

## *Supplementary Material*

### **Neural underpinnings of threat bias in relation to loss-of-control eating behaviors among adolescent girls with high weight**

**Meghan E. Byrne<sup>1,2</sup>, Marian Tanofsky-Kraff<sup>2,3,4\*</sup>, Lucrezia Liuzzi<sup>1</sup>, Tom Holroyd<sup>5</sup>, Megan N. Parker<sup>2,3</sup>, Bess F. Bloomer<sup>2</sup>, Allison Nugent<sup>5</sup>, Sheila M. Brady<sup>2</sup>, Shanna B. Yang<sup>6</sup>, Sara A. Turner<sup>6</sup>, Daniel S. Pine<sup>1</sup>, & Jack A. Yanovski<sup>2\*</sup>**

<sup>1</sup> Section on Development and Affective Neuroscience, Emotion and Development Branch, National Institute of Mental Health (NIMH), Bethesda, MD, USA

<sup>2</sup> Section on Growth and Obesity, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), Division of Intramural Research, National Institutes of Health (NIH), 10 Center Drive, Bethesda, MD, 20892, USA

<sup>3</sup> Department of Medical and Clinical Psychology, USUHS, 4301 Jones Bridge Road, Bethesda, MD, 20814, USA

<sup>4</sup> Military Cardiovascular Outcomes Research (MiCOR) Program, Department of Medicine, Uniformed Services University of the Health Sciences (USUHS), 4301 Jones Bridge Road, Bethesda, MD, 20814, USA

<sup>5</sup> MEG Core Facility, National Institute of Mental Health (NIMH), Bethesda, MD, USA

<sup>6</sup> Nutrition Department, Clinical Center, NIH, 10 Center Drive, Bethesda, MD, 20892, USA

**\* Correspondence:**

Jack A. Yanovski, MD, PhD

Section on Growth and Obesity, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, National Institutes of Health, 10 Center Drive, Room 1-3330, MSC 1103, Bethesda, MD, 20892-1103, Phone: 301-496-0858; FAX 301-480-4271, Email: yanovskj@mail.nih.gov

Marian Tanofsky-Kraff, PhD

Departments of Medical and Clinical Psychology and Medicine, Uniformed Services University of the Health Sciences, 4301 Jones Bridge Road, Bethesda, MD 20814-4712, Phone: 301-295-1482, Fax: 301-400-4296, Email: marian.tanofsky-kraff@usuhs.edu

**1 Supplementary Table 1. Freesurfer (aparc.a2009s+aseg.mgz) regions-of-interest (ROI).**

|           | ROI                  | Freesurfer ROI label          |
|-----------|----------------------|-------------------------------|
| Amygdala  | Left Amygdala        | Left-Amygdala                 |
|           | Right Amygdala       | Right-Amygdala                |
| Striatum  | Right Striatum       | Left Striatum                 |
|           |                      | Left-Caudate                  |
|           |                      | Left-Putamen                  |
|           |                      | Left-Pallidum                 |
|           |                      | Right-Caudate                 |
|           |                      | Right-Putamen                 |
| Insula    | Left Insula          | ctx_lh_G_insular_short        |
|           | Right Insula         | ctx_rh_G_insular_short        |
| ACC       | Right ACC            | Left ACC                      |
|           |                      | ctx_lh_G_and_S_cingul-Ant     |
|           |                      | ctx_lh_G_and_S_cingul-Mid-Ant |
|           |                      | ctx_rh_G_and_S_cingul-Ant     |
| Fusiform  | Left Fusiform Gyrus  | ctx_lh_G_oc-temp_lat-fusifor  |
|           | Right Fusiform Gyrus | ctx_rh_G_oc-temp_lat-fusifor  |
| Occipital | Right Occipital      | Left Occipital                |
|           |                      | ctx_lh_Pole_occipital         |
|           |                      | ctx_lh_G_occipital_middle     |
|           |                      | ctx_rh_Pole_occipital         |
| mPFC      | Left mPFC            | ctx_lh_G_front_sup            |
|           | Right mPFC           | ctx_rh_G_front_sup            |
| dlPFC     | Right dlPFC          | Left dlPFC                    |
|           |                      | ctx_lh_S_front_sup            |
|           |                      | ctx_lh_G_front_middle         |
|           |                      | ctx_rh_S_front_sup            |
| vIPFC     | Right vIPFC          | ctx_rh_G_front_middle         |
|           |                      | Left vIPFC                    |
|           |                      | ctx_lh_G_orbital              |
|           |                      | ctx_lh_Lat_Fis-ant-Vertical   |
|           |                      | ctx_lh_G_front_inf-Opercular  |
|           |                      | ctx_lh_G_front_inf-Triangul   |
|           |                      | ctx_lh_G_front_inf-Orbital    |
|           |                      | ctx_rh_G_orbital              |
|           |                      | ctx_rh_Lat_Fis-ant-Vertical   |
|           |                      | ctx_rh_G_front_inf-Opercular  |
|           |                      | ctx_rh_G_front_inf-Triangul   |
|           |                      | ctx_rh_G_front_inf-Orbital    |

**Note.** ACC = anterior cingulate cortex; mPFC = medial prefrontal cortex; dlPFC = dorsolateral prefrontal cortex; vIPFC = ventrolateral prefrontal cortex.

