Data supplement for Chavanne and Robinson, The Overlapping Neurobiology of Induced and Pathological Anxiety: A Meta-Analysis of Functional Neural Activation. Am J Psychiatry (doi: 10.1176/appi.ajp.2020.19111153)

Supplementary Methods

Literature search and inclusion

Database keywords for titles and abstracts included ‘major depression’, ‘major depressive’, ‘unipolar depression’, ‘traumatized’, ‘trauma’, ‘anxiety’, ’anxious’, ‘phobia’, ‘phobic’, ‘phobics’, ‘post-traumatic stress disorder’, ‘posttraumatic stress disorder’, ‘panic’, ‘PTSD’ in conjunction with ‘fMRI’ or ‘functional magnetic resonance imaging’. Studies reporting null results for the whole-brain analysis were included.

Unpredictability of the threat relied on the time of delivery and/or the intensity of the stimulus, and nociceptive stimuli were not excluded provided they fit these criteria. Only potent aversive stimuli (ex: electrical shocks, thermal stimuli) were selected as unpredictable threats to avoid potential confusion with stimuli used in other included articles (ex: emotional faces). Classical fear-conditioning paradigms were excluded as they did not fit the unpredictability criteria.

Records were excluded if they were not experimental (and therefore did not include data to analyze), if they were not published in English (as we did not want to risk misunderstanding the reported information), if activation was only reported after treatment administration, and if they used a sample fully comorbid with any current medical or mental condition (other anxiety disorders and unipolar depression excepted), as both treatment and comorbidity could confound reported activations. Authors were contacted for unthresholded activation maps

Full-text articles were excluded if they did not report activation/deactivation coordinates (as they constituted the main analysis), or if thresholding was inhomogenous across the brain (Müller et al., 2018). Exceptions were made for the latter criteria if only *one* region of interest was thresholded differently (in all cases but one this was an amygdala region of interest– we assumed that it was too small to come up in most whole-brain analyses, hence the need for authors to threshold it differently), in which case articles were included but *only* the data using the whole-brain threshold was collected. Articles using fully duplicate samples were excluded where reported. Articles were also excluded if they reported incomplete post-hoc analyses for a whole-brain interaction analysis with more than two levels, as this meant it was impossible to determine which group/condition was driving effects. No additional judgments of study quality were made beyond the exclusions reported above. Authors were contacted for unthresholded activation maps.

For the PTSD category, only articles using healthy controls (and not traumatized controls) were used in the main analysis. Eligible PTSD articles with traumatized controls (22 for emotion tasks, 325 patients, 353 controls) were kept aside only to be compared with the PTSD healthy controls articles. See Table S7 for a whole-brain meta-analysis of PTSD patients vs. traumatized controls for emotion tasks.

Note that for each study we do not take the effect of task, but the effect of anxiety (either induced or pathological) *on* the task contrast of interest. Our analysis therefore makes the assumption that the average effect of anxiety across multiple tasks provides an estimate of the average impact of anxiety on emotional cognitive task processing *in general*. Notably, this does not mean, for example, that we are comparing the effect of specific tasks in patients to the overall effect of threat of shock. We are comparing the *average impact of patients vs. controls on tasks relative to the average impact of threat vs safe on tasks*. In an ideal world we would compare the exact same tasks across types of anxiety. However, as with any meta-analysis we need to trade precision (i.e. restricting it to the small number of identical tasks) and power (i.e., number of studies) against each other. Given that there simply aren't enough studies to solely examine a single task type, we believe that this analysis provides the best *current* approximation of the consistencies between induced and pathological anxiety. If anything, averaging across tasks increases the noise, making it harder to find consistent activations, thus the observed overlap is likely biased towards the lower end of true overlap (which in turn urges caution in interpretation of activation *differences*).

SDM meta-analysis procedure

Z-values, or uncorrected p-values were collected and converted to t-values via the SDM online converter. SDM-PSI also allows for absence of a statistical value, requiring only the direction of the analysis (activation or deactivation): this was used for articles reporting only corrected p-values, F-values not originating from a 2x2 design, or not reporting any statistical value. Atlas space (MNI, Talairach) for each article was also entered into SDM-PSI, which uses matrix transforms (Lancaster et al., 2007) to convert into consistent space. According to SDM recommendations, cluster-forming height thresholds were used instead of voxel thresholds for articles using cluster-based statistics. A conservative value of $p = 0.001$ (converted to t) was used as threshold for articles in which there was no uncorrected threshold reported or if the threshold was unclear

Articles were split by anxiety type (7 groups: Induced, post-traumatic stress disorder [PTSD], social anxiety disorder, generalized anxiety disorder, panic disorder, specific phobia, transdiagnostic [articles contrasting anxious subjects pooled across two or more of the 5 previous anxiety disorders, with the possible addition of separation anxiety disorder for pediatric samples, with healthy controls]).

Large clusters were also checked in a complementary FWHM 10mm analysis conducted with all other parameters identical. Meta-analytic maps were computed with the SDM mean analysis via permutation tests (Albajes-Eizagirre et al., 2019), thresholded with peak height 1, voxelwise $p \leq 0.0025$ (paired one-tailed tests, resulting in two-tailed $p \leq 0.005$), uncorrected and clusterwise $k \geq 10$ voxels as the classical balance between Type I and Type II errors (Lieberman & Cunningham, 2009). Pairwise convergence maps approximating significant commonalities and differences between two article groups were computed with the multimodal SDM tool by assuming error in p-values and adjusting to reduce false negative rates, and thresholded with a voxelwise uncorrected $p \leq 0.0025$ (four-tailed) and clusterwise $k \geq 10$ voxels, peak height 0.00025 (Radua et al., 2013).

Identified clusters were large and encompassed many areas. This meant automated approaches would miss relevant areas by focusing solely on peaks (or indeed erroneously identify out-of-cluster coordinates by triangulating between contributing clusters). As such, all clusters reported were manually confirmed using the AAL atlas visualized on the MRIcron software. All contributing brain regions within each cluster were listed. Additionally, the PAG (peri-aqueductal gray) and BNST (bed nucleus of the stria terminalis) regions were visually examined using MNI coordinates (x=±4, y=-29 (±5), z=-12(±7) (Linnman et al., 2012) and x=±8, y=0, z=5 (Buff et al., 2017) respectively).

It should be noted that effect sizes for non-significant results are unknown and conservatively assumed to be 0 by SDM-PSI unless unthresholded maps were used (N=17 of 138), making the Egger's test exploratory only.

Supplementary Results

Other tasks

We investigated brain activation patterns across anxiety studies for attention, decision and memory tasks as well, although they included an order of magnitude less papers than emotion tasks.

Briefly, anxious patients (N=396) vs. controls (N=324) during attention tasks did not show any significant activation or deactivation. During decision tasks (222 patients vs. 218 controls), they showed reduced activation in bilateral middle frontal gyri and right putamen. During the memory tasks, anxious patients (N=217) compared to controls (N=216) showed increased activation in left hippocampus and right inferior frontal gyrus (IFG) opercular, but reduced activation in anterior cingulate cortex (ACC), midcingulate cortex (MCC) and left insula. (See Table S8 for additional clusters description and peak information).

PTSD controls vs trauma

No convergence was found between studies contrasting PTSD patients with healthy controls and studies contrasting PTSD patients with non-PTSD traumatized controls for emotion tasks.

Supplementary Discussion

Induced anxiety as a model for pathological anxiety

Our findings of bilateral BNST activation in induced anxiety is in line with recent literature, which reports that the BNST plays a key role in generating anxious feeling and is engaged when faced with uncertain threat, both in humans and rodents (Davis et al., 2010; LeDoux & Pine, 2016). Interestingly, consistent with older meta-analyses (Etkin & Wager, 2007), BNST activations were not consistently seen in pathological anxiety (although this may depend on medication status; see below), which suggests that this might be an activation that is specific to imminent state anxiety, which may be less present at any given time in anxious patients than someone undergoing direct threat manipulation (Gungor & Paré, 2016). This is in contrast with the amygdala which was observed in the pathological – but not induced – anxiety group, perhaps indicating more of a role in dispositional anxiety (Hur et al., 2019). Animal work nevertheless demonstrates that uncertain threat response in the BNST usually travels through the amygdala (Gungor & Paré, 2016; Hur et al., 2019) so it may actually be that this dissociation is an artefact of confounds/power issues inherent in meta-analyses. Interestingly, of prior anxiety-linked subcortical regions it was the PAG that was consistent across both groups, perhaps indicating a more general role in anxiety/negative affect. These patterns should of course be treated with caution until replicated in well-controlled direct test across anxiety groups, but they do highlight interesting predictions for future research.

It is worth noting that medication status may be an important factor modulating the role of the BNST in pathological
anxiety as excluding medicated patients led to BNST activations in the pathological anxiety group (consistent with the induced anxiety group). It is important therefore to test the effects of medication on BNST activation in future studies.

Our findings indicate a globally satisfactory functional overlap between induced anxiety and anxiety disorders, although some differences were also found, including the absence of amygdala activation in induced anxiety. We however advise caution in overinterpreting apparent differences, particularly for the amygdala and other small regions, and elaborate further on this in the limitations section.

Specificity across disorders

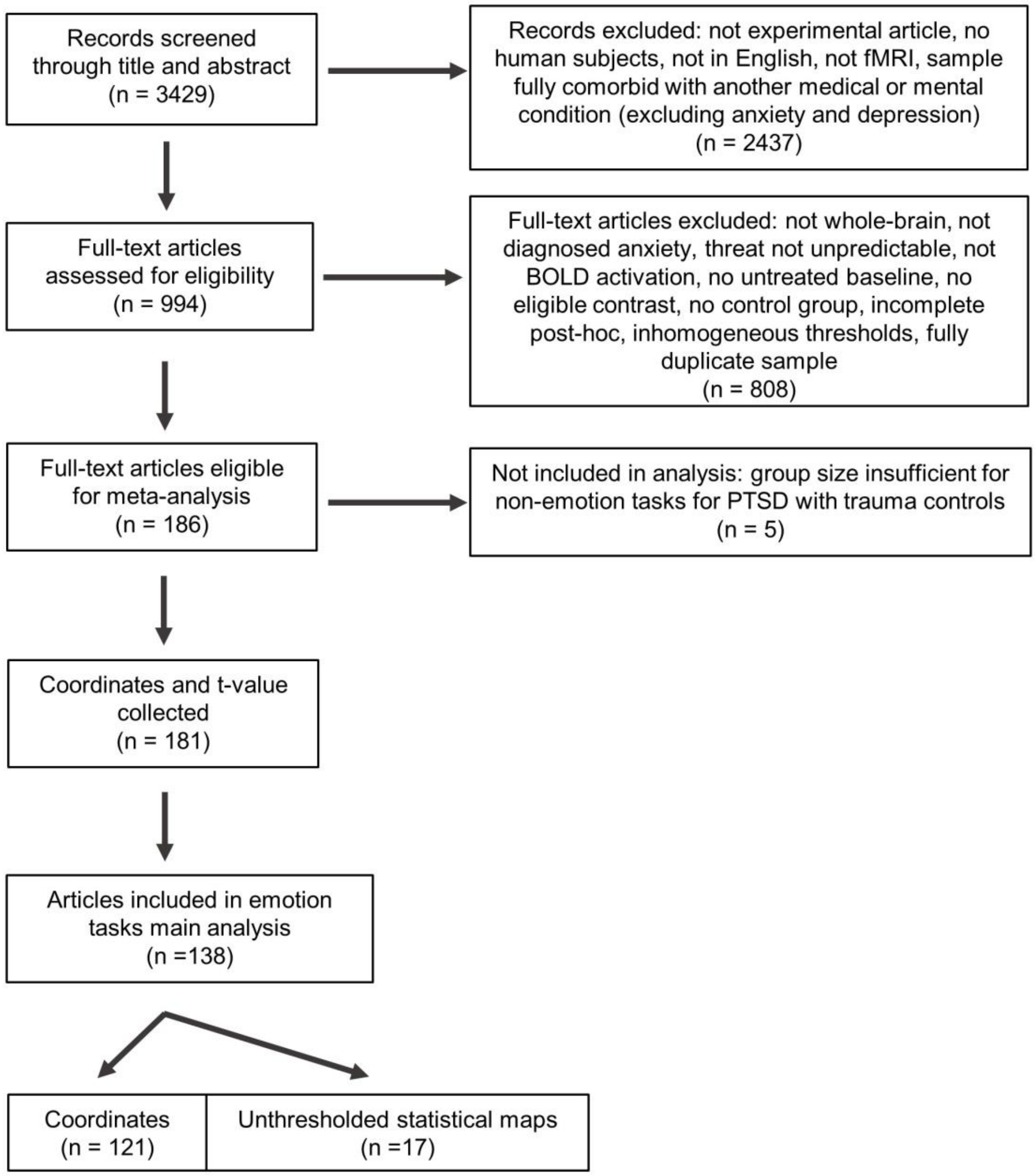
One reason for the apparent differences between diagnostic groups might be that the cingulate cortex is an architecturally complex structure, with anterior regions thought to be involved in social and emotional processing, while medial regions are involved in goal-directed behavior (Apps, 2018). Thus, increased activation in MCC and ACC may reflect an increase in goal-directed behavior in response to emotional stimuli, corresponding to the high state-anxiety following exposure to phobic stimuli in specific phobia patients. By contrast, *reduced* activation in generalized anxiety disorder could perhaps reflect a difficulty engaging in such behavior perhaps as illustrated by housebound avoidance behavior during more continuous trait-like anxiety. In other words, subtleties in symptoms may emerge from (or drive) activation patterns in adjacent medial prefrontal regions with dissociable roles.

The insula is also a complex brain structure receiving numerous sensory inputs and believed to play a key role in interoceptive perception and the integration of bodily sensations (Gogolla, 2017; Paulus & Stein, 2006). Our findings point to hyperactivation of the insula in specific phobia, panic disorder, PTSD and possibly social anxiety disorder, but potential deactivation in generalized anxiety disorder. This could be in line with the difference between defining symptoms of these disorders, some – like specific phobia or panic disorder – are more centred on bodily sensations, whereas generalized anxiety disorder is associated with general feelings of worry, often about external environmental factors. Thus, involvement of this region in anxiety disorders may be specific to symptoms involving interoception. Alternatively, since both cingulate and insula are also part of a hypothetical salience network as defined by Yeo (2011) (Yeo et al., 2011) deactivation in both regions in generalized anxiety disorder might be because it is characterized by more general apprehension and hypervigilance rather than targeted responses to specific salient (e.g. phobic) stimuli.

