

A Combined Behavioral and Neuroimaging Battery to Test Positive Appraisal Style Theory of Resilience in Longitudinal Studies

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Supporting information

1 Whole brain analysis – Task 2

Table S1

Whole brain analysis – Task 2

Contrast	Region	MNI	<i>z-score</i>	<i>pFWE</i>	k	
Gain>Zero - anticipation	R insular c.	32	26	4	Inf <0.001*	131222
	L caudate	-8	10	-2	Inf <0.001*	
	R nucleus accumbens	8	8	-4	Inf <0.001*	
	L nucleus accumbens	-8	8	-8	Inf <0.001*	
	R putamen	14	8	-12	Inf <0.001*	
	L suppl. motor area	-4	0	48	Inf <0.001*	
	L precentral g.	-46	-6	46	Inf <0.001*	
	R precentral g.	36	-8	44	Inf <0.001*	
	L thalamus	0	-14	10	Inf <0.001*	
	R thalamus	6	-18	12	Inf <0.001*	
	R brainstem	4	-28	-2	Inf <0.001*	
	L precuneous c.	-20	-60	4	Inf <0.001*	
	R cuneal c.	12	-68	22	Inf <0.001*	
	B cuneal c.	0	-80	28	Inf <0.001*	
	L lingual g.	-8	-72	-2	Inf <0.001*	
	R lingual g.	10	-60	0	Inf <0.001*	
	L intracalcarine c.	-2	-88	0	Inf <0.001*	
	R intracalcarine c.	10	-86	4	Inf <0.001*	
	L occ. pole	-8	-90	4	Inf <0.001*	
	L cerebellum	-6	-68	-16	Inf <0.001*	
Loss>Zero - Anticipation	R insular c.	32	20	-4	7.72 <0.001*	95679
	L nucleus accumbens	-8	8	-8	Inf <0.001*	
	L caudate	-8	6	2	Inf <0.001*	
	R caudate	8	6	4	Inf <0.001*	
	R precentral g.	46	-4	48	7.83 <0.001*	
	R brainstem	4	-28	-2	Inf <0.001*	
	L brainstem	-4	-28	-2	Inf <0.001*	
	temporal occ. fusiform					
	R c.	28	-48	-8	Inf <0.001*	
	R lingual g.	12	-60	2	Inf <0.001*	
	R cuneal cortex	12	-68	24	Inf <0.001*	
	L occ. fusiform g.	-28	-62	-6	Inf <0.001*	
	R occ. fusiform g.	24	-68	-8	Inf <0.001*	

Contrast	Region		MNI	<i>z-score</i>	<i>p_{FWE}</i>	k	
	lateral occ. cortex,						
R	superior division	24	-80	20	Inf <0.001*		
L	lingual g.	-2	-84	-2	Inf <0.001*		
R	intracalcarine c.	10	-84	4	Inf <0.001*		
L	intracalcarine c.	-8	-84	4	Inf <0.001*		
L	occ. Pole	-8	-90	4	Inf <0.001*		
R	occ. Pole	14	-92	12	Inf <0.001*		
Gain>Loss -							
Anticipation	R frontal pole	22	38	52	3.81	0.78	13
	L frontal pole	-30	52	24	3.37	1.00	21
	R nucleus accumbens	8	16	-6	6.59 <0.001*	24667	
	L caudate	-16	16	-2	6.76 <0.001*	24667	
	R superior frontal g.	18	34	42	3.59	0.95	22
	L frontal orbital c.	-32	16	-24	3.76	0.84	22
	R precentral g.	36	-16	56	3.23	1.00	3
	L precentral g.	-2	-34	52	3.32	1.00	73
	L thalamus	-16	-26	16	3.71	0.88	19
	cingulate g., posterior						
	L division	-2	-26	46	3.95	0.62	73
	supramarginal g.,						
	R anterior division	52	-32	56	3.65	0.93	33
	L precuneous c.	-6	-56	20	3.44	0.99	45
	R cerebellum	40	-50	-38	3.79	0.80	38
	R cerebellum	32	-64	-40	3.69	0.89	378
	L cerebellum	-12	-82	-38	3.28	1.00	8
	lateral occipital c.,						
	R inferior division	38	-84	-8	4.96	0.02	1551
	R occipital pole	30	-90	4	5.13	0.01	1551
	lateral occipital c.,						
	L inferior division	-54	-66	-8	3.21	1.00	8
	temporal occipital						
	R fusiform c.	30	-46	-22	3.64	0.93	65
Loss>Gain -							
Anticipation	R lingual g.	28	-42	-10	4.04	0.50	30
	B lingual g.	0	-84	-2	3.77	0.82	23
	R occipital pole	14	-92	14	3.58	0.96	5
Gain>No gain							
- Outcome	B paracingulate g.	0	44	-8	7.69 <0.001*	36496	
	R frontal medial c.	8	34	-14	7.59 <0.001*		
	R frontal pole	16	44	40	5.68 <0.001*		
	L frontal pole	-18	40	44	6.26 <0.001*		
	L superior frontal g.	-22	34	52	6.94 <0.001*		
	L frontal orbital c.	-36	34	-16	6.64 <0.001*		
	R frontal pole	32	34	-12	6.12 <0.001*		
	cingulate g., anterior						
	B division	0	32	10	6.45 <0.001*		
	L middle frontal g.	-28	26	50	6.31 <0.001*		
	R subcallosal c.	2	20	-18	5.80 <0.001*		
	R putamen	26	10	-8	6.41 <0.001*		
	L nucleus accumbens	-12	8	-8	7.32 <0.001*		