## 2 Supplementary Table 2. Generalized Linear Mixed Model of LOC-Eating and Neural Evoked Response on Test Meal Carbohydrate Intake

| <b>Dependent Variable: % Energy Consumed from Carbohydrates</b> | <b>F</b> | <b>p</b> |
|-----------------------------------------------------------------|----------|----------|
| LeftStriatum_Abu                                                | 0.077    | 0.784    |
| LOC_presence                                                    | 3.086    | 0.093    |
| LOC_presence * LeftStriatum_Abu                                 | 2.196    | 0.153    |
| RightStriatum_Abu                                               | 0.000    | 0.984    |
| LOC_presence                                                    | 0.346    | 0.563    |
| LOC_presence * RightStriatum_Abu                                | 0.004    | 0.953    |
| LeftInsula_Abu                                                  | 0.173    | 0.681    |
| LOC_presence                                                    | 5.964    | 0.023    |
| LOC_presence * LeftInsula_Abu                                   | 5.563    | 0.028    |
| RightInsula_Abu                                                 | 0.011    | 0.919    |
| LOC_presence                                                    | 0.366    | 0.551    |
| LOC_presence * RightInsula_Abu                                  | 0.006    | 0.940    |
| LeftAmygdala_Abu                                                | 1.533    | 0.229    |
| LOC_presence                                                    | 4.169    | 0.053    |
| LOC_presence * LeftAmygdala_Abu                                 | 3.689    | 0.068    |
| RightAmygdala_Abu                                               | 0.446    | 0.511    |
| LOC_presence                                                    | 1.348    | 0.258    |
| LOC_presence * RightAmygdala_Abu                                | 0.605    | 0.445    |
| LeftACC_Abu                                                     | 2.926    | 0.101    |
| LOC_presence                                                    | 0.228    | 0.638    |
| LOC_presence * LeftACC_Abu                                      | 1.498    | 0.234    |
| RightACC_Abu                                                    | 5.133    | 0.034    |
| LOC_presence                                                    | 4.152    | 0.054    |
| LOC_presence * RightACC_Abu                                     | 2.908    | 0.102    |
| LeftvIPFC_Abu                                                   | 2.493    | 0.129    |
| LOC_presence                                                    | 3.161    | 0.089    |
| LOC_presence * LeftvIPFC_Abu                                    | 3.805    | 0.064    |
| RightvIPFC_Abu                                                  | 0.029    | 0.866    |
| LOC_presence                                                    | 0.029    | 0.866    |
| LOC_presence * RightvIPFC_Abu                                   | 0.224    | 0.640    |
| LeftdlPFC_Abu                                                   | 0.015    | 0.905    |
| LOC_presence                                                    | 0.855    | 0.365    |
| LOC_presence * LeftdlPFC_Abu                                    | 0.050    | 0.825    |
| RightdlPFC_Abu                                                  | 0.006    | 0.941    |
| LOC_presence                                                    | 0.000    | 0.999    |
| LOC_presence * RightdlPFC_Abu                                   | 1.804    | 0.193    |
| LeftmPFC_Abu                                                    | 2.222    | 0.150    |
| LOC_presence                                                    | 0.110    | 0.743    |
| LOC_presence * LeftmPFC_Abu                                     | 2.718    | 0.113    |
| RightmPFC_Abu                                                   | 0.116    | 0.737    |
| LOC_presence                                                    | 0.000    | 0.986    |