Limitations

Finally, it is important to recognize some limitations with the meta-analytic approach specifically. SDM only allows one to prioritize maps that were corrected for multiple comparisons and does not filter studies by the p- or z-value threshold they use. There is also a potential publication bias towards activation in the patient vs. control contrast, as many eligible articles do not clearly state whether the opposite (controls vs. patients) contrast had null results meaning it was not possible to know if this evoked significant but unreported activations. The use of unthresholded maps in place of coordinates allows us to avoid those biases, but we were only able to collect 17 maps out of 138 articles. Unfortunately, even the raw data cannot fully circumvent the differences between MRI scanners and pre-processing strategies across all eligible studies. Nevertheless, the Egger's test indicated no significant publication bias for any of the clusters in the primary analyses of interest.

FIGURE S1. Flowchart of article selection



N represents the number of articles.

TABLE S1. Demographic sample description for all 181 articles meeting criteria

	Induced anxiety	PTSD	PTSD HC	SAD	SAD HC	GAD	GAD HC	PD	PD HC	SpP	SpP HC	Tdiag	Tdiag HC	PTSD[a]	PTSD TC[a]
Articles (studies)	18 (19)	34		41		17		14		21 (23)		14		22	
Sample	693	576	539	830[b]	766[c]	289	260	310	323	414	373	492	424	325	353[d]
Mean Age	25.15	32.48	31.38	28.70	28.83	34.79	35.01	33.04	32.32	25.53	22.66	21.13	21.58	34.88	35.13
Mean Male %	53.67	31.32	31.54	37.52	39.58	36.70	41.93	34.52	35.60	12.03	10.92	30.29	35.59	44.93	43.60

a: articles not using emotion tasks were not included in analysis because there were too few; b: including 33 comorbidly depressed SAD patients; c: including 27 depressed non-SAD controls; d: including 16 depressed non-PTSD patients; HC: healthy controls; TC: trauma-exposed controls; SAD: social anxiety disorder; GAD: generalized anxiety disorder; PD: panic disorder; SpP: specific phobia; Tdiag: transdiagnostic anxiety category, where each article reports two or more anxiety disorders in one pooled group of patient

TABLE S2. Comprehensive list of the 181 articles meeting inclusion criteria

Eligible articles	Anxiety type	Task category
Sakamoto et al. (2005)	PTSD	Emotion, Attention
Williams et al. (2006)	PTSD	Emotion
Strigo et al. (2010)	PTSD	Emotion
Zweerings et al. (2018)	PTSD	Emotion, Attention
Elman et al. (2018)	PTSD	Emotion
Dégeilh et al. (2017)	PTSD	Emotion
Brinkmann et al. (2017)	PTSD	Emotion
Aupperle et al. (2016)	PTSD	Attention
M. J. Kim et al. (2008)	PTSD	Emotion
Rabellino et al. (2016)	PTSD	Emotion
Werner et al. (2009)	PTSD	Memory
Moores et al. (2008)	PTSD	Attention
Simmons et al. (2008)	PTSD	Emotion
Xiong et al. (2013)	PTSD	Emotion
van Rooij et al. (2015)	PTSD	Emotion
Bryant et al. (2005)	PTSD	Attention
Thomaes et al. (2012)	PTSD	Emotion, Attention
Landré et al. (2012)	PTSD	Emotion, Memory
Fonzo et al. (2010)	PTSD	Emotion
Sailer et al. (2008)	PTSD	Decision
Cisler et al. (2015)	PTSD	Decision
Steiger et al. (2015)	PTSD	Emotion
van Rooij et al. (2014)	PTSD	Attention
Aupperle et al. (2012)	PTSD	Emotion
St Jacques et al. (2011)	PTSD	Emotion, Memory
Elman et al. (2009)	PTSD	Emotion
New et al. (2009)	PTSD, PTSD trauma	Emotion
Falconer et al. (2008)	PTSD	Attention
Astur et al. (2006)	PTSD	Memory
Mazza et al. (2012)	PTSD	Emotion
Zhang et al. (2013)	PTSD	Emotion, Memory
Garrett et al. (2019)	PTSD	Emotion
Steuwe et al. (2014)	PTSD	Emotion
Simmons et al. (2011)	PTSD	Emotion
Stevens et al. (2013)	PTSD trauma	Emotion
Naegeli et al. (2018)	PTSD trauma	Emotion
Ke et al. (2016)	PTSD trauma	Emotion
Mazza et al. (2013)	PTSD trauma	Emotion
Mazza et al. (2015)	PTSD trauma	Emotion
Mueller-Pfeiffer et al. (2013)	PTSD trauma	Emotion
Hou et al. (2007)	PTSD trauma	Emotion
Lanius et al. (2002)	PTSD trauma	Emotion
Shin et al. (2001)	PTSD trauma	Emotion
Whalley et al. (2009)	PTSD trauma	Emotion
Whalley et al. (2013)	PTSD trauma	Emotion
Cortese et al. (2018)	PTSD trauma	Emotion
Linnman et al. (2011)	PTSD trauma	Emotion
Rabinak et al. (2014)	PTSD trauma	Emotion
Simmons et al. (2013)	PTSD trauma	Emotion
Fani et al. (2012)	PTSD trauma	Emotion

Eligible articles	Anxiety type	Task category
Hayes et al. (2011)	PTSD trauma	Emotion
Lanius et al. (2007)	PTSD trauma	Emotion
Lanius et al. (2003)	PTSD trauma	Emotion
Yang et al. (2004)	PTSD trauma	Emotion
Fani et al. (2019)	PTSD trauma	Emotion
Patel et al. (2016)	PTSD trauma	Emotion
Stein et al. (2002	Social anxiety disorder	Emotion
Månsson et al. (2016	Social anxiety disorder	Emotion
Richey et al. (2014	Social anxiety disorder	Emotion, Decision
Heeren et al. (2017	Social anxiety disorder	Emotion, Decision
Kim et al. (2016	Social anxiety disorder	Emotion
Richey et al. (2017)	Social anxiety disorder	Emotion, Decision
Frick et al. (2013)	Social anxiety disorder	Emotion
Prater et al. (2013)	Social anxiety disorder	Emotion
Giménez et al. (2012)	Social anxiety disorder	Emotion, Attention
Brown et al. (2019)	Social anxiety disorder	Emotion
Goldin et al. (2009a)	Social anxiety disorder	Emotion
Goldin et al. (2009b)	Social anxiety disorder	Emotion
Boehme et al. (2014)	Social anxiety disorder	Emotion
Gaebler et al. (2014)	Social anxiety disorder	Emotion
Ziv et al. (2013)	Social anxiety disorder	Emotion
Pujol et al. (2013)	Social anxiety disorder	Emotion, Memory
Schneier et al. (2011)	Social anxiety disorder	Emotion
Klumpp et al. (2012)	Social anxiety disorder	Emotion
Koric et al. (2012)	Social anxiety disorder	Decision
Blair et al. (2011a)	Social anxiety disorder	Emotion
Blair et al. (2011b)	Social anxiety disorder	Emotion
Brühl et al. (2011)	Social anxiety disorder	Emotion
Nakao et al. (2011)	Social anxiety disorder	Emotion
Klumpp et al. (2010)	Social anxiety disorder	Emotion
Sripada et al. (2009)	Social anxiety disorder	Emotion
Yoon et al. (2007)	Social anxiety disorder	Emotion
Yoon et al. (2016)	Social anxiety disorder	Memory
Sareen et al. (2007)	Social anxiety disorder	Attention, Memory
Phan et al. (2006)	Social anxiety disorder	Emotion
Amir et al. (2005)	Social anxiety disorder	Emotion
Evans et al. (2008)	Social anxiety disorder	Emotion
Heitmann et al. (2017)	Social anxiety disorder	Emotion
Heitmann et al. (2016)	Social anxiety disorder	Emotion
Blair et al. (2016)	Social anxiety disorder	Emotion
Binelli et al. (2016)	Social anxiety disorder	Emotion
Blair et al. (2010)	Social anxiety disorder	Emotion
Gentili et al. (2008)	Social anxiety disorder	Emotion
Schmidt et al. (2010)	Social anxiety disorder	Emotion
Stoddard et al. (2017)	Social anxiety disorder	Emotion
Waugh et al. (2012)	Social anxiety disorder	Emotion
Hamilton et al. (2015)	Social anxiety disorder	Emotion
Yin et al. (2017)	Generalized anxiety disorder	Emotion
Diwadkar et al. (2017)	Generalized anxiety disorder	Memory
Moon et al. (2016)	Generalized anxiety disorder	Emotion, Memory
Moon & Jeong (2017)	Generalized anxiety disorder	Emotion, Memory
Moon et al. (2017)	Generalized anxiety disorder	Emotion, Memory

Eligible articles	Anxiety type	Task category
Moon et al., 2015)	Generalized anxiety disorder	Emotion, Memory
Moon & Jeong (2015)	Generalized anxiety disorder	Emotion, Memory
Monk et al. (2008)	Generalized anxiety disorder	Emotion
Ottaviani et al. (2016)	Generalized anxiety disorder	Emotion, Attention
Fonzo et al. (2014)	Generalized anxiety disorder	Emotion
Price et al. (2011)	Generalized anxiety disorder	Emotion
Schlund et al. (2012)	Generalized anxiety disorder	Emotion
White et al. (2017)	Generalized anxiety disorder	Decision
Karim et al. (2016)	Generalized anxiety disorder	Emotion
Strawn et al. (2012)	Generalized anxiety disorder	Emotion
Paulesu et al. (2010)	Generalized anxiety disorder	Emotion
Palm et al. (2011)	Generalized anxiety disorder	Emotion
Robinson et al. (2013)	Induced – unpredictable shock	Emotion (due to threat)
Balderston et al. (2017a)	Induced – unpredictable shock	Emotion (due to threat)
Balderston e al. (2017b)	Induced – unpredictable shock	Emotion (due to threat)
Kirlic et al. (2017)	Induced – unpredictable shock	Emotion (due to threat)
Klumpers et al. (2017) – 2 studies	Induced – unpredictable shock	Emotion (due to threat)
Torrisi et al. (2016)	Induced – unpredictable shock	Emotion (due to threat)
Gold et al. (2015)	Induced – unpredictable shock	Emotion (due to threat)
Choi et al. (2012)	Induced – unpredictable shock	Emotion (due to threat)
Alvarez et al. (2015)	Induced – unpredictable shock	Emotion (due to threat)
Clarke & Johnstone (2013)	Induced – unpredictable shock	Emotion (due to threat)
Holtz et al. (2012)	Induced – unpredictable hyperventilation	Emotion (due to threat)
Drabant et al. (2011)	Induced – unpredictable shock	Emotion (due to threat)
Klumpers et al. (2010)	Induced – unpredictable shock	Emotion (due to threat)
Reicherts et al. (2017)	Induced – unpredictable thermal painful stimuli	Emotion (due to threat)
Yoshimura et al. (2014)	Induced – unpredictable shock	Emotion (due to threat)
Eser et al. (2009)	Induced – unpredictable CCK4-induced panic-like symptoms	Emotion (due to threat)
Yang et al. (2012)	Induced – unpredictable thermal painful stimuli	Emotion (due to threat)
Kalisch et al., 2006)	Induced – unpredictable shock	Emotion (due to threat)
Wittmann et al. (2018)	Panic disorder	Emotion
Feldker et al. (2018)	Panic disorder	Emotion
Held-Poschardt et al. (2018)	Panic disorder	Emotion, Decision
Reinecke et al. (2015)	Panic disorder	Emotion
Feldker et al. (2016)	Panic disorder	Emotion
Schwarzmeier et al. (2019)	Panic disorder	Emotion
Engel et al. (2016)	Panic disorder	Emotion
Petrowski et al. (2014)	Panic disorder	Emotion
Lueken et al. (2014)	Panic disorder	Emotion
Dresler et al. (2012)	Panic disorder	Emotion, Attention
van den Heuvel et al. (2011)	Panic disorder	Decision
Maddock et al. (2003)	Panic disorder	Emotion, Attention
Wintermann et tal. (2013)	Panic disorder	Attention
Pfleiderer et al. (2010)	Panic disorder	Attention
Caseras et al. (2010a) – 2 studies	Specific phobia	Emotion
Caseras et al. (2010b) – 2 studies	Specific phobia	Emotion
Rivero et al. (2017)	Specific phobia	Emotion
Wiemer et al. (2015)	Specific phobia	Emotion
Scharmüller et al. (2014)	Specific phobia	Emotion

Eligible articles	Anxiety type	Task category
Lipka et al. (2014)	Specific phobia	Emotion
Schienle et al. (2013)	Specific phobia	Emotion
Schienle et al. (2007)	Specific phobia	Emotion
Straube et al. (2007)	Specific phobia	Emotion
Goossens et al. (2007)	Specific phobia	Emotion
Schienle et al. (2005)	Specific phobia	Emotion
Dilger et al. (2003)	Specific phobia	Emotion
Aue et al. (2019)	Specific phobia	Emotion
Hilbert et al. (2014)	Specific phobia	Emotion
Zilverstand et al. (2017)	Specific phobia	Emotion
Aue et al. (2015)	Specific phobia	Emotion
Barke et al. (2012)	Specific phobia	Emotion
Straube et al. (2011)	Specific phobia	Emotion, Attention
Schweckendiek et al. (2011)	Specific phobia	Emotion
Hermann et al. (2007)	Specific phobia	Emotion
Lange et al. (2019)	Specific phobia	Emotion
Feldker et al. (2017)	Transdiagnostic anxiety	Emotion
Neumeister et al. (2018)	Transdiagnostic anxiety	Emotion
Williams et al. (2015)	Transdiagnostic anxiety	Emotion
Price et al. (2014)	Transdiagnostic anxiety	Emotion, Attention
Demenescu et al. (2011)	Transdiagnostic anxiety	Emotion
Carlisi et al. (2017)	Transdiagnostic anxiety	Emotion
Galván & Peris (2014)	Transdiagnostic anxiety	Decision
Smith et al. (2018)	Transdiagnostic anxiety	Emotion
Smith et al. (2019)	Transdiagnostic anxiety	Attention
Swartz et al. (2014a)	Transdiagnostic anxiety	Emotion
Swartz et al. (2014b)	Transdiagnostic anxiety	Emotion
Benson et al. (2015)	Transdiagnostic anxiety	Decision
Krain et al. (2008)	Transdiagnostic anxiety	Decision
Campbell-Sills et al. (2011)	Transdiagnostic anxiety	Emotion

TABLE S3. Whole-brain meta-analysis of the anxiety disorders diagnostic groups in emotion tasks