Contrast	Region	MNI		<i>z-score</i>	<i>p_{FWE}</i>	k
	R nucleus accumbens	12	8	-8	7.21	<0.001*
	L amygdala	-28	-2	-14	5.81	<0.001*
	R amygdala	24	-14	-12	5.78	<0.001*
	R putamen	30	-16	2	6.84	<0.001*
	L putamen	-30	-16	6	5.70	<0.001*
	cingulate g., posterior					
	R division	2	-36	38	7.28	<0.001*
	L precuneous c.	-8	-56	16	6.73	<0.001*
	R occipital fusiform g.	18	-86	-6	6.12	<0.001*
	R superior frontal g.	22	30	42	5.12	0.01*
	middle temporal g.,					
	L temporooccipital part	-60	-48	-10	5.17	0.01*
	inferior temporal g.,					
	L temporooccipital part	-56	-58	-12	4.92	0.02*
No						
Gain>Gain -						
Outcome	L frontal operculum c. middle temporal g.,	-38	14	10	3.11	1.00
	R posterior division	50	-24	-6	3.22	1.00
No Loss>Loss	L frontal Pole	-36	46	-10	6.18	<0.001*
- Outcome	L frontal orbital c.	-24	30	-20	7.19	<0.001*
	R putamen	20	18	-4	7.38	<0.001*
	L putamen	-26	6	-6	6.69	<0.001*
	L nucleus accumbens	-10	8	-8	6.90	<0.001*
	R nucleus accumbens	10	8	-8	6.51	<0.001*
	L caudate	-18	-20	22	5.69	<0.001*
	R insular c.	40	2	2	5.85	<0.001*
	R suppl. motor area	12	-10	42	5.43	<0.001*
	R precentral g.	12	-16	48	5.57	<0.001*
	R planum temporale	58	-28	10	5.85	<0.001*
	L planum temporale	-52	-38	12	5.86	<0.001*
	L cerebellum	-18	-44	-20	4.68	0.05*
	R bainstem	8	-42	-22	4.66	0.05*
Loss>No Loss						
- Outcome	R superior frontal g.	12	26	62	3.51	0.96
	R temporal pole	48	8	-30	4.26	0.23

Note. N=52. Initial threshold p=0.001 uncorrected. MNI=coordinates for the Montreal Neurological Institute coordinate system for the peak location (x, y, z). Cluster extend in number of voxels (k); maximum z score; and FWE-corrected p-values. L, left; R, right; B, bilateral midline-cortical activation; c.,cortex; g.,gyrus, occ.,occipital; post,posterior; suppl.,supplementary. *significant at $p_{svc} < 0.05$.

2 Whole brain analysis – Task 3 – conditioning

The model for conditioning estimates the effect over all conditioning trials (categorical) and includes a parametric modulator of linear decay (pmod).

Table S2

Whole brain analysis – Task 3 – conditioning

Contrast	Region	MNI	<i>z-score</i>	<i>pFWE</i>	k	
CS+s>CS-, categorical	R insular c.	32	18	6	Inf <0.001*	
	L insular c.	-30	16	8	Inf <0.001*	
	R suppl. motor area	8	6	50	Inf <0.001*	
	L suppl. motor area	-4	-4	54	Inf <0.001*	
	L central opercular c.	-42	-2	10	Inf <0.001*	
	L superior frontal g.	-20	-10	66	Inf <0.001*	
	L thalamus	-10	-18	6	Inf <0.001*	
	R thalamus	6	-18	-2	Inf <0.001*	
	L precentral g.	-40	-20	52	Inf <0.001*	
	cingulate g., post.					
	L division	-12	-24	40	Inf <0.001*	
	supramarginal g., ant.					
	R division	58	-24	40	Inf <0.001*	
	L parietal operculum c.	-48	-28	20	Inf <0.001*	
	L postcentral g.	-36	-30	54	Inf <0.001*	
	L superior parietal lobule	-34	-44	58	Inf <0.001*	
	R cerebellum	22	-48	-20	Inf <0.001*	
	lateral occ. c., inferior					
CS+s>CS-, pmod	L division	-42	-64	6	Inf <0.001*	
	L frontal Pole	-34	40	32	5.43 <0.001*	315
	L middle frontal g.	-32	36	28	5.26 <0.001*	
	R frontal Pole	38	42	34	4.73 0.04*	159
	L cerebellum	-20	-68	-48	4.19 0.29	35
CS+s>CS-, pmod	L middle frontal g.	-26	34	40	4.70 0.04*	432
	R precentral g.	28	-22	70	4.65 0.05*	11630
	R postcentral g.	32	-28	60	4.73 0.04*	
	parahippoc. g., post.					
	R division	30	-32	-14	4.73 0.04*	
	cingulate g., post.					
	L division	-2	-34	40	4.74 0.04*	
	cingulate g., post.					
	R division	8	-44	34	4.82 0.03*	
	R lingual g.	18	-42	-8	5.31 <0.001*	
	L lingual g.	-12	-70	-4	6.16 <0.001*	
	R precuneous c.	20	-60	14	6.36 <0.001*	
	L precuneous c.	-8	-66	18	6.99 <0.001*	
	R cuneal c.	14	-66	22	6.59 <0.001*	
	L supracalcarine c.	-16	-66	12	6.25 <0.001*	
	middle temporal g.,					
	R ant. division	62	2	-16	4.55 0.08	2120

Contrast	Region		MNI	<i>z-score</i>	<i>pFWE</i>	k
	middle temporal g.,					
	R post. division	52	-10	-14	4.47	0.11
	R angular g.	54	-48	20	4.17	0.31
	lateral occ. c., superior					
	R division	46	-64	22	5.25	<0.001*
	lateral occ. c., superior					
	L division	-54	-66	20	4.00	0.48
						585
CS->CS+s, categorical	L paracingulate g.	-6	52	-2	6.54	<0.001*
	R paracingulate g.	8	52	4	7.06	<0.001*
	L frontal Pole	-34	50	-6	5.27	<0.001*
	R frontal Pole	38	40	-10	6.05	<0.001*
	L superior frontal g. cingulate g., ant.	-6	46	36	4.96	0.01*
	R division	2	40	-2	5.57	<0.001*
	R frontal medial c. inferior frontal g., p.	4	40	-16	6.62	<0.001*
	L triangularis	-50	32	0	5.44	<0.001*
	B subcallosal c. middle temporal g.,	0	30	-24	5.05	0.01*
	R ant. division	62	-6	-16	5.44	<0.001*
	R angular g. middle temporal g.,	58	-58	38	4.88	0.02*
	L ant. division	-64	-10	-18	4.59	0.07
						95
CS->CS+s, pmod	No activations					