|                                   |       |               |
|-----------------------------------|-------|---------------|
| LOC_presence * RightmPFC_Abu      | 1.001 | 0.328         |
| LeftOccipital_Abu                 | 0.012 | 0.913         |
| LOC_presence                      | 0.010 | 0.920         |
| LOC_presence * LeftOccipital_Abu  | 0.361 | 0.554         |
| RightOccipital_Abu                | 5.518 | 0.028         |
| LOC_presence                      | 0.208 | 0.653         |
| LOC_presence * RightOccipital_Abu | 0.404 | 0.531         |
| LeftFusiform_Abu                  | 0.002 | 0.965         |
| LOC_presence                      | 0.226 | 0.639         |
| LOC_presence * LeftFusiform_Abu   | 0.138 | 0.713         |
| RightFusiform_Abu                 | 1.184 | 0.288         |
| LOC_presence                      | 0.071 | 0.792         |
| LOC_presence * RightFusiform_Abu  | 1.657 | 0.211         |
| LeftStriatum_Atd                  | 0.006 | 0.939         |
| LOC_presence                      | 0.392 | 0.537         |
| LOC_presence * LeftStriatum_Atd   | 0.164 | 0.689         |
| RightStriatum_Atd                 | 1.536 | 0.228         |
| LOC_presence                      | 1.189 | 0.287         |
| LOC_presence * RightStriatum_Atd  | 0.613 | 0.442         |
| LeftInsula_Atd                    | 1.514 | 0.232         |
| LOC_presence                      | 1.353 | 0.257         |
| LOC_presence * LeftInsula_Atd     | 0.362 | 0.553         |
| RightInsula_Atd                   | 0.231 | 0.636         |
| LOC_presence                      | 1.127 | 0.300         |
| LOC_presence * RightInsula_Atd    | 0.551 | 0.466         |
| LeftAmygdala_Atd                  | 0.304 | 0.587         |
| LOC_presence                      | 0.972 | 0.335         |
| LOC_presence * LeftAmygdala_Atd   | 0.499 | 0.487         |
| RightAmygdala_Atd                 | 0.003 | 0.960         |
| LOC_presence                      | 0.947 | 0.341         |
| LOC_presence * RightAmygdala_Atd  | 0.174 | 0.681         |
| LeftACC_Atd                       | 0.908 | 0.351         |
| LOC_presence                      | 1.703 | 0.205         |
| LOC_presence * LeftACC_Atd        | 8.228 | <b>0.009*</b> |
| RightACC_Atd                      | 0.043 | 0.838         |
| LOC_presence                      | 0.003 | 0.955         |
| LOC_presence * RightACC_Atd       | 1.683 | 0.208         |
| LeftvIPFC_Atd                     | 0.165 | 0.688         |
| LOC_presence                      | 0.381 | 0.543         |
| LOC_presence * LeftvIPFC_Atd      | 0.007 | 0.933         |
| RightvIPFC_Atd                    | 1.047 | 0.317         |
| LOC_presence                      | 0.004 | 0.949         |
| LOC_presence * RightvIPFC_Atd     | 1.320 | 0.263         |
| LeftdlPFC_Atd                     | 2.672 | 0.116         |
| LOC_presence                      | 2.170 | 0.155         |

|                                   |       |       |
|-----------------------------------|-------|-------|
| LOC_presence * LeftdlPFC_Atd      | 1.351 | 0.258 |
| RightdlPFC_Atd                    | 1.411 | 0.248 |
| LOC_presence                      | 1.733 | 0.202 |
| LOC_presence * RightdlPFC_Atd     | 0.818 | 0.375 |
| LeftmPFC_Atd                      | 2.228 | 0.150 |
| LOC_presence                      | 0.006 | 0.940 |
| LOC_presence * LeftmPFC_Atd       | 1.696 | 0.206 |
| RightmPFC_Atd                     | 0.444 | 0.512 |
| LOC_presence                      | 0.526 | 0.476 |
| LOC_presence * RightmPFC_Atd      | 0.013 | 0.912 |
| LeftOccipital_Atd                 | 0.559 | 0.463 |
| LOC_presence                      | 0.387 | 0.540 |
| LOC_presence * LeftOccipital_Atd  | 6.142 | 0.021 |
| RightOccipital_Atd                | 0.512 | 0.482 |
| LOC_presence                      | 0.071 | 0.793 |
| LOC_presence * RightOccipital_Atd | 1.600 | 0.219 |
| LeftFusiform_Atd                  | 1.358 | 0.256 |
| LOC_presence                      | 1.244 | 0.277 |
| LOC_presence * LeftFusiform_Atd   | 0.143 | 0.709 |
| RightFusiform_Atd                 | 0.455 | 0.507 |
| LOC_presence                      | 0.180 | 0.675 |
| LOC_presence * RightFusiform_Atd  | 1.787 | 0.195 |
| LeftStriatum_Hbu                  | 2.354 | 0.139 |
| LOC_presence                      | 0.442 | 0.513 |
| LOC_presence * LeftStriatum_Hbu   | 0.006 | 0.937 |
| RightStriatum_Hbu                 | 0.969 | 0.336 |
| LOC_presence                      | 0.101 | 0.753 |
| LOC_presence * RightStriatum_Hbu  | 0.952 | 0.340 |
| LeftInsula_Hbu                    | 2.709 | 0.114 |
| LOC_presence                      | 0.219 | 0.645 |
| LOC_presence * LeftInsula_Hbu     | 0.447 | 0.511 |
| RightInsula_Hbu                   | 2.188 | 0.153 |
| LOC_presence                      | 1.514 | 0.232 |
| LOC_presence * RightInsula_Hbu    | 0.065 | 0.800 |
| LeftAmygdala_Hbu                  | 1.238 | 0.278 |
| LOC_presence                      | 1.359 | 0.256 |
| LOC_presence * LeftAmygdala_Hbu   | 0.034 | 0.856 |
| RightAmygdala_Hbu                 | 0.032 | 0.859 |
| LOC_presence                      | 1.067 | 0.313 |
| LOC_presence * RightAmygdala_Hbu  | 0.157 | 0.696 |
| LeftACC_Hbu                       | 0.257 | 0.618 |
| LOC_presence                      | 2.606 | 0.121 |
| LOC_presence * LeftACC_Hbu        | 1.731 | 0.202 |
| RightACC_Hbu                      | 0.005 | 0.945 |
| LOC_presence                      | 1.731 | 0.202 |