MNI coordinates	Voxels	Z value	Description	Egger's Intercept	Egger's p value
Social anxiety disorder					
-38,-80,26	1422	3.714	L. MOG, Angular g., MTG	0.01	0.996
42,20,-4	634	4.054	R. Insula, IFG all, STG pole	-0.04	0.971
4,-90,12	564	4.222	Bilateral Calcarine, cuneus	1.09	0.309
-20,0,-12	354	3.251	L. Amygdala, Hippocampus, Parahippocampal g., Olfactive b., Pallidum	0.60	0.614
58,-54,6	192	2.947	R. MTG	1.00	0.415
14,-60,-4	90	2.629	R. Lingual g.	-0.02	0.987
-40,26,-12	61	2.635	L. IFG orbital, triangular	-0.07	0.949
24,62,24	32	2.847	R. SFG, MFG	0.42	0.715
-8,-4,2	33	2.358	L. Thalamus	-0.07	0.956
14,-54,60	12	2.288	R. SPG, Precuneus	-0.32	0.784
-8,34,-8	12	2.170	L. MedFG orb., ACC	0.34	0.774
-12,-2,14	11	2.372	L. Caudate	0.09	0.936
Panic disorder					
-56,-6,-12	536	3.129	L. MTG, STG, ITG, STG pole, Insula	0.04	0.972
34,6,-6	204	3.089	R. Putamen, Insula	-0.10	0.937
-48,36,28	188	3.680	L. IFG triangular, MidFG	-0.45	0.709
26,-36,-16	82	2.245	R. Fusiform g.	0.22	0.863
-10,-32,-10	39	3.166	L. Cerebellum 4/5	1.05	0.413
-34,18,-14	20	2.373	L. Insula	0.60	0.684
44,-12,16	14	2.191	R. Rolandic operculum	1.46	0.253
34,14,26	12	2.325	R. IFG triangular, opercular	0.51	0.687
Generalized anxiety disorder					
58,-28,38	477	3.841	R. Supramarginal g., Postcentral g.	1.09	0.744
42,-28,-18	488	3.537	R. Parahippocampal, Angular g., Hippocampus	0.29	0.926
40,-68,14	241	3.416	R. MTG	0.71	0.837
48,-8,-12	209	3.095	R. MTG, STG, ITG	0.35	0.913
-26,-40,8	175	3.569	L. Hippocampus, Parahippocampal g., Lingual g.	0.25	0.941
44,-74,-2	180	3.107	R. MOG, IOG, ITG	0.49	0.880
-18,-76,-10	161	2.943	L. Lingual g.	1.21	0.688
-64,-14,-6	128	3.131	L. MTG, STG	0.36	0.912
-14,-26,16	101	2.740	L. Thalamus	0.61	0.846
54,10,40	90	2.712	R. Precentral g.	0.14	0.965
-26,-96,6	76	2.651	L. MOG	0.84	0.791
-2,-64,-28	74	2.575	Vermis 8	1.23	0.693
16,-92,-6	54	2.521	R. Calcarine, Lingual g.	0.27	0.936
-4,-50,-12	42	2.559	L Cerebellum 4/5	0.18	0.957
30,-44,0	38	2.865	R. Hippocampus	0.18	0.957
6,-68,16	37	2.832	Calcarine	0.41	0.899
-60,-30,38	29	2.672	L. Supramarginal g.	0.58	0.856
2,-82,4	30	2.384	Calcarine	-0.31	0.921
-22,30,44	24	2.633	L. MidFG, SFG	-0.23	0.941
-18,-48,-14	15	2.252	L. Cerebellum 4/5, Fusiform g.	-0.32	0.925

MNI coordinates	Voxels	Z value	Description	Egger's Intercept	Egger's p value
22,-78,-10	10	2.244	L. Lingual g., Fusiform g.	0.86	0.785
2,6,46	282	-2.843	MCC, SMA	-0.98	0.762
10,52,6	156	-3.273	R. MedFG orbital, ACC	1.07	0.750
-8,-34,54	165	-2.984	L. Precuneus, MCC	-0.59	0.861
26,54,0	145	-3.397	R. SFG orb., MidFG orb., SFG, MidFG	0.26	0.938
40,16,-14	105	-2.910	R. Insula, STG pole	-0.47	0.885
44,-60,-20	81	-3.526	R. Fusiform g., Cerebellum 1	0.55	0.875
16,-24,-22	66	-3.100	R. Cerebellum 3, possible Parahippocampal g.	-1.40	0.675
12,12,-10	63	-2.509	R. Caudate	-0.29	0.932
12,16,2	61	-2.896	R. Caudate	0.24	0.944
-10,-70,54	59	-2.991	L. Precuneus	-0.54	0.862
-32,-38,66	40	-2.395	L. Postcentral g.	0.19	0.955
-28,-44,52	38	-2.394	L. IPG, Postcentral g.	-0.20	0.952
2,-12,2	21	-2.438	Bilateral thalamus	-0.49	0.889
36,-16,6	18	-2.540	L. Insula	-3.62	0.185
34,46,30	15	-2.400	R. MidFG	-1.37	0.686
PTSD					
50,4,-6	1671	5.105	R. STG, STG pole, Insula, Heschl's g., Rolandic operculum, IFG opercular, MTG, MTG pole	1.35	0.319
-42,-8,6	283	3.059	L. Insula, STG pole, STG, Heschl's g., Rolandic operculum,	-0.39	0.805
-52,4,34	39	2.567	L. Precentral g.	-0.41	0.805
-44,-60,36	18	-2.285	L. Angular g.	-0.24	0.905
-62,-54,32	11	-2.269	L. Supramarginal g.	-0.15	0.937
Specific phobia					
-4,28,36	4369	4.906	MCC, ACC, MedFG sup., SMA	0.62	0.590
-6,-70,-12	2357	3.651	Cerebellum 6, 3-5, 1, Vermis 6, Lingual g.	0.79	0.523
-44,16,-2	2073	3.825	L. Insula, IFG all, STG, STG pole, Heschl's g., Rolandic operculum, Amygdala, Hippocampus, Putamen	1.09	0.382
14,8,14	1177	3.475	Bilateral Caudate	0.80	0.492
38,20,-8	658	3.237	R. Insula, IFG all	1.32	0.329
36,-76,-14	628	2.902	R. Cerebellum 6, 1, Fusiform g., IOG	0.17	0.883
36,-54,54	174	2.832	R. IPG, Angular g.	-0.41	0.760
12,-14,-24	172	2.714	R. Parahippocampal g., Hippocampus	0.61	0.675
-48,-46,46	138	2.735	L. IPG	0.01	0.993
-18,-90,-8	115	2.723	L. Lingual g., IOG	0.90	0.461
24,-36,-34	86	2.641	R. Cerebellum 4/5	0.91	0.437
56,-50,6	80	2.684	R. MTG	-0.10	0.931
-60,-34,8	50	2.535	L. MTG	0.24	0.841
-44,-64,-16	39	2.358	L. Fusiform g.	-0.31	0.806
-20,30,42	30	2.673	L. MidFG/SFG	-0.31	0.797
-36,-64,42	31	2.275	L. Angular g., IPG	0.02	0.988
44,10,-22	30	2.412	R. STG, MTG pole	0.64	0.633
42,38,20	26	2.361	R. MidFG	0.76	0.514
-32,2,48	24	2.287	L. Precentral g./MidFG	0.33	0.770

MNI coordinates	Voxels	Z value	Description	Egger's Intercept	Egger's p value
-6,48,38	18	2.271	L. MedFG	0.25	0.834
48,-12,50	15	2.231	R. Precentral g.	0.15	0.899
-6,-32,-30	13	2.264	Undefined – L. Pons suggested	0.68	0.583
40,-38,48	10	2.090	R. IPG	-0.60	0.612
Transdiagnostic anxiety					
-34,6,-10	224	2.837	L. Insula, Putamen	0.31	0.838
10,-66,18	184	2.996	R. Calcarine, Cuneus, Lingual g., Precuneus	0.69	0.681
2,20,40	132	2.651	MCC, MedFG	1.03	0.504
12,-36,-24	52	2.409	R. Cerebellum 3, 4/5	1.44	0.325
-4,22,54	42	2.389	R. SMA, MedFG	0.57	0.711
-16,-28,-28	21	2.350	L. Cerebellum 4/5	0.24	0.885
-30,24,38	18	2.355	L. MidFG	0.84	0.608

$p \leq 0.005$, $k \geq 10$. Exploratory Egger's tests are reported for meta-analytic clusters.
ACC: anterior cingulate cortex; MCC: midcingulate cortex; MidFG: middle frontal gyrus; MedFG: Medial frontal gyrus; SMA: Supplementary motor area; STG: superior temporal gyrus; MTG: Middle temporal gyrus; ITG: inferior temporal gyrus; SPG: superior parietal gyrus; IPG: inferior parietal gyrus; SOG: superior occipital gyrus; MOG: middle occipital gyrus; IOG: inferior occipital gyrus

TABLE S4. Whole-brain meta-analysis of anxiety induced by threat-of-shock only

MNI coordinates	Voxels	Z value	Description	Egger's Intercept	Egger's p value
42,16,8	8111	6.145	Bilateral Insula, IFG all, STG pole, Putamen, Rolandic operculum, Caudate, Pallidum, Thalamus, Vermis 3, R Lingual g., L.STG	0.84	0.466
2,-4,48	7499	6.011	MCC, SMA, MedFG, ACC, R. SFG	0.06	0.960
58,-44,36	2081	6.505	R. Supramarginal g., Angular g., IPG, STG, MTG, Rolandic operculum	0.75	0.500
32,42,18	888	3.967	R. MidFG, SFG	0.48	0.738
-60,-38,26	743	4.986	L. Supramarginal g., STG	0.69	0.516
18,-62,34	378	4.276	R. Precuneus, Cuneus, SOG	-0.07	0.956
-38,44,26	265	3.598	L. MidFG	1.08	0.333
-42,-52,-30	161	2.758	L. Cerebellum 6, Cerebellum crus 1	0.61	0.624
-34,-54,-48	76	2.794	Cerebellum 8	0.59	0.605
0,-50,-26	65	2.749	Vermis 9, Vermis 4-5	1.08	0.391
54,-30,-10	30	2.643	R. MTG	0.13	0.918
-10,-34,-48	24	2.749	Undefined – Cerebellum 9 suggested	0.58	0.630
28,-48,70	22	2.443	R. SPG	-0.23	0.855
-10,-70,46	17	2.465	L. Precuneus	0.83	0.493
54,-60,-8	2227	-4.151	R. ITG, MTG, MOG, SOG, IOG	-0.60	0.616
-48,-70,0	2130	-4.123	L. IOG, ITG, MTG, MOG, SOG, IPG, SPG, Angular g.	-0.76	0.496
-56,-22,48	1101	-4.630	L. Postcentral g., Precentral g., IPG	-0.76	0.506
-8,50,-22	1074	-4.518	Rectus g., Bilateral SFG orb	-0.15	0.906
-22,-16,-22	899	-4.237	L. Hippocampus, Parahippocampal g., Fusiform g, Lingual g, Calcarine	-0.61	0.605
-42,-10,16	295	-3.506	L. Insula, Heschl's g., Rolandic operculum	-0.37	0.747
52,-2,24	285	-3.829	R. Postcentral, Precentral	-0.67	0.549
26,-6,-28	276	-3.600	R. Parahippocampal g. Hippocampus	-0.40	0.731
-12,-54,18	195	-3.150	L. Calcarine, Cuneus, Precuneus	0.02	0.987
12,-54,12	179	-3.127	R. Calcarine, Cuneus, Precuneus	0.01	0.994
-4,-32,66	109	-2.287	Paracentral lobule	-0.23	0.907
26,-62,-6	101	-2.735	R. Fusiform g., Lingual g.	-0.58	0.620
-22,32,40	33	-2.336	L. MidFG	0.24	0.889
28,-56,10	15	-2.311	R. Calcarine	-0.41	0.747
30,-76,14	13	-2.160	R. MOG	-0.45	0.697

$p \leq 0.005$, $k \geq 10$. Exploratory Egger's tests are reported for meta-analytic clusters.
ACC: anterior cingulate cortex; MCC: midcingulate cortex; MidFG: middle frontal gyrus; MedFG: Medial frontal gyrus; SMA: Supplementary motor area; STG: superior temporal gyrus; MTG: Middle temporal gyrus; ITG: inferior temporal gyrus; SPG: superior parietal gyrus; IPG: inferior parietal gyrus; SOG: superior occipital gyrus; MOG: middle occipital gyrus; IOG: inferior occipital gyrus

TABLE S5. Whole-brain pairwise analysis of convergence between induced anxiety and pathological anxiety with exclusions

MNI coordinates	Voxels	Description
Induced vs. Pathological anxiety (youth patient sample excluded)		
-10,-4,68	2442	SMA, MCC, MedFG sup., ACC
46,14,-14	2150	R. Insula, IFG all, Rolandic operculum, STG pole, STG
-40,20,-10	1009	L. Insula, IFG all, Putamen, Rolandic operculum, STG pole
-4,-22,-10	615	R. Thalamus, Lingual g., Vermis 3
50,4,46	183	R. Precentral g., MidFG
12,-26,40	49	R. MCC
Induced vs. Pathological anxiety (medicated patient sample excluded)		
-2,0,40	2778	MCC, MedFG sup., ACC, SMA
44,20,-2	1720	R. Insula, IFG all, Rolandic operculum, STG pole, STG, Putamen
-48,16,2	1362	L. Insula, IFG all, Rolandic operculum, STG pole, Putamen, Pallidum
-2,-22,-10	517	R. Thalamus, Lingual g., Vermis 3
-6,6,2	192	L. Caudate, Pallidum
-10,-4,68	172	L. SMA

$p \leq 0.005$, $k \geq 10$.

ACC: anterior cingulate cortex; MCC: midcingulate cortex; MidFG: middle frontal gyrus; MedFG: Medial frontal gyrus; SMA: Supplementary motor area; STG: superior temporal gyrus; ITG: inferior temporal gyrus

TABLE S6. Whole-brain pairwise analyses of convergence between induced anxiety and anxiety disorders diagnostic groups in emotion tasks

MNI coordinates	Voxels	Description
Induced vs. Specific phobia		
2,28,16	5043	MCC, MedFG sup., ACC, SMA
38,20,-8	1274	R. Insula, IFG all, STG pole, STG, Putamen
2,-20,-8	997	Bilateral Thalamus, Caudate, L. Pallidum
-42,18,-4	846	L. Insula, IFG all, Putamen, Rolandic operculum, STG pole
-38,4,-14	51	L. Putamen, Insula
Induced vs. Panic disorder		
34,6,-6	490	R. Insula, Putamen, STG pole
-34,18,-14	131	L. Insula, IFG orbital, STG pole
Induced vs Generalized anxiety disorder		
58,-30,34	205	R. Supramarginal g.
Induced vs. PTSD		
52,8,-6	689	R. Rolandic operculum, Insula, IFG opercular, STG pole, STG
-50,8,2	36	L. Rolandic operculum, Insula, IFG opercular, STG pole
Induced vs. Social anxiety disorder		
48,18,-12	954	R. IFG all, Insula, STG pole
-56,-46,32	225	L. Supramarginal g., STG, MTG
-42,26,-10	82	L. IFG orbital
-8,-2,64	34	L. SMA
Induced vs. Transdiagnostic anxiety		
2,20,40	621	SMA, MCC, MedFG
-26,10,-2	193	L. Insula, putamen, STG pole

$p \leq 0.005$, $k \geq 10$.

