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Supplementary Figures: 6

Supplementary Tables: 4

Supplementary Videos: 0

Reporting Checklist for Nature Neuroscience

This checklist is used to ensure good reporting standards and to improve the reproducibility of published results. For more information, please read Reporting Life Sciences Research.

Please note that in the event of publication, it is mandatory that authors include all relevant methodological and statistical information in the manuscript.

Statistics reporting, by figure

- Please specify the following information for each panel reporting quantitative data, and where each item is reported (section, e.g. Results, & paragraph number).
- Each figure legend should ideally contain an exact sample size (n) for each experimental group/condition, where n is an exact number and not a range, a clear definition of how n is defined (for example x cells from x slices from x animals from x litters, collected over x days), a description of the statistical test used, the results of the tests, any descriptive statistics and clearly defined error bars if applicable.
- For any experiments using custom statistics, please indicate the test used and stats obtained for each experiment.
- Each figure legend should include a statement of how many times the experiment shown was replicated in the lab; the details of sample collection should be sufficiently clear so that the replicability of the experiment is obvious to the reader.
- For experiments reported in the text but not in the figures, please use the paragraph number instead of the figure number.

Note: Mean and standard deviation are not appropriate on small samples, and plotting independent data points is usually more informative. When technical replicates are reported, error and significance measures reflect the experimental variability and not the variability of the biological process; it is misleading not to state this clearly.

		TEST USED		n			DESCRIPTIVE STATS (AVERAGE, VARIANCE)		P VALUE		DEGREES OF FREEDOM & F/t/z/R/ETC VALUE	
	FIGURE NUMBER	WHICH TEST?	SECTION & PARAGRAPH #	EXACT VALUE	DEFINED?	SECTION & PARAGRAPH #	REPORTED?	SECTION & PARAGRAPH #	EXACT VALUE	SECTION & PARAGRAPH #	VALUE	SECTION & PARAGRAPH #
example	1a	one-way ANOVA	Fig. legend	9, 9, 10, 15	mice from at least 3 litters/group	Methods para 8	error bars are mean +/- SEM	Fig. legend	p = 0.044	Fig. legend	F(3, 36) = 2.97	Fig. legend
example	results, para 6	unpaired t-test	Results para 6	15	slices from 10 mice	Results para 6	error bars are mean +/- SEM	Results para 6	p = 0.0006	Results para 6	t(28) = 2.808	Results para 6

		TEST USED		n			DESCRIPTIVE STATS (AVERAGE, VARIANCE)		P VALUE		DEGREES OF FREEDOM & F/t/z/R/ETC VALUE	
	FIGURE NUMBER	WHICH TEST?	SECTION & PARAGRAPH #	EXACT VALUE	DEFINED?	SECTION & PARAGRAPH #	REPORTED?	SECTION & PARAGRAPH #	EXACT VALUE	SECTION & PARAGRAPH #	VALUE	SECTION & PARAGRAPH #
+ -	1b	mixed ANOVA; unpaired t-test, two-tailed	Fig. legend ; Results para 1	42	21 patients, 21 controls	Figure legend; Methods para 1, Fig 1 legend	mean +/- SEM	Fig. legend	Group x Food Type interaction: p = 0.000001; High-fat foods: p=7.6*10^-9; Low-fat foods: p = 0.15	Fig. legend	Group x Food Type interaction: F(1,40) = 32.16; High-fat foods: t(40) = 7.28; Low-fat foods: t(40) = 1.47	Fig. legend
+ -	1c	Pearson correlation, two-tailed	Fig. Legend	16; 21	16 patients, 21 controls	MS, para 5, Fig 1 legend	N/A	N/A	patients: p = 0.01 controls: p=0.47	Fig. legend	patients: r(14) = 0.61 controls: r(19) = 0.17	Fig. legend
+ -	2b	unpaired t-test using FSL Randomise tool for permutation testing within anatomical ROI, contrast of parametric modulator including age covariate across groups	Methods, "fMRI data analysis" section , para 2	42	21 patients, 21 controls	Methods para 1, Fig 2 legend	not applicable for imaging data; statistical parametric map shown	N/A	p < 0.05 tfce in bilateral caudate	Fig. legend	N/A	N/A
+ -	2a	FSL whole-brain contrast of parametric modulator, one-sample t-tests		21	21 patients alone and 21 controls alone	Methods para 1, Fig 2 legend	not applicable for imaging data; statistical parametric map shown	N/A	FWE-corrected p < 0.05 whole-brain, cluster-forming threshold Z > 2.3	Fig. legend	Multiple values; see Supplementary Table 3	Supplementary Table 3
+ -	2c	unpaired t-test, two-tailed	Fig. legend	42	21 patients, 21 controls	Methods para 1, Fig 2 legend	mean +/- SEM	Fig. legend	Caudate: p=0.048 Nucl. accum: p=0.315 Putamen: p=0.913	Fig. legend	Caudate: t(40) = -2.04 Nucl. accumb: t(40) = -1.02 Putamen: t(40) = 0.11	Fig. legend
+ -	3a	unpaired t-test using FSL Randomise tool for permutation testing within anatomical ROI	Methods, "fMRI data analysis" section , para 2	42	21 patients, 21 controls	Methods para 1, Fig 3 legend	not applicable for imaging data; statistical parametric map shown	N/A	FWE-corrected p < 0.05 tfce in PFC	Fig. legend	Multiple values; see Supplementary Table 4	Supplementary Table 4
+ -	3b	for illustration purposes only	Fig. legend	42	21 patients, 21 controls	Methods para 1, Fig 3 legend	mean +/- SEM	Fig. legend	for illustration purposes only		for illustration purposes only	