|                                   |       |       |
|-----------------------------------|-------|-------|
| LOC_presence * RightACC_Hbu       | 0.623 | 0.438 |
| LeftvIPFC_Hbu                     | 0.309 | 0.584 |
| LOC_presence                      | 0.610 | 0.443 |
| LOC_presence * LeftvIPFC_Hbu      | 0.001 | 0.977 |
| RightvIPFC_Hbu                    | 0.240 | 0.629 |
| LOC_presence                      | 1.327 | 0.262 |
| LOC_presence * RightvIPFC_Hbu     | 0.199 | 0.660 |
| LeftdlPFC_Hbu                     | 0.004 | 0.952 |
| LOC_presence                      | 0.649 | 0.429 |
| LOC_presence * LeftdlPFC_Hbu      | 0.028 | 0.868 |
| RightdlPFC_Hbu                    | 2.182 | 0.154 |
| LOC_presence                      | 0.536 | 0.472 |
| LOC_presence * RightdlPFC_Hbu     | 0.752 | 0.395 |
| LeftmPFC_Hbu                      | 1.040 | 0.319 |
| LOC_presence                      | 1.217 | 0.282 |
| LOC_presence * LeftmPFC_Hbu       | 1.081 | 0.310 |
| RightmPFC_Hbu                     | 1.482 | 0.236 |
| LOC_presence                      | 1.398 | 0.250 |
| LOC_presence * RightmPFC_Hbu      | 1.541 | 0.228 |
| LeftOccipital_Hbu                 | 0.005 | 0.943 |
| LOC_presence                      | 1.242 | 0.277 |
| LOC_presence * LeftOccipital_Hbu  | 0.267 | 0.611 |
| RightOccipital_Hbu                | 1.146 | 0.296 |
| LOC_presence                      | 6.757 | 0.016 |
| LOC_presence * RightOccipital_Hbu | 7.717 | 0.011 |
| LeftFusiform_Hbu                  | 0.564 | 0.461 |
| LOC_presence                      | 3.191 | 0.088 |
| LOC_presence * LeftFusiform_Hbu   | 3.716 | 0.067 |
| RightFusiform_Hbu                 | 0.001 | 0.972 |
| LOC_presence                      | 1.069 | 0.312 |
| LOC_presence * RightFusiform_Hbu  | 0.159 | 0.694 |
| LeftStriatum_Htd                  | 0.357 | 0.556 |
| LOC_presence                      | 1.248 | 0.276 |
| LOC_presence * LeftStriatum_Htd   | 0.030 | 0.864 |
| RightStriatum_Htd                 | 0.797 | 0.382 |
| LOC_presence                      | 0.581 | 0.454 |
| LOC_presence * RightStriatum_Htd  | 0.120 | 0.733 |
| LeftInsula_Htd                    | 0.894 | 0.355 |
| LOC_presence                      | 1.121 | 0.301 |
| LOC_presence * LeftInsula_Htd     | 0.057 | 0.814 |
| RightInsula_Htd                   | 1.094 | 0.307 |
| LOC_presence                      | 0.734 | 0.401 |
| LOC_presence * RightInsula_Htd    | 0.042 | 0.840 |
| LeftAmygdala_Htd                  | 1.779 | 0.196 |
| LOC_presence                      | 0.805 | 0.379 |

