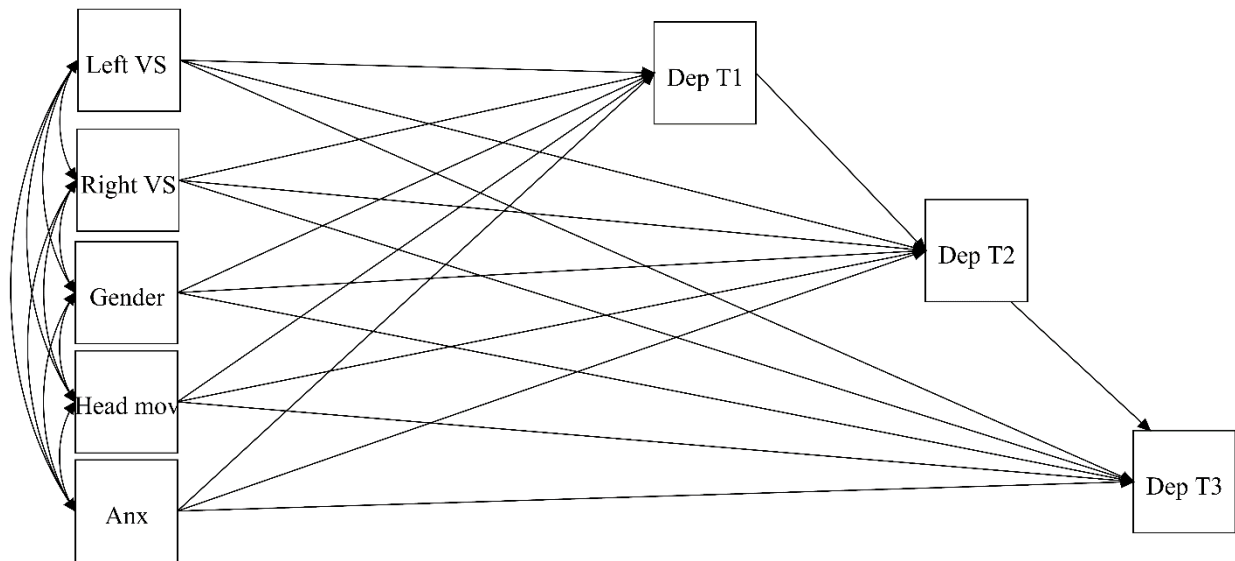
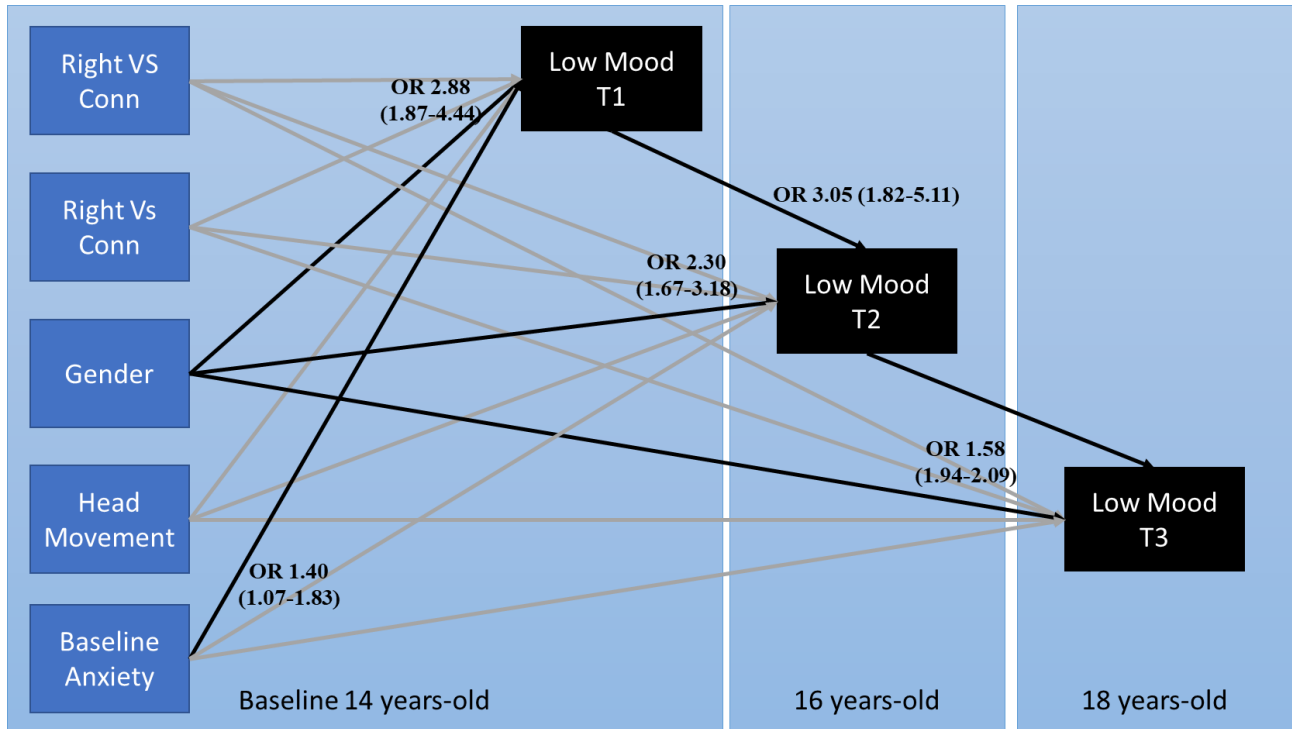