ACC: anterior cingulate cortex; MCC: midcingulate cortex; MidFG: middle frontal gyrus; MedFG: Medial frontal gyrus; SMA: Supplementary motor area; STG: superior temporal gyrus; MTG: Middle temporal gyrus; ITG: inferior temporal gyrus; SPG: superior parietal gyrus; IPG: inferior parietal gyrus; SOG: superior occipital gyrus; MOG: middle occipital gyrus; IOG: inferior occipital gyrus

TABLE S7. Whole-brain meta-analysis of PTSD contrasting patients vs. traumatized controls in emotion tasks

MNI coordinates	Voxels	Z value	Description	Egger's Intercept	Egger's p value
-2,-30,48	193	2.745	MCC, Precuneus, PCC	0.57	0.663
-48,-68,14	42	2.519	L. MTG, MOG	1.19	0.389
-16,-64,54	38	2.654	L. SPG, Precuneus	1.12	0.398
-26,-70,50	32	2.429	L. SPG	1.08	0.420
-14,46,4	28	2.684	L. ACC, MedFG orb.	0.64	0.622
10,-24,44	28	2.447	R. MCC	0.68	0.597
-14,-74,14	21	2.460	L. Calcarine	1.16	0.355
6,-80,20	21	2.396	Cuneus, Calcarine	1.91	0.113
48,26,28	16	2.535	R. IFG triangular	0.36	0.770
44,-18,50	16	2.281	R. Postcentral g., Precentral g.	-0.73	0.586
32,42,14	14	2.596	R. MidFG	1.27	0.288
0,-68,12	11	2.191	Calcarine	1.59	0.203
4,34,0	197	-3.948	ACC (pregenual), MedFG orb.	-1.13	0.371
56,-30,16	11	-2.529	R. STG	-0.90	0.462

$p \leq 0.005$, $k \geq 10$. Exploratory Egger's tests are reported for meta-analytic clusters.

ACC: anterior cingulate cortex; MCC: midcingulate cortex; PCC: posterior cingulate cortex; MidFG: middle frontal gyrus; MedFG: Medial frontal gyrus; STG: superior temporal gyrus; MTG: Middle temporal gyrus; SPG: superior parietal gyrus; MOG: middle occipital gyrus

TABLE S8. Whole-brain meta-analysis of pathological anxiety across disorders for non-emotion tasks

MNI coordinates	Voxels	Z value	Description	Egger's Intercept	Egger's p value
Attention					
No peaks					
Decision					
20,10,-10	69	-2.636	R. Olfactory c., Putamen	0.98	0.743
26,48,20	45	-2.594	R. MidFG	-1.01	0.730
-24,46,30	13	-2.327	L. MidFG, SFG	-0.31	0.891
Memory					
-28,-40,-2	98	3.298	L. Hippocampus, Parahippocampal g.	0.15	0.962
58,12,30	94	2.984	R. IFG opercular, Precentral g.	0.68	0.840
2,4,40	647	-4.344	Bilateral MCC, SMA, ACC	-0.61	0.846
-20,-90,22	459	-4.712	L. SOG, MOG, Cuneus	-1.61	0.584
12,-44,40	363	-3.048	R. Precuneus, MCC, PCC	-1.90	0.526
14,18,4	287	-4.135	R. Caudate	-2.50	0.373
48,42,4	250	-3.690	R. MidFG, IFG orbital, triangular	0.23	0.945
26,-86,32	233	-3.169	R. SOG, Cuneus, MOG	-2.19	0.506
-32,46,32	197	-3.032	L. MidFG, IFG triangular	0.05	0.988
34,-4,16	167	-3.066	L. Insula, Rolandic operculum, Putamen, Heschl's g.	-1.72	0.576
-44,-56,20	153	-3.357	L. MTG, Angular g.	-0.79	0.773
6,36,32	124	-2.890	L. ACC, MCC, MedFG sup.	2.08	0.578
14,10,-10	106	-2.986	R. Caudate, Putamen, Olfactory c., Rectus	-0.46	0.888
-40,44,8	104	-3.165	L. MidFG, IFG triangular, MidFG orbital	-0.42	0.882
16,-78,48	91	-2.854	R. Cuneus, Precuneus, SPG	-0.01	0.996
-28,-14,-20	63	-2.778	L. Hippocampus	-0.47	0.888
-10,-74,56	55	-3.151	L. Precuneus	-0.81	0.791
40,34,30	54	-2.727	R. MidFG, IFG triangular	0.11	0.973
46,30,10	37	-2.659	R. IFG triangular	1.35	0.720
52,-2,8	19	-2.470	R. Rolandic operculum	-1.17	0.699
10,-14,70	13	-2.372	R. SMA	-0.65	0.842

$p \leq 0.005$, $k \geq 10$. Exploratory Egger's tests are reported for meta-analytic clusters.
ACC: anterior cingulate cortex; MCC: midcingulate cortex; MidFG: middle frontal gyrus; MedFG: Medial frontal gyrus; SMA: Supplementary motor area; STG: superior temporal gyrus; MTG: Middle temporal gyrus; ITG: inferior temporal gyrus; SPG: superior parietal gyrus; IPG: inferior parietal gyrus; SOG: superior occipital gyrus; MOG: middle occipital gyrus; IOG: inferior occipital gyrus

Supplementary References

Albajes-Eizagirre, A., Solanes, A., Vieta, E., & Radua, J. (2019). Voxel-based meta-analysis via permutation of subject images (PSI): Theory and implementation for SDM. *NeuroImage*, *186*, 174–184. https://doi.org/10.1016/j.neuroimage.2018.10.077

Alvarez, R. P., Kirlic, N., Misaki, M., Bodurka, J., Rhudy, J. L., Paulus, M. P., & Drevets, W. C. (2015). Increased anterior insula activity in anxious individuals is linked to diminished perceived control. *Translational Psychiatry*, *5*, e591. https://doi.org/10.1038/tp.2015.84

Amir, N., Klumpp, H., Elias, J., Bedwell, J. S., Yanasak, N., & Miller, L. S. (2005). Increased activation of the anterior cingulate cortex during processing of disgust faces in individuals with social phobia. *Biological Psychiatry*, *57*(9), 975–981. https://doi.org/10.1016/j.biopsych.2005.01.044

Apps, M. A. J. (2018). Stimulating cingulate: Distinct behaviours arise from discrete zones. *Brain*, *141*(10), 2827–2830. https://doi.org/10.1093/brain/awy224

Astur, R. S., St Germain, S. A., Tolin, D., Ford, J., Russell, D., & Stevens, M. (2006). Hippocampus function predicts severity of post-traumatic stress disorder. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*, *9*(2), 234–240. https://doi.org/10.1089/cpb.2006.9.234

Aue, T., Guex, R., Chauvigné, L. A. S., Okon-Singer, H., & Vuilleumier, P. (2019). Expectancies influence attention to neutral but not necessarily to threatening stimuli: An fMRI study. *Emotion (Washington, D.C.)*, *19*(7), 1244–1258. https://doi.org/10.1037/emo0000496

Aue, T., Hoeppli, M.-E., Piguet, C., Hofstetter, C., Rieger, S. W., & Vuilleumier, P. (2015). Brain systems underlying encounter expectancy bias in spider phobia. *Cognitive, Affective & Behavioral Neuroscience*, *15*(2), 335–348. https://doi.org/10.3758/s13415-015-0339-6

Aupperle, R. L., Allard, C. B., Grimes, E. M., Simmons, A. N., Flagan, T., Behrooznia, M., Cissell, S. H., Twamley, E. W., Thorp, S. R., Norman, S. B., Paulus, M. P., & Stein, M. B. (2012). Dorsolateral prefrontal cortex activation during emotional anticipation and neuropsychological performance in posttraumatic stress disorder. *Archives of General Psychiatry*, *69*(4), 360–371. https://doi.org/10.1001/archgenpsychiatry.2011.1539

Aupperle, R. L., Stillman, A. N., Simmons, A. N., Flagan, T., Allard, C. B., Thorp, S. R., Norman, S. B., Paulus, M. P., & Stein, M. B. (2016). Intimate Partner Violence PTSD and Neural Correlates of Inhibition. *Journal of Traumatic Stress*, *29*(1), 33–40. https://doi.org/10.1002/jts.22068

Balderston, N. L., Hsiung, A., Ernst, M., & Grillon, C. (2017). Effect of Threat on Right dlPFC Activity during Behavioral Pattern Separation. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, *37*(38), 9160–9171. https://doi.org/10.1523/JNEUROSCI.0717-17.2017

Balderston, N. L., Liu, J., Roberson-Nay, R., Ernst, M., & Grillon, C. (2017). The relationship between dlPFC activity during unpredictable threat and CO2-induced panic symptoms. *Translational Psychiatry*, *7*(12), 1266. https://doi.org/10.1038/s41398-017-0006-5

Barke, A., Baudewig, J., Schmidt-Samoa, C., Dechent, P., & Kröner-Herwig, B. (2012). Neural correlates of fear of movement in high and low fear-avoidant chronic low back pain patients: An event-related fMRI study. *Pain*, *153*(3), 540–552. https://doi.org/10.1016/j.pain.2011.11.012

Benson, B. E., Guyer, A. E., Nelson, E. E., Pine, D. S., & Ernst, M. (2015). Role of contingency in striatal response to incentive in adolescents with anxiety. *Cognitive, Affective & Behavioral Neuroscience*, *15*(1), 155–168. https://doi.org/10.3758/s13415-014-0307-6

Binelli, C., Muñiz, A., Subira, S., Navines, R., Blanco-Hinojo, L., Perez-Garcia, D., Crippa, J., Farré, M., Pérez-Jurado, L., Pujol, J., & Martin-Santos, R. (2016). Facial emotion processing in patients with social anxiety disorder and Williams-Beuren syndrome: An fMRI study. *Journal of Psychiatry & Neuroscience: JPN*, *41*(3), 182–191.

Blair, K. S., Geraci, M., Hollon, N., Otero, M., DeVido, J., Majestic, C., Jacobs, M., Blair, R. J. R., & Pine, D. S. (2010). Social norm processing in adult social phobia: Atypically increased ventromedial frontal cortex responsiveness to unintentional (embarrassing) transgressions. *The*

American Journal of Psychiatry, *167*(12), 1526–1532. https://doi.org/10.1176/appi.ajp.2010.09121797

Blair, K. S., Geraci, M., Korelitz, K., Otero, M., Towbin, K., Ernst, M., Leibenluft, E., Blair, R. J. R., & Pine, D. S. (2011). The pathology of social phobia is independent of developmental changes in face processing. *The American Journal of Psychiatry*, *168*(11), 1202–1209. https://doi.org/10.1176/appi.ajp.2011.10121740

Blair, K. S., Geraci, M., Otero, M., Majestic, C., Odenheimer, S., Jacobs, M., Blair, R. J. R., & Pine, D. S. (2011). Atypical modulation of medial prefrontal cortex to self-referential comments in generalized social phobia. *Psychiatry Research*, *193*(1), 38–45. https://doi.org/10.1016/j.pscychresns.2010.12.016

Boehme, S., Mohr, A., Becker, M. P., Miltner, W. H., & Straube, T. (2014). Area-dependent time courses of brain activation during video-induced symptom provocation in social anxiety disorder. *Biology of Mood & Anxiety Disorders*, *4*, 6. https://doi.org/10.1186/2045-5380-4-6

Brinkmann, L., Buff, C., Neumeister, P., Tupak, S. V., Becker, M. P. I., Herrmann, M. J., & Straube, T. (2017). Dissociation between amygdala and bed nucleus of the stria terminalis during threat anticipation in female post-traumatic stress disorder patients. *Human Brain Mapping*, *38*(4), 2190–2205. https://doi.org/10.1002/hbm.23513

Brown, L. A., Young, K. S., Goldin, P. R., Torre, J. B., Burklund, L. J., Davies, C. D., Niles, A. N., Lieberman, M. D., Saxbe, D. E., & Craske, M. G. (2019). Self-referential processing during observation of a speech performance task in social anxiety disorder from pre- to post-treatment: Evidence of disrupted neural activation. *Psychiatry Research. Neuroimaging*, *284*, 13–20. https://doi.org/10.1016/j.pscychresns.2018.12.017

Brühl, A. B., Rufer, M., Delsignore, A., Kaffenberger, T., Jäncke, L., & Herwig, U. (2011). Neural correlates of altered general emotion processing in social anxiety disorder. *Brain Research*, *1378*, 72–83. https://doi.org/10.1016/j.brainres.2010.12.084

Bryant, R. A., Felmingham, K. L., Kemp, A. H., Barton, M., Peduto, A. S., Rennie, C., Gordon, E., & Williams, L. M. (2005). Neural networks of information processing in posttraumatic stress disorder: A functional magnetic resonance imaging study. *Biological Psychiatry*, *58*(2), 111–118. https://doi.org/10.1016/j.biopsych.2005.03.021

Buff, C., Brinkmann, L., Bruchmann, M., Becker, M. P. I., Tupak, S., Herrmann, M. J., & Straube, T. (2017). Activity alterations in the bed nucleus of the stria terminalis and amygdala during threat anticipation in generalized anxiety disorder. *Social Cognitive and Affective Neuroscience*, *12*(11), 1766–1774. https://doi.org/10.1093/scan/nsx103

Campbell-Sills, L., Simmons, A. N., Lovero, K. L., Rochlin, A. A., Paulus, M. P., & Stein, M. B. (2011). Functioning of neural systems supporting emotion regulation in anxiety-prone individuals. *NeuroImage*, *54*(1), 689–696. https://doi.org/10.1016/j.neuroimage.2010.07.041

Carlisi, C. O., Hilbert, K., Guyer, A. E., & Ernst, M. (2017). Sleep-amount differentially affects fear-processing neural circuitry in pediatric anxiety: A preliminary fMRI investigation. *Cognitive, Affective & Behavioral Neuroscience*, *17*(6), 1098–1113. https://doi.org/10.3758/s13415-017-0535-7

Caseras, X., Giampietro, V., Lamas, A., Brammer, M., Vilarroya, O., Carmona, S., Rovira, M., Torrubia, R., & Mataix-Cols, D. (2010). The functional neuroanatomy of blood-injection-injury phobia: A comparison with spider phobics and healthy controls. *Psychological Medicine*, *40*(1), 125–134. https://doi.org/10.1017/S0033291709005972

Caseras, Xavier, Mataix-Cols, D., Trasovares, M. V., López-Solà, M., Ortriz, H., Pujol, J., Soriano-Mas, C., Giampietro, V., Brammer, M. J., & Torrubia, R. (2010). Dynamics of brain responses to phobic-related stimulation in specific phobia subtypes. *The European Journal of Neuroscience*, *32*(8), 1414–1422. https://doi.org/10.1111/j.1460-9568.2010.07424.x