|                                   |       |       |
|-----------------------------------|-------|-------|
| LOC_presence * LeftAmygdala_Htd   | 0.040 | 0.844 |
| RightAmygdala_Htd                 | 0.016 | 0.901 |
| LOC_presence                      | 2.139 | 0.158 |
| LOC_presence * RightAmygdala_Htd  | 1.887 | 0.183 |
| LeftACC_Htd                       | 0.026 | 0.873 |
| LOC_presence                      | 1.359 | 0.256 |
| LOC_presence * LeftACC_Htd        | 0.189 | 0.668 |
| RightACC_Htd                      | 0.767 | 0.391 |
| LOC_presence                      | 1.936 | 0.178 |
| LOC_presence * RightACC_Htd       | 1.419 | 0.246 |
| LeftvIPFC_Htd                     | 0.864 | 0.363 |
| LOC_presence                      | 0.376 | 0.546 |
| LOC_presence * LeftvIPFC_Htd      | 0.143 | 0.709 |
| RightvIPFC_Htd                    | 0.270 | 0.608 |
| LOC_presence                      | 1.232 | 0.279 |
| LOC_presence * RightvIPFC_Htd     | 0.082 | 0.777 |
| LeftdlPFC_Htd                     | 6.215 | 0.021 |
| LOC_presence                      | 0.004 | 0.951 |
| LOC_presence * LeftdlPFC_Htd      | 4.876 | 0.038 |
| RightdlPFC_Htd                    | 0.107 | 0.746 |
| LOC_presence                      | 0.572 | 0.458 |
| LOC_presence * RightdlPFC_Htd     | 0.018 | 0.894 |
| LeftmPFC_Htd                      | 0.127 | 0.725 |
| LOC_presence                      | 1.225 | 0.280 |
| LOC_presence * LeftmPFC_Htd       | 0.469 | 0.501 |
| RightmPFC_Htd                     | 0.257 | 0.617 |
| LOC_presence                      | 0.289 | 0.596 |
| LOC_presence * RightmPFC_Htd      | 0.497 | 0.488 |
| LeftOccipital_Htd                 | 0.002 | 0.965 |
| LOC_presence                      | 0.913 | 0.350 |
| LOC_presence * LeftOccipital_Htd  | 0.017 | 0.897 |
| RightOccipital_Htd                | 0.625 | 0.438 |
| LOC_presence                      | 1.222 | 0.281 |
| LOC_presence * RightOccipital_Htd | 0.399 | 0.534 |
| LeftFusiform_Htd                  | 0.284 | 0.599 |
| LOC_presence                      | 1.295 | 0.267 |
| LOC_presence * LeftFusiform_Htd   | 0.002 | 0.966 |
| RightFusiform_Htd                 | 3.974 | 0.059 |
| LOC_presence                      | 3.794 | 0.064 |
| LOC_presence * RightFusiform_Htd  | 3.778 | 0.065 |

**Note.** Abu = Angry face cue bottom-up time window (0-250 ms) average evoked response; Atd = Angry face cue top-down time window (250-600 ms) average evoked response; Hbu = Happy face cue bottom-up time window (0-250 ms) average evoked response; Htd = Happy face cue top-down time window (250-600 ms) average evoked response.

### 3 Supplementary Table 3. Generalized Linear Mixed Model of LOC-Eating and Neural Evoked Response on Test Meal Fat Intake

| Dependent Variable: % Energy Consumed from Fats | F     | p             |
|-------------------------------------------------|-------|---------------|
| LeftStriatum_Abu                                | 0.537 | 0.471         |
| LOC_presence                                    | 4.227 | 0.052         |
| LOC_presence * LeftStriatum_Abu                 | 3.543 | 0.073         |
| RightStriatum_Abu                               | 0.335 | 0.569         |
| LOC_presence                                    | 0.188 | 0.669         |
| LOC_presence * RightStriatum_Abu                | 0.004 | 0.952         |
| LeftInsula_Abu                                  | 0.004 | 0.951         |
| LOC_presence                                    | 7.715 | 0.011         |
| LOC_presence * LeftInsula_Abu                   | 8.186 | <b>0.009*</b> |
| RightInsula_Abu                                 | 0.289 | 0.597         |
| LOC_presence                                    | 0.371 | 0.549         |
| LOC_presence * RightInsula_Abu                  | 0.001 | 0.980         |
| LeftAmygdala_Abu                                | 0.307 | 0.585         |
| LOC_presence                                    | 3.908 | 0.061         |
| LOC_presence * LeftAmygdala_Abu                 | 3.148 | 0.090         |
| RightAmygdala_Abu                               | 0.802 | 0.380         |
| LOC_presence                                    | 2.140 | 0.158         |
| LOC_presence * RightAmygdala_Abu                | 1.460 | 0.240         |
| LeftACC_Abu                                     | 3.653 | 0.069         |
| LOC_presence                                    | 0.009 | 0.927         |
| LOC_presence * LeftACC_Abu                      | 0.410 | 0.529         |
| RightACC_Abu                                    | 4.417 | 0.047         |
| LOC_presence                                    | 4.826 | 0.039         |
| LOC_presence * RightACC_Abu                     | 3.698 | 0.068         |
| LeftvIPFC_Abu                                   | 1.278 | 0.271         |
| LOC_presence                                    | 3.569 | 0.072         |
| LOC_presence * LeftvIPFC_Abu                    | 4.006 | 0.058         |
| RightvIPFC_Abu                                  | 0.085 | 0.774         |
| LOC_presence                                    | 0.611 | 0.443         |
| LOC_presence * RightvIPFC_Abu                   | 0.085 | 0.773         |
| LeftdlPFC_Abu                                   | 0.357 | 0.556         |
| LOC_presence                                    | 0.936 | 0.344         |
| LOC_presence * LeftdlPFC_Abu                    | 0.055 | 0.816         |
| RightdlPFC_Abu                                  | 0.094 | 0.762         |
| LOC_presence                                    | 0.075 | 0.786         |
| LOC_presence * RightdlPFC_Abu                   | 0.740 | 0.399         |
| LeftmPFC_Abu                                    | 2.953 | 0.100         |
| LOC_presence                                    | 0.000 | 0.994         |
| LOC_presence * LeftmPFC_Abu                     | 1.101 | 0.305         |
| RightmPFC_Abu                                   | 0.012 | 0.913         |
| LOC_presence                                    | 0.049 | 0.828         |