**FIGURE S1. Diagram of the Structural Equation Model for Depressive Disorders**

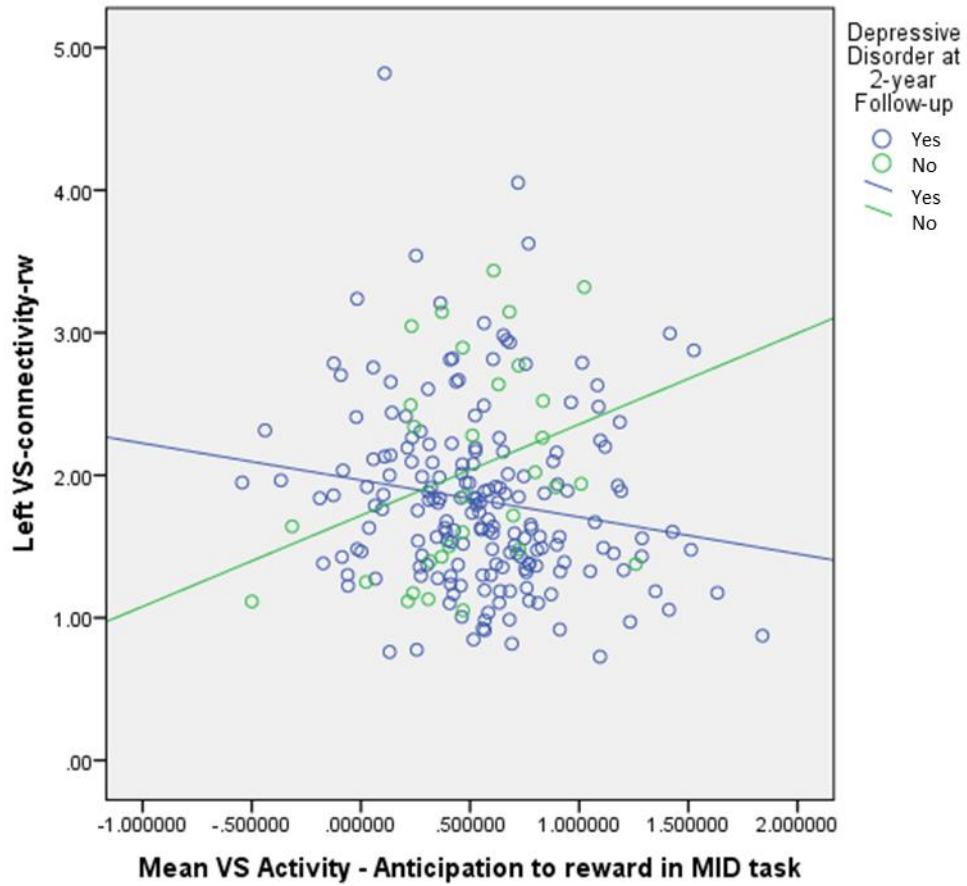


**FIGURE S2. Ventral Striatum connectivity association with Low Mood using Structural Equation Models**

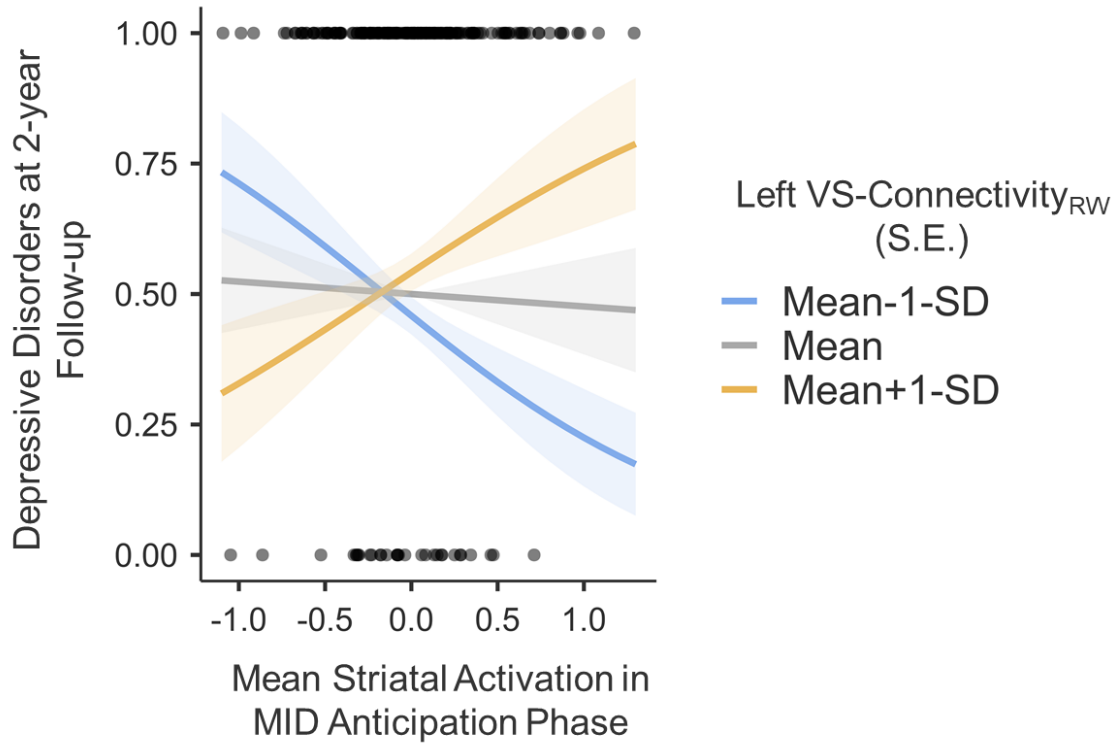


Black lines are significant at the  $p < .05$  level. Right VS Conn: Right Ventral Striatum-connectivity<sub>rw</sub>; Left VS Conn: Left Ventral Striatum -connectivity<sub>rw</sub>.

**FIGURE S3. Raw Left VS-connectivity<sub>rw</sub> values and Mean VS Activation in the anticipation of Reward in the MID task z-scores. Blue and Green Markers represent Depressive Disorders and No Depressive Disorders at 2-year follow-up**



**FIGURE S4. Logistic Regression Model: Significant Left VS -connectivity<sub>rw</sub> by Mean VS Activation in the anticipation of Reward in the MID task interaction predicted Depressive Disorders at 2-year follow-up**



