Data Supplement for Frank et al., Alterations in Brain Structures Related to Taste Reward Circuitry in Ill and Recovered Anorexia Nervosa and in Bulimia Nervosa. Am J Psychiatry (doi: 10.1176/appi.ajp.2012.12101294)

**Subject selection**

Anorexia and bulimia nervosa study subjects were in either inpatient treatment or partial hospital treatment with close supervision. After admission to the program each subject had in depth medical assessments including blood work, urine analysis and EKG in order to detect abnormalities that would require treatment. Only subjects with normal lab work and EKG were allowed into the study. A nutritionist in collaboration with the physician and psychologist determined individual nutritional requirements to either gradual promote weight gain in anorexia or provide adequate nutrition for bulimia subjects. Recovered anorexia subjects provided self report data on their nutrition pattern to ensure normal food intake."

**Taste test description**

On the day of the magnetic resonance brain imaging (MRI) scan, prior to scanning subjects were presented with a tray of seven unmarked small cups that contained distilled water, five sucrose solution strengths (Mallinckrodt Chemicals, Phillipsburg, NJ; 2%, 4%, 8%, 16% and 1 M), or Artificial Saliva (25mM KCl, 2mM $NaHCO_3$ ) (O'Doherty et al , 2003). All cups were randomly lined up on the tray, subjects did not know the individual content and rated blindly the solutions for sweetness and pleasantness on 9-point Likert scales. The scales were anchored by the descriptive 'dislike extremely' (1) to 'like extremely' (9) for pleasantness ratings, and 'absent' (1) to 'extreme' (9) for sweetness. The results were analyzed across groups for each taste quality sweetness and pleasantness rating. In addition, we used regression analysis to test (1) whether within groups sweetness or pleasantness ratings across the taste stimuli followed a predictable curve, such as linear, quadratic, and so on, and (2) whether such relationships differed between groups.

**Tissue segmentation**

Segmentation procedures used in VBM8 automatically removed non-brain tissues including scalp, skull and dural venous sinus. The segmentation approach used in VBM8 (for detailed bibliography see http://www.fil.ion.ucl.ac.uk/spm/doc/biblio/) is based on maximum a posteriori probability (MAP) estimation technique that does not require *a priori* information about tissue probabilities. Older VBM versions used Bayesian statistics tissue priors of control subjects that may not accurately represent the analyzed sample which may be particularly important for ED brains that may not conform to standard templates. After an initial segmentation of the brain tissue into 3 pure tissue classes: gray matter, white matter, and cerebral spinal fluid using the MAP estimation described above, two additional mixed tissue classes (gray matter-white matter and gray matter-cerebral spinal fluid) were estimated using a Partial Volume Effect. The result was an estimation of the fraction of pure tissue type present in every voxel instead of a probability density of tissue class used in older VBM versions, providing more accurate brain tissue segmentation. In addition, optimized block-wise non-local means (NLM) and classical Markov Random Field (MRF) denoising methods were applied. Non-linear modulated data were used in the analyses. Images were then smoothed to an 8-mm full-width at half maximum Gaussian kernel.

Total intracranial volume (TIV) was obtained by adding up the GM, WM, and CSF volumes for each subject. These 'raw values' were generated within the VBM8 toolbox using the tissue class images in native space and are a measure of the global tissue volumes (e.g.,

GM+WM+CSF=TIV) (Ashburner, 2010, VBM tutorial and Kurth F, Luders E, Gaser C (2010) VBM8 Toolbox Manual). The comparison of total GM, WM, CSF and TIV among groups were based on the raw volumes for each subject, prior to the normalization process, and were not based on a voxel-wise comparison.

**Whole brain statistical procedures**

We used the standard default significance threshold for uncorrected comparisons in SPM. For the cluster threshold we tried to find a balance between only selecting substantial areas of the brain and by the same time not be overly exclusive of smaller brain areas within larger structures. We felt that using the taste area within the insula would be a good point of reference, which is approximately 50$mm^3$ in volume (Paxinos and Mai, 2004), about the volume of our cluster threshold. Similarly, a cluster threshold above 50 $mm^3$ has been suggested for study of the orbitofrontal cortex (Cacioppo and Berntson, 2005). Thus we felt that this combination of significance and cluster threshold would provide an unbiased approach to the analysis.

**Manual orbitofrontal cortex gyrus rectus tracing**

All manual tracings were done by one person blind to the diagnosis (MES) and when we first started the manual tracings we evaluated intra-rater reliability across 6 subjects, which yielded Cronbach's alpha = 0.89, suggesting good to excellent reliability.