+ -	3c	Pearson correlation, two-tailed	Fig legend	16	16 patients	Results para 2, Fig 3 legend	N/A	N/A	p = 0.04	Fig. legend	r(14) = -0.52	Fig. legend
+ -	Supp 1a	mixed ANOVA	Fig legend	42	21 patients, 21 controls	Methods para 1, Fig S1 legend	mean +/- SEM	Fig. legend	Main effect Food type: p=4.3*10^-28 Main effect Group: p=0.003	Fig. legend	Main effect Food type: F(1,40) = 802.9 Main effect Group: F(1,40) = 10.10	Fig. legend
+ -	Supp 1b	mixed ANOVA	Fig legend	42	21 patients, 21 controls	Methods para 1, Fig S1 legend	mean +/- SEM	Fig. legend	Main effect Group: p = 0.000007; Group X Food Type interaction: p = 0.028	Fig. legend	Main effect Group: F(1,40) = 10.07; Group X Food Type interaction: F(1,40) = 5.21	Fig. legend
+ -	Supp 1c	multilevel logistic regression	Fig legend	42	21 patients, 21 controls	Methods para 1, Fig S1 legend	Fixed effects coefficients and standard errors	Fig. legend	Controls: Taste>Health, p < 0.000001; Patients: Taste=Health, p = 0.64	Fig. legend	Controls: Taste>Health, $\chi2$ = 75.64 Patients: Taste=Health, $\chi2$ = 0.22	Fig. legend
+ -	Supp 1d	multilevel linear regression	Fig legend	42	21 patients, 21 controls	Methods para 1, Fig S1 legend	Fixed effects coefficients and standard errors	Fig. legend	p = 0.02	Fig. legend	z = 5.3	Fig. legend
+ -	Supp 1e	mixed ANOVA	Fig legend	42	21 patients, 21 controls	Methods para 1, Fig S1 legend	mean +/- SEM	Fig. legend	Rating phase X Food type X Group interaction: p = 0.001	Fig. legend	Rating phase X Food type X Group interaction F(1,40) = 11.81	Fig. legend
+ -	Supp 1f	$\chi2$	Fig legend	42	21 patients, 21 controls	Methods para 1, Fig S1 legend	N/A	N/A	p = 0.002	Fig. legend	$\chi2$ = 10.15	Fig. legend
+ -	Supp 2b	unpaired t-test, two-tailed	Fig legend	42	21 patients, 21 controls	Methods para 1, Fig S2 legend	mean +/- SEM	Fig. legend	p = 0.000024	Fig. legend	t(33.88)= -4.89, df adjusted due to unequal variance	Fig. legend
+ -	Supp 2b legend	unpaired t-test, two-tailed	Fig legend	42	21 patients, 21 controls	Methods para 1, Fig S2 legend	mean +/- SEM	Fig. legend	p = 0.004	Fig. legend	t(40) = 3.1	Fig. legend
+ -	Supp 2c	multilevel linear regression	Fig legend	42	21 patients, 21 controls	Methods para 1, Fig S2 legend	mean +/- SEM	Fig. legend	Group X Self-control use interaction: p = 0.03	Fig. legend	Group X Self-control use interaction: $\chi2$ = 4.78	Fig. legend
+ -	Supp 3a	unpaired t-test, two-tailed	Fig legend	42; 41	Health: 21 pt, 21 ctrl Taste: 21 pt, 20 ctrl (fMRI Taste data lost from 1 ctrl due to excessive motion)	Methods para 1; Methods, "fMRI data analysis" Section para 2, Fig S3 legend	mean +/- SEM	Fig. legend	Health: p = 0.42 Taste: p = 0.68	Fig. legend	Health: t(40) = -0.81 Taste: t(39) = -0.41	Fig. legend
+ -	Supp 3b	unpaired t-test, two-tailed; paired t-test, two-tailed	Fig legend	42	21 patients, 21 controls	Methods para 1, Fig S3 legend	mean +/- SEM	Fig. legend	Low-fat: p=0.028 High-fat: p=0.170 Controls: high vs. low p=0.31 Patients: high vs. low p=0.38	Fig. legend	Low-fat: t(40) = -2.29 High-fat: t(40) = -1.396 Controls: high vs. low t(20) = -1.03 Patients: high vs. low t(20) = -0.90	Fig. legend