**TABLE S1. Regions of Interest of the Reward Network from Bartra et al (2013)**

ROI	Montreal Neurological Institute coordinates used in BHRCS			ROIs Conversion to Talairach mapping used in IMAGEN*		
	X	Y	Z	X	Y	Z
Left Ventral Striatum (L VS)	-12	12	-6	-12	9	-6
Right Ventral Striatum (R VS)	12	10	-6	11	7	-2
Ventromedial Prefrontal Cortex (VmPFC)	2	46	-8	1	41	-8
Left Anterior Insula (L Ins)	-30	22	-6	-29	22	-6
Right Anterior Insula (R Ins)	32	20	-6	30	16	-1
Posterior Cingulate (PCC)	-4	-30	36	-3	-28	34
Brainstem - Ventral Tegmental Area (VTA)	-2	-22	-12	-1	-23	-6
Anterior Cingulate (ACC)	-2	28	28	-2	27	26
Pre-Supplementary motor area (pre-SMA)	-2	16	46	-1	18	42
Left Thalamus (L Th)	-6	-8	6	-5	-9	8
Right Thalamus (R Th)	6	-8	6	5	-9	8

\*The MNI to Talairach mapping is from Lacadie et al. Neuroimage 2008.  
(<http://sprout022.sprout.yale.edu/mni2tal/mni2tal.html>)

**TABLE S2. Mean values for the 55 edges of the Reward Network among Depressive Disorders vs No Depressive Disorders at baseline: ROI to ROI z-transformed spearman correlation of BOLD signal**

	Depressive Disorders at Baseline							
	No				Yes			
	Mean	s.d.	Minimum	Maximum	Mean	s.d.	Minimum	Maximum
ACC-LINS	.22	.14	-.13	.60	.24	.16	-.04	.56
ACC-LTH	.24	.17	-.40	.74	.28	.17	.01	.57
LINS-LTH	.13	.13	-.17	.50	.14	.10	-.08	.32
ACC-LVS	.17	.15	-.43	.57	.22	.13	-.02	.47
LINS-LVS	.15	.15	-.24	.72	.20	.16	-.07	.58
LTH-LVS	.13	.14	-.28	.51	.14	.10	-.07	.27
ACC-PCC	.36	.19	-.21	.90	.36	.25	-.13	.81
LINS-PCC	.14	.13	-.25	.52	.17	.19	-.17	.76
LTH-PCC	.24	.16	-.24	.84	.25	.16	-.07	.50
LVS-PCC	.13	.14	-.30	.59	.17	.16	-.17	.46
ACC-PRESMA	.52	.20	-.02	1.18	.56	.23	.13	.99
LINS-PRESMA	.18	.16	-.22	.63	.22	.17	-.15	.47
LTH-PRESMA	.25	.17	-.17	.89	.26	.17	-.11	.58
LVS-PRESMA	.12	.14	-.38	.63	.15	.13	-.13	.40
PCC-PRESMA	.30	.18	-.13	.96	.32	.20	-.02	.60
ACC-RINS	.24	.15	-.14	.69	.26	.17	.01	.69
LINS-RINS	.27	.16	-.12	.76	.31	.17	.05	.69
LTH-RINS	.14	.14	-.25	.62	.19	.12	-.01	.39
LVS-RINS	.10	.14	-.25	.58	.13	.10	-.04	.36
PCC-RINS	.15	.13	-.21	.55	.19	.12	-.08	.53
PRESMA-RINS	.27	.15	-.05	.71	.33	.17	.06	.79
ACC-RTH	.26	.17	-.20	.75	.32	.17	.03	.71
LINS-RTH	.14	.13	-.18	.49	.15	.13	-.12	.39
LTH-RTH	.90	.24	.21	1.61	.91	.23	.40	1.39
LVS-RTH	.14	.14	-.44	.54	.14	.10	-.05	.37
PCC-RTH	.26	.16	-.09	.76	.31	.14	.05	.56
PRESMA-RTH	.26	.16	-.13	.69	.31	.17	.00	.59
RINS-RTH	.19	.15	-.25	.60	.25	.15	-.14	.53
ACC-RVS	.15	.13	-.26	.52	.23	.15	-.06	.47
LINS-RVS	.14	.13	-.22	.61	.20	.12	-.02	.46
LTH-RVS	.14	.13	-.23	.48	.16	.11	-.10	.37
<b>LVS-RVS</b>	<b>.42</b>	<b>.22</b>	<b>-.28</b>	<b>1.06</b>	<b>.50</b>	<b>.23</b>	<b>-.03</b>	<b>.86</b>
PCC-RVS	.15	.13	-.34	.58	.19	.12	.00	.42

