SUPPLEMENTARY MATERIAL

Neural Network Alterations Across Eating Disorders: A Narrative Review of fMRI Studies

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Supplementary Table 1. Summary of the featured fMRI studies exploring reward processes in patients with eating disorders.

Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold used)
Balodis *et al.*, 2013	Adult women with OB+BED, OB	19 OB+BED, 19 OB, 19 HC	Monetary incentive delay task. Participants pressed a button during the presentation of a target divided over two anticipatory periods. After the target disappeared, feedback appeared during the outcome phase.	OB demonstrated increased ventral striatal and ventromedial prefrontal cortex activity during anticipatory phases. BED, relative to OB, demonstrated decreased bilateral ventral striatal activity during anticipatory rewards/losses (AlphaSim combined voxel-wise and cluster thresholds at FWE rate of 5%).
Balodis *et al.*, 2014	Adult women with OB+BED	19 OB+BED	Monetary incentive delay task. Participants pressed a button during the presentation of a target divided over two anticipatory periods. After the target disappeared, feedback appeared during the outcome phase.	Patients with BED following treatment showed less activation in the ventral striatum and the inferior frontal gyrus during the anticipatory phase of reward processing and reduced activity in the medial prefrontal cortex during the outcome phase of reward processing compared to patients without BED following treatment (AlphaSim, FWE-corrected at $p < .05$).
Bischoff-Grethe *et al.*, 2013	Female adolescents with AN-R	10 AN-R, 12 HC	Monetary guessing task. Participants were instructed to guess whether a hidden number was less than or greater than 5.	AN participants exhibited exaggerated response to losses compared to wins in posterior executive and sensorimotor striatal regions (FDR at $q=0.05$).
Bohon *et al.*, 2011	Adult women with subthreshold BN, with full threshold BN	11 subthreshold BN, 2 full threshold BN, 13 HC	Negative affect was measured just prior to the scan. Two pictures were presented: a chocolate milkshake labeled ''milkshake'' and a glass of water labeled ''water". The milkshake or tasteless solution was and was not delivered orally when cued.	Women with BN showed a positive correlation between negative affect and activity in the putamen, caudate, and pallidum during anticipated receipt of milkshake ($Z > 2.0$, k threshold of $p < .05$).

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Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold used)
Bohon *et al.*, 2012	Adult women with sub-threshold BN, with full threshold BN	11 subthreshold BN, 2 full threshold BN, 13 HC	Two pictures were presented: a chocolate milkshake labeled ''milkshake'' and a glass of water labeled ''water". The milkshake or tasteless solution was and was not delivered orally when cued.	Women with BN showed trends for less activation than HC in the right anterior insula in response to anticipated receipt of chocolate milkshake, and in the left middle frontal gyrus, right posterior insula, right precentral gyrus, and right mid dorsal insula in response to the consumptions of milkshake ($p<.005$ uncorrected).
DeGuzman *et al.*, 2017	Female adolescents with AN-R/AN-BP	20 AN-R, 1 AN-BP, 21 HC	Monetary reward task to associate visual conditioned stimuli (CS) with unconditioned stimuli (US). 10 trials established an initial association and all subsequent trials were fully randomized to probabilistically associate CS with its corresponding US.	The AN group exhibited greater brain response for prediction error regression, unexpected reward receipt, and unexpected reward omission. Prediction error and unexpected reward omission response normalized with treatment, while unexpected reward receipt response remained elevated; greater caudate prediction error response associated with less weight gain (FDR, 95% CI, 1000 sample bootstrap).
Foerde *et al.*, 2015	Female adolescents and adults with AN-R/AN-BP	10 AN-R, 11-AN-BP, 21 HC	Food choice task: participants rated the healthiness and the tastiness of 76 food items; participants made choices between 'neutral' reference foods and each of the other foods.	AN showed greater dorsal striatum activation when making choices about what to eat (FWE cluster significance threshold of $P = 0.05$); fronto-striatal activity correlated with actual food consumption in a meal the next day (FWE-corrected $P<0.05$).
Frank *et al.*, 2011	Adult women with BN	20 BN, 23 HC	Individuals received three taste stimuli during fMRI imaging: sucrose solution, no solution, and artificial saliva. Individuals learned to associate each taste stimulus with a paired conditioned visual stimulus (CS) that was probabilistically associated with its unconditioned stimuli (US); the CS associated with no-solution (null) appeared before 20% of the trials in which sucrose solution is presented as the US (US+) and (US-). The first 10 trials were CS sucrose fractal followed by US sucrose application, but all other trials were randomized.	BN showed reduced brain response compared with HC for unexpected receipt and omission of taste stimuli. BN had reduced brain regression response to the temporal difference computer-model-generated reward values, in the insula, ventral putamen, amygdala, and orbitofrontal cortex ($p < .05$, FWE, cluster threshold corrected). Binge/purge frequency in BN inversely predicted reduced temporal difference model response.
Frank *et al.*, 2012	Adult women with AN-R, adults with OB	21 AN-R, 19 OB, 23 HC	Conditioned visual stimuli and unconditioned taste stimuli association learning; unexpected violation of learned associations.	The orbitofrontal cortex differentiated all three groups in group-by-task condition analysis (FWE-corrected $P<0.05$); reward-learning signal distinguished groups in the anteroventral striatum, insula, and prefrontal cortex: greater brain responses in AN, reduced response in OB ($P<0.001$, 25 voxel cluster threshold).
Frank *et al.*, 2016	Young adult women with AN-R, BN	26 AN, 25 BN, 26 HC	Participants learned to associate sucrose taste stimuli with a paired conditioned visual stimulus (CS) that was probabilistically associated with the unconditioned stimulus (US). The CS shape associated with no solution (null) was followed in 20% of the trials by sucrose solution, and the CS shape for sucrose was followed in 20% of trials by no solution. The first 10 trials were fixed CS shape for sucrose followed by US sucrose to establish an initial association between the CS sucrose shape and US sucrose taste.	AN and BN had greater structural connectivity in pathways between insula, orbitofrontal cortex and ventral striatum, but lower connectivity from orbitofrontal cortex and amygdala to the hypothalamus ($P<0.05$, FDR). The hypothalamus drove ventral striatal activity in HC, but in AN and BN effective connectivity was directed from anterior cingulate via ventral striatum to the hypothalamus.