+ -	Supp 3c	for illustration purposes only	Fig. legend	42	21 patients, 21 controls	Methods para 1, Fig S3 legend	mean +/- SEM	Fig. legend	for illustration purposes only		for illustration purposes only	
+ -	Supp 4a	FSL whole-brain contrast of parametric modulator, one-sample t-tests; unpaired t-tests for group comparison	Fig. legend	21; 42	21 patients, 21 controls	Methods para 1, Fig S4 legend	not applicable for imaging data; statistical parametric map shown	N/A	FWE-corrected p < 0.05 whole-brain, cluster-forming threshold Z > 2.3	Fig. legend	Multiple values; see Supplementary Table 3	Supplementary Table 3
+ -	Supp 4b	unpaired t-test, two-tailed	Fig. legend	42	21 patients, 21 controls	Methods para 1, Fig S4 legend	mean +/- SEM	Fig. legend	p=0.82	Fig. legend	t(40) = 0.23	Fig. legend
+ -	Supp 4c	unpaired t-test, two-tailed	Fig. legend	42	21 patients, 21 controls	Methods para 1, Fig S4 legend	mean +/- SEM	Fig. legend	p= 0.61	Fig. legend	t(40) = 0.52	Fig. legend
+ -	Supp 5a	unpaired t-test, two-tailed	Fig. legend	42; 41	Health: 21 pt, 21 ctrl Taste: 21 pt, 20 ctrl (fMRI Taste data lost from 1 ctrl due to excessive motion)	Methods para 1; Methods, "fMRI data analysis" Section para 2, Fig S5 legend	mean +/- SEM	Fig. legend	Health: p=0.16 Taste: p=0.54	Fig. legend	Health: t(32.83)=1.44 Taste: t(39)= 0.62	Fig. legend
+ -	Supp 5b	Pearson correlation, two-tailed	Fig. legend	21; 21	21 patients, 21 controls	Methods para 1, Fig S5 legend	N/A	Fig. legend	Health: Controls p=0.38 Patients p=0.046 Taste: Controls: p=0.024 Patients p=0.36	Fig. legend	Health: Controls r(19)= -0.20 Patients r(19)=0.44 Taste: Controls: r(19)=0.49 Patients r(19)=0.21	Fig. legend
+ -	Supp 6a	Pearson correlation, two-tailed	Fig. legend	16	16 patients	Results para 2, Fig S6 legend	N/A	Fig. legend	p = 0.04	Fig. legend	r(14) = -0.51	Fig. legend
+ -	Supp 6b	Pearson correlation, two-tailed	Fig. legend	16	16 patients	Results para 2, Fig S6 legend	N/A	Fig. legend	p = 0.09	Fig. legend	r(14) = 0.44	Fig. legend
+ -	MS, para 5	robust regression	Methods, "Data analysis" section, para 5	19	19 patients	MS, para 5	N/A	N/A	p=0.015	MS, para 5	t(17)=2.71,	MS, para 5
+ -	MS, para 8	robust regression	Methods, "Data analysis" section, para 5	19	19 patients	MS, para 8	N/A	N/A	p=0.05	MS, para 8	t(17)=-2.11,	MS, para 8