|                                   |       |               |
|-----------------------------------|-------|---------------|
| LOC_presence * RightmPFC_Abu      | 0.448 | 0.510         |
| LeftOccipital_Abu                 | 0.151 | 0.701         |
| LOC_presence                      | 0.080 | 0.780         |
| LOC_presence * LeftOccipital_Abu  | 0.073 | 0.790         |
| RightOccipital_Abu                | 6.942 | 0.015         |
| LOC_presence                      | 0.608 | 0.444         |
| LOC_presence * RightOccipital_Abu | 1.385 | 0.252         |
| LeftFusiform_Abu                  | 0.022 | 0.884         |
| LOC_presence                      | 0.237 | 0.631         |
| LOC_presence * LeftFusiform_Abu   | 0.077 | 0.783         |
| RightFusiform_Abu                 | 3.505 | 0.075         |
| LOC_presence                      | 0.001 | 0.971         |
| LOC_presence * RightFusiform_Abu  | 0.694 | 0.414         |
| LeftStriatum_Atd                  | 0.031 | 0.861         |
| LOC_presence                      | 0.171 | 0.683         |
| LOC_presence * LeftStriatum_Atd   | 0.685 | 0.417         |
| RightStriatum_Atd                 | 0.720 | 0.405         |
| LOC_presence                      | 1.033 | 0.320         |
| LOC_presence * RightStriatum_Atd  | 0.338 | 0.567         |
| LeftInsula_Atd                    | 2.137 | 0.158         |
| LOC_presence                      | 1.193 | 0.287         |
| LOC_presence * LeftInsula_Atd     | 0.195 | 0.663         |
| RightInsula_Atd                   | 0.035 | 0.853         |
| LOC_presence                      | 1.208 | 0.284         |
| LOC_presence * RightInsula_Atd    | 0.827 | 0.373         |
| LeftAmygdala_Atd                  | 0.443 | 0.513         |
| LOC_presence                      | 0.958 | 0.338         |
| LOC_presence * LeftAmygdala_Atd   | 1.031 | 0.321         |
| RightAmygdala_Atd                 | 0.018 | 0.894         |
| LOC_presence                      | 0.947 | 0.341         |
| LOC_presence * RightAmygdala_Atd  | 0.161 | 0.692         |
| LeftACC_Atd                       | 1.704 | 0.205         |
| LOC_presence                      | 1.690 | 0.207         |
| LOC_presence * LeftACC_Atd        | 8.046 | <b>0.010*</b> |
| RightACC_Atd                      | 0.004 | 0.948         |
| LOC_presence                      | 0.001 | 0.980         |
| LOC_presence * RightACC_Atd       | 1.957 | 0.176         |
| LeftvIPFC_Atd                     | 0.010 | 0.920         |
| LOC_presence                      | 0.269 | 0.609         |
| LOC_presence * LeftvIPFC_Atd      | 0.212 | 0.650         |
| RightvIPFC_Atd                    | 1.192 | 0.287         |
| LOC_presence                      | 0.037 | 0.849         |
| LOC_presence * RightvIPFC_Atd     | 0.584 | 0.453         |
| LeftdlPFC_Atd                     | 3.720 | 0.067         |
| LOC_presence                      | 2.367 | 0.138         |