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Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold used)
Frank *et al.*, 2016	Adult women with AN-R, AN-rec, BN, OB	21 AN-R, 19 AN-rec, 20 BN, 19 OB and 27 HC	Participants received three taste stimuli: sucrose, no solution, and artificial saliva. Each taste stimulus was associated with a paired conditioned visual stimulus (CS) that was probabilistically associated with its unconditioned stimulus (US).	Higher classification accuracy in the insular primary taste cortex was found in HC compared to AN-R or OB, and in AN-rec compared to AN-R or OB (Multivariate Bayes Decoding Analysis was used to determine classification accuracy).
Frank *et al.*, 2016	Adult women recovered from AN-R	24 AN-rec and 24 HC	Participants learned to associate taste stimuli with a paired conditioned visual stimulus (CS) that was probabilistically associated with the unconditioned stimulus (US). The CS shape associated with no solution (null) was followed in 20% of the trials by sucrose solution (unexpected sucrose receipt, positive prediction error condition), and the CS shape for sucrose was followed in 20% of trials by no solution (unexpected sucrose omission).	AN-rec showed increased left posterior insula activation for the prediction error model analysis than HC (FWE and small volume–corrected $p < 0.05$). A group × condition analysis found greater posterior insula response in AN-rec than HC for unexpected stimulus omission, but not for unexpected receipt. Sensitivity to punishment was elevated in AN-rec.
Lyu *et al.*, 2016	Adult women with BED	18 BED and 26 HC	Participants were randomly assigned to unpleasant stressor or less unpleasant stressor conditions. They were subsequently scanned while viewing food and neutral images.	During exposure to food images, BED in the unpleasant stressor condition reported more liking of high calorie food images and showed less activation the hippocampus (FDR corrected exploratory analyses $p<0.05$, uncorrected $p<0.001$ for ROI effects). Reduced hippocampal activation to high calorie food images predicted more chocolate consumption following fMRI scans in the entire sample.
Monteleone *et al.*, 2016	Adult women with AN-R, AN-BP, BN	16 AN-R, 4 AN-BP, 20 BN and 20 HC	Participants were administered a sucrose solution (sweet taste), a quinine hydrochloride (HCl) solution (bitter taste) and water (reference taste).	AN had a decreased response to bitter taste in the right amygdala and left anterior cingulate cortex. BN had a decreased response to bitter taste in the right amygdala and left insula (5% statistical threshold applied to t-maps, cluster level corrected for multiple comparisons over mask after 1000 Monte-Carlo iterations).
Murao *et al.*, 2017	Adult women with AN-R, AN-BP	11 AN-R, 12 AN-BP, 20 HC	Monetary incentive delay task. Participants pressed a button during the presentation of a target. If participants succeeded in doing so, they gained or avoided losing money. After the target disappeared, feedback appeared.	Increased rostral anterior cingulate cortex and right posterior insula activation in the AN-BP group relative to AN-R and HC groups (corrected threshold of $P < 0.05$, determined using AlphaSim, single voxel $P < 0.001$, 1000 iterations).
Sanders *et al.*, 2015	Adult AN-R, AN-BP, AN-rec,	9 AN-R, 6 AN-BP, 14 AN-rec, 15 HC	Images of 60 of high and low calorie, sweet and savory, foods were presented. The food images were presented in random order. Non-food images were presented. Each block consisted of images preceded by a short instruction: "Imagine eating/using the food/object presented," which was shown on the screen before each block.	The caudate showed higher activation in both patient groups compared to HC when visually processing food images. Increased activations in the medial and lateral PFC, and anterior cingulate in both patient groups were found when compared to healthy controls ($P <0.05$ and a cluster size, $k >9$, HSD correction used to correct for multiple comparisons in *post hoc* t-tests).