Representative figures

1. Are any representative images shown (including Western blots and immunohistochemistry/staining) in the paper?

   If so, what figure(s)?

   No.

2. For each representative image, is there a clear statement of how many times this experiment was successfully repeated and a discussion of any limitations in repeatability?

   If so, where is this reported (section, paragraph #)?

   N/A

Statistics and general methods

1. Is there a justification of the sample size?

   If so, how was it justified?

   Where (section, paragraph #)?

   Even if no sample size calculation was performed, authors should report why the sample size is adequate to measure their effect size.

   The current sample size was adequate as it was based on our previously published experiment using the same experimental paradigm.
   Additionally, the sample size was within the standard range for fMRI.

2. Are statistical tests justified as appropriate for every figure?

   Where (section, paragraph #)?

   Statistical tests are listed in figure legends, described in the main text, and justified in detail in the methods.

   a. If there is a section summarizing the statistical methods in the methods, is the statistical test for each experiment clearly defined?

      Yes.

   b. Do the data meet the assumptions of the specific statistical test you chose (e.g. normality for a parametric test)?

      Where is this described (section, paragraph #)?

      Data distribution was assumed to be normal but this was not formally tested.

   c. Is there any estimate of variance within each group of data?

      Is the variance similar between groups that are being statistically compared?

      Where is this described (section, paragraph #)?

      When unequal variances was indicated, degrees of freedom were adjusted accordingly.
      Variance was unequal on various clinical measures (Supplementary Table 1) and one behavioral measure (Supplementary Figure 2).
      This is described in Methods, Data analysis para 6 and Supplementary Table 1 legend.

   d. Are tests specified as one- or two-sided?

      Tests were two-sided.

   e. Are there adjustments for multiple comparisons?

      fMRI data are corrected for multiple comparisons, as described in the Methods.

3. Are criteria for excluding data points reported?

   Was this criterion established prior to data collection?

   Where is this described (section, paragraph #)?

   Criteria for excluding data points are described for the multi-item meal in MS para 5 and for fMRI data in Methods, "fMRI data analysis" section, para 2.

4. Define the method of randomization used to assign subjects (or samples) to the experimental groups and to collect and process data. If no randomization was used, state so. Where does this appear (section, paragraph #)?	Group assignment is not random as patients with Anorexia Nervosa are compared with healthy controls. All other factors are within-subject.
5. Is a statement of the extent to which investigator knew the group allocation during the experiment and in assessing outcome included? If no blinding was done, state so. Where (section, paragraph #)?	Subject assignment to group was not random (see above) and was known to investigators.
6. For experiments in live vertebrates, is a statement of compliance with ethical guidelines/regulations included? Where (section, paragraph #)?	Yes, Methods, para 1.
7. Is the species of the animals used reported? Where (section, paragraph #)?	N/A (humans).
8. Is the strain of the animals (including background strains of KO/ transgenic animals used) reported? Where (section, paragraph #)?	N/A
9. Is the sex of the animals/subjects used reported? Where (section, paragraph #)?	Yes. Methods para 1.
10. Is the age of the animals/subjects reported? Where (section, paragraph #)?	Yes. Methods para 1.
11. For animals housed in a vivarium, is the light/dark cycle reported? Where (section, paragraph #)?	N/A
12. For animals housed in a vivarium, is the housing group (i.e. number of animals per cage) reported? Where (section, paragraph #)?	N/A
13. For behavioral experiments, is the time of day reported (e.g. light or dark cycle)? Where (section, paragraph #)?	Yes. Methods para 2.
14. Is the previous history of the animals/subjects (e.g. prior drug administration, surgery, behavioral testing) reported? Where (section, paragraph #)?	N/A