|                                   |       |       |
|-----------------------------------|-------|-------|
| LOC_presence * LeftdlPFC_Atd      | 1.627 | 0.215 |
| RightdlPFC_Atd                    | 1.404 | 0.249 |
| LOC_presence                      | 1.812 | 0.192 |
| LOC_presence * RightdlPFC_Atd     | 0.960 | 0.338 |
| LeftmPFC_Atd                      | 1.870 | 0.185 |
| LOC_presence                      | 0.001 | 0.971 |
| LOC_presence * LeftmPFC_Atd       | 1.195 | 0.286 |
| RightmPFC_Atd                     | 0.388 | 0.540 |
| LOC_presence                      | 0.489 | 0.492 |
| LOC_presence * RightmPFC_Atd      | 0.018 | 0.895 |
| LeftOccipital_Atd                 | 0.014 | 0.908 |
| LOC_presence                      | 0.263 | 0.613 |
| LOC_presence * LeftOccipital_Atd  | 4.375 | 0.048 |
| RightOccipital_Atd                | 0.098 | 0.757 |
| LOC_presence                      | 0.094 | 0.762 |
| LOC_presence * RightOccipital_Atd | 0.712 | 0.408 |
| LeftFusiform_Atd                  | 1.923 | 0.179 |
| LOC_presence                      | 0.913 | 0.350 |
| LOC_presence * LeftFusiform_Atd   | 0.002 | 0.968 |
| RightFusiform_Atd                 | 0.014 | 0.906 |
| LOC_presence                      | 0.103 | 0.751 |
| LOC_presence * RightFusiform_Atd  | 1.354 | 0.257 |
| LeftStriatum_Hbu                  | 1.567 | 0.224 |
| LOC_presence                      | 0.065 | 0.801 |
| LOC_presence * LeftStriatum_Hbu   | 0.573 | 0.457 |
| RightStriatum_Hbu                 | 1.335 | 0.260 |
| LOC_presence                      | 0.019 | 0.893 |
| LOC_presence * RightStriatum_Hbu  | 1.663 | 0.211 |
| LeftInsula_Hbu                    | 2.511 | 0.127 |
| LOC_presence                      | 0.050 | 0.825 |
| LOC_presence * LeftInsula_Hbu     | 1.284 | 0.269 |
| RightInsula_Hbu                   | 3.226 | 0.086 |
| LOC_presence                      | 1.355 | 0.257 |
| LOC_presence * RightInsula_Hbu    | 0.003 | 0.955 |
| LeftAmygdala_Hbu                  | 0.812 | 0.377 |
| LOC_presence                      | 0.595 | 0.449 |
| LOC_presence * LeftAmygdala_Hbu   | 0.124 | 0.729 |
| RightAmygdala_Hbu                 | 0.000 | 0.986 |
| LOC_presence                      | 0.808 | 0.379 |
| LOC_presence * RightAmygdala_Hbu  | 0.013 | 0.910 |
| LeftACC_Hbu                       | 0.133 | 0.719 |
| LOC_presence                      | 1.867 | 0.186 |
| LOC_presence * LeftACC_Hbu        | 0.893 | 0.355 |
| RightACC_Hbu                      | 0.009 | 0.926 |
| LOC_presence                      | 1.381 | 0.252 |

|                                   |       |       |
|-----------------------------------|-------|-------|
| LOC_presence * RightACC_Hbu       | 0.332 | 0.570 |
| LeftvIPFC_Hbu                     | 0.706 | 0.410 |
| LOC_presence                      | 0.268 | 0.610 |
| LOC_presence * LeftvIPFC_Hbu      | 0.186 | 0.671 |
| RightvIPFC_Hbu                    | 0.277 | 0.604 |
| LOC_presence                      | 1.168 | 0.292 |
| LOC_presence * RightvIPFC_Hbu     | 0.102 | 0.752 |
| LeftdlPFC_Hbu                     | 0.103 | 0.751 |
| LOC_presence                      | 0.070 | 0.793 |
| LOC_presence * LeftdlPFC_Hbu      | 0.273 | 0.607 |
| RightdlPFC_Hbu                    | 1.422 | 0.246 |
| LOC_presence                      | 0.372 | 0.548 |
| LOC_presence * RightdlPFC_Hbu     | 0.291 | 0.595 |
| LeftmPFC_Hbu                      | 1.299 | 0.267 |
| LOC_presence                      | 0.851 | 0.366 |
| LOC_presence * LeftmPFC_Hbu       | 0.640 | 0.432 |
| RightmPFC_Hbu                     | 1.605 | 0.218 |
| LOC_presence                      | 1.130 | 0.299 |
| LOC_presence * RightmPFC_Hbu      | 1.203 | 0.285 |
| LeftOccipital_Hbu                 | 0.108 | 0.746 |
| LOC_presence                      | 0.687 | 0.416 |
| LOC_presence * LeftOccipital_Hbu  | 0.001 | 0.970 |
| RightOccipital_Hbu                | 0.648 | 0.429 |
| LOC_presence                      | 5.297 | 0.031 |
| LOC_presence * RightOccipital_Hbu | 5.487 | 0.029 |
| LeftFusiform_Hbu                  | 0.048 | 0.829 |
| LOC_presence                      | 1.703 | 0.205 |
| LOC_presence * LeftFusiform_Hbu   | 1.023 | 0.323 |
| RightFusiform_Hbu                 | 0.000 | 0.987 |
| LOC_presence                      | 0.628 | 0.436 |
| LOC_presence * RightFusiform_Hbu  | 0.079 | 0.781 |
| LeftStriatum_Htd                  | 0.340 | 0.566 |
| LOC_presence                      | 1.026 | 0.322 |
| LOC_presence * LeftStriatum_Htd   | 0.001 | 0.980 |
| RightStriatum_Htd                 | 0.854 | 0.365 |
| LOC_presence                      | 0.528 | 0.475 |
| LOC_presence * RightStriatum_Htd  | 0.151 | 0.702 |
| LeftInsula_Htd                    | 0.973 | 0.335 |
| LOC_presence                      | 0.881 | 0.358 |
| LOC_presence * LeftInsula_Htd     | 0.205 | 0.655 |
| RightInsula_Htd                   | 1.234 | 0.279 |
| LOC_presence                      | 0.758 | 0.393 |
| LOC_presence * RightInsula_Htd    | 0.027 | 0.872 |
| LeftAmygdala_Htd                  | 1.191 | 0.287 |
| LOC_presence                      | 0.551 | 0.466 |