Note. N=50. initial threshold $p=0.001$ uncorrected. MNI=coordinates for the Montreal Neurological Institute coordinate system for the peak location (x, y, z). Cluster extend in number of voxels (k); maximum z score; and FWE-corrected p-values. Contrasts: CS,conditioned stimulus; CS+s,both the to be extinguished and the to be unextinguished CS+; CS-,unreinforced CS. regions: L,left; R,right; B, bilateral midline-cortical activation; ant.,anterior; c.,cortex; g.,gyrus; occ.,occipital; p.,pars; parahippoc.,parahippocampal; post.,posterior; suppl.,supplementary. * significant at $p_{svc}<0.05$.

3 Whole brain analysis – Task 3 – extinction

The model for extinction compares early (first two extinction trials, EX1) with late extinction (last two extinction trials, EX2).

Table S3

Whole brain analysis – Experiment 3 – extinction

Contrast	Region	MNI		<i>z-score</i>	<i>p_{FWE}</i>	k
EX1>EX2	R frontal orbital c.	30	22	-10	5.30	<0.001*
	R insular c.	32	18	-12	5.49	<0.001*
	L frontal orbital c.	-28	20	-10	4.46	0.10
	L postcentral g.	-62	-20	22	4.58	0.06
	middle temporal g,					
	R post. division	46	-28	-4	5.35	<0.001*
	middle temporal g,					
	L post. division	-48	-28	-6	5.07	0.01*
	middle temporal g,					
	temporooccipital					
	L part	-50	-58	8	5.05	0.01*
	L angular g.	-58	-54	14	4.63	0.05*
	L cerebellum	-10	-78	-26	5.26	<0.001*
	R cerebellum	16	-52	-48	5.02	0.01*
EX2>EX1	R precentral g.	22	-22	74	4.95	0.01*
	R lingual g.	26	-40	-10	5.81	<0.001*
	R precuneous cortex	24	-58	20	4.81	0.02*
	L lingual g.	-22	-50	-8	5.51	<0.001*

no stimulus*time interaction

Note. N=50. initial threshold p=0.001 uncorrected. MNI=coordinates for the Montreal Neurological Institute coordinate system for the peak location (x, y, z). Cluster extend in number of voxels (k); maximum z score; and FWE-corrected p-values. Contrasts: EX1,first two extinction trials; EX2,last two extinction trials. Regions: L,left; R,right.; c.,cortex; g.,gyrus; post.,posterior. *significant at psvc<0.05.

4 Whole brain analysis – Task 3 – retrieval tests (SR, RN)

The models for spontaneous recovery and renewal test memory retrieval effects for the first two trials of the respective retrieval test.

Table S4

Whole brain analysis – Experiment 3 – spontaneous recovery

Contrast	Region	MNI		z-score	pFWE	k
CS+u>CS-	R insular c.	30	26	4	3.94	0.62
	L insular c.	-38	12	-8	3.65	0.91
	R thalamus	6	-4	0	4.03	0.50
	L thalamus	-10	-26	14	3.59	0.95
	R middle frontal g.	32	18	30	4.41	0.26
	L frontal operculum c.	-32	16	10	4.08	0.44
	L middle frontal g.	-34	18	30	4.33	0.21
	L precentral g.	-26	-8	48	3.86	0.72
	L amygdala	-22	-4	-16	4.05	0.48
	R amygdala	18	-2	-12	3.85	0.72
CS->CS+u	R precentral g.	16	-24	64	4.76	0.04*
	R occ. pole	8	-98	14	3.37	1.00
	L frontal medial c.	-8	44	-14	3.55	0.96
	parahippoc. g., post. L division	-22	-40	-18	3.42	0.99
						4
CS+u>CS+e	R thalamus	4	0	0	4.03	0.50
	L thalamus	-10	-10	2	3.65	0.91
	R insular c.	36	16	-8	3.82	0.76
	R frontal orbital c.	30	26	-20	3.97	0.57
	L middle frontal g.	-42	28	32	3.44	0.99
	L temporal pole	-32	10	-26	3.94	0.61
CS+e>CS+u	No activations					

Note. N=50. initial threshold p=0.001 uncorrected. MNI=coordinates for the Montreal Neurological Institute coordinate system for the peak location (x, y, z). Cluster extend in number of voxels (k); maximum z score; and FWE-corrected p-values. Contrasts: CS,conditioned stimulus; CS+,CS that was reinforced during conditioning; CS-,unreinforced CS; CS+,extinguished during extinction; CS+u,not extinguished during extinction. Regions: L,left; R,right; c.,cortex; g.,gyrus; post.,posterior. *significant at psvc<0.05.