PRESMA-RVS	.10	.13	-.25	.52	.16	.12	-.12	.39
RINS-RVS	.10	.14	-.28	.55	.16	.12	-.11	.38
RTH-RVS	.14	.14	-.23	.54	.17	.10	-.03	.46
ACC-VMPFC	.01	.14	-.31	.54	.03	.17	-.29	.54
LINS-VMPFC	.14	.16	-.27	.83	.21	.22	-.10	.81
LTH-VMPFC	.06	.15	-.34	.70	.03	.14	-.29	.33
LVS-VMPFC	.23	.17	-.32	.81	.27	.16	-.14	.65
PCC-VMPFC	.08	.17	-.40	.59	.08	.21	-.28	.77
PRESMA-VMPFC	.00	.15	-.34	.47	.02	.20	-.42	.46
RINS-VMPFC	.02	.16	-.44	.47	.02	.15	-.32	.25
RTH-VMPFC	.05	.14	-.39	.45	.01	.12	-.21	.19
RVS-VMPFC	.22	.14	-.34	.96	.25	.17	-.08	.54
ACC-VTA	.03	.16	-.40	.49	.00	.16	-.31	.24
LINS-VTA	.07	.16	-.38	.47	.03	.17	-.23	.52
LTH-VTA	-.02	.19	-.64	.67	-.02	.17	-.25	.46
LVS-VTA	.01	.22	-.52	.65	-.04	.19	-.37	.29
PCC-VTA	.03	.15	-.52	.39	.04	.14	-.25	.32
PRESMA-VTA	.08	.14	-.30	.50	.08	.17	-.23	.52
RINS-VTA	.08	.15	-.32	.49	.09	.16	-.21	.37
RTH-VTA	-.02	.20	-.64	.53	-.03	.13	-.29	.19
RVS-VTA	.04	.21	-.49	.93	.07	.22	-.37	.53
VMPFC-VTA	.06	.16	-.32	.69	.05	.14	-.24	.42
LINS-LTH	.13	.13	-.17	.50	.14	.10	-.08	.32

Abbreviations: Left Ventral Striatum (LVS), Right Ventral Striatum (RVS), Ventromedial Prefrontal Cortex (VMPFC), Left Anterior Insula (LINS), Right Anterior Insula (RINS), Posterior Cingulate (PCC), Brainstem - Ventral Tegmental Area (VTA), Anterior Cingulate (ACC), Pre-Supplementary motor area (PRESMA), Left Thalamus (LTH), Right Thalamus (RTH).

**TABLE S3. Reward Network: edges (node-node connectivity) connecting to the Ventral Striatum (VS-connectivity<sub>rw</sub>)**

Edge (node-node connectivity)	Bonferroni Corrected ( $p < .00091$ )	
	n = 303	
	t	p
<b>Left Ventral Striatum</b>		
L VS-PCC	16.56	<.0001
ACC-L VS	20.11	<.0001
VTA-L VS	0.57	.566
L VS-PreSMA	14.77	<.0001
L Ins-L VS	18.10	<.0001
L VS-R Ins	33.70	<.0001
L VS-L Th	16.08	<.0001
L VS-R Th	16.80	<.0001
L VS-VMPFC	23.71	<.0001
L VS-R VS	47.85	<.0001
<b>Right Ventral Striatum</b>		
PCC-R VS	20.53	<.0001
ACC-R VS	16.45	<.0001
VTA-R VS	3.69	<.0001
PreSMA-R VS	14.39	<.0001
L Ins-R VS	18.72	<.0001
R Ins-R VS	13.26	<.0001
R VS-L Th	18.03	<.0001
R VS-R Th	18.20	<.0001
R VS-VMPFC	26.47	<.0001
L VS-R VS	47.85	<.0001

Note: Abbreviations can be found in Table S1.



