**Supplementary material**

Functional Neuroimaging of Sex Differences in Autobiographical Memory Recall in Depression

Kymberly D. Young, Jerzy Bodurka, Wayne C. Drevets

**Supplementary Results: Group x Sex X Valence x Specificity ANOVA for Percent of**

 **Memories Recalled.**

**Figure SF1: Regions Showing a Significant Group x Sex x Valence Interaction**

**Supplementary Table ST1: Properties of Specific and Categorical Memories by Sex**

**Supplementary Table ST2: Group x Sex x Valence Linear Mixed Effects Analysis of fMRI**

 **data**

Supplementary Results: Group x Sex X Valence x Specificity ANOVA for Percent of Memories Recalled.

We expanded our ANOVA analysis on the behavioral data by including Group (MDD, HC) in addition to Valence and Specificity. There was still no main effect of or interaction with Sex (Valence × Sex F(2,102)=0.49, p=0.62; Valence × Diagnosis × Sex (f(2,102)=0.66, p=0.52; Specificity × Sex F(1,103)=1.49, p=0.23; Specificity x Diagnosis × Sex F(1,103)=0.42, p=0.52; Valence × Specificity × Sex F(2,102)=0.49, p=0.62; Valence × Specificity × Sex × Diagnosis F(2,102)=0.03, p=0.97). All significant effects were for Group (Fs>12.6, ps<0.001), including a Group x Valence interaction (F(2,206)=12.6, p<0.001), and a Group x Valence x Specificity interaction (F(2,206)=14.2, p<0.001). This analysis replicates the well-established finding in the literature that participants with MDD recall fewer specific autobiographical memories(Williams *et al.*, 2007), particularly for memories rated positive in valence(Young *et al.*, 2013). The lack of a Sex x Diagnosis interaction also supports previous studies that report healthy males and females do not differ in the properties of memories recalled(Piefke *et al.*, 2005, St Jacques *et al.*, 2011).

**Figure Captions**

Figure SF1: Regions Showing a Significant Group x Sex x Valence Interaction

a) Sagittal, b) Coronal, and c) Axial slices showing the regions in Table ST2 where a significant Sex x Diagnosis x Valence interaction occurred

Supplementary Table ST1: Properties of Specific and Categorical Memories by Sex

|  |  |  |  |
| --- | --- | --- | --- |
| *Valence* | Males | Females | Effect Size (*d*) |
| Specific | Positive | 47.6 (14.1) | 47.9 (11.4) | 0.02 |
| Negative | 36.0 (15.6) | 37.4 (14.5) | 0.09 |
| Neutral  | 14.2 (11.6) | 14.7 (10.8) | 0.05 |
| Categorical | Positive | 49.8 (17.3) | 50.3 (12.3) | 0.03 |
| Negative | 28.2 (13.8) | 31.9 (15.2) | 0.25 |
| Neutral  | 21.8 (15.3) | 17.8 (15.1) | 0.26 |
| *Arousal* |   |   |  |
| Specific | Low  | 21.5 (19.8) | 32.3 (24.1) | 0.49 |
| Medium | 34.3 (18.8) | 25.3 (14.4) | 0.53 |
| High | 43.3 (24.0) | 42.4 (25.8) | 0.04 |
| Categorical | Low | 35.1 (18.0) | 33.4 (22.0) | 0.08 |
| Medium | 30.8 (14.3) | 27.5(14.1) | 0.23 |
| High | 34.2 (24.6) | 39.2 (15.7) | 0.24 |
| *Vividness* |   |   |  |
| Specific | Low  | 8.39 (8.56) | 17.1 (20.6) | 0.55 |
| Medium | 22.0 (17.2) | 20.4 (14.6) | 0.11 |
| High | 69.3 (24.1) | 62.1 (26.2) | 0.29 |
| Categorical | Low | 20.0 (23.1) | 25.1 (19.3) | 0.24 |
| Medium | 30.8 (19.8) | 23.6 (13.2) | 0.29 |
| High | 49.3 (28.7) | 51.2 (25.1) | 0.07 |
| *Age* |   |   |  |
| Specific | Childhood | 7.61 (6.75) | 6.10 (12.4) | 0.15 |
| Adolescence | 13.8 (11.2) | 8.98 (7.78) | 0.49 |
| Remote Adult | 36.1 (18.5) | 40.8 (20.7) | 0.24 |
| Adult: 6mo-1yr | 12.7 (10.2) | 12.2 (9.31) | 0.05 |
| Recent Adult | 29.9 (19.1) | 31.6 (20.9) | 0.08 |
| Categorical | Childhood | 12.3 (9.28) | 7.59 (8.04) | 0.54 |
| Adolescence | 15.8 (13.5) | 11.0 (8.36) | 0.43 |
| Remote Adult | 30.9 (21.4) | 33.7 (15.9) | 0.15 |
| Adult: 6mo-1yr | 7.04 (7.79) | 9.25 (9.11) | 0.26 |
| Recent Adult | 34.1 (17.1) | 38.5 (18.0) | 0.25 |

Numbers in the table represent the average percent of memories recalled, and numbers in parentheses indicate one standard deviation of the mean.

Supplementary Table ST2: Group x Sex x Valence Linear Mixed Effects Analysis of fMRI data

|  |
| --- |
| **Gender x Diagnosis x Valence Interaction** |
| **Area** | x, y, z | cluster size | F Value |
| L medial frontal G | -11, 37, 26 | 33 | 6.78 |
| R subgenual ACC | 7, 21, -10 | 130 | 10.2 |
| L ACC | -9, -5, 32 | 123 | 10.9 |
| R PCC | 3, -53, 19 | 132 | 10.3 |
| R Insula | 37, -15, 20 | 239 | 9.72 |
| L caudate | 11, 17, -2 | 32 | 10.8 |
| L Precuneus | -15, -49, 48 | 37 | 12.1 |
| R Precuneus | 15, -61, 18 | 55 | 7.19 |
| L thalamus | -1, -13, 12 | 33 | 13.3 |

Coordinates correspond to the stereotaxic array of Talairach & Tournoux (1988). Cluster size refers to the number of contiguous voxels for which the voxel F value corresponds to *p*corrected<0.05. Abbreviations: ACC= anterior cingulate cortex; G= gyrus; L= left; PCC = posterior cingulate cortex; R= right

**References:**

**Piefke M, Weiss P, Markowitsch H, Fink G** (2005). Gender differences in the functional neuroanatomy of emotional episodic autobiographical memory. *Human Brain Mapping* **24**, 313-324.

**St Jacques PL, Conway MA, Cabeza R** (2011). Gender differences in autobiographical memory for everyday events: retrieval elicited by SenseCam images versus verbal cues. *Memory* **19**, 723-732.

**Williams JM, Barnhofer T, Crane C, Herman D, Raes F, Watkins E, Dalgleish T** (2007). Autobiographical memory specificity and emotional disorder. *Psychological Bulletin* **133**, 122-148.

**Young KD, Bellgowan P, Bodurka J, Drevets WC** (2013). Behavioral and neurophysiological correlates of autobiographical memory deficits in patients with depression and individuals at high risk for depression. *Journal of the Aerican Medical Association: Psychiatry* **70**, 698-708.