a. If multiple behavioral tests were conducted in the same group of animals, is this reported?

Where (section, paragraph #)?

N/A

15. If any animals/subjects were excluded from analysis, is this reported?

Where (section, paragraph #)?

Yes
Yes, Results para 2 and Methods, "fMRI data analysis" section, para 2.

a. How were the criteria for exclusion defined?

Where is this described (section, paragraph #)?

Yes

b. Specify reasons for any discrepancy between the number of animals at the beginning and end of the study.

Where is this described (section, paragraph #)?

N/A

Reagents

1. Have antibodies been validated for use in the system under study (assay and species)?

N/A

a. Is antibody catalog number given?

Where does this appear (section, paragraph #)?

N/A

b. Where were the validation data reported (citation, supplementary information, Antibodypedia)?

Where does this appear (section, paragraph #)?

N/A

2. Cell line identity

a. Are any cell lines used in this paper listed in the database of commonly misidentified cell lines maintained by ICLAC and NCBI Biosample?

Where (section, paragraph #)?

N/A

b. If yes, include in the Methods section a scientific justification of their use--indicate here in which section and paragraph the justification can be found.

N/A

c. For each cell line, include in the Methods section a statement that specifies:

- the source of the cell lines
- have the cell lines been authenticated? If so, by which method?
- have the cell lines been tested for mycoplasma contamination?

Where (section, paragraph #)?

N/A

Data deposition

Data deposition in a public repository is mandatory for:

a. Protein, DNA and RNA sequences
b. Macromolecular structures
c. Crystallographic data for small molecules
d. Microarray data

Deposition is strongly recommended for many other datasets for which structured public repositories exist; more details on our data policy are available here. We encourage the provision of other source data in supplementary information or in unstructured repositories such as Figshare and Dryad.

We encourage publication of Data Descriptors (see Scientific Data) to maximize data reuse.

1. Are accession codes for deposit dates provided? Where (section, paragraph #)?	N/A

Computer code/software

Any custom algorithm/software that is central to the methods must be supplied by the authors in a usable and readable form for readers at the time of publication. However, referees may ask for this information at any time during the review process.

1. Identify all custom software or scripts that were required to conduct the study and where in the procedures each was used.	N/A
2. If computer code was used to generate results that are central to the paper's conclusions, include a statement in the Methods section under "**Code availability**" to indicate whether and how the code can be accessed. Include version information as necessary and any restrictions on availability.	N/A

Human subjects

1. Which IRB approved the protocol? Where is this stated (section, paragraph #)?	New York State Psychiatric Institute Institutional Review Board. Methods, para 1.
2. Is demographic information on all subjects provided? Where (section, paragraph #)?	Summary demographic information is provided in Supplementary Table 1.
3. Is the number of human subjects, their age and sex clearly defined? Where (section, paragraph #)?	Yes. Methods para 1 and Supplementary Table 1.
4. Are the inclusion and exclusion criteria (if any) clearly specified? Where (section, paragraph #)?	Yes. Methods para 1.

5. How well were the groups matched?

   Where is this information described (section, paragraph #)?

   Supplementary Table 1.

6. Is a statement included confirming that informed consent was obtained from all subjects?

   Where (section, paragraph #)?

   Yes.
   Methods para 1.

7. For publication of patient photos, is a statement included confirming that consent to publish was obtained?

   Where (section, paragraph #)?