**TABLE S4. Polychoric Correlations of Clinical Depressive Measures at Baseline, 2- and 4-year Follow-up**

		Depressive Disorders			Low Mood			Anhedonia		
		Baseline	2-Year	4-Year	Baseline	2-Year	4-Year	Baseline	2-Year	4-Year
Depressive Disorders	Baseline	1								
	2-Year	0.5367	1							
	4-Year	0.2191	0.3788	1						
Low Mood	Baseline	0.7563	0.3184	0.3755	1					
	2-Year	0.4221	0.9107	0.4673	0.4771	1				
	4-Year	0.2893	0.4081	0.8103	0.4314	0.5476	1			
Anhedonia	Baseline	0.6804	0.4021	0.0698	0.2224	0.1583	-0.137	1		
	2-Year	0.4623	0.8143	0.3959	0.1892	0.6048	0.2636	0.3499	1	
	4-Year	-0.000842	0.3525	0.68	0.01649	0.3569	0.4894	0.1793	0.4377	1

**TABLE S5. Associations of Clinical Depressive Phenotyping at Baseline, 2- and 4-year Follow-up**

		Depressive Disorders			Low Mood			Anhedonia		
		Baseline	2-Year	4-Year	Baseline	2-Year	4-Year	Baseline	2-Year	4-Year
Depressive Disorders	Baseline		0.000012	0.222688	0.000000	0.001008	0.033728	0.000000	0.001032	0.996360
	2-Year	0.000046	0.000001	0.016235	0.017091	0.872094	0.001081	0.005170	0.000000	0.020199
	4-Year	0.276441	0.027831	0.000001	0.007466	0.000361	0.000000	0.712739	0.011624	0.000000
Low Mood	Baseline	0.000001	0.027967	0.014146	0.000001	0.000001	0.000013	0.102515	0.172432	0.907854
	2-Year	0.002595	0.923393	0.001083	0.000001	0.000001	0.000001	0.255201	0.000001	0.005840
	4-Year	0.048568	0.002595	0.000001	0.000046	0.000001	0.000001	0.342514	0.053629	0.000034
Anhedonia	Baseline	0.000001	0.010949	0.777534	0.136687	0.306242	0.385328	0.000001	0.021119	0.286265
	2-Year	0.002595	0.000001	0.020923	0.221698	0.000001	0.074255	0.031678	0.000001	0.002037
	4-Year	0.996360	0.031616	0.000001	0.933792	0.011679	0.000110	0.332437	0.004584	0.000001

Note: Upper triangle = raw p-value, lower triangle = FDR-corrected at  $p=.05$ . Significant p-values at FDR-corrected threshold are in red.

**TABLE S6. VS-connectivity<sub>rw</sub> associations with Any Anxiety Disorder**

	Baseline N=302*	2-Year Follow-up n=247* (81.5%)	4-Year Follow-up n=217* (71.6%)
Left VS (OR (95%CI))	0.92 (0.28-3.00)	1.72 (0.39-7.62);	0.59 (0.20-1.75)
	p=.891	p=.472	p=.342
Right VS (OR (95%CI))	1.08 (0.38-3.10)	1.13 (0.33-3.80)	0.72 (0.28-1.86)
	p=.881	p=.850	p=.493

\*Subjects missing Anxiety rating data. All models were adjusted for age, gender, and site. Baseline models were adjusted for baseline Depressive Disorders. Follow-up models were adjusted for baseline Any Anxiety Disorder. 2-year follow-up Depressive Disorders and anhedonia models adjusted for number of included MRI volumes. N.S.= logistic regression models were not significant over the intercept-only model.

**TABLE S7. Thalamic-connectivity<sub>rw</sub> associations with Depressive Disorders and Anhedonia**

Left Th (OR (95%CI))	1.19 (0.71-2.00)	0.92 (0.57-1.47);	n.s.
	p=.500	p=.719	
Right Th (OR (95%CI))	1.53 (0.89-2.63)	0.77 (0.47-1.26)	n.s.
	p=.123	p=.299	

Th.: Thalamus. All models were adjusted for age, gender, and site. Baseline models were adjusted for anxiety symptoms. Follow-up models were adjusted for baseline Depressive Disorders. 2-year follow-up Depressive Disorders and anhedonia models adjusted for number of included MRI volumes. N.S.= logistic regression models were not significant over the intercept-only model.