|                                   |       |               |
|-----------------------------------|-------|---------------|
| LOC_presence * LeftAmygdala_Htd   | 0.151 | 0.702         |
| RightAmygdala_Htd                 | 0.070 | 0.794         |
| LOC_presence                      | 2.267 | 0.146         |
| LOC_presence * RightAmygdala_Htd  | 2.297 | 0.144         |
| LeftACC_Htd                       | 0.088 | 0.770         |
| LOC_presence                      | 1.191 | 0.287         |
| LOC_presence * LeftACC_Htd        | 0.216 | 0.647         |
| RightACC_Htd                      | 0.895 | 0.354         |
| LOC_presence                      | 1.873 | 0.185         |
| LOC_presence * RightACC_Htd       | 1.434 | 0.244         |
| LeftvIPFC_Htd                     | 1.305 | 0.266         |
| LOC_presence                      | 0.128 | 0.724         |
| LOC_presence * LeftvIPFC_Htd      | 0.542 | 0.469         |
| RightvIPFC_Htd                    | 0.197 | 0.661         |
| LOC_presence                      | 1.403 | 0.249         |
| LOC_presence * RightvIPFC_Htd     | 0.197 | 0.661         |
| LeftdlPFC_Htd                     | 8.814 | <b>0.007*</b> |
| LOC_presence                      | 0.013 | 0.912         |
| LOC_presence * LeftdlPFC_Htd      | 7.185 | 0.014         |
| RightdlPFC_Htd                    | 0.228 | 0.638         |
| LOC_presence                      | 0.459 | 0.505         |
| LOC_presence * RightdlPFC_Htd     | 0.072 | 0.791         |
| LeftmPFC_Htd                      | 0.115 | 0.738         |
| LOC_presence                      | 0.909 | 0.351         |
| LOC_presence * LeftmPFC_Htd       | 0.175 | 0.680         |
| RightmPFC_Htd                     | 0.308 | 0.584         |
| LOC_presence                      | 0.239 | 0.630         |
| LOC_presence * RightmPFC_Htd      | 0.612 | 0.442         |
| LeftOccipital_Htd                 | 0.000 | 0.992         |
| LOC_presence                      | 0.815 | 0.377         |
| LOC_presence * LeftOccipital_Htd  | 0.045 | 0.834         |
| RightOccipital_Htd                | 0.626 | 0.437         |
| LOC_presence                      | 1.112 | 0.303         |
| LOC_presence * RightOccipital_Htd | 0.280 | 0.602         |
| LeftFusiform_Htd                  | 0.728 | 0.403         |
| LOC_presence                      | 1.142 | 0.297         |
| LOC_presence * LeftFusiform_Htd   | 0.119 | 0.733         |
| RightFusiform_Htd                 | 4.397 | 0.048         |
| LOC_presence                      | 3.559 | 0.073         |
| LOC_presence * RightFusiform_Htd  | 3.393 | 0.079         |

**Note.** Abu = Angry face cue bottom-up time window (0-250 ms) average evoked response; Atd = Angry face cue top-down time window (250-600 ms) average evoked response; Hbu = Happy face cue bottom-up time window (0-250 ms) average evoked response; Htd = Happy face cue top-down time window (250-600 ms) average evoked response.