Choi, J. M., Padmala, S., & Pessoa, L. (2012). Impact of state anxiety on the interaction between threat monitoring and cognition. *NeuroImage*, *59*(2), 1912–1923. https://doi.org/10.1016/j.neuroimage.2011.08.102

Cisler, J. M., Bush, K., Scott Steele, J., Lenow, J. K., Smitherman, S., & Kilts, C. D. (2015). Brain and behavioral evidence for altered social learning mechanisms among women with assault-related posttraumatic stress disorder. *Journal of Psychiatric Research*, *63*, 75–83. https://doi.org/10.1016/j.jpsychires.2015.02.014

Clarke, R., & Johnstone, T. (2013). Prefrontal inhibition of threat processing reduces working memory interference. *Frontiers in Human Neuroscience*, *7*, 228. https://doi.org/10.3389/fnhum.2013.00228

Cortese, B. M., Schumann, A. Y., Howell, A. N., McConnell, P. A., Yang, Q. X., & Uhde, T. W. (2018). Preliminary evidence for differential olfactory and trigeminal processing in combat veterans with and without PTSD. *NeuroImage. Clinical*, *17*, 378–387. https://doi.org/10.1016/j.nicl.2017.09.018

Davis, M., Walker, D. L., Miles, L., & Grillon, C. (2010). Phasic vs sustained fear in rats and humans: Role of the extended amygdala in fear vs anxiety. *Neuropsychopharmacology: Official Publication of the American College of Neuropsychopharmacology*, *35*(1), 105–135. https://doi.org/10.1038/npp.2009.109

Dégeilh, F., Viard, A., Guénolé, F., Gaubert, M., Egler, P.-J., Egret, S., Gerardin, P., Baleyte, J.-M., Eustache, F., Dayana, J., & Guillery-Girard, B. (2017). Functional brain alterations during self-reference processing in adolescents with sexual abuse-related post-traumatic stress disorder: A preliminary report. *Neurocase*, *23*(1), 52–59. https://doi.org/10.1080/13554794.2017.1290807

Demenescu, L. R., Renken, R., Kortekaas, R., van Tol, M.-J., Marsman, J. B. C., van Buchem, M. A., van der Wee, N. J. A., Veltman, D. J., den Boer, J. A., & Aleman, A. (2011). Neural correlates of perception of emotional facial expressions in out-patients with mild-to-moderate depression and anxiety. A multicenter fMRI study. *Psychological Medicine*, *41*(11), 2253–2264. https://doi.org/10.1017/S0033291711000596

Dilger, S., Straube, T., Mentzel, H.-J., Fitzek, C., Reichenbach, J. R., Hecht, H., Krieschel, S., Gutberlet, I., & Miltner, W. H. R. (2003). Brain activation to phobia-related pictures in spider phobic humans: An event-related functional magnetic resonance imaging study. *Neuroscience Letters*, *348*(1), 29–32. https://doi.org/10.1016/s0304-3940(03)00647-5

Diwadkar, V. A., Re, M., Cecchetto, F., Garzitto, M., Piccin, S., Bonivento, C., Maieron, M., D'Agostini, S., Balestrieri, M., & Brambilla, P. (2017). Attempts at memory control induce dysfunctional brain activation profiles in Generalized Anxiety Disorder: An exploratory fMRI study. *Psychiatry Research. Neuroimaging*, *266*, 42–52. https://doi.org/10.1016/j.pscychresns.2017.05.010

Drabant, E. M., Kuo, J. R., Ramel, W., Blechert, J., Edge, M. D., Cooper, J. R., Goldin, P. R., Hariri, A. R., & Gross, J. J. (2011). Experiential, autonomic, and neural responses during threat anticipation vary as a function of threat intensity and neuroticism. *NeuroImage*, *55*(1), 401–410. https://doi.org/10.1016/j.neuroimage.2010.11.040

Dresler, T., Hindi Attar, C., Spitzer, C., Löwe, B., Deckert, J., Büchel, C., Ehlis, A.-C., & Fallgatter, A. J. (2012). Neural correlates of the emotional Stroop task in panic disorder patients: An event-related fMRI study. *Journal of Psychiatric Research*, *46*(12), 1627–1634. https://doi.org/10.1016/j.jpsychires.2012.09.004

Elman, I., Lowen, S., Frederick, B. B., Chi, W., Becerra, L., & Pitman, R. K. (2009). Functional neuroimaging of reward circuitry responsivity to monetary gains and losses in posttraumatic stress disorder. *Biological Psychiatry*, *66*(12), 1083–1090. https://doi.org/10.1016/j.biopsych.2009.06.006

Elman, I., Upadhyay, J., Langleben, D. D., Albanese, M., Becerra, L., & Borsook, D. (2018). Reward and aversion processing in patients with post-traumatic stress disorder: Functional neuroimaging with visual and thermal stimuli. *Translational Psychiatry*, *8*(1), 240. https://doi.org/10.1038/s41398-018-0292-6

Engel, K. R., Obst, K., Bandelow, B., Dechent, P., Gruber, O., Zerr, I., Ulrich, K., & Wedekind, D. (2016). Functional MRI activation in response to panic-specific, non-panic aversive, and neutral pictures in patients with panic disorder and healthy controls. *European Archives of Psychiatry and Clinical Neuroscience*, *266*(6), 557–566. https://doi.org/10.1007/s00406-015-0653-6

Eser, D., Leicht, G., Lutz, J., Wenninger, S., Kirsch, V., Schüle, C., Karch, S., Baghai, T., Pogarell, O., Born, C., Rupprecht, R., & Mulert, C. (2009). Functional neuroanatomy of CCK-4-induced panic attacks in healthy volunteers. *Human Brain Mapping*, *30*(2), 511–522. https://doi.org/10.1002/hbm.20522

Etkin, A., & Wager, T. D. (2007). Functional neuroimaging of anxiety: A meta-analysis of emotional processing in PTSD, social anxiety disorder, and specific phobia. *The American Journal of Psychiatry*, *164*(10), 1476–1488. https://doi.org/10.1176/appi.ajp.2007.07030504

Evans, K. C., Wright, C. I., Wedig, M. M., Gold, A. L., Pollack, M. H., & Rauch, S. L. (2008). A functional MRI study of amygdala responses to angry schematic faces in social anxiety disorder. *Depression and Anxiety*, *25*(6), 496–505. https://doi.org/10.1002/da.20347

Falconer, E., Bryant, R., Felmingham, K. L., Kemp, A. H., Gordon, E., Peduto, A., Olivieri, G., & Williams, L. M. (2008). The neural networks of inhibitory control in posttraumatic stress disorder. *Journal of Psychiatry & Neuroscience: JPN*, *33*(5), 413–422.

Fani, N., Jovanovic, T., Ely, T. D., Bradley, B., Gutman, D., Tone, E. B., & Ressler, K. J. (2012). Neural correlates of attention bias to threat in post-traumatic stress disorder. *Biological Psychology*, *90*(2), 134–142. https://doi.org/10.1016/j.biopsycho.2012.03.001

Fani, N., King, T. Z., Clendinen, C., Hardy, R. A., Surapaneni, S., Blair, J. R., White, S. F., Powers, A., Ely, T. D., Jovanovic, T., Ressler, K. J., & Bradley, B. (2019). Attentional control abnormalities in posttraumatic stress disorder: Functional, behavioral, and structural correlates. *Journal of Affective Disorders*, *253*, 343–351. https://doi.org/10.1016/j.jad.2019.04.098

Feldker, K., Heitmann, C. Y., Neumeister, P., Tupak, S. V., Schrammen, E., Moeck, R., Zwitserlood, P., Bruchmann, M., & Straube, T. (2017). Transdiagnostic brain responses to disorder-related threat across four psychiatric disorders. *Psychological Medicine*, *47*(4), 730–743. https://doi.org/10.1017/S0033291716002634

Feldker, Katharina, Heitmann, C. Y., Neumeister, P., Brinkmann, L., Bruchmann, M., Zwitserlood, P., & Straube, T. (2018). Cardiorespiratory concerns shape brain responses during automatic panic-related scene processing in patients with panic disorder. *Journal of Psychiatry & Neuroscience : JPN*, *43*(1), 26–36. https://doi.org/10.1503/jpn.160226

Feldker, Katharina, Heitmann, C. Y., Neumeister, P., Bruchmann, M., Vibrans, L., Zwitserlood, P., & Straube, T. (2016). Brain responses to disorder-related visual threat in panic disorder. *Human Brain Mapping*, *37*(12), 4439–4453. https://doi.org/10.1002/hbm.23320

Fonzo, G. A., Ramsawh, H. J., Flagan, T. M., Sullivan, S. G., Simmons, A. N., Paulus, M. P., & Stein, M. B. (2014). Cognitive-behavioral therapy for generalized anxiety disorder is associated with attenuation of limbic activation to threat-related facial emotions. *Journal of Affective Disorders*, *169*, 76–85. https://doi.org/10.1016/j.jad.2014.07.031

Fonzo, G. A., Simmons, A. N., Thorp, S. R., Norman, S. B., Paulus, M. P., & Stein, M. B. (2010). Exaggerated and disconnected insular-amygdalar blood oxygenation level-dependent response to threat-related emotional faces in women with intimate-partner violence posttraumatic stress disorder. *Biological Psychiatry*, *68*(5), 433–441. https://doi.org/10.1016/j.biopsych.2010.04.028

Frick, A., Howner, K., Fischer, H., Kristiansson, M., & Furmark, T. (2013). Altered fusiform connectivity during processing of fearful faces in social anxiety disorder. *Translational Psychiatry*, *3*, e312. https://doi.org/10.1038/tp.2013.85

Gaebler, M., Daniels, J. K., Lamke, J.-P., Fydrich, T., & Walter, H. (2014). Behavioural and neural correlates of self-focused emotion regulation in social anxiety disorder. *Journal of Psychiatry & Neuroscience: JPN*, *39*(4), 249–258.

Galván, A., & Peris, T. S. (2014). Neural correlates of risky decision making in anxious youth and healthy controls. *Depression and Anxiety*, *31*(7), 591–598. https://doi.org/10.1002/da.22276

Garrett, A., Cohen, J. A., Zack, S., Carrion, V., Jo, B., Blader, J., Rodriguez, A., Vanasse, T. J., Reiss, A. L., & Agras, W. S. (2019). Longitudinal changes in brain function associated with symptom improvement in youth with PTSD. *Journal of Psychiatric Research*, *114*, 161–169. https://doi.org/10.1016/j.jpsychires.2019.04.021

Gentili, C., Gobbini, M. I., Ricciardi, E., Vanello, N., Pietrini, P., Haxby, J. V., & Guazzelli, M. (2008). Differential modulation of neural activity throughout the distributed neural system for face perception in patients with Social Phobia and healthy subjects. *Brain Research Bulletin*, *77*(5), 286–292. https://doi.org/10.1016/j.brainresbull.2008.08.003

Giménez, M., Pujol, J., Ortiz, H., Soriano-Mas, C., López-Solà, M., Farré, M., Deus, J., Merlo-Pich, E., & Martín-Santos, R. (2012). Altered brain functional connectivity in relation to perception of scrutiny in social anxiety disorder. *Psychiatry Research*, *202*(3), 214–223. https://doi.org/10.1016/j.pscychresns.2011.10.008

Gogolla, N. (2017). The insular cortex. *Current Biology: CB*, *27*(12), R580–R586. https://doi.org/10.1016/j.cub.2017.05.010

Gold, A. L., Morey, R. A., & McCarthy, G. (2015). Amygdala-prefrontal cortex functional connectivity during threat-induced anxiety and goal distraction. *Biological Psychiatry*, *77*(4), 394–403. https://doi.org/10.1016/j.biopsych.2014.03.030

Goldin, P. R., Manber, T., Hakimi, S., Canli, T., & Gross, J. J. (2009). Neural bases of social anxiety disorder: Emotional reactivity and cognitive regulation during social and physical threat. *Archives of General Psychiatry*, *66*(2), 170–180. https://doi.org/10.1001/archgenpsychiatry.2008.525

Goldin, P. R., Manber-Ball, T., Werner, K., Heimberg, R., & Gross, J. J. (2009). Neural mechanisms of cognitive reappraisal of negative self-beliefs in social anxiety disorder. *Biological Psychiatry*, *66*(12), 1091–1099. https://doi.org/10.1016/j.biopsych.2009.07.014

Goossens, L., Schruers, K., Peeters, R., Griez, E., & Sunaert, S. (2007). Visual presentation of phobic stimuli: Amygdala activation via an extrageniculostriate pathway? *Psychiatry Research*, *155*(2), 113–120. https://doi.org/10.1016/j.pscychresns.2006.12.005

Gungor, N. Z., & Paré, D. (2016). Functional Heterogeneity in the Bed Nucleus of the Stria Terminalis. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, *36*(31), 8038–8049. https://doi.org/10.1523/JNEUROSCI.0856-16.2016

Hamilton, J. P., Chen, M. C., Waugh, C. E., Joormann, J., & Gotlib, I. H. (2015). Distinctive and common neural underpinnings of major depression, social anxiety, and their comorbidity. *Social Cognitive and Affective Neuroscience*, *10*(4), 552–560. https://doi.org/10.1093/scan/nsu084

Hayes, J. P., LaBar, K. S., McCarthy, G., Selgrade, E., Nasser, J., Dolcos, F., VISN 6 Mid-Atlantic MIRECC workgroup, & Morey, R. A. (2011). Reduced hippocampal and amygdala activity predicts memory distortions for trauma reminders in combat-related PTSD. *Journal of Psychiatric Research*, *45*(5), 660–669. https://doi.org/10.1016/j.jpsychires.2010.10.007

Heeren, A., Dricot, L., Billieux, J., Philippot, P., Grynberg, D., de Timary, P., & Maurage, P. (2017). Correlates of Social Exclusion in Social Anxiety Disorder: An fMRI study. *Scientific Reports*, *7*(1), 260. https://doi.org/10.1038/s41598-017-00310-9

Heitmann, C. Y., Feldker, K., Neumeister, P., Brinkmann, L., Schrammen, E., Zwitserlood, P., & Straube, T. (2017). Brain activation to task-irrelevant disorder-related threat in social anxiety disorder: The impact of symptom severity. *NeuroImage. Clinical*, *14*, 323–333. https://doi.org/10.1016/j.nicl.2017.01.020

Heitmann, C. Y., Feldker, K., Neumeister, P., Zepp, B. M., Peterburs, J., Zwitserlood, P., & Straube, T. (2016). Abnormal brain activation and connectivity to standardized disorder-related visual scenes in social anxiety disorder. *Human Brain Mapping*, *37*(4), 1559–1572. https://doi.org/10.1002/hbm.23120