Table S5

Whole brain analysis – Experiment 3 – renewal

Contrast	Region	MNI	<i>z-score</i>	<i>p_{FWE}</i>	k
CS+s>CS-	L frontal operculum cortex	-34 20 12	3.40	1.00	19
	R lingual gyrus	6 -66 -6	3.43	0.99	24
	L brainstem	-4 -28 -2	3.10	1.00	1
CS->CS+s	R frontal medial c.	10 38 -18	3.64	0.93	83
	B subcallosal c.	0 24 -20	3.76	0.84	83
	R frontal pole	36 38 -10	3.81	0.79	45
	L frontal orbital c.	-40 30 -14	3.43	0.99	3
	R postcentral g.	50 -16 52	3.32	1.00	188
	R precentral g.	42 -18 56	4.28	0.26	188
	L postcentral g.	-58 -10 38	3.86	0.74	41
	R planum polare	54 -2 -4	3.63	0.94	50
	R HPC	24 -12 -20	3.22	1.00	3
	parahippocampal g.,				
	R posterior division	22 -28 -20	3.34	1.00	6
	L insular c.	-36 -14 18	3.91	0.67	16
	temporal fusiform c.,				
	R posterior division	34 -26 -20	4.03	0.53	25
	middle temporal g.,				
	R posterior division	64 -36 -8	3.96	0.61	58
	R lingual g.	32 -38 -10	3.53	0.97	27
	R temporal occ. fusiform c.	26 -50 -12	3.24	1.00	7
	R occ. pole	12 -90 28	3.39	1.00	50
	L lingual g.	-14 -72 -6	4.08	0.47	269
	L occ. fusiform g.	-24 -76 -4	3.43	0.99	269
CS+u>CS+e	R superior frontal g.	2 36 54	3.70	0.89	77
	R thalamus	18 -32 -4	3.53	0.98	21
	B cerebellum	0 -48 -20	3.84	0.75	24
CS+e>CS+u	no activations				

Note. N=50. initial threshold $p=0.001$ uncorrected. MNI=coordinates for the Montreal Neurological Institute coordinate system for the peak location (x, y, z). Cluster extend in number of voxels (k); maximum z score; and FWE-corrected p-values. Contrasts: CS,conditioned stimulus; CS+,CS that was reinforced during conditioning; CS-,unreinforced CS; CS+,extinguished during extinction; CS+u,not extinguished during extinction. Regions: L, left; R, right; B, bilateral midline-cortical activation; c.,cortex; HPC,hippocampus; g.,gyrus; occ.,occipital; parahippoc.,parahippocampal; post.=posterior.

5 Whole brain analysis – Task 4

The model for Task 4 estimates the effect over all trials (categorical) and includes a parametric modulator of quadratic decay (pmod).

Table S6

Whole brain analysis – Task 4

Contrast	Region	MNI	z-score	p _{FWE}	k
T>NT, categorical	R frontal pole	30 50 20	5.93	<0.001*	24954
	R cingulate g., ant. division	6 34 22	Inf	<0.001*	
	R paracingulate g.	6 28 36	Inf	<0.001*	
	R superior frontal g.	6 20 52	Inf	<0.001*	
	L superior frontal g.	-12 -2 68	6.66	<0.001*	
	R frontal operculum c.	36 24 6	Inf	<0.001*	
	R frontal orbital c.	32 24 -6	Inf	<0.001*	
	L insular c.	-32 20 6	Inf	<0.001*	
	R middle frontal g.	50 8 46	7.37	<0.001*	
	L middle frontal g.	-28 0 54	5.28	<0.001*	
	L putamen	-18 8 -6	6.65	<0.001*	
	R pallidum	18 6 0	Inf	<0.001*	
	L pallidum	-12 4 0	7.68	<0.001*	
	L precentral g.	-54 4 6	5.99	<0.001*	
	R thalamus	8 -6 0	7.24	<0.001*	
	L thalamus	-4 -10 -2	7.78	<0.001*	
	L brainstem	-6 -26 -14	5.47	<0.001*	
	R cingulate g., post. division	2 -20 34	Inf	<0.001*	
	L frontal pole	-32 54 22	5.92	<0.001*	1102
	R cerebellum	2 -48 -18	5.80	<0.001*	2362
	R cerebellum	38 -54 -28	6.74	<0.001*	2046
	lateral occ. c., inferior				
	R division	36 -80 -8	5.66	<0.001*	
	R occ. fusiform g.	30 -64 -18	5.06	0.01*	
	R angular g.	52 -48 48	6.59	<0.001*	1819
	supramarginal g., post.				
	R division	48 -44 40	6.27	<0.001*	
	R middle temporal g., post.				
	division	52 -26 -6	5.86	<0.001*	460
	R precuneous c.	16 -62 38	5.83	<0.001*	359
	R occ. pole	18 -92 6	6.57	<0.001*	220
	L middle temporal g.	-58 -24 24	4.50	0.15	387
	L precuneous c.	-8 -68 38	4.72	0.04*	209
	L occ. pole	-30 -94 -6	5.03	0.01*	126
T>NT, pmod	L amygdala	-22 -6 -18	3.57	0.94	51
	R amygdala	18 -6 -18	3.59	0.93	23
	L HPC	-28 -24 -18	5.38	<0.001*	11556
	parahippocampal g.,				
	R post.division	26 -30 -18	4.97	0.01*	