## Supplemental Results

### Dimensional measures for anhedonia and low mood

Dimensional measures for anhedonia and low mood were computed by summing the scores of 4 additional questions on anhedonia and 4 questions on low mood from the DAWBA's depression section. These questions are completed only if participants endorse the first item (any anhedonia or any low mood question (Y/N)). These questions refer to anhedonia and low mood severity and frequency. When subjects had not endorsed anhedonia or low mood, these dimensional scores were set to 0.

First, Spearman correlation tests were conducted to investigate whether these dimensional measures of anhedonia and low mood were associated with one another other across time points (Table S8). Second, partial correlation tests estimated the strength of associations of VS-connectivity<sub>rw</sub> with low mood and anhedonia, adjusting for head movement in the brain scan. Results are included in Table S9. The only significant effect was a positive correlation between left VS-connectivity<sub>rw</sub> and anhedonia at 16 years old.

**TABLES S8. Spearman Correlations of Dimensional Measures of Anhedonia and Low Mood at 3 time-points**

		<b>Anhedonia</b>					
		Baseline		2-Year		4-Year	
Anhedonia	Baseline	—					
	2-Year	0.15	*	—			
	4-Year	0.055		0.238	***	—	
		<b>Low mood</b>					
		Baseline		2-Year		4-Year	
Low mood	Baseline	—					
	2-Year	0.337	***	—			
	4-Year	0.253	***	0.403	***	—	
		<b>Low Mood</b>					
		Baseline		2-Year		4-Year	
Anhedonia	Baseline	0.176	**	0.113		-0.066	
	2-Year	0.119		0.446	***	0.189	**
	4-Year	-0.022		0.198	**	0.328	***

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**TABLE S9. Partial correlation tests of VS-connectivity<sub>rw</sub> with dimensional measures of low mood and anhedonia**

		Low Mood			Anhedonia		
		Base-line	2-Year	4-Year	Base-line	2-Year	4-Year
Left VS-connectivity <sub>rw</sub>	Rho	-0.055	-0.045	-0.117	0.080	0.151*	0.020
	p-value	0.339	0.477	0.084	0.166	0.017	0.770
	N	303	250	219	303	250	219
Right VS-connectivity <sub>rw</sub>	Rho	0.064	-0.008	-0.091	0.051	0.068	0.049
	p-value	0.268	0.906	0.180	0.374	0.288	0.469
	N	303	250	219	303	250	219

Note: Controlling for the number of included MRI volumes, a proxy of head movement during the brain scan. \*  $p < .05$ .

**TABLE S10. Comparison between baseline depressed vs non-depressed subjects using independent sample t-test for the Left VS node connectivity-strength**

	Baseline MDD				t-value	p-value
	No		Yes			
	Mean Rho*	s.d.	Mean Rho*	SD		
cor-ACC-LVS	.1708	.15	.2176	.13	-1.459	.146
cor-LINS-LVS	.1539	.15	.2007	.16	-1.455	.147
cor-LTH-LVS	.1270	.14	.1407	.10	-.464	.643
cor-LVS-PCC	.1336	.14	.1683	.16	-1.139	.253
cor-LVS-PRESMA	.1172	.14	.1497	.13	-1.081	.281
cor-LVS-RINS	.0991	.14	.1279	.10	-.971	.332
cor-LVS-RTH	.1366	.14	.1390	.10	.079	.937
cor-LVS-RVS	.4214	.22	.4951	.23	-1.573	.117
cor-LVS-VMPPFC	.2287	.17	.2716	.16	-1.185	.237

**Left VS-connectivity<sub>rw</sub> associations with Depressive Disorders including the VS-Ventral Tegmental Area edge**

As described in the main text, the VS-Ventral Tegmental Area edge did not survive multiple comparisons correction. To explore the impact of excluding this edge on the association between Left VS-connectivity<sub>rw</sub> and Depressive Disorders, we conducted a specificity analyses that included the VS-Ventral Tegmental Area edge within the node strength measure. The left VS-connectivity<sub>rw</sub> was significantly associated with baseline Depressive Disorders even after including the VS-Ventral Tegmental Area edge to the node degree measure (OR 2.03 95%CI 1.04-3.94, p=.037).