Held-Poschardt, D., Sterzer, P., Schlagenhauf, F., Pehrs, C., Wittmann, A., Stoy, M., Hägele, C., Knutson, B., Heinz, A., & Ströhle, A. (2018). Reward and loss anticipation in panic disorder: An fMRI study. *Psychiatry Research. Neuroimaging*, *271*, 111–117. https://doi.org/10.1016/j.pscychresns.2017.11.005

Hermann, A., Schäfer, A., Walter, B., Stark, R., Vaitl, D., & Schienle, A. (2007). Diminished medial prefrontal cortex activity in blood-injection-injury phobia. *Biological Psychology*, *75*(2), 124–130. https://doi.org/10.1016/j.biopsycho.2007.01.002
Hilbert, K., Evens, R., Maslowski, N. I., Wittchen, H.-U., & Lueken, U. (2014). Fear processing in dental phobia during crossmodal symptom provocation: An fMRI study. *BioMed Research International*, *2014*, 196353. https://doi.org/10.1155/2014/196353
Holtz, K., Pané-Farré, C. A., Wendt, J., Lotze, M., & Hamm, A. O. (2012). Brain activation during anticipation of interoceptive threat. *NeuroImage*, *61*(4), 857–865. https://doi.org/10.1016/j.neuroimage.2012.03.019
Hou, C., Liu, J., Wang, K., Li, L., Liang, M., He, Z., Liu, Y., Zhang, Y., Li, W., & Jiang, T. (2007). Brain responses to symptom provocation and trauma-related short-term memory recall in coal mining accident survivors with acute severe PTSD. *Brain Research*, *1144*, 165–174. https://doi.org/10.1016/j.brainres.2007.01.089
Hur, J., Stockbridge, M. D., Fox, A. S., & Shackman, A. J. (2019). Dispositional negativity, cognition, and anxiety disorders: An integrative translational neuroscience framework. *Progress in Brain Research*, *247*, 375–436. https://doi.org/10.1016/bs.pbr.2019.03.012
Kalisch, R., Wiech, K., Herrmann, K., & Dolan, R. J. (2006). Neural correlates of self-distraction from anxiety and a process model of cognitive emotion regulation. *Journal of Cognitive Neuroscience*, *18*(8), 1266–1276. https://doi.org/10.1162/jocn.2006.18.8.1266
Karim, H., Tudorascu, D. L., Aizenstein, H., Walker, S., Good, R., & Andreescu, C. (2016). Emotion Reactivity and Cerebrovascular Burden in Late-Life GAD: A Neuroimaging Study. *The American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry*, *24*(11), 1040–1050. https://doi.org/10.1016/j.jagp.2016.07.015
Ke, J., Zhang, L., Qi, R., Li, W., Hou, C., Zhong, Y., He, Z., Li, L., & Lu, G. (2016). A longitudinal fMRI investigation in acute post-traumatic stress disorder (PTSD). *Acta Radiologica (Stockholm, Sweden: 1987)*, *57*(11), 1387–1395. https://doi.org/10.1177/0284185115585848
Kim, M. J., Chey, J., Chung, A., Bae, S., Khang, H., Ham, B., Yoon, S. J., Jeong, D.-U., & Lyoo, I. K. (2008). Diminished rostral anterior cingulate activity in response to threat-related events in posttraumatic stress disorder. *Journal of Psychiatric Research*, *42*(4), 268–277. https://doi.org/10.1016/j.jpsychires.2007.02.003
Kim, M.-K., Yoon, H.-J., Shin, Y.-B., Lee, S.-K., & Kim, J.-J. (2016). Neural basis of distorted self-face recognition in social anxiety disorder. *NeuroImage. Clinical*, *12*, 956–964. https://doi.org/10.1016/j.nicl.2016.04.010
Kirlic, N., Aupperle, R. L., Misaki, M., Kuplicki, R., & Alvarez, R. P. (2017). Recruitment of orbitofrontal cortex during unpredictable threat among adults at risk for affective disorders. *Brain and Behavior*, *7*(8), e00757. https://doi.org/10.1002/brb3.757
Klumpers, F., Kroes, M. C. W., Baas, J. M. P., & Fernández, G. (2017). How Human Amygdala and Bed Nucleus of the Stria Terminalis May Drive Distinct Defensive Responses. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, *37*(40), 9645–9656. https://doi.org/10.1523/JNEUROSCI.3830-16.2017
Klumpers, F., Raemaekers, M. A. H. L., Ruigrok, A. N. V., Hermans, E. J., Kenemans, J. L., & Baas, J. M. P. (2010). Prefrontal mechanisms of fear reduction after threat offset. *Biological Psychiatry*, *68*(11), 1031–1038. https://doi.org/10.1016/j.biopsych.2010.09.006
Klumpp, H., Angstadt, M., Nathan, P. J., & Phan, K. L. (2010). Amygdala reactivity to faces at varying intensities of threat in generalized social phobia: An event-related functional MRI study. *Psychiatry Research*, *183*(2), 167–169. https://doi.org/10.1016/j.pscychresns.2010.05.001
Klumpp, H., Angstadt, M., & Phan, K. L. (2012). Insula reactivity and connectivity to anterior cingulate cortex when processing threat in generalized social anxiety disorder. *Biological Psychology*, *89*(1), 273–276. https://doi.org/10.1016/j.biopsycho.2011.10.010
Koric, L., Volle, E., Seassau, M., Bernard, F. A., Mancini, J., Dubois, B., Pelissolo, A., & Levy, R. (2012). How cognitive performance-induced stress can influence right VLPFC activation: An

fMRI study in healthy subjects and in patients with social phobia. *Human Brain Mapping*, *33*(8), 1973–1986. https://doi.org/10.1002/hbm.21340
Krain, A. L., Gotimer, K., Hefton, S., Ernst, M., Castellanos, F. X., Pine, D. S., & Milham, M. P. (2008). A functional magnetic resonance imaging investigation of uncertainty in adolescents with anxiety disorders. *Biological Psychiatry*, *63*(6), 563–568. https://doi.org/10.1016/j.biopsych.2007.06.011
Lancaster, J. L., Tordesillas-Gutiérrez, D., Martinez, M., Salinas, F., Evans, A., Zilles, K., Mazziotta, J. C., & Fox, P. T. (2007). Bias between MNI and Talairach coordinates analyzed using the ICBM-152 brain template. *Human Brain Mapping*, *28*(11), 1194–1205. https://doi.org/10.1002/hbm.20345
Landré, L., Destrieux, C., Andersson, F., Barantin, L., Quidé, Y., Tapia, G., Jaafari, N., Clarys, D., Gaillard, P., Isingrini, M., & El-Hage, W. (2012). Working memory processing of traumatic material in women with posttraumatic stress disorder. *Journal of Psychiatry & Neuroscience : JPN*, *37*(2), 87–94. https://doi.org/10.1503/jpn.100167
Lange, I., Goossens, L., Bakker, J., Michielse, S., Marcelis, M., Wichers, M., van Os, J., van Amelsvoort, T., & Schruers, K. (2019). Functional neuroimaging of associative learning and generalization in specific phobia. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, *89*, 275–285. https://doi.org/10.1016/j.pnpbp.2018.09.008
Lanius, R. A., Frewen, P. A., Girotti, M., Neufeld, R. W. J., Stevens, T. K., & Densmore, M. (2007). Neural correlates of trauma script-imagery in posttraumatic stress disorder with and without comorbid major depression: A functional MRI investigation. *Psychiatry Research*, *155*(1), 45–56. https://doi.org/10.1016/j.pscychresns.2006.11.006
Lanius, R. A., Williamson, P. C., Boksman, K., Densmore, M., Gupta, M., Neufeld, R. W. J., Gati, J. S., & Menon, R. S. (2002). Brain activation during script-driven imagery induced dissociative responses in PTSD: A functional magnetic resonance imaging investigation. *Biological Psychiatry*, *52*(4), 305–311. https://doi.org/10.1016/s0006-3223(02)01367-7
Lanius, R. A., Williamson, P. C., Hopper, J., Densmore, M., Boksman, K., Gupta, M. A., Neufeld, R. W. J., Gati, J. S., & Menon, R. S. (2003). Recall of emotional states in posttraumatic stress disorder: An fMRI investigation. *Biological Psychiatry*, *53*(3), 204–210. https://doi.org/10.1016/s0006-3223(02)01466-x
LeDoux, J. E., & Pine, D. S. (2016). Using Neuroscience to Help Understand Fear and Anxiety: A Two-System Framework. *American Journal of Psychiatry*, *173*(11), 1083–1093. https://doi.org/10.1176/appi.ajp.2016.16030353
Lieberman, M. D., & Cunningham, W. A. (2009). Type I and Type II error concerns in fMRI research: Re-balancing the scale. *Social Cognitive and Affective Neuroscience*, *4*(4), 423–428. https://doi.org/10.1093/scan/nsp052
Linnman, C., Moulton, E. A., Barmettler, G., Becerra, L., & Borsook, D. (2012). Neuroimaging of the Periaqueductal Gray: State of the Field. *Neuroimage*, *60*(1), 505–522. https://doi.org/10.1016/j.neuroimage.2011.11.095
Linnman, C., Zeffiro, T. A., Pitman, R. K., & Milad, M. R. (2011). An fMRI study of unconditioned responses in post-traumatic stress disorder. *Biology of Mood & Anxiety Disorders*, *1*, 8. https://doi.org/10.1186/2045-5380-1-8
Lipka, J., Hoffmann, M., Miltner, W. H. R., & Straube, T. (2014). Effects of cognitive-behavioral therapy on brain responses to subliminal and supraliminal threat and their functional significance in specific phobia. *Biological Psychiatry*, *76*(11), 869–877. https://doi.org/10.1016/j.biopsych.2013.11.008
Lueken, U., Straube, B., Reinhardt, I., Maslowski, N. I., Wittchen, H.-U., Ströhle, A., Wittmann, A., Pfleiderer, B., Konrad, C., Ewert, A., Uhlmann, C., Arolt, V., Jansen, A., & Kircher, T. (2014). Altered top-down and bottom-up processing of fear conditioning in panic disorder with agoraphobia. *Psychological Medicine*, *44*(2), 381–394. https://doi.org/10.1017/S0033291713000792

Maddock, R. J., Buonocore, M. H., Kile, S. J., & Garrett, A. S. (2003). Brain regions showing increased activation by threat-related words in panic disorder. *Neuroreport*, *14*(3), 325–328. https://doi.org/10.1097/00001756-200303030-00006

Månsson, K. N. T., Salami, A., Frick, A., Carlbring, P., Andersson, G., Furmark, T., & Boraxbekk, C.-J. (2016). Neuroplasticity in response to cognitive behavior therapy for social anxiety disorder. *Translational Psychiatry*, *6*, e727. https://doi.org/10.1038/tp.2015.218

Mazza, M., Catalucci, A., Mariano, M., Pino, M. C., Tripaldi, S., Roncone, R., & Gallucci, M. (2012). Neural correlates of automatic perceptual sensitivity to facial affect in posttraumatic stress disorder subjects who survived L'Aquila eartquake of April 6, 2009. *Brain Imaging and Behavior*, *6*(3), 374–386. https://doi.org/10.1007/s11682-012-9151-x

Mazza, M., Tempesta, D., Pino, M. C., Catalucci, A., Gallucci, M., & Ferrara, M. (2013). Regional cerebral changes and functional connectivity during the observation of negative emotional stimuli in subjects with post-traumatic stress disorder. *European Archives of Psychiatry and Clinical Neuroscience*, *263*(7), 575–583. https://doi.org/10.1007/s00406-013-0394-3

Mazza, M., Tempesta, D., Pino, M. C., Nigri, A., Catalucci, A., Guadagni, V., Gallucci, M., Iaria, G., & Ferrara, M. (2015). Neural activity related to cognitive and emotional empathy in post-traumatic stress disorder. *Behavioural Brain Research*, *282*, 37–45. https://doi.org/10.1016/j.bbr.2014.12.049

Monk, C. S., Telzer, E. H., Mogg, K., Bradley, B. P., Mai, X., Louro, H. M. C., Chen, G., McClure-Tone, E. B., Ernst, M., & Pine, D. S. (2008). Amygdala and ventrolateral prefrontal cortex activation to masked angry faces in children and adolescents with generalized anxiety disorder. *Archives of General Psychiatry*, *65*(5), 568–576. https://doi.org/10.1001/archpsyc.65.5.568

Moon, C.-M., & Jeong, G.-W. (2015). Functional neuroanatomy on the working memory under emotional distraction in patients with generalized anxiety disorder. *Psychiatry and Clinical Neurosciences*, *69*(10), 609–619. https://doi.org/10.1111/pcn.12295

Moon, C.-M., & Jeong, G.-W. (2017). Functional and morphological alterations associated with working memory dysfunction in patients with generalized anxiety disorder. *Acta Radiologica (Stockholm, Sweden: 1987)*, *58*(3), 344–352. https://doi.org/10.1177/0284185116649794

Moon, C.-M., Sundaram, T., Choi, N.-G., & Jeong, G.-W. (2016). Working memory dysfunction associated with brain functional deficits and cellular metabolic changes in patients with generalized anxiety disorder. *Psychiatry Research. Neuroimaging*, *254*, 137–144. https://doi.org/10.1016/j.pscychresns.2016.06.013

Moon, C.-M., Yang, J.-C., & Jeong, G.-W. (2015). Explicit verbal memory impairments associated with brain functional deficits and morphological alterations in patients with generalized anxiety disorder. *Journal of Affective Disorders*, *186*, 328–336. https://doi.org/10.1016/j.jad.2015.07.038

Moon, C.-M., Yang, J.-C., & Jeong, G.-W. (2017). Functional neuroanatomy associated with the interaction between emotion and cognition in explicit memory tasks in patients with generalized anxiety disorder. *Acta Radiologica (Stockholm, Sweden: 1987)*, *58*(1), 98–106. https://doi.org/10.1177/0284185116633915

Moores, K. A., Clark, C. R., McFarlane, A. C., Brown, G. C., Puce, A., & Taylor, D. J. (2008). Abnormal recruitment of working memory updating networks during maintenance of trauma-neutral information in post-traumatic stress disorder. *Psychiatry Research*, *163*(2), 156–170. https://doi.org/10.1016/j.pscychresns.2007.08.011

Mueller-Pfeiffer, C., Schick, M., Schulte-Vels, T., O'Gorman, R., Michels, L., Martin-Soelch, C., Blair, J. R., Rufer, M., Schnyder, U., Zeffiro, T., & Hasler, G. (2013). Atypical visual processing in posttraumatic stress disorder. *NeuroImage. Clinical*, *3*, 531–538. https://doi.org/10.1016/j.nicl.2013.08.009

Müller, V. I., Cieslik, E. C., Laird, A. R., Fox, P. T., Radua, J., Mataix-Cols, D., Tench, C. R., Yarkoni, T., Nichols, T. E., Turkeltaub, P. E., Wager, T. D., & Eickhoff, S. B. (2018). Ten simple rules for neuroimaging meta-analysis. *Neuroscience & Biobehavioral Reviews*, *84*, 151–161. https://doi.org/10.1016/j.neubiorev.2017.11.012