Contrast	Region	MNI	z-score	p _{FWE}	k
	temporal fusiform c.,				
	L post.division	-28 -44 -14	4.93	0.02*	
	R intracalcarine c.	8 -64 10	5.13	0.01*	
	L intracalcarine c.	-6 -66 14	5.73	<0.001*	
	L occ.fusiform g.	-22 -70 -10	4.71	0.04*	
	B precuneous c.	0 -72 24	5.55	<0.001*	
	R cuneal c.	14 -74 28	4.81	0.03*	
	L lingual g.	-10 -74 -8	4.94	0.02*	
	R lingual g.	8 -74 -2	6.18	<0.001*	
	lateral occ.c., superior				
	R division	28 -78 24	5.71	<0.001*	
	L cuneal c.	-2 -84 22	4.78	0.03*	
	L occ.pole	-10 -90 4	4.81	0.03*	
	R frontal medial c.	6 44 -12	4.45	0.12	1343
	L frontal orbital c.	-26 32 -12	4.25	0.25	63
	R insular c.	44 -10 6	4.06	0.44	336
	superior temporal g. ,ant.				
	R division	54 -6 -14	4.01	0.50	
	R parietal operculum c.	60 -22 20	4.80	0.03*	811
	L insular c.	-38 -12 4	4.53	0.09	1956
	L parietal operculum c.	-52 -26 22	4.67	0.05*	
	R precentral g.	10 -16 44	5.03	0.01*	1591
	L cingulate g., post.division	-12 -28 42	4.91	0.02*	
NT>T, main	R subcallosal c.	2 10 -12	5.73	<0.001*	1354
	B frontal medial c.	0 34 -22	5.24	<0.001*	
	R central opercular c.	36 -8 18	7.24	<0.001*	13610
	R HPC	24 -12 -18	5.91	<0.001*	
	R parahippoc. g., post. division	28 -30 -16	5.13	0.01*	
	R precentral g.	4 -24 58	4.84	0.03*	
	R postcentral g.	42 -26 60	6.31	<0.001*	
	R parietal operculum c.	38 -26 18	5.54	<0.001*	
	R cingulate g., post. division	16 -46 4	6.27	<0.001*	
	L cingulate g., post. division	-12 -50 4	5.86	<0.001*	
	L precuneous c.	-2 -66 16	5.51	<0.001*	
	L intracalcarine c.	-6 -70 14	5.60	<0.001*	
	R cuneal c.	8 -86 22	4.86	0.02*	
	L lingual g.	-8 -84 -4	7.64	<0.001*	
	lateral occ. c., superior				
	L division	-16 -86 20	4.95	0.02*	
	lateral occ. c., superior				
	R division	18 -86 26	5.28	<0.001*	
	L occ. pole	-2 -90 0	6.21	<0.001*	
	L frontal orbital c.	-34 32 -16	4.49	0.10	52
	L insular c.	-34 -10 16	5.11	0.01*	920
	L precentral g.	-48 -8 28	4.76	0.04*	
	L postcentral g.	-54 -18 46	5.24	<0.001*	
	L HPC	-24 -14 -16	6.25	<0.001*	734
	parahippocampal g., post.				
	L division	-34 -34 -14	5.32	<0.001*	

Contrast	Region	MNI	z-score	p _{FWE}	k
	middle temporal g., ant.				
	L division	-58 -10 -12	3.96	0.56	79
	lateral occ. c., inferior				
	L division	-50 -68 -6	4.68	0.05*	439
	lateral occ. c., superior				
	L division	-46 -68 24	4.19	0.30	293
	lateral occ. c., superior				
	R division	20 -60 66	3.83	0.72	97
R>NR, main	L precentral g.	-50 0 50	6.24	<0.001*	261
	L middle frontal g.	-38 10 46	3.20	1.00	
	B suppl. motor area	-4 4 62	6.16	<0.001*	340
	L frontal orbital c.	-42 24 -4	4.88	0.02*	2254
	inferior frontal g., p.				
	L opercularis	-50 18 2	4.36	0.17	
	middle temporal g., post.				
	L division	-58 -30 -2	5.85	<0.001*	
	supramarginal g., post.				
	L division	-54 -42 22	5.34	<0.001*	
NR>R, main	R frontal pole	32 36 -8	3.62	0.91	48
	R caudate	10 20 0	3.73	0.83	40
	R subcallosal c.	8 14 -14	3.41	0.99	8
	inferior frontal g., pars				
	R opercularis	52 12 28	3.64	0.90	99
	L insular c.	-38 -6 12	3.88	0.65	53
	R thalamus	4 -14 4	3.63	0.90	16
	L brainstem	-10 -40 -48	4.04	0.46	17
	L postcentral g.	-60 -22 44	3.96	0.56	77
	supramarginal g., ant.				
	L division	-64 -24 36	3.86	0.68	77
	supramarginal g., posterior				
	R division	40 -40 46	4.07	0.43	570
	middle temporal g.,				
	R temporooccipital part	52 -52 -6	5.38	<0.001*	420
	R HPC	32 -32 -6	4.23	0.27	41
	lateral occipital c., inferior				
	R division	46 -64 -6	3.42	0.99	420
	L cerebellum	-4 -72 -24	3.66	0.89	55
Interaction 1:	R subcallosal c.	12 18 -12	3.32	1.00	3
(T-NT) _{R-}	R frontal pole	6 54 -6	3.12	1.00	2
(T-NT) _{NR}	L subcallosal c.	-8 24 -14	3.32	1.00	2
	L HPC	-28 -30 -12	3.10	1.00	1
Interaction 2:	L central opercular c.	-40 2 16	3.11	1.00	1
(T-NT) _{NR-}	L thalamus	-16 -20 8	3.34	1.00	13
(T-NT) _R	R thalamus	14 -22 10	3.12	1.00	1
	L cerebellum	-16 -60 -28	4.27	0.24	95
	R cerebellum	6 -62 -24	3.45	0.98	7
T/NR>T/R, main	R frontal pole	44 56 4	3.10	1.00	2
	L insular c.	-38 -6 14	4.32	0.20	86

Contrast	Region	MNI		z-score	p _{FWE}	k
	R planum polare	50	-6	-2	3.62	0.92
	supramarginal g., anterior					14
	R division	60	-20	38	3.45	0.98
	supramarginal g., anterior					14
	L division	-64	-26	38	3.38	0.99
	R thalamus	14	-22	10	4.07	0.43
	L thalamus	-14	-22	4	4.35	0.18
	L postcentral g.	-42	-26	36	3.34	1.00
	R parietal operculum c.	48	-30	26	3.26	1.00
	inferior temporal g.,					2
	R temporooccipital part	50	-50	-8	3.82	0.73
	R cerebellum	24	-48	-28	3.57	0.94
	L cerebellum	-16	-60	-28	4.55	0.08
						54

Note. N=54. Initial threshold p=0.001 uncorrected. MNI=coordinates for the Montreal Neurological Institute coordinate system for the peak location (x, y, z). Cluster extend in number of voxels (k); maximum z score; and FWE-corrected p-values. Contrasts: NR,no reappraisal; NT,no threat; R,reappraisal, T,threat. Regions: L, left; R, right; B, bilateral midline-cortical activation; ant.,anterior; c.,cortex; HPC,hippocampus; g.,gyrus; occ.,occipital; parahippoc.,parahippocampal; post.,posterior. *significant at psvc<0.05.