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Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold used)
Scaife *et al.*, 2016	Adult women with AN-R, AN-rec	12 AN-R, 14 AN-rec and 16 HC	Participants were shown pictures of high and low-calorie foods and asked to evaluate how much they wanted to eat each food following a four-hour fast.	Increased activations were found following presentation of high-calorie stimuli and decreased activations during presentation of low-calorie food in AN-R, the opposite pattern emerged in HC. PPI analyses found hypo-connectivity between the caudate and both somatosensory and visual processing regions in AN ($p<0.05$. *Post-hoc* results were adjusted for multiple comparisons using Bonferroni corrections).
Simon *et al.*, 2016	Adult women with BED, with BN.	27 BED, 29 BN and 55 HC	Participants performed both food and monetary incentive delay tasks. Participants pressed a button during the presentation of a target (anticipatory period). Feedback appeared during the reward phase.	Patients (BED and BN) had reduced activation in the posterior cingulate cortex while anticipating food and increased activity in the medial orbitofrontal cortex, anterior medial prefrontal cortex and posterior cingulate cortex during the food reward phase. No significant group differences related to monetary reward ($P<0.05$ cluster level corrected with a cluster-defining threshold $P<0.001$ uncorrected and cluster size $k>10$).
Via *et al.*, 2015	Adult women with AN-R	20 AN-R and 20 HC	Participants received social feedback based on willingness to be met by others. Each face was presented with an overlapping feedback symbol. Acceptance, rejection or no-feedback (control condition) was indicated by a happy, sad, or neutral drawing of a face.	AN showed hypoactivation in the dorsomedial prefrontal cortex during social acceptance and hyperactivation of visual areas during social rejection (individual voxel threshold set at an uncorrected $p<0.005$, minimum spatial cluster extent to satisfy $pFWE<0.05$ determined by 1000 iterations using AlphaSim). Ventral striatum activation during rejection positively correlated with severity scores in patients.
Wagner *et al.*, 2015	Adult women recovered from AN-R, BN	14 AN-rec, 15 BN-rec and 13 HC	Repeated tastes of sucrose and sucralose were compared to test sensitization (first vs. second administration).	AN-R revealed decreased sensitization to sucrose. BN-R displayed an increased sensitization to sucrose. BN sensitization was not as pronounced as in HC (Monte-Carlo simulations, voxel-wise probability of $p<0.05$, $k>30$).
Weygandt *et al.*, 2012	Adult women with BED, BN, overweight controls	17 BED, 14 BN, 17 overweight controls and 19 HC.	Participants passively viewed pictures from the categories of food, disgust, and neutral.	The left insular cortex separated between food and neutral contents in all four groups (multivariate pattern recognition). The right insular cortex provided a maximum diagnostic accuracy for the separation of BED and HC, as well as BN and HC (ensemble classifier analysis). The right ventral striatum separated maximally between BED and overweight controls (ensemble classifier analysis).
Wierenga *et al.*, 2015	Adult women with AN-R	23 AN-rec, 17 HC	Monetary delay discounting task conducted during hunger and satiated states.	In the AN-rec group, response in reward and cognitive neurocircuitry did not differ during hunger and satiety (Small volume correction via Monte-Carlo 3dClustSim simulations, voxel-wise probability of $p<05$). In the HC group, hunger increased activation in reward circuitry (ventral striatum, dorsal caudate, anterior cingulate cortex) during processing of immediate reward, whereas satiety increased activation in cognitive control circuitry (ventrolateral prefrontal cortex, insula) during decision-making.

Abbreviations: AN, anorexia nervosa; AN-R, anorexia nervosa restrictive-subtype; AN-BP, anorexia nervosa bingeing/purging subtype; AN-rec, recovered anorexia nervosa; BN, bulimia nervosa, BED, binge-eating disorder; HC, healthy controls; OB, obesity; FWE, family-wise error; FDR, false discover rate; k, cluster extent.

Supplementary Table 2. Summary of the featured fMRI studies examining cognitive control networks in patients with eating disorders.

Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold Used)
Balodis *et al.*, 2013	Adults with BED, with OB	11 BED, 13 OB, 11 HC	Stroop color-word interference task: During fMRI scanning, incongruent stimuli were presented pseudo-randomly every 13-16 congruent stimuli, with seven incongruent events every run. Behavioral Stroop performance was assessed out-of-scanner immediately following scanning. A microphone recorded verbal responses as reaction times and errors were manually recorded.	BED showed diminished activity in the ventromedial prefrontal cortex, inferior frontal gyrus, and insula during Stroop performance compared to OB and HC. Dietary restraint scores were negatively correlated with right inferior frontal gyrus and ventromedial prefrontal cortex activation in BED, but not in the other groups (uncorrected level of $p < 0.01$ two-tailed and AlphaSim FWE-corrected at $P < 0.05$).
Decker *et al.*, 2015	Female adolescents and young adults with AN	30 AN, 22 HC (fMRI task)	Participants made binary choices between amounts of money. In each trial, they chose between an amount of money that was available sooner (smaller-sooner) or a larger amount of money available after a delay (larger-later).	Before treatment, AN showed a preference for delayed over earlier rewards. After weight restoration, AN did not differ from HC. AN showed abnormal activations in striatum and dorsal anterior cingulate. Normalization of behavior was associated with increased activation in the striatum and dorsal anterior cingulate and the dorsolateral prefrontal cortex and parietal cortex (whole-brain corrected $p<.01$, individual voxel threshold $p<.01$, k extent corrected).
Dreyfuss *et al.*, 2017	Adults with BN	19 BN, 27 HC	Emotional go/no-go task: brief presentations of socioemotional cues of smiling, fearful and calm facial expressions. Participants are instructed to press to a specific target emotion ("go" trial) while withholding responses to other non-target ("no go") emotions	Overall task performance improved with age for HC, but not for BN. Age predicted increased recruitment of both left mid-frontal gyrus and left subgenual cingulate cortex in HC, and less regional recruitment in BN during successful task performance (3dClustSim defined mask, $k>10$, $p < 0.005$, cluster effect $\alpha < 0.05$).
Ehrlich *et al.*, 2015	Female adults recovered from AN-R and AN-BP	30 AN-rec, 30 HC	Instrumental motivation task: A visual cue was presented to inform the participant of the reward level during the anticipation phase. The motor response phase consisted of increased monetary reward per trial and was determined by multiplying number of button presses × reward level × an individual adjustment factor. Acoustic feedback for button presses was provided through headphones. Feedback was provided by displaying the amount of money gained in each trial and the cumulative amount.	There were no behavioral differences between groups. AN-rec showed elevated dorsolateral pre-frontal cortex activity during the anticipation phase, failed to deactivate this region during the feedback phase and displayed greater functional coupling between the dorsolateral pre-frontal cortex and the medial orbitofrontal cortex (voxel-wise threshold of $p < 0.005$, cluster size correction, corrected threshold of $p < 0.05$).
Fischer *et al.*, 2017	Adult women with BN symptoms	12 BN, 4 OSFED	Participants viewed palatable food cues prior to and immediately following acute stress induction in the scanner. Participants responded to a series of prompts assessing daily ratings of stress and binge episodes for a period of the following two weeks using ecological momentary assessment.	Decreased activation was observed in response to food cues pre to post stress in the anterior cingulate cortex, amygdala, and ventromedial prefrontal cortex (FDR corrected). Participants who exhibited significant decreases in BOLD response to food cues following acute stress had significantly greater increases in stress prior to binge eating than other women in the sample.

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Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold Used)
Fonville *et al.*, 2013	Adults with AN-R, AN-BP	28 AN-R, 7 AN-BP, 35 HC	The Embedded Figures Test presents a target geometrical shape and two more figures. Participants were required to indicate which of the two figures contained the target geometrical shape. Difficulty was manipulated by displaying figures that were either simple or complex.	HC showed greater accuracy on the task than AN. HC showed greater activation in the precuneus whereas AN showed greater activation in the fusiform gyrus (FDR corrected).
Garrett *et al.*, 2014	Adult women with AN-R, AN-BP	4 AN-R, 17 AN-BP	Wisconsin Card Sorting Task: subjects used trial and error to deduce which criterion determined a correct response. Reference cards were presented on the top of the screen, and the target card below. Subjects chose reference cards for each target card. The Embedded Figures Test presents a target geometrical shape and two more figures. Participants were required to indicate which of the two figures contained the target geometrical shape. Difficulty was manipulated by displaying figures that were either simple or complex.	Improvements in set shifting following treatment were predicted by a combination of low ventrolateral pre-frontal cortex/insula and high anterior middle frontal activation. Embedded figures task activations were not correlated with neuropsychological measures of central coherence and did not predict outcome (cluster-wise FWE correction $p < .05$).
Geisler *et al.*, 2017	Adolescent/young adults, non-chronic female AN patients	36 AN, 36 HC	2 abstract stimuli are presented. After the participant selected one stimulus by pressing a left or right button, a fixation cross was presented s. Finally, positive or negative feedback (monetary reward or loss) was displayed followed by a fixation cross.	Overall task performance was comparable between groups. A showed increased shifting after receiving negative feedback and altered dorsal anterior cingulate cortex responses as a function of feedback (small volume correction with an α-level of 0.01). Increased dACC task-related coupling with amygdala preceded behavioral adaption ($p < 0.001$ uncorrected, cluster extent $k >= 30$).
King *et al.*, 2016	Predominately adolescent female patients with AN-R and AN-BP	30 AN-R, 1 AN-BP, 31 HC	Monetary delay discounting task: Participants were required to make a series of decisions between a small reward delivered immediately and a large one delivered later, thereby enabling estimation of temporal reward discounting. Pairs of amounts and delays of rewards were calculated in advance and presented randomly across the task.	Delayed discounting rates did not differ between the groups. Decision-making was consistently faster in the AN group. Activation associated with decision making in AN was decreased in lateral prefrontal and posterior parietal regions. Difficult decisions showed decreased activation in the AN group in the dorsal anterior cingulate cortex (3DClustSim, 10,000 Monte Carlo simulations at alpha=0.05, voxel-wise p values set at .005, combined threshold of $p < .05$, FWE corrected).
Kullmann *et al.*, 2014	Adults with AN-R, AN-BP	8 AN-R, 4 AN-BP, 26 HC (12 athletes, 14 non-athletes)	Affective go/no-go paradigm: In one session, food and non-food stimuli were used. In the physical activity paradigm, physically active and inactive stimuli were used. The go/no-go tasks required subjects to respond as quickly as possible with a button press to 'go' stimuli and withhold responses to 'no-go' stimuli.	Reduced response inhibition for food and non-food images in the putamen in AN, while stimuli depicting physical activity resulted in an exaggerated response of the prefrontal cortex and cerebellum. Both AN and athletes revealed an increased response in the somatosensory cortex to physical activity stimuli ($P<0.05$, FWE-corrected for multiple comparisons).