Naegeli, C., Zeffiro, T., Piccirelli, M., Jaillard, A., Weilenmann, A., Hassanpour, K., Schick, M., Rufer, M., Orr, S. P., & Mueller-Pfeiffer, C. (2018). Locus Coeruleus Activity Mediates Hyperresponsiveness in Posttraumatic Stress Disorder. *Biological Psychiatry*, *83*(3), 254–262. https://doi.org/10.1016/j.biopsych.2017.08.021

Nakao, T., Sanematsu, H., Yoshiura, T., Togao, O., Murayama, K., Tomita, M., Masuda, Y., & Kanba, S. (2011). FMRI of patients with social anxiety disorder during a social situation task. *Neuroscience Research*, *69*(1), 67–72. https://doi.org/10.1016/j.neures.2010.09.008

Neumeister, P., Feldker, K., Heitmann, C. Y., Buff, C., Brinkmann, L., Bruchmann, M., & Straube, T. (2018). Specific amygdala response to masked fearful faces in post-traumatic stress relative to other anxiety disorders. *Psychological Medicine*, *48*(7), 1209–1217. https://doi.org/10.1017/S0033291717002513

New, A. S., Fan, J., Murrough, J. W., Liu, X., Liebman, R. E., Guise, K. G., Tang, C. Y., & Charney, D. S. (2009). A functional magnetic resonance imaging study of deliberate emotion regulation in resilience and posttraumatic stress disorder. *Biological Psychiatry*, *66*(7), 656–664. https://doi.org/10.1016/j.biopsych.2009.05.020

Ottaviani, C., Watson, D. R., Meeten, F., Makovac, E., Garfinkel, S. N., & Critchley, H. D. (2016). Neurobiological substrates of cognitive rigidity and autonomic inflexibility in generalized anxiety disorder. *Biological Psychology*, *119*, 31–41. https://doi.org/10.1016/j.biopsycho.2016.06.009

Palm, M. E., Elliott, R., McKie, S., Deakin, J. F. W., & Anderson, I. M. (2011). Attenuated responses to emotional expressions in women with generalized anxiety disorder. *Psychological Medicine*, *41*(5), 1009–1018. https://doi.org/10.1017/S0033291710001455

Patel, R., Girard, T. A., Pukay-Martin, N., & Monson, C. (2016). Preferential recruitment of the basolateral amygdala during memory encoding of negative scenes in posttraumatic stress disorder. *Neurobiology of Learning and Memory*, *130*, 170–176. https://doi.org/10.1016/j.nlm.2016.02.003

Paulesu, E., Sambugaro, E., Torti, T., Danelli, L., Ferri, F., Scialfa, G., Sberna, M., Ruggiero, G. M., Bottini, G., & Sassaroli, S. (2010). Neural correlates of worry in generalized anxiety disorder and in normal controls: A functional MRI study. *Psychological Medicine*, *40*(1), 117–124. https://doi.org/10.1017/S0033291709005649

Paulus, M. P., & Stein, M. B. (2006). An insular view of anxiety. *Biological Psychiatry*, *60*(4), 383–387. https://doi.org/10.1016/j.biopsych.2006.03.042

Petrowski, K., Wintermann, G., Smolka, M. N., Huebner, T., & Donix, M. (2014). The neural representation of emotionally neutral faces and places in patients with panic disorder with agoraphobia. *Journal of Affective Disorders*, *152–154*, 454–461. https://doi.org/10.1016/j.jad.2013.10.016

Pfleiderer, B., Zinkirciran, S., Michael, N., Hohoff, C., Kersting, A., Arolt, V., Deckert, J., & Domschke, K. (2010). Altered auditory processing in patients with panic disorder: A pilot study. *The World Journal of Biological Psychiatry: The Official Journal of the World Federation of Societies of Biological Psychiatry*, *11*(8), 945–955. https://doi.org/10.3109/15622975.2010.490273

Phan, K. L., Fitzgerald, D. A., Nathan, P. J., & Tancer, M. E. (2006). Association between amygdala hyperactivity to harsh faces and severity of social anxiety in generalized social phobia. *Biological Psychiatry*, *59*(5), 424–429. https://doi.org/10.1016/j.biopsych.2005.08.012

Prater, K. E., Hosanagar, A., Klumpp, H., Angstadt, M., & Phan, K. L. (2013). Aberrant amygdala-frontal cortex connectivity during perception of fearful faces and at rest in generalized social anxiety disorder. *Depression and Anxiety*, *30*(3), 234–241. https://doi.org/10.1002/da.22014

Price, R B, Eldreth, D. A., & Mohlman, J. (2011). Deficient prefrontal attentional control in late-life generalized anxiety disorder: An fMRI investigation. *Translational Psychiatry*, *1*(10), e46. https://doi.org/10.1038/tp.2011.46

Price, Rebecca B., Siegle, G. J., Silk, J. S., Ladouceur, C. D., McFarland, A., Dahl, R. E., & Ryan, N. D. (2014). Looking under the hood of the dot-probe task: An fMRI study in anxious youth. *Depression and Anxiety*, *31*(3), 178–187. https://doi.org/10.1002/da.22255

Pujol, J., Giménez, M., Ortiz, H., Soriano-Mas, C., López-Solà, M., Farré, M., Deus, J., Merlo-Pich, E., Harrison, B. J., Cardoner, N., Navinés, R., & Martín-Santos, R. (2013). Neural response to the observable self in social anxiety disorder. *Psychological Medicine*, *43*(4), 721–731. https://doi.org/10.1017/S0033291712001857

Rabellino, D., Densmore, M., Frewen, P. A., Théberge, J., & Lanius, R. A. (2016). The innate alarm circuit in post-traumatic stress disorder: Conscious and subconscious processing of fear- and trauma-related cues. *Psychiatry Research. Neuroimaging*, *248*, 142–150. https://doi.org/10.1016/j.pscychresns.2015.12.005

Rabinak, C. A., MacNamara, A., Kennedy, A. E., Angstadt, M., Stein, M. B., Liberzon, I., & Phan, K. L. (2014). Focal and aberrant prefrontal engagement during emotion regulation in veterans with posttraumatic stress disorder. *Depression and Anxiety*, *31*(10), 851–861. https://doi.org/10.1002/da.22243

Radua, J., Romeo, M., Mataix-Cols, D., & Fusar-Poli, P. (2013). A general approach for combining voxel-based meta-analyses conducted in different neuroimaging modalities. *Current Medicinal Chemistry*, *20*(3), 462–466.

Reicherts, P., Wiemer, J., Gerdes, A. B. M., Schulz, S. M., Pauli, P., & Wieser, M. J. (2017). Anxious anticipation and pain: The influence of instructed vs conditioned threat on pain. *Social Cognitive and Affective Neuroscience*, *12*(4), 544–554. https://doi.org/10.1093/scan/nsw181

Reinecke, A., Filippini, N., Berna, C., Western, D. G., Hanson, B., Cooper, M. J., Taggart, P., & Harmer, C. J. (2015). Effective emotion regulation strategies improve fMRI and ECG markers of psychopathology in panic disorder: Implications for psychological treatment action. *Translational Psychiatry*, *5*, e673. https://doi.org/10.1038/tp.2015.160

Richey, J. A., Ghane, M., Valdespino, A., Coffman, M. C., Strege, M. V., White, S. W., & Ollendick, T. H. (2017). Spatiotemporal dissociation of brain activity underlying threat and reward in social anxiety disorder. *Social Cognitive and Affective Neuroscience*, *12*(1), 81–94. https://doi.org/10.1093/scan/nsw149

Richey, J. A., Rittenberg, A., Hughes, L., Damiano, C. R., Sabatino, A., Miller, S., Hanna, E., Bodfish, J. W., & Dichter, G. S. (2014). Common and distinct neural features of social and non-social reward processing in autism and social anxiety disorder. *Social Cognitive and Affective Neuroscience*, *9*(3), 367–377. https://doi.org/10.1093/scan/nss146

Rivero, F., Herrero, M., Viña, C., Álvarez-Pérez, Y., & Peñate, W. (2017). Neuroimaging in cockroach phobia: An experimental study. *International Journal of Clinical and Health Psychology : IJCHP*, *17*(3), 207–215. https://doi.org/10.1016/j.ijchp.2017.06.002

Robinson, O. J., Overstreet, C., Charney, D. R., Vytal, K., & Grillon, C. (2013). Stress increases aversive prediction error signal in the ventral striatum. *Proceedings of the National Academy of Sciences of the United States of America*, *110*(10), 4129–4133. https://doi.org/10.1073/pnas.1213923110

Sailer, U., Robinson, S., Fischmeister, F. P. S., König, D., Oppenauer, C., Lueger-Schuster, B., Moser, E., Kryspin-Exner, I., & Bauer, H. (2008). Altered reward processing in the nucleus accumbens and mesial prefrontal cortex of patients with posttraumatic stress disorder. *Neuropsychologia*, *46*(11), 2836–2844. https://doi.org/10.1016/j.neuropsychologia.2008.05.022

Sakamoto, H., Fukuda, R., Okuaki, T., Rogers, M., Kasai, K., Machida, T., Shirouzu, I., Yamasue, H., Akiyama, T., & Kato, N. (2005). Parahippocampal activation evoked by masked traumatic images in posttraumatic stress disorder: A functional MRI study. *NeuroImage*, *26*(3), 813–821. https://doi.org/10.1016/j.neuroimage.2005.02.032

Sareen, J., Campbell, D. W., Leslie, W. D., Malisza, K. L., Stein, M. B., Paulus, M. P., Kravetsky, L. B., Kjernisted, K. D., Walker, J. R., & Reiss, J. P. (2007). Striatal function in generalized social phobia: A functional magnetic resonance imaging study. *Biological Psychiatry*, *61*(3), 396–404. https://doi.org/10.1016/j.biopsych.2006.05.043

Scharmüller, W., Ubel, S., Leutgeb, V., Schoengassner, F., Wabnegger, A., & Schienle, A. (2014). Do not think about pain: Neural correlates of attention guiding during visual symptom provocation in

dental phobia--an fMRI study. *Brain Research*, *1566*, 69–76. https://doi.org/10.1016/j.brainres.2014.04.017
Schienle, A., Schäfer, A., Hermann, A., Rohrmann, S., & Vaitl, D. (2007). Symptom provocation and reduction in patients suffering from spider phobia: An fMRI study on exposure therapy. *European Archives of Psychiatry and Clinical Neuroscience*, *257*(8), 486–493. https://doi.org/10.1007/s00406-007-0754-y
Schienle, A., Schäfer, A., Walter, B., Stark, R., & Vaitl, D. (2005). Brain activation of spider phobics towards disorder-relevant, generally disgust- and fear-inducing pictures. *Neuroscience Letters*, *388*(1), 1–6. https://doi.org/10.1016/j.neulet.2005.06.025
Schienle, A., Scharmüller, W., Leutgeb, V., Schäfer, A., & Stark, R. (2013). Sex differences in the functional and structural neuroanatomy of dental phobia. *Brain Structure & Function*, *218*(3), 779–787. https://doi.org/10.1007/s00429-012-0428-z
Schlund, M. W., Verduzco, G., Cataldo, M. F., & Hoehn-Saric, R. (2012). Generalized anxiety modulates frontal and limbic activation in major depression. *Behavioral and Brain Functions: BBF*, *8*, 8. https://doi.org/10.1186/1744-9081-8-8
Schmidt, S., Mohr, A., Miltner, W. H. R., & Straube, T. (2010). Task-dependent neural correlates of the processing of verbal threat-related stimuli in social phobia. *Biological Psychology*, *84*(2), 304–312. https://doi.org/10.1016/j.biopsycho.2010.03.005
Schneier, F. R., Pomplun, M., Sy, M., & Hirsch, J. (2011). Neural response to eye contact and paroxetine treatment in generalized social anxiety disorder. *Psychiatry Research*, *194*(3), 271–278. https://doi.org/10.1016/j.pscychresns.2011.08.006
Schwarzmeier, H., Kleint, N. I., Wittchen, H. U., Ströhle, A., Hamm, A. O., & Lueken, U. (2019). Characterizing the nature of emotional-associative learning deficits in panic disorder: An fMRI study on fear conditioning, extinction training and recall. *European Neuropsychopharmacology: The Journal of the European College of Neuropsychopharmacology*, *29*(2), 306–318. https://doi.org/10.1016/j.euroneuro.2018.11.1108
Schweckendiek, J., Klucken, T., Merz, C. J., Tabbert, K., Walter, B., Ambach, W., Vaitl, D., & Stark, R. (2011). Weaving the (neuronal) web: Fear learning in spider phobia. *NeuroImage*, *54*(1), 681–688. https://doi.org/10.1016/j.neuroimage.2010.07.049
Shin, L. M., Whalen, P. J., Pitman, R. K., Bush, G., Macklin, M. L., Lasko, N. B., Orr, S. P., McInerney, S. C., & Rauch, S. L. (2001). An fMRI study of anterior cingulate function in posttraumatic stress disorder. *Biological Psychiatry*, *50*(12), 932–942. https://doi.org/10.1016/s0006-3223(01)01215-x
Simmons, A. N., Flagan, T. M., Wittmann, M., Strigo, I. A., Matthews, S. C., Donovan, H., Lohr, J. B., & Paulus, M. P. (2013). The effects of temporal unpredictability in anticipation of negative events in combat veterans with PTSD. *Journal of Affective Disorders*, *146*(3), 426–432. https://doi.org/10.1016/j.jad.2012.08.006
Simmons, A. N., Matthews, S. C., Strigo, I. A., Baker, D. G., Donovan, H. K., Motezadi, A., Stein, M. B., & Paulus, M. P. (2011). Altered amygdala activation during face processing in Iraqi and Afghanistani war veterans. *Biology of Mood & Anxiety Disorders*, *1*, 6. https://doi.org/10.1186/2045-5380-1-6
Simmons, A. N., Paulus, M. P., Thorp, S. R., Matthews, S. C., Norman, S. B., & Stein, M. B. (2008). Functional activation and neural networks in women with posttraumatic stress disorder related to intimate partner violence. *Biological Psychiatry*, *64*(8), 681–690. https://doi.org/10.1016/j.biopsych.2008.05.027
Smith, A. R., Nelson, E. E., Rappaport, B. I., Pine, D. S., Leibenluft, E., & Jarcho, J. M. (2018). I Like Them…Will They Like Me? Evidence for the Role of the Ventrolateral Prefrontal Cortex During Mismatched Social Appraisals in Anxious Youth. *Journal of Child and Adolescent Psychopharmacology*, *28*(9), 646–654. https://doi.org/10.1089/cap.2017.0142
Smith, A. R., White, L. K., Leibenluft, E., McGlade, A. L., Heckelman, A. C., Haller, S. P., Buzzell, G. A., Fox, N. A., & Pine, D. S. (2019). The Heterogeneity of Anxious Phenotypes: Neural

Responses to Errors in Treatment-Seeking Anxious and Behaviorally-Inhibited Youth. *Journal of the American Academy of Child and Adolescent Psychiatry*. https://doi.org/10.1016/j.jaac.2019.05.014

Sripada, C. S., Angstadt, M., Banks, S., Nathan, P. J., Liberzon, I., & Phan, K. L. (2009). Functional neuroimaging of mentalizing during the trust game in social anxiety disorder. *Neuroreport*, *20*(11), 984–989. https://doi.org/10.1097/WNR.0b013e32832d0a67

St Jacques, P. L., Botzung, A., Miles, A., & Rubin, D. C. (2011). Functional neuroimaging of emotionally intense autobiographical memories in post-traumatic stress disorder. *Journal of Psychiatric Research*, *45*(5), 630–637. https://doi.org/10.1016/j.jpsychires.2010.10.011

Steiger, F., Nees, F., Wicking, M., Lang, S., & Flor, H. (2015). Behavioral and central correlates of contextual fear learning and contextual modulation of cued fear in posttraumatic stress disorder. *International Journal of Psychophysiology: Official Journal of the International Organization of Psychophysiology*, *98*(3 Pt 2), 584–593. https://doi.org/10.1016/j.ijpsycho.2015.06.009

Stein, M. B., Goldin, P. R., Sareen, J., Zorrilla, L. T. E., & Brown, G. G. (2002). Increased amygdala activation to angry and contemptuous faces in generalized social phobia. *Archives of General Psychiatry*, *59*(11), 1027–1034. https://doi.org/10.1001/archpsyc.59.11.1027

Steuwe, C., Daniels, J. K., Frewen, P. A., Densmore, M., Pannasch, S., Beblo, T., Reiss, J., & Lanius, R. A. (2014). Effect of direct eye contact in PTSD related to interpersonal trauma: An fMRI study of activation of an innate alarm system. *Social Cognitive and Affective Neuroscience*, *9*(1), 88–97. https://doi.org/10.1093/scan/nss105

Stevens, J. S., Jovanovic, T., Fani, N., Ely, T. D., Glover, E. M., Bradley, B., & Ressler, K. J. (2013). Disrupted amygdala-prefrontal functional connectivity in civilian women with posttraumatic stress disorder. *Journal of Psychiatric Research*, *47*(10), 1469–1478. https://doi.org/10.1016/j.jpsychires.2013.05.031

Stoddard, J., Tseng, W.-L., Kim, P., Chen, G., Yi, J., Donahue, L., Brotman, M. A., Towbin, K. E., Pine, D. S., & Leibenluft, E. (2017). Association of Irritability and Anxiety With the Neural Mechanisms of Implicit Face Emotion Processing in Youths With Psychopathology. *JAMA Psychiatry*, *74*(1), 95–103. https://doi.org/10.1001/jamapsychiatry.2016.3282

Straube, T., Lipka, J., Sauer, A., Mothes-Lasch, M., & Miltner, W. H. (2011). Amygdala activation to threat under attentional load in individuals with anxiety disorder. *Biology of Mood & Anxiety Disorders*, *1*, 12. https://doi.org/10.1186/2045-5380-1-12

Straube, T., Mentzel, H.-J., & Miltner, W. H. R. (2007). Waiting for spiders: Brain activation during anticipatory anxiety in spider phobics. *NeuroImage*, *37*(4), 1427–1436. https://doi.org/10.1016/j.neuroimage.2007.06.023

Strawn, J. R., Bitter, S. M., Weber, W. A., Chu, W.-J., Whitsel, R. M., Adler, C., Cerullo, M. A., Eliassen, J., Strakowski, S. M., & DelBello, M. P. (2012). Neurocircuitry of generalized anxiety disorder in adolescents: A pilot functional neuroimaging and functional connectivity study. *Depression and Anxiety*, *29*(11), 939–947. https://doi.org/10.1002/da.21961

Strigo, I. A., Simmons, A. N., Matthews, S. C., Grimes, E. M., Allard, C. B., Reinhardt, L. E., Paulus, M. P., & Stein, M. B. (2010). Neural correlates of altered pain response in women with posttraumatic stress disorder from intimate partner violence. *Biological Psychiatry*, *68*(5), 442–450. https://doi.org/10.1016/j.biopsych.2010.03.034

Swartz, J. R., Phan, K. L., Angstadt, M., Fitzgerald, K. D., & Monk, C. S. (2014). Dynamic changes in amygdala activation and functional connectivity in children and adolescents with anxiety disorders. *Development and Psychopathology*, *26*(4 Pt 2), 1305–1319. https://doi.org/10.1017/S0954579414001047

Swartz, J. R., Phan, K. L., Angstadt, M., Klumpp, H., Fitzgerald, K. D., & Monk, C. S. (2014). Altered activation of the rostral anterior cingulate cortex in the context of emotional face distractors in children and adolescents with anxiety disorders. *Depression and Anxiety*, *31*(10), 870–879. https://doi.org/10.1002/da.22289

Thomaes, K., Dorrepaal, E., Draijer, N., de Ruiter, M. B., Elzinga, B. M., van Balkom, A. J., Smit, J. H., & Veltman, D. J. (2012). Treatment effects on insular and anterior cingulate cortex activation during classic and emotional Stroop interference in child abuse-related complex post-traumatic stress disorder. *Psychological Medicine*, *42*(11), 2337–2349. https://doi.org/10.1017/S0033291712000499

Torrisi, S., Robinson, O., O'Connell, K., Davis, A., Balderston, N., Ernst, M., & Grillon, C. (2016). The neural basis of improved cognitive performance by threat of shock. *Social Cognitive and Affective Neuroscience*, *11*(11), 1677–1686. https://doi.org/10.1093/scan/nsw088

van den Heuvel, O. A., Mataix-Cols, D., Zwitser, G., Cath, D. C., van der Werf, Y. D., Groenewegen, H. J., van Balkom, A. J. L. M., & Veltman, D. J. (2011). Common limbic and frontal-striatal disturbances in patients with obsessive compulsive disorder, panic disorder and hypochondriasis. *Psychological Medicine*, *41*(11), 2399–2410. https://doi.org/10.1017/S0033291711000535

van Rooij, S. J. H., Rademaker, A. R., Kennis, M., Vink, M., Kahn, R. S., & Geuze, E. (2015). Neural correlates of trauma-unrelated emotional processing in war veterans with PTSD. *Psychological Medicine*, *45*(3), 575–587. https://doi.org/10.1017/S0033291714001706

van Rooij, Sanne J.H., Rademaker, A. R., Kennis, M., Vink, M., Kahn, R. S., & Geuze, E. (2014). Impaired right inferior frontal gyrus response to contextual cues in male veterans with PTSD during response inhibition. *Journal of Psychiatry & Neuroscience : JPN*, *39*(5), 330–338. https://doi.org/10.1503/jpn.130223

Waugh, C. E., Hamilton, J. P., Chen, M. C., Joormann, J., & Gotlib, I. H. (2012). Neural temporal dynamics of stress in comorbid major depressive disorder and social anxiety disorder. *Biology of Mood & Anxiety Disorders*, *2*, 11. https://doi.org/10.1186/2045-5380-2-11

Werner, N. S., Meindl, T., Engel, R. R., Rosner, R., Riedel, M., Reiser, M., & Fast, K. (2009). Hippocampal function during associative learning in patients with posttraumatic stress disorder. *Journal of Psychiatric Research*, *43*(3), 309–318. https://doi.org/10.1016/j.jpsychires.2008.03.011

Whalley, M. G., Kroes, M. C. W., Huntley, Z., Rugg, M. D., Davis, S. W., & Brewin, C. R. (2013). An fMRI investigation of posttraumatic flashbacks. *Brain and Cognition*, *81*(1), 151–159. https://doi.org/10.1016/j.bandc.2012.10.002

Whalley, M. G., Rugg, M. D., Smith, A. P. R., Dolan, R. J., & Brewin, C. R. (2009). Incidental retrieval of emotional contexts in post-traumatic stress disorder and depression: An fMRI study. *Brain and Cognition*, *69*(1), 98–107. https://doi.org/10.1016/j.bandc.2008.05.008

White, S. F., Geraci, M., Lewis, E., Leshin, J., Teng, C., Averbeck, B., Meffert, H., Ernst, M., Blair, J. R., Grillon, C., & Blair, K. S. (2017). Prediction Error Representation in Individuals With Generalized Anxiety Disorder During Passive Avoidance. *The American Journal of Psychiatry*, *174*(2), 110–117. https://doi.org/10.1176/appi.ajp.2016.15111410

Wiemer, J., Schulz, S. M., Reicherts, P., Glotzbach-Schoon, E., Andreatta, M., & Pauli, P. (2015). Brain activity associated with illusory correlations in animal phobia. *Social Cognitive and Affective Neuroscience*, *10*(7), 969–977. https://doi.org/10.1093/scan/nsu142

Williams, L. E., Oler, J. A., Fox, A. S., McFarlin, D. R., Rogers, G. M., Jesson, M. A. L., Davidson, R. J., Pine, D. S., & Kalin, N. H. (2015). Fear of the unknown: Uncertain anticipation reveals amygdala alterations in childhood anxiety disorders. *Neuropsychopharmacology: Official Publication of the American College of Neuropsychopharmacology*, *40*(6), 1428–1435. https://doi.org/10.1038/npp.2014.328

Williams, L. M., Kemp, A. H., Felmingham, K., Barton, M., Olivieri, G., Peduto, A., Gordon, E., & Bryant, R. A. (2006). Trauma modulates amygdala and medial prefrontal responses to consciously attended fear. *NeuroImage*, *29*(2), 347–357. https://doi.org/10.1016/j.neuroimage.2005.03.047

Wintermann, G.-B., Donix, M., Joraschky, P., Gerber, J., & Petrowski, K. (2013). Altered olfactory processing of stress-related body odors and artificial odors in patients with panic disorder. *PloS One*, *8*(9), e74655. https://doi.org/10.1371/journal.pone.0074655

Wittmann, A., Schlagenhauf, F., Guhn, A., Lueken, U., Elle, M., Stoy, M., Liebscher, C., Bermpohl, F., Fydrich, T., Pfleiderer, B., Bruhn, H., Gerlach, A. L., Straube, B., Wittchen, H.-U., Arolt, V., Heinz, A., Kircher, T., & Ströhle, A. (2018). Effects of Cognitive Behavioral Therapy on Neural Processing of Agoraphobia-Specific Stimuli in Panic Disorder and Agoraphobia. *Psychotherapy and Psychosomatics*, *87*(6), 350–365. https://doi.org/10.1159/000493146

Xiong, K., Zhang, Y., Qiu, M., Zhang, J., Sang, L., Wang, L., Xie, B., Wang, J., & Li, M. (2013). Negative Emotion Regulation in Patients with Posttraumatic Stress Disorder. *PLoS ONE*, *8*(12). https://doi.org/10.1371/journal.pone.0081957

Yang, H., Spence, J. S., Devous, M. D., Briggs, R. W., Goyal, A., Xiao, H., Yadav, H., & Adinoff, B. (2012). Striatal-limbic activation is associated with intensity of anticipatory anxiety. *Psychiatry Research*, *204*(2–3), 123–131. https://doi.org/10.1016/j.pscychresns.2012.10.001

Yang, P., Wu, M.-T., Hsu, C.-C., & Ker, J.-H. (2004). Evidence of early neurobiological alternations in adolescents with posttraumatic stress disorder: A functional MRI study. *Neuroscience Letters*, *370*(1), 13–18. https://doi.org/10.1016/j.neulet.2004.07.033

Yeo, B. T. T., Krienen, F. M., Sepulcre, J., Sabuncu, M. R., Lashkari, D., Hollinshead, M., Roffman, J. L., Smoller, J. W., Zöllei, L., Polimeni, J. R., Fischl, B., Liu, H., & Buckner, R. L. (2011). The organization of the human cerebral cortex estimated by intrinsic functional connectivity. *Journal of Neurophysiology*, *106*(3), 1125–1165. https://doi.org/10.1152/jn.00338.2011

Yin, D., Liu, W., Zeljic, K., Lv, Q., Wang, Z., You, M., Men, W., Fan, M., Cheng, W., & Wang, Z. (2017). Failure in Cognitive Suppression of Negative Affect in Adolescents with Generalized Anxiety Disorder. *Scientific Reports*, *7*(1), 6583. https://doi.org/10.1038/s41598-017-07063-5

Yoon, H.-J., Kim, J. S., Shin, Y.-B., Choi, S.-H., Lee, S.-K., & Kim, J.-J. (2016). Neural activity during self-referential working memory and the underlying role of the amygdala in social anxiety disorder. *Neuroscience Letters*, *627*, 139–147. https://doi.org/10.1016/j.neulet.2016.05.068

Yoon, K. L., Fitzgerald, D. A., Angstadt, M., McCarron, R. A., & Phan, K. L. (2007). Amygdala reactivity to emotional faces at high and low intensity in generalized social phobia: A 4-Tesla functional MRI study. *Psychiatry Research*, *154*(1), 93–98. https://doi.org/10.1016/j.pscychresns.2006.05.004

Yoshimura, S., Okamoto, Y., Yoshino, A., Kobayakawa, M., Machino, A., & Yamawaki, S. (2014). Neural basis of anticipatory anxiety reappraisals. *PloS One*, *9*(7), e102836. https://doi.org/10.1371/journal.pone.0102836

Zhang, J., Xiong, K., Qiu, M., Zhang, Y., Xie, B., Wang, J., Li, M., Chen, H., Zhang, Y., & Zhang, J. (2013). Negative emotional distraction on neural circuits for working memory in patients with posttraumatic stress disorder. *Brain Research*, *1531*, 94–101. https://doi.org/10.1016/j.brainres.2013.07.042

Zilverstand, A., Sorger, B., Kaemingk, A., & Goebel, R. (2017). Quantitative representations of an exaggerated anxiety response in the brain of female spider phobics-a parametric fMRI study. *Human Brain Mapping*, *38*(6), 3025–3038. https://doi.org/10.1002/hbm.23571

Ziv, M., Goldin, P. R., Jazaieri, H., Hahn, K. S., & Gross, J. J. (2013). Emotion regulation in social anxiety disorder: Behavioral and neural responses to three socio-emotional tasks. *Biology of Mood & Anxiety Disorders*, *3*(1), 20. https://doi.org/10.1186/2045-5380-3-20

Zweerings, J., Pflieger, E. M., Mathiak, K. A., Zvyagintsev, M., Kacela, A., Flatten, G., & Mathiak, K. (2018). Impaired Voluntary Control in PTSD: Probing Self-Regulation of the ACC With Real-Time fMRI. *Frontiers in Psychiatry*, *9*, 219. https://doi.org/10.3389/fpsyt.2018.00219