   N/A

fMRI studies

For papers reporting functional imaging (fMRI) results please ensure that these minimal reporting guidelines are met and that all this information is clearly provided in the methods:

1. Were any subjects scanned but then rejected for the analysis after the data was collected?

   No.

   a. If yes, is the number rejected and reasons for rejection described?

      Where (section, paragraph #)?

      N/A

2. Is the number of blocks, trials or experimental units per session and/or subjects specified?

   Where (section, paragraph #)?

   Yes, Methods, para 5.

3. Is the length of each trial and interval between trials specified?

   Yes, Methods, para 9.

4. Is a blocked, event-related, or mixed design being used? If applicable, please specify the block length or how the event-related or mixed design was optimized.

   Event-related design was used. Stimulus presentation sequence and timing were optimized using the optseq2 algorithm.
   Methods, para 9.

5. Is the task design clearly described?

   Where (section, paragraph #)?

   Yes, Methods, para 4-8.

6. How was behavioral performance measured?

   Behavior was measured with ratings, choices, reaction times, and real eating behavior in a lunchtime meal.

7. Is an ANOVA or factorial design being used?

   No.

8. For data acquisition, is a whole brain scan used?

   If not, state area of acquisition.

   Yes.

   a. How was this region determined?

      N/A

9. Is the field strength (in Tesla) of the MRI system stated?	Yes, 3T.
a. Is the pulse sequence type (gradient/spin echo, EPI/spiral) stated?	Yes, Methods, "fMRI data acquisition" section.
b. Are the field-of-view, matrix size, slice thickness, and TE/TR/ flip angle clearly stated?	Yes, Methods, "fMRI data acquisition" section.
10. Are the software and specific parameters (model/functions, smoothing kernel size if applicable, etc.) used for data processing and pre-processing clearly stated?	Yes, Methods, "fMRI data analysis" section, para 1.
11. Is the coordinate space for the anatomical/functional imaging data clearly defined as subject/native space or standardized stereotaxic space, e.g., original Talairach, MNI305, ICBM152, etc? Where (section, paragraph #)?	Yes, Methods, "fMRI data analysis" section, para 9.
12. If there was data normalization/standardization to a specific space template, are the type of transformation (linear vs. nonlinear) used and image types being transformed clearly described? Where (section, paragraph #)?	Yes, Methods, "fMRI data analysis" section, para 1.
13. How were anatomical locations determined, e.g., via an automated labeling algorithm (AAL), standardized coordinate database (Talairach daemon), probabilistic atlases, etc.?	Harvard-Oxford probabilistic cortical and subcortical atlases.
14. Were any additional regressors (behavioral covariates, motion etc) used?	Yes, Methods, "fMRI data analysis" section, para 2.
15. Is the contrast construction clearly defined?	Yes, Methods, "fMRI data analysis" section, para 4-7.
16. Is a mixed/random effects or fixed inference used?	Mixed/random.
a. If fixed effects inference used, is this justified?	N/A
17. Were repeated measures used (multiple measurements per subject)?	Yes.
a. If so, are the method to account for within subject correlation and the assumptions made about variance clearly stated?	Yes.
18. If the threshold used for inference and visualization in figures varies, is this clearly stated?	Yes.
19. Are statistical inferences corrected for multiple comparisons?	Yes.
a. If not, is this labeled as uncorrected?	N/A

20. Are the results based on an ROI (region of interest) analysis?	Yes.
a. If so, is the rationale clearly described?	Yes.
b. How were the ROI's defined (functional vs anatomical localization)?	Mainly anatomical. Anatomical vs. functional is specified when needed. Methods, "fMRI data analysis" section, para 3.
21. Is there correction for multiple comparisons within each voxel?	Data were corrected for multiple comparisons using FWE corrected cluster-wise significance or permutation testing.
22. For cluster-wise significance, is the cluster-defining threshold and the corrected significance level defined?	Yes, clusters determined by Z > 2.3 and a whole-brain corrected, family wise error (FWE) cluster significance threshold of P = 0.05.

Additional comments

Additional Comments	