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Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold Used)
Lao-Kaim *et al.*, 2014	Adults with AN-R, AN-BP	24 AN-R, 7 AN-BP, 31 HC	Participants were presented with letters and were required to press a button when the letter they saw was identical to the letter they saw *n* trials previously (n = 1, 2 or 3). For the control condition, participants pressed the button when they saw the letter ''X''.	There were no between-group differences in accuracy and speed at any task difficulty. fMRI data revealed no regions exhibiting significant differences in activation when groups were compared at each difficulty separately and no regions showing group x condition interaction (functional data were thresholded to yield less than 1 false positive cluster).
Lee *et al.*, 2017	Adult women with BED, with BN	13BN, 12BED, 14HC	Stroop-Match-to-Sample task: Subjects were instructed to press a key when the cue and target matched and another key for non-matches, yielding accuracy and reaction time measures. Both food and neutral stimuli were used. 6 preselected food pictures with the highest craving scores were used as the interference stimuli.	Participants with BN showed lower accuracy compared to HC. BED demonstrated increased activations in the ventral striatum in response to food images. BN exhibited increased activations in the premotor cortex and dorsal striatum (exclusive masks were created for each group with a threshold at $P < 0.05$, uncorrected $P < 0.001$, $k > 5$ for the whole brain.)
Marsh *et al.*, 2011	Female adolescents with BN	18 BN, 18 HC	Simon Spatial Incompatibility Task: A series of arrows pointing either left or right was displayed either to the left or to the right crosshair positioned at midline. Stimuli were congruent (pointing in the same direction as their position on the screen), incongruent (pointing in a direction opposite their position on the screen), or blank. Participants responded to the direction of the arrow by pressing a button on a response box.	Both groups performed similarly on the task. During correct responses in conflict trials, the right inferolateral and dorsolateral prefrontal cortices and putamen had decreased activation in BN compared to HC. Deactivation was found in the left inferior frontal gyrus, the posterior cingulate cortex and superior frontal gyrus (second-level Bayesian analysis, p- value <0.025, k>25).
Reiter *et al.*, 2016	Adults with BED	22 BED, 22 HC	Anti-correlated decision-making task: Participants chose the card that they thought would lead to a monetary reward. After the participant had selected one card, feedback was displayed. Outcome stimuli were either a monetary win or loss. One card had a 80% reward probability and a 20% punishment probability. Reward contingencies were stable for the first trials (pre-reversal block) and for the last trials (post-reversal block). In the intermediate block, reward contingencies changed (reversal block).	On a behavioral level, BED, showed enhanced switching behavior. Impaired behavioral adaptation was accompanied by diminished activation related to exploratory decisions in the anterior insula/ventro-lateral prefrontal cortex. Representation of ventro–medial prefrontal learning signatures was reduced in BED (p-FWE<0.05).
Seitz *et al.*, 2016	Female adolescents and young adults with BN	20 BN, 20 HC	Attention Network Task: participants maintain fixation on a centrally located cross and respond as fast as possible to indicate the direction in which the target within five vertically arranged arrows is pointed.	BN showed reduced activation in the anterior cingulate regions, the temporo-parietal junction (TPJ) and parahippocampus during executive control (Whole-brain analysis corrected for multiple comparisons using cluster k>40, p<0.01 voxel level).
Sultson *et al.*, 2016	Adult women with AN, recovered from AN	14 AN, 14 AN-rec, 15 HC	Images of 60 of high and low calorie, sweet and savory, foods were presented. The food images were presented in random order. Non-food images were presented.	Activations in the right dorsal anterior cingulate cortex, left precuneus, and right paracentral lobule correlated negatively with perseverative errors in AN during food processing. In REC, left dorsal anterior cingulate cortex activation correlated positively with perseverative errors during food and non- food processing (small volume correction was applied to each ROI with a threshold for peaks at p<0.001 uncorrected with an extent threshold of k>3 voxels and z-score>3).