6 Whole brain analysis – Task 5

Table S7

Whole brain analysis – Task 5

Contrast	Region	MNI	<i>z-score</i>	<i>pFWE</i>	k	
Neg/NR>Neu/NR	L superior frontal g.	-2	52	26	4.81 0.03*	1213
	R frontal medial c.	4	50	-22	5.47 <0.001*	130
	R caudate	6	12	4	4.72 0.04*	2001
	R thalamus	2	-10	6	5.40 <0.001*	
	L thalamus	-8	-6	0	4.23 0.24	
	L brainstem	-8	-28	-10	5.47 <0.001*	
	R brainstem	2	-36	-4	4.50 0.09	
	R amygdala	18	-4	-12	5.50 <0.001*	
	L amygdala	-22	-6	-12	5.16 0.01*	520
	L frontal orbital c.	-30	12	-24	4.70 0.04*	
	R frontal orbital c.	44	30	-8	4.12 0.34	353
	R precentral g.	50	8	24	4.24 0.24	243
	R cingulate g., ant. division	2	-8	38	3.80 0.72	312
	L cingulate g., post. division	-4	-46	20	5.52 <0.001*	894
	R cerebellum	4	-64	-28	5.95 <0.001*	12442
	L cerebellum	-10	-70	-40	5.47 <0.001*	
	R Intracalcarine c.	14	-82	6	5.42 <0.001*	
	R lateral occ. c., inferior division	40	-68	-10	5.09 0.01*	
	L lateral occ. c., inferior division	-44	-82	-2	5.89 <0.001*	
Pos/NR>Neu/NR	L frontal pole	-20	52	34	3.37 0.99	12
	L frontal pole	-40	42	24	3.41 0.98	27
	L paracingulate g.	-8	36	-10	3.88 0.62	115
	L paracingulate g.	-4	54	0	4.12 0.34	179
	L cingulate g., ant. division	-8	42	6	3.48 0.96	179
	B cingulate g., ant. division	0	18	24	3.81 0.71	36
	L superior frontal g.	-14	0	70	3.33 0.99	13
	R precentral g.	62	10	14	3.51 0.96	8
	L middle frontal g.	-30	32	46	3.32 0.99	10
	L insular c.	-40	4	0	3.55 0.94	26
	L insular c.	-40	0	-14	4.00 0.47	49
	R supramarginal g., anterior division	68	-20	24	3.70 0.82	559
	L middle temporal g., posterior division	-66	-20	-10	3.58 0.92	41
	L supramarginal g., anterior division	-66	-22	32	3.53 0.94	683
	L cingulate g., post. division	-12	-30	40	5.27 <0.001*	562

Contrast	Region		MNI		<i>z-score</i>	<i>pFWE</i>	k
	L Parietal Operculum c.	-50	-32	26	4.91	0.02*	683
	R Parietal Operculum c.	56	-34	32	5.00	0.01*	559
	R brainstem	4	-34	-22	3.64	0.87	17
	L brainstem	-6	-38	-24	4.47	0.10	40
	L supramarginal g., anterior division	-52	-38	54	3.57	0.92	5
	L cerebellum	-14	-42	-48	4.33	0.17	16
	L superior parietal lobule	-40	-44	62	3.80	0.71	31
	R postcentral g.	12	-46	74	4.32	0.18	24
	R cerebellum	22	-44	-28	3.84	0.66	7
	L cerebellum	-16	-46	-24	3.54	0.94	11
	R precuneous c.	6	-48	62	3.32	1.00	77
	L superior parietal lobule	-16	-50	72	4.48	0.10	34
	R precuneous c.	10	-52	32	3.32	0.99	6
	L Angular g.	-42	-56	32	3.14	1.00	4
	L lateral occ. c., superior division	-50	-62	32	3.26	1.00	28
	R lateral occ. c., inferior division	52	-64	2	4.53	0.08	559
	L lateral occ. c., inferior division	-54	-66	6	4.61	0.06	821
R>NR	L frontal pole	-12	56	32	7.02	<0.001*	20497
	L superior frontal g.	-10	24	62	7.25	<0.001*	
	L frontal orbital c.	-48	24	-8	7.42	<0.001*	
	L temporal pole	-36	18	-26	5.24	<0.001*	
	L inferior frontal g., p. opercularis	-54	18	18	6.36	<0.001*	
	L paracingulate g.	-4	18	38	7.06	<0.001*	
	L inferior frontal g., p. opercularis	-56	16	4	6.10	<0.001*	
	L temporal pole	-44	16	-24	6.95	<0.001*	
	L suppl. motor area	-4	8	62	Inf	<0.001*	
	L caudate	-16	6	18	6.69	<0.001*	
	L temporal pole	-50	6	-24	Inf	<0.001*	
	L middle frontal g.	-44	2	54	Inf	<0.001*	
	L middle temporal g., anterior division	-56	0	-18	Inf	<0.001*	
	L thalamus	-6	-4	4	5.20	<0.001*	
	L thalamus	-12	-10	12	5.92	<0.001*	
	L middle temporal g. posterior division	-54	-16	-12	Inf	<0.001*	
	L cingulate g., post. division	-6	-48	36	5.70	<0.001*	
	L Angular g.	-54	-56	20	Inf	<0.001*	
	L frontal orbital c.	46	20	-12	4.86	0.02*	1501

Contrast	Region		MNI	<i>z-score</i>	<i>pFWE</i>	k
	L insular c.	34	18	-12	4.93	0.01*
	R temporal Pole	52	16	-24	7.64	<0.001*
	L middle temporal g., ant. division	54	-4	-18	5.02	0.01*
	L middle temporal g., post. division	48	-34	0	5.77	<0.001*
	R cerebellum	34	-58	-26	Inf	<0.001*
	L cerebellum	6	-48	-42	6.11	<0.001*
NR>R	R frontal pole	22	34	-16	4.74	0.03*
	R inferior frontal g., p. opercularis	50	8	18	3.54	0.94
	R insular c.	38	2	10	4.38	0.14
	R central opercular c.	40	-6	16	3.82	0.69
	R heschl's g. (includes h1 and h2)	50	-8	-2	5.59	<0.001*
	R planum temporale	58	-10	4	4.88	0.02*
	R central opercular c.	60	-16	10	5.24	<0.001*
	R postcentral g.	52	-18	54	4.19	0.28
	R precentral g.	32	-20	68	3.59	0.91
	R supramarginal g., anterior division	58	-24	42	5.44	<0.001*
	R parietal operculum c.	60	-28	18	4.46	0.11
	R supramarginal g., posterior division	42	-42	50	6.15	<0.001*
	R lateral occ. c., superior division	30	-66	46	4.14	0.31
	L insular c.	-40	-2	-6	3.77	0.74
	L heschl's g. (includes h1 and h2)	-48	-12	2	5.82	<0.001*
	L postcentral g.	-66	-14	20	4.68	0.04*
	L planum temporale	-58	-16	6	5.04	0.01*
	L heschl's g. (includes h1 and h2)	-50	-24	8	5.43	<0.001*
	L supramarginal g., anterior division	-62	-26	40	5.07	0.01*
	R middle temporal g., temporooccipital part	58	-52	-10	5.51	<0.001*
	L inferior temporal g., temporooccipital part	-52	-48	-16	3.59	0.91
Neg/NR>Neg/R	R frontal orbital c.	20	32	-16	3.53	0.95
	L precentral g.	-62	-2	32	3.49	0.96
	R central opercular c.	38	2	12	5.38	<0.001*
	R planum temporale	60	-14	8	5.62	<0.001*
	R parietal operculum c.	54	-30	20	5.43	<0.001*
	L central opercular c.	-38	-6	16	6.45	<0.001*
	L heschl's gyrus (includes h1 and h2)	-46	-10	4	5.69	<0.001*
	L planum temporale	-58	-18	8	5.87	<0.001*
	L suppl. motor area	-10	-10	44	4.75	0.03*
	R precentral g.	6	-22	54	4.40	0.13

Contrast	Region	MNI	<i>z-score</i>	<i>p_{FWE}</i>	k		
R	postcentral g.	12	-36	52	4.47	0.10	
R	inferior temporal g., temporooccipital part	56	-52	-10	4.31	0.19	97

Note. N=52. Initial threshold $p=0.001$ uncorrected. MNI=coordinates for the Montreal Neurological Institute coordinate system for the peak location (x, y, z). Cluster extend in number of voxels (k); maximum z score; and FWE-corrected p-values. Contrasts: Neg,negative pictures; Neu,neutral pictures; NR,no reappraisal; Pos,positive pictures; R,reappraisal. Regions: L,left; R,right, B, bilateral midline-cortical activation; ant.,anterior; c.,cortex; g.,gyrus; occ.,occipital; post.,posterior; suppl.,supplementary. *significant at $p_{svc}<0.05$.

7 Whole brain analysis – Task 6

Three second level models were estimated. Model 1 investigated the stopping effect, model 2 the effect of response interference inhibition (Simon-task) and model 3 the emotional interference and interaction

Table S8

Whole brain analysis – Experiment 6 – Stopping (Stop>Con Go)

Region	MNI	<i>z-score</i>	<i>p_{FWE}</i>	k	
R cingulate g., ant. division	8	34	20	6.62 <0.001*	2253
R paracingulate g.	6	16	50	7.01 <0.001*	
R superior frontal g.	16	10	60	5.78 <0.001*	
R frontal pole	44	38	34	5.84 <0.001*	5044
R insular c.	34	20	-6	Inf <0.001*	
R inferior frontal g., p. opercularis	46	10	20	5.38 <0.001*	
R precentral g.	44	8	30	6.61 <0.001*	
R middle frontal g.	46	6	46	6.62 <0.001*	
L frontal pole	-30	50	-12	5.39 <0.001*	110
L insular c.	-32	18	-6	Inf <0.001*	1399
L middle frontal g.	-44	26	40	4.86 0.03*	241
R cingulate g., ant. division	6	-12	30	5.61 <0.001*	512
L cingulate g., ant. division	-4	-16	30	5.11 0.01*	
L cingulate g., post. division	-4	-22	32	5.29 <0.001*	
R cingulate g., post. division	6	-26	28	5.77 <0.001*	
L caudate	-8	6	4	6.20 <0.001*	400
R caudate	8	6	2	5.63 <0.001*	531
R brainstem	6	-28	-2	6.96 <0.001*	1070
R thalamus	22	-30	-4	6.57 <0.001*	
L thalamus	-18	-30	-2	5.77 <0.001*	141
R middle temporal g., post. division	48	-26	-6	Inf <0.001*	9211
R supramarginal g., post. division	52	-40	42	6.93 <0.001*	
R middle temporal g., temporooccipital part	54	-42	8	6.13 <0.001*	
R angular g.	52	-44	28	Inf <0.001*	
R superior parietal lobule	36	-46	42	6.19 <0.001*	
R angular g.	54	-48	52	6.35 <0.001*	
R superior parietal lobule	34	-52	48	6.49 <0.001*	
R temporal occ. fusiform c.	32	-56	-12	7.15 <0.001*	

R	itg, temporooccipital part	46	-58	-10	6.66	<0.001*
R	lateral occ. c., inferior division	44	-64	0	5.90	<0.001*
R	lateral occ. c., superior division	30	-64	32	5.45	<0.001*
R	precuneous c.	14	-64	40	4.94	0.02*
R	occ. fusiform g.	32	-78	-10	7.52	<0.001*
R	occ. pole	32	-90	2	Inf	<0.001*
L	supramarginal g., posterior division	-64	-44	28	5.73	<0.001*
L	angular g.	-50	-52	34	5.09	0.01*
L	temporal occ. fusiform c.	-30	-60	-10	7.48	<0.001*
L	occ. fusiform g.	-30	-74	-10	Inf	<0.001*
L	lateral occ. c., inferior division	-30	-88	-4	Inf	<0.001*
L	occ. pole	-26	-92	12	7.84	<0.001*

Note. N=47. Initial threshold p=0.001 uncorrected. MNI=coordinates for the Montreal Neurological Institute coordinate system for the peak location (x, y, z). Cluster extend in number of voxels (k); maximum z score; and FWE-corrected p-values. Regions: L, left; R, right; ant., anterior; c., cortex; g., gyrus; occ., occipital; post., posterior; suppl., supplementary. *significant at psvc<0.05.

Table S9

Whole brain analysis – Experiment 6 – Response interference inhibition (Incon Go>Con Go)

Region		MNI		z-score	pFWE	k
R	insular c.	32	20	6	5.08	0.01*
L	insular c.	-28	22	-8	3.69	0.87
L	paracingulate g.	-2	16	44	4.57	0.08
L	inferior frontal g., pars opercularis	-50	10	2	3.89	0.65
L	suppl. motor area	-2	6	50	4.60	0.07
L	precentral g.	-48	4	30	7.16	<0.001*
L	superior frontal g.	-24	-2	58	Inf	<0.001*
R	supramarginal g., ant. division	58	-22	40	4.70	0.05*
R	superior parietal lobule	36	-46	56	5.03	0.01*
R	lateral occ. c., superior division	18	-64	54	7.84	<0.001*
R	lateral occ. c., inferior division	32	-90	-4	5.37	<0.001*
R	occ. pole	28	-94	-6	5.25	<0.001*
L	supramarginal g., ant. division	-56	-32	40	7.38	<0.001*
L	superior parietal lobule	-32	-56	56	4.64	0.06
L	lateral occ. c., superior division	-14	-68	54	7.26	<0.001*
L	middle temporal g., temporoocc. part	-50	-60	-4	6.13	<0.001*
L	lateral occ. c., inferior division	-42	-64	6	4.43	0.14
R	inferior temporal g., temporoocc. part	50	-52	-8	6.37	<0.001*
R	lateral occ. c., inferior division	46	-64	-12	4.63	0.06
R	thalamus	14	-20	14	3.88	0.67
L	thalamus	-10	-22	10	4.44	0.13
L	putamen	-32	-16	-4	3.76	0.81
R	cerebellum	26	-62	-30	3.98	0.54

Note. N=47. Initial threshold p=0.001 uncorrected. MNI=coordinates for the Montreal Neurological Institute coordinate system for the peak location (x, y, z). Cluster extend in number of voxels (k); maximum z score; and FWE-corrected p-values. Regions: L, left; R, right; ant., anterior; c., cortex; g., gyrus; occ., occipital; post., posterior; suppl., supplementary. *significant at psvc<0.05.

Table S10

Whole brain analysis – Experiment 6 – Emotional interference inhibition (Model 3)

Contrast	Region	MNI	z-score	pFWE	k
Neg>Neu	L superior frontal g.	-6 52 28	3.97	0.57	122
	L frontal operculum c.	-36 26 2	6.52	<0.001*	779
	L inferior frontal g., pars triangularis	-40 32 14	4.53	0.10	779
	L frontal orbital c.	-26 32 -14	7.51	<0.001*	779
	R inferior frontal g., pars opercularis	46 18 22	4.18	0.33	912
	L precentral g.	-40 4 28	5.54	<0.001*	257
	L cingulate g., ant. division	6 4 28	5.69	<0.001*	190
	L frontal orbital c.	-26 12 -18	5.54	<0.001*	420
	L temporal pole	-30 4 -20	6.11	<0.001*	420
	L Amygdala	-22 -4 -18	7.24	<0.001*	420
	R Amygdala	22 -2 -18	6.75	<0.001*	342
	R frontal orbital c.	28 12 -22	5.66	<0.001*	342
	R Thalamus	2 -12 0	5.27	<0.001*	259
	R Brainstem	4 -28 -2	5.06	0.01*	205
	R superior parietal lobule	30 -50 48	4.70	0.05*	72
	R temporal occ. fusiform c.	36 -42 -18	7.04	<0.001*	3133
	R lateral occ. c., inferior division	44 -64 -8	Inf	<0.001*	3133
	L temporal occ. fusiform c.	-38 -50 -14	Inf	<0.001*	2902
	L lateral occ. c., inferior division	-44 -74 -6	7.70	<0.001*	2902
Interaction1 ¹	No activations				
Interaction2 ²	R frontal pole	56 36 6	3.25	1.00	3
	R frontal medial c.	2 34 -24	3.37	1.00	6
	R inferior frontal g., p. triangularis	56 26 0	3.21	1.00	6
	R amygdala	24 4 -20	3.85	0.71	22
	R inferior temporal g., temporooccipital part	48 -50 -14	3.15	1.00	3
	R angular g.	42 -56 18	3.15	1.00	3
	L middle temporal g., ant. division	-54 -6 -18	3.53	0.97	14
	L temporal pole	-48 6 -12	3.47	0.98	9

Note. N=47. Initial threshold p=0.001 uncorrected. MNI=coordinates for the Montreal Neurological Institute coordinate system for the peak location (x, y, z). Cluster extend in number of voxels (k); maximum z score; and FWE-corrected p-values. Regions: L, left; R, right; ant., anterior; c., cortex; g., gyrus; occ., occipital; p., pars; post., posterior; suppl., supplementary. ¹The first interaction checks which regions are upregulated when a negative prime interferes with response inhibition. The contrast was build as follows: ((stop, incon)/2 -(con))_{Neg} -((stop, incon)/2 -(con))_{Neu}. ²The second interaction tests which regions were downregulated due to emotional interference during response inhibition. At the same time it tests if response inhibition downregulated emotional responses. The contrast was build as follows: ((con) - (stop, incon)/2)_{Neg} -((con) -(stop, incon)/2)_{Neu}. *significant at psvc<0.05.