 8 Right) 1 voxels (0%) covering 1% of atlas.Ver9 (Vermis 9) 14269 voxels (39%) covering 4% of atlas.not-labeled					
PCC Seed					

75 voxels (79%) covering 3% of atlas.SFG r (Superior Frontal Gyrus Right)	+	-	+	94		
5 voxels (5%) covering 0% of atlas.MidFG r (Middle Frontal Gyrus Right)	2	28	5			
15 voxels (16%) covering 0% of atlas.not- labeled	4		8			<.001(FWE)