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Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold Used)
Wierenga *et al.*, 2014	Adolescent females with AN-R	11 AN-R, 12 HC	Stop signal task. Participants responded as quickly and accurately as possible with a left or right button press when they saw an ''X'' or an ''O'' stimulus, but were to not press either button when they heard a tone that coincided with the presentation of the visual stimuli. The timing of the tone relative to the visual stimulus was manipulated, such that it was either easy or hard to inhibit a response.	Less activation in AN was found in the right dorsal anterior cingulate cortex, right middle frontal gyrus, and left posterior cingulate cortex (PCC) compared to HC during hard trials. AN showed reduced activation to errors in the bilateral MFG and left PCC (Small volume FWE correction with Monte-Carlo 3dClustSim simulations, cluster threshold of $p<0.05$ with a peak voxel of $p<0.05$.

Abbreviations: AN, anorexia nervosa; AN-R, anorexia nervosa restrictive-subtype; AN-BP, anorexia nervosa bingeing/purging subtype; AN-rec, recovered anorexia nervosa; BN, bulimia nervosa, BED, binge-eating disorder; HC, healthy controls; OB, obesity; FWE, family-wise error; FDR, false discover rate; k, cluster extent.

Supplementary Table 3. Summary of the featured fMRI studies examining self-monitoring networks in patients with eating disorders.

Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold used)
Bang *et al.*, 2016	Adult women recovered from AN	22 AN-R, 21 HC	Dot-probe task: Trials began with a fixation point, followed by a pair of faces (cues) on the left and right side of the screen. An asterisk (probe) replaced one of the faces, and was visible for 1100 ms or until a response had been made. Participants were instructed to determine the location of the probe (left or right) as quickly and accurately as possible.	In response to angry faces, AN-R showed significant hypoactivation in the extrastriate cortex. During attentional bias to angry faces, AN-R showed significant hyperactivation in the medial prefrontal cortex. There was significant deactivation in HC as opposed to AN-R (Monte Carlo simulations used to determine the minimum k required to obtain a whole-brain corrected alpha level of $p< .05$, with a primary voxel-wise alpha level of $p< .001$).
Castellini *et al.*, 2013	Female adults with AN-R	18 AN-R, 19 HC	Photographs of the subject's own body (normal size, undersize, oversize) were used as target stimuli. Photos of houses were used as control stimuli	Increased activation was found in the dorsolateral prefrontal cortex in response to the oversized body picture in AN ($P < 0.05$, FWE). A significant correlation was found in AN between dorsolateral prefrontal cortex activation and eating disorder psychopathology.
Fladung *et al.*, 2013	Female adolescents with AN	13 AN, 14 HC	Stimuli were 48 computer-generated nude images of the same woman, varying in BMI and body posture. Subjects processed stimuli in a self-referring way, giving ratings of each stimulus from 'very bad' to 'very good'. In the control task referred to as 'weight', subjects estimated the weight of each body stimulus using four weight categories.	Underweight stimuli were associated with greater activity in the ventral striatum, and processing of normal-weight stimuli elicited reduced signaling in AN ($P<0.05$, FWE corrected).
Kerr *et al.*, 2015	Female adults with AN-R (weight restored)	15 AN-R, 15 HC	Interoceptive attention task: participants viewed the word 'HEART,' 'STOMACH,' or 'BLADDER', and were instructed to attend to the intensity of sensations from that organ, such as heartbeat or stomach distension. Anxious rumination trials, participants ruminated about worrisome situations related to the word presented on the screen (peers, family, or academics).	Group differences during stomach interoception ($p=0.002$, Bonferroni corrected) were found in the dorsal mid-insula and in the anterior insula during heart interoception ($p=0.03$, Bonferroni corrected). AN displayed increased activation during anxious rumination in the dorsal mid-insula, and activation in this region during stomach interoception was correlated with measures of anxiety and psychopathology.

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Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold used)
Li *et al.*, 2015	Adults with weight-restored AN, with body dysmorphic disorder	15 AN, 15 body dysmorphic disorder (BDD), 15 HC	Visual matching task: stimuli were face and house photographs that were normal spatial frequency, or filtered to low or high spatial frequency, and circles/ovals or squares/rectangles as control images. Participants pressed a button corresponding to images that matched the target image. Joint independent component analysis combined data by joint estimation of temporal ERP and fMRI components.	AN and BDD demonstrated similar hypoactivity in early secondary visual processing regions and the dorsal visual stream when viewing low spatial frequency faces and in early secondary visual processing regions when viewing low spatial frequency houses (clusters determined by $z>2.3$ and a corrected cluster significance threshold of $p<0.05$.).
McAdams *et al.*, 2014	Female adults recovering from AN-R, AN-BP	11 AN-R, 7 AN-BP, 18 HC	3 types of appraisals were shown: Self (an attribute about one's own identity based on one's own opinion); Friend (an attribute about a close female friend); and Reflected (an attribute about one's self as believed by one's friend). Each statement was presented using a scale from, 'strongly disagree' to 'strongly agree'. For the social task, the self statements were presented in the format 'I believe I am kind', friend statements: 'I believe my friend is thoughtful' and reflected statements: 'My friend believes I am selfish'.	Differences in activation relating to self-knowledge and perspective-taking were found in the precuneus (initial threshold of voxel-wise $P<0.001$, uncorrected and $k>20$ to identify regions with group differences). a single, large region in the dorsal anterior cingulate extending into dorsomedial prefrontal cortex showed increased activation in the reflected appraisals for HC relative to the self appraisals, and more activation during self appraisals than reflected appraisals for the AN. Left middle frontal gyrus also showed differential activation by group.
McAdams *et al.*, 2015	Female adults recovered from AN, recent history of AN	23 AN, 19 AN-rec, 21 HC	Malevolence and benevolence task: Participants interact with a computer-simulated investor. During a malevolent round, the repayment fraction increased but the investment fraction decreased. During a benevolent round, the repayment fraction decreased but the investment increased.	Neural responses to benevolence were diminished in the precuneus and right angular gyrus in both AN and AN-rec, but neural responses to malevolence differed in the left fusiform only in AN (cluster $PFWE<0.05$).
McAdams *et al.*, 2016	Female adults recovered from AN, current AN	22 AN, 18 AN-rec, 19 HC	The Social Identity-V2 task: see above. Faces task: For the Faces task, each subject viewed 15 images of their own face and 15 images of a stranger	AN had increased bilateral fusiform gyri activations for self-images compared with stranger-images relative to HC and AN-rec (cluster-corrected FWE $p<0.05$ with voxel-wise $P<0.005$, uncorrected).
Mohr *et al.*, 2011	Female adults with BN	15 BN, 16 HC	Subjects were asked to rate the presented images compared to their real body image (body size estimation task). Subjects rated the presented images with regard to their ideal body image (body satisfaction task).	BN overestimated their own body size. BN did not recruit the middle frontal gyrus to the same extent as controls during the body size estimation task. In HC, an activated cluster in lateral occipital cortex was sensitive for body size distortions ($p<.001$, uncorrected, $k>15$).
Suda *et al.*, 2013	Female adults with AN	20 AN, 15 HC	Body checking task: participants were presented images of pinching skin folds, measuring thigh diameter with a tape measure, etc. and control images. Participants were instructed to imagine doing what is shown in the pictures; imagine touching their body as shown in the images, etc.	AN presented less activation in the medial prefrontal cortex and right fusiform gyrus compared to HC in response to body checking (Voxel-wise significance level, set at $p<0.01$, cluster-wise significance threshold set to obtain less than one false positive 3D cluster per map). Body shape concern scores correlated negatively with medial prefrontal cortex activation in AN group.

(Supplementary Table 3) contd….

Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold used)
Via *et al.*, 2016	Female adults with AN	20 AN, 20 HC	Prior to scanning, subjects were video-recorded in three static positions (front-facing, lateral, back). During scanning, participants viewed video clips of their own body and another's body. Functional connectivity was also assessed at rest.	AN showed hyperactivation in the dorsal posterior cingulate cortex during own-body processing and less response to another's body processing in the precuneus and ventral posterior cingulate cortex. Increased task-related connectivity was found between dorsal posterior cingulate cortex–dorsal anterior cingulate cortex and precuneus–mid-temporal cortex. AN had decreased resting-state connectivity between the posterior cingulate cortex and the angular gyrus (individual voxel threshold was set at an uncorrected P<.005, minimum k required to satisfy FWE p<.05, determined by 5000 iterations, AlphaSim).

Abbreviations: AN, anorexia nervosa; AN-R, anorexia nervosa restrictive-subtype; AN-BP, anorexia nervosa bingeing/purging subtype; AN-rec, recovered anorexia nervosa; BN, bulimia nervosa, BED, binge-eating disorder; HC, healthy controls; OB, obesity; FWE, family-wise error; FDR, false discover rate; k, cluster extent; ROI, region of interest.

Supplementary Table 4. Summary of featured resting-state fMRI studies.

Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold used)
Lee *et al.*, 2014	Adult women with AN, BN	18 AN, 20 BN, 20 HC	Seed-based (dorsal anterior cingulate cortex) resting-state functional connectivity	AN exhibited stronger synchronous activity between the dorsal anterior cingulate cortex and retrosplenial cortex. BN showed stronger synchronous activity between the dorsal anterior cingulate cortex and medial orbitofrontal cortex. Both AN and BN demonstrated stronger synchronous activity between the dACC and precuneus, which correlated positively with the Body Shape Questionnaire (uncorrected p<0.001, k>430 at whole brain.).
Biezonski *et al.*, 2015	Adolescent and adult women with AN	15 AN, 16 HC	Seed-based (seven bilateral thalamic seed masks) resting-state functional connectivity	Abnormal functional connectivity between the thalamus and the dorsolateral and anterior prefrontal cortices (voxel-level threshold of p = 0.005, k extent threshold using FDR. FDR P≤ 0.05 was considered statistically significant, Bonferroni correction for multiple comparisons from the 7 thalamic seeds). Alterations in thalamo-frontal connectivity were associated with deficits in performance on the Stroop task and working memory.
Boehm *et al.*, 2014	Adolescent and adult women with AN-R and AN-BP	33 AN-R, 2 AN-BP, 35 HC	Independent component analyses (the frontoparietal network, the salience network, the visual and somatosensory networks and the default-mode network).	Increased functional connectivity between the angular gyrus and the fronto-parietal network in AN. In the default-mode network, AN had increased functional connectivity in the anterior insula (p < 0.05 FWE cluster-level).
Favaro *et al.*, 2012	Female adults with AN, recovered from AN	29 AN, 16 AN-rec, 26 HC	Independent component analyses (medial, lateral, and ventral visual networks and somatosensory network).	Both AN groups showed areas of decreased connectivity in the ventral visual network. AN, but not AN-rec, displayed increased coactivation in the left parietal cortex, encompassing the somatosensory cortex (FDR, p<0.05).
Lavagnino *et al.*, 2014	Adult women with BN	16 BN, 18 HC	Seed-based (somatosensory network regions)	BN showed decreased connectivity within the somatosensory network and with posterior cingulate cortex, the right middle occipital gyrus, and the right cuneus (cluster-wise p<0.05 corrected, AlphaSim).

(Supplementary Table 4) contd….

Authors	Patient Group(s)	Patient Sample Size vs. Control Sample Size	fMRI Task Procedure	Primary Results (fMRI Threshold used)
Cowdrey *et al.*, 2014	Adult women recovered from AN	16 AN-rec, 14 HC	Whole-brain independent component analyses (12 networks identified)	Increased connectivity between the default-mode network and the precuneus and the dorsolateral prefrontal cortex/inferior frontal gyrus (FWE corrected k at P<0.05.).
Boehm *et al.*, 2016	Adult women recovered from AN	31 AN-rec, 31 HC	Independent component analyses (fronto-parietal, default-mode, salience networks)	AN-rec had reduced connectivity between the dorsolateral prefrontal cortex and the fronto-parietal network ($p < 0.05$, FDR). Increased connectivity was found between the angular gyrus and the fronto-parietal network. No differences were found in the default-mode network.
Phillipou *et al.*, 2016	Adult women with AN	26 AN, 27 HC	Independent component analyses (ROI-to-ROI approach, default-mode network, sensory-motor network and visual networks)	Decreased connectivity was identified between the sensory-motor and visual networks in AN. AN had reduced connectivity between primary somatosensory, and secondary visual and associative visual areas. The same pattern occurred between primary motor, and secondary visual and associative visual areas. No differences in the default-mode network (FDR, $p<0.05$).
Ehrlich *et al.*, 2015	Adolescent and adult women with AN-R and AN-BP	32 AN-R, 2 AN-BP, 35 HC	Graph analysis (network-based statistic approach)	A subnetwork of connections with decreased connectivity including the amygdala, thalamus, fusiform gyrus, putamen and the posterior insula as the central hub was found in AN ($p<0.05$, FWE).
Geisler *et al.*, 2015	Adolescent and adult women with AN	35 AN, 35 HC	Graph analysis (7 separate global and 7 nodal graph metrics)	Global functional network structure in AN was characterized by increases in both path length and assortativity. Locally decreased connectivity strength and increased path length in the posterior insula and thalamus were found in AN (FDR, $p>0.05$).
Lord *et al.*, 2016	Adolescent and adult women with AN-R and AN-BP	33 AN-R, 2 AN-BP, 35 HC	Comparison of parcellation approaches (anatomical and literature based analyses), global and local network properties	Alterations in functional connectivity were found consistently across parcellation approaches in AN in the insula and thalamus ($p<0.05$, FDR).
Kullmann *et al.*, 2014	Adults with AN-R, AN-BP	8 AN-R, 4 AN-BP, 26 HC (12 athletes, 14 non-athletes)	Graph analysis (degree centrality and effective connectivity)	Reduced connectivity in the bilateral inferior frontal gyrus in AN. Altered effective connectivity from the right inferior frontal gyrus to the middle cingulate cortex, from the bilateral orbitofrontal gyrus to the right inferior frontal gyrus, and from the bilateral insula to the left inferior frontal gyrus in AN (FWE, $p<0.05$).
Baek *et al.*, 2016	Adults with BED, with obesity	20 OB, 20 BED, 40 HC	Graph analysis (whole-brain functional connectivity matrix, Automated Anatomical Labeling Atlas deconstruction)	OB and BED had reduced global and local network efficiency and decreased modularity, showing disruption in small-world and modular network structures. The putamen, pallidum and thalamus exhibited significantly decreased nodal degree and efficiency in OB and BED. OB and BED showed decreased connectivity of cortico-striatal/cortico-thalamic networks ($p < 0.05$, FWE-corrected).

Abbreviations: AN, anorexia nervosa; AN-R, anorexia nervosa restrictive-subtype; AN-BP, anorexia nervosa bingeing/purging subtype; AN-rec, recovered anorexia nervosa; BN, bulimia nervosa, BED, binge-eating disorder; HC, healthy controls; OB, obesity; FWE, family-wise error; FDR, false discover rate; k, cluster extent.

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