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## Supporting Information for

## Human cerebellum and corticocerebellar connections involved in emotional memory enhancement

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| DCM model (R12 and one other ROI) | Sample size in discovery sample | Sample size in replication sample |
|---|---|---|
| R1 and R12 | 901 | 433 |
| R2 and R12 | 899 | 429 |
| R3 and R12 | 899 | 429 |
| R4 and R12 | 862 | 419 |
| R5 and R12 | 852 | 411 |
| R6 and R12 | 894 | 422 |
| R8 and R12 | 881 | 426 |
| R9 and R12 | 798 | 378 |
| R10 and R12 | 899 | 432 |
| R14 and R12 | 902 | 432 |
| R15 and R12 | 837 | 410 |
| R16 and R12 | 902 | 433 |
| R17 and R12 | 899 | 432 |
| R18 and R12 | 902 | 432 |
| R19 and R12 | 901 | 433 |
| R20 and R12 | 902 | 433 |
| R21 and R12 | 902 | 433 |
| R22 and R12 | 902 | 433 |
| R23 and R12 | 902 | 433 |
| R24 and R12 | 901 | 433 |
| R26 and R12 | 902 | 433 |
| R27 and R12 | 902 | 433 |
| R28 and R12 | 902 | 433 |
| R29 and R12 | 902 | 433 |
| R30 and R12 | 899 | 432 |

Table S1. Number of subjects per DCM between replicating ROIs. The table lists the sample size after the exclusion of subjects from whom time courses could not be successfully extracted. Sample size without exclusions due to unsuccessful time course extraction: Discovery sample N = 945; replication sample N = 473. Table refers to Materials and Methods, paragraph "*Time course extraction from ROIs*". R: ROI

| ROI | Percentage of excluded subjects in discovery sample | Percentage of excluded subjects in replication sample |
|---|---|---|
| 1 | 0.11% | 0% |
| 2 | 0.42% | 0.85% |
| 3 | 0.42% | 0.85% |
| 4 | 4.87% | 3.59% |
| 5 | 5.92% | 5.29% |
| 6 | 1.27% | 2.54% |
| 8 | 2.54% | 1.69% |
| 9 | 11.64% | 14.16% |
| 10 | 0.32% | 0.21% |
| 12 | 4.55% | 8.46% |
| 14 | 0% | 0.21% |
| 15 | 7.20% | 5.92% |
| 16 | 0% | 0% |
| 17 | 0.32% | 0.21% |
| 18 | 0% | 0.21% |
| 19 | 0.11% | 0% |
| 20 | 0% | 0% |
| 21 | 0% | 0% |
| 22 | 0% | 0% |
| 23 | 0% | 0% |
| 24 | 0.11% | 0% |
| 26 | 0% | 0% |
| 27 | 0% | 0% |
| 28 | 0% | 0% |
| 29 | 0% | 0% |
| 30 | 0.32% | 0.21% |

Table S2. Percentage of subjects per replicating ROI that had to be excluded as they did not show robust activation (Table refers to Materials and Methods, paragraph "*Time course extraction from ROIs*").

| ROI from parcellation | Maximum t value within ROI | Regional correspondence of the local maxima within ROI | MNI coordinates at maximum | | |
|---|---|---|---|---|---|
| | | | X | Y | Z |
| 1 | 12.0263 | ctx-lh-inferiorparietal (1%) ctx-lh-inferiortemporal (11%) ctx-lh-lateraloccipital (54%) ctx-lh-middletemporal (5%) | -49.5 | -74.25 | 0 |
| 2 | 7.0601 | ctx-lh-postcentral (3%) ctx-lh-supramarginal (80%) | -63.25 | -27.5 | 28 |
| 3 | 8.6389 | ctx-lh-fusiform (36%) ctx-lh-inferiortemporal (33%) | -44 | -46.75 | -20 |
| 4 | 7.2131 | ctx-rh-superiorparietal (59%) | 16.5 | -85.25 | 40 |
| 5 | 6.6197 | ctx-rh-postcentral (8%) ctx-rh-supramarginal (30%) | 66 | -16.5 | 40 |
| 6 | 6.6173 | ctx-lh-lateraloccipital (1%) ctx-lh-superiorparietal (29%) | -19.25 | -85.25 | 32 |
| 7 | 6.3562 | ctx-lh-posteriorcingulate (56%) ctx-rh-posteriorcingulate (14%) | 0 | 0 | 36 |
| 8 | 7.1087 | ctx-rh-superiorparietal (59%) | 27.5 | -55 | 64 |
| 9 | 6.4531 | ctx-rh-caudalmiddlefrontal (4%) ctx-rh-precentral (50%) | 46.75 | 0 | 56 |
| 10 | 7.5141 | ctx-lh-precuneus (1%) ctx-rh-cuneus (10%) ctx-rh-lingual (23%) ctx-rh-pericalcarine (5%) ctx-rh-precuneus (2%) | 2.75 | -63.25 | 12 |
| 12 | 5.7674 | Right-Cerebellