Supplementary Material

for

Anterior insula integrates information about salience into perceptual decisions about pain

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Table S1: Brain responses during anticipation: pain > no pain (pooled across high and low threat)

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
insula	R	47	36	17	-8	444	5.23
parahippocampal gyrus	R	28	27	5	-29		4.08
insula	R	48	42	-10	7		3.84
cerebellum	R	-	18	-58	-38	76	4.29
cerebellum	R	-	27	-58	-41		3.61
inferior temporal lobe	R	37	39	-49	-11	137	4.21
fusiform gyrus	R	37	30	-55	-17		3.8
fusiform gyrus	R	19	30	-58	-2		3.29
PAG	R	-	9	-13	-11	291	4.12
hippocampal gyrus/amygdala	R	34	18	-4	-14		4.09
PAG	L	-	-6	-16	-8		3.89
insula	L	48	-45	11	-2	187	3.9
insula	L	48	-39	2	-8		3.65
Heschl gyrus	L	48	-36	-25	13	44	3.9
operculum	L	48	-42	-31	22		2.81
pallidum	L	25	-12	2	-5	30	3.45
OFC	R	47	39	44	-5	26	3.37
rACC/OFC	L	10	-12	44	-2	23	3.24
VLPFC	R	45	51	32	22	42	3.15
VLPFC/operculum	R	44	57	20	31		3.05
mid temporal lobe	L	39	-51	-67	19	8	3.03
lingual gyrus	L	19	-24	-55	-2	6	2.99
OFC	R	47	39	56	-5	42	2.96
OFC	R	10	33	62	4		2.93
OFC	R	10	21	65	4		2.85
inferior temporal lobe	R	37	57	-64	-2	12	2.95
insula	R	48	33	17	10	5	2.95

vermis	**R**	**-**	**3**	**-49**	**-26**	**12**	**2.9**
lingual gyrus	**R**	**18**	**15**	**-70**	**-2**	**11**	**2.88**
operculum	**L**	**48**	**-42**	**-4**	**13**	**4**	**2.85**
parahippocamp. gyrus	**R**	**27**	**18**	**-40**	**-5**	**2**	**2.84**
lingual gyrus	**L**	**37**	**-24**	**-43**	**-2**	**11**	**2.83**
occipital lobe	**R**	**19**	**45**	**-82**	**1**	**3**	**2.82**
lingual gyrus	**L**	**18**	**-18**	**-70**	**1**	**1**	**2.74**
insula	**L**	**48**	**-42**	**-13**	**10**	**1**	**2.73**
SMA	**R**	**6**	**12**	**20**	**52**	**1**	**2.7**
parahippocamp. gyrus	**L**	**28**	**-24**	**5**	**-26**	**1**	**2.68**
SMA	**R**	**6**	**12**	**2**	**61**	**1**	**2.65**
operculum	**R**	**48**	**39**	**-16**	**22**	**1**	**2.62**
motor cortex	**L**	**6**	**-24**	**-13**	**61**	**2**	**2.61**

Note: **L, left; R, right; PAG, periaqueductal gray; OFC, orbitofrontal cortex; rACC, rostral anterior cingulate cortex; VLPFC, ventrolateral prefrontal cortex; SMA, supplementary motor cortex; p< 0.005 uncorrected at voxel level; voxel size: 3x3x4 mm**

Table S2: **Brain responses during anticipation: no pain > pain (pooled across high and low threat)**

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
PCC	L	29	-6	-43	13	25	3.17
calcarine sulcus	L	18/30	-6	-52	4		2.88
cerebellum	L	30	-12	-37	-14	5	3.05
precuneus	R	7	6	-73	46	5	2.86
calcarine sulcus	R	30	9	-52	13	3	2.78
SMA	L	6	-12	5	73	1	2.63
caudate nucleus	L	-	-12	20	10	1	2.59

Note: L, left; R, right; PCC, posterior cingulate cortex; SMA, supplementary motor area; p< 0.005 uncorrected at voxel level; voxel size: 3x3x4 mm

Table S3: Brain responses during stimulation: pain > no pain (pooled across high and low threat)

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
MCC	R	24	3	11	40	13284	5.44
MCC	L	24	-3	-4	43		5.42
SMA	R	6	0	-10	52		5.29
operculum/VLPFC	L	44	-51	11	16	60	4.12
olfactory sulcus	L	48	-21	8	-14	85	3.36
temporal pole/OFC	L	38	-33	23	-23		3.32
DLPFC	R	46	42	53	16	32	3.34
DLPFC	R	46/9	30	50	37	23	3.28
OFC	L	47	-42	29	-2	18	3.15
insula	R	48/38	36	50	-17	27	3.1
OFC	R	47	42	44	-20		2.86
OFC/ temporal pole	R	38	36	26	-23	11	3.07
mid temporal lobe	L	21	-54	-52	4	15	3.05
OFC	L	11	-24	44	-14	3	2.93
VLPFC	R	45	48	32	34	5	2.9
PAG	L	-	-3	-16	-20	4	2.88
cerebellum	R	-	24	-43	-29	12	2.87
OFC	L	47	-36	50	-11	2	2.79
OFC	R	11	9	53	-20	2	2.75
rACC	L	32	-3	47	16	4	2.7
OFC	L	47	-30	38	-17	3	2.7
fusiform gyrus	R	20/37	42	-31	-14	1	2.64
VLPFC	R	45	51	41	7	1	2.63
pallidum	L	-	-24	-4	1	2	2.6
OFC	L	47	-39	47	-14	1	2.6

Note: L, left; R, right; MCC, mid cingulate cortex; SMA, supplementary motor cortex; VLPFC, ventrolateral prefrontal cortex; OFC, orbitofrontal cortex; DLPFC, dorsolateral prefrontal cortex; PAG, periaqueductal gray; rACC, rostral anterior cingulate cortex; $p < 0.005$ uncorrected at voxel level; voxel size: 3x3x4 mm

Table S4: **Brain responses during anticipation: high > low threat (pooled across pain and no pain)**

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
insula	L	47	-30	20	-5	10	3.22
SII	R	48	60	-25	28	12	3.06
insula	L	48	-30	17	-17	5	2.87
fusiform gyrus	R	20	30	2	-41	1	2.86
insula/ OFC	R	47	33	23	-8	2	2.81
DLPFC	L	46	-33	29	28	1	2.69

Note: L, left; R, right; SII, secondary somatosensory cortex; OFC, orbitofrontal cortex; DLPFC, dorsolateral prefrontal cortex; $p < 0.005$ uncorrected at voxel level; voxel size: 3x3x4 mm

Table S5: Brain responses during anticipation: low > high threat (pooled across pain and no pain)

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
DLPFC	L	8	-21	5	49	60	4.19
DLPFC/DMPFC	R	9	15	35	52	160	3.79
SMA	R	6	21	8	61		3.43
DLPFC/DMPFC	L	9	-15	41	49	51	3.5
DLPFC/DMPFC	L	9	-12	32	49		3.11
SMA	L	6	-6	5	67	4	2.98
lingual gyrus	L	19	-27	-55	-2	7	2.92
SII	R	40	30	-34	46	9	2.92
VLPFC/DLPFC	R	44	36	14	40	5	2.92
lingual gyrus	L	18	-15	-79	-11		2.79
precuneus	R	7	6	-67	37	11	2.81
inferior parietal lobe	L	7	-30	-61	40	6	2.78
SMA	R	6	24	-19	70	5	2.77
SMA	R	6	33	-25	61		2.65
rACC	R	32	0	41	10	4	2.73
DLPFC	R	9	27	35	43	1	2.62
mid temporal lobe	L	22	-51	-34	4	2	2.62
cerebellum	R	-	30	-85	-26	1	2.62

Note: L, left; R, right; DLPFC, dorsolateral prefrontal cortex; DMPFC, dorsomedial prefrontal cortex; SMA, supplementary motor cortex; SII, secondary somatosensory cortex; VLPFC, ventrolateral prefrontal cortex; rACC, rostral anterior cingulate cortex; $p < 0.005$ uncorrected at voxel level; voxel size: 3x3x4 mm

Table S6: **Brain responses during stimulation: high > low threat (pooled across pain and no pain)**

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
rACC	R	24	6	38	10	150	4.31
VLPFC	R	45	63	26	7	68	4.05
VLPFC	R	45	54	29	16		3.18
OFC	L	11	-21	41	-11	17	3.48
mid temporal lobe	R	21	63	-55	10	41	3.25
mid temporal lobe	R	21/22	66	-46	4		2.83
premotor cortex	L	6	-33	2	40	10	3.08
putamen	L	48	-27	8	16	9	3.08
SMA	L	6	-15	8	70	12	2.99
MPFC	L	32	-12	35	43	9	2.98
cerebellum	R	-	30	-85	-23	3	2.9
premotor cortex	L	6	-39	-13	52	6	2.9
OFC	R	10/11	6	50	-8	8	2.87
MPFC	L	32	-12	44	34	6	2.78
DLPFC	L	9/46	-21	47	28		2.62
VLPFC	L	45	-45	38	16	3	2.73
OFC	L	10	-39	56	-2	2	2.68
MCC	R	23	3	-10	34	1	2.64
MPFC	R	32	15	29	37	1	2.59

Note: L, left; R, right; rACC, rostral anterior cingulate cortex; VLPFC, ventrolateral prefrontal cortex; OFC, orbitofrontal cortex; SMA, supplementary motor cortex; MPFC, medial prefrontal cortex; DLPFC, dorsolateral prefrontal cortex; MCC, mid cingulate cortex; $p < 0.005$ uncorrected at voxel level; voxel size: 3x3x4 mm

Table S7: **Brain responses during stimulation: low > high threat (pooled across pain and no pain)**

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
temporal pole	L	38	-33	17	-20	11	3.06
cerebellum	R	-	15	-46	-11	4	2.88
cerebellum	R	-	12	-67	-38	2	2.73

Note: L, left; R, right; p< 0.005 uncorrected at voxel level; voxel size: 3x3x4 mm

Table S8: **Brain regions showing a positive psychophysiological interaction with the left anterior insula during pain compared to no pain**

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
insula	R	48	45	-10	7	21	3.24
operculum	L	48	-45	-7	22	4	3.22
MCC	R	24	3	17	22	38	3.17
rACC	R	24/25	6	35	7		3.14
rACC	L	24/25	-3	29	13		3.13
SI/MI	L	3/4	-30	-25	58	10	3.06
MCC	L	23	-3	-10	31	4	2.92
temporal pole	R	38	39	20	-38	3	2.89
occipital lobe	R	18	36	-94	1	3	2.88
VLPFC	R	45	45	35	13	7	2.85
thalamus	L	-	-18	-16	7	2	2.64
operculum	R	48	39	14	31	4	2.63
DMPFC	L	9	-6	47	34	1	2.61
OFC/DLPFC	R	10/46	24	50	10	1	2.61
temporal pole	R	38	36	23	-23	1	2.61
MI/SMA	L	4/6	-39	-16	52	1	2.59

Note: L, left; R, right; MCC, mid cingulate cortex; rACC, rostral anterior cingulate cortex; SI, primary somatosensory cortex; MI, primary motor cortex; VLPFC, ventrolateral prefrontal cortex; DMPFC, dorsomedial prefrontal cortex; OFC, orbitofrontal cortex; DLPFC, dorsolateral prefrontal cortex; SMA, supplementary motor cortex; $p < 0.005$ uncorrected at voxel level; voxel size: 3x3x4 mm

Table S9: **Brain regions showing a positive correlation between their prestimulus connectivity with the left anterior insula in pain compared to no pain trials and the threat-related bias towards pain ('bias index')**

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
insula	R	48	39	5	7	5	3.11
occipital lobe	R	18	30	-91	4	4	2.78
posterior cingulate cortex	R	23	12	-37	31	1	2.75
MCC	R	24	12	14	28	2	2.67
insula	L	48	-42	17	7	2	2.65

Note: L, left; R, right; MCC, mid cingulate cortex; p< 0.005 uncorrected at voxel level; voxel size: 3x3x4 mm

Table S10: **Brain regions showing a positive correlation between the activation under high compared to low threat during stimulation and the threat-related bias towards pain ('bias index')**

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
MCC	L	24	-3	11	22	34	5.57
VLPFC	R	45	36	38	7	18	3.5
OFC/VLPFC	R	47	30	44	4		3.37
precuneus	L	27	-9	-37	4	19	3.37
DLPFC	L	9	-18	41	40	10	3.18
DLPFC	L	9	-15	47	31		2.81
inferior parietal lobe	L	7	-30	-58	49	3	3.05
thalamus	R	-	9	-31	4	3	2.9
MCC	L	24	-6	2	34	3	2.9
putamen	L	-	-21	14	13	2	2.77
VLPFC	L	45	-42	23	7	2	2.67
putamen	R	-	30	-1	4	2	2.62
putamen	R	-	27	11	1	1	2.6
VLPFC	L	44	-45	14	34	1	2.58

Note: L, left; R, right; MCC, mid cingulate cortex; VLPFC, ventrolateral prefrontal cortex; OFC, orbitofrontal cortex; DLPFC, dorsolateral prefrontal cortex; $p < 0.005$ uncorrected at voxel level; voxel size: 3x3x4 mm

Table S11: Brain responses during anticipation: interaction analysis [(high – low threat)$_{pain}$ – (high – low threat)$_{no\ pain}$

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
thalamus	R	-	3	-22	7	107	3.59
inferior parietal lobe	R	40	42	-52	43	21	3.41
OFC	R	11	15	59	-5	6	3.31
cerebellum	R	-	3	-46	-50	35	3.22
cerebellum	R	-	3	-49	-35		3.17
DLPFC	R	8	33	26	52	25	3.13
DLPFC	R	46	39	23	46		2.87
vermis	R	-	3	-73	-20	12	3.03
OFC	L	47	-51	32	-5	6	2.85
insula	R	48	36	-7	22	2	2.81
medial temporal lobe	R	21	69	-28	-11	5	2.70
temporal pole	R	20	33	20	-38	4	2.69
superior temporal gyrus	L	42	-63	-43	22	2	2.69
temporal pole	R	-	45	5	-11	1	2.69
inferior temporal lobe	L	20	-42	-1	-29	4	2.62
MI	L	4	-9	-25	79	1	2.60
OFC	L	47	-36	47	-2	1	2.60
fusiform gyrus	L	20	-36	-10	-26	1	2.60

Note: L, left; R, right; OFC, orbitofrontal cortex; DLPFC, dorsolateral prefrontal cortex; MI, primary motor cortex; p< 0.005 uncorrected at voxel level; voxel size: 3x3x4 mm

Table S12: Brain responses during anticipation: interaction analysis [(high – low threat)$_{no\ pain}$ – (high – low threat)$_{pain}$

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
SII	R	40	30	-34	43	10	3.09
SMA	L	6	-15	-7	70	8	3.06
MCC	R	32	12	20	34	8	2.91
DLPFC	R	9	21	35	31	3	2.9
rACC	L	32	-12	53	22	1	2.64
OFC	R	10	9	59	13	1	2.58

Note: L, left; R, right; SII, secondary somatosensory cortex; SMA, supplementary motor cortex; MCC, mid cingulate cortex; DLPFC, dorsolateral prefrontal cortex; rACC, rostral anterior cingulate cortex; OFC, orbitofrontal cortex; $p < 0.005$ uncorrected at voxel level; voxel size: 3x3x4 mm

Table S13: Brain responses during stimulation: interaction analysis [(high – low threat)$_{pain}$ – (high – low threat)$_{no\ pain}$

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
occipital lobe	L	19	-36	-82	34	4	2.82
premotor cortex	L	6	-18	-7	73	2	2.68
premotor cortex	L	6	-24	-22	67	1	2.59

Note: L, left; R, right; p< 0.005 uncorrected at voxel level; voxel size: 3x3x4 mm

Table S14: Brain responses during stimulation: interaction analysis [(high – low threat)$_{no\ pain}$ – (high – low threat)$_{pain}$

brain region	laterality	Brodman area	MNI coordinates			cluster size (voxel)	Z score
			x	y	z		
fusiform gyrus	R	37	39	-46	-14	87	3.44
fusiform gyrus	R	37	36	-52	-2		3.41
mid temporal lobe	R	21/37	45	-46	-2		3.15
vermis	R	30	6	-43	-8	20	3.43
precuneus	L	37	-21	-46	7	7	3.14
fusiform gyrus	L	30	-18	-37	-11	13	3.11
DLPFC	R	46	33	23	40	15	2.97
occipital lobe	R	19	27	-70	1	2	2.96
mid temporal lobe	L	37	-42	-58	4	7	2.9
MPFC	R	32	18	29	43	2	2.87
PAG	R	-	6	-25	-14	3	2.71
mid temporal lobe	L	22	-48	-22	1	1	2.63
PAG	L	-	-3	-25	-14	1	2.62
occipital lobe	R	37	39	-64	-8	1	2.6
lingual gyrus	R	18	9	-61	-3	1	2.59

Note: L, left; R, right; DLPFC, dorsolateral prefrontal cortex; MPFC, medial prefrontal cortex; PAG, periaqueductal gray; $p < 0.005$ uncorrected at voxel level; voxel size: 3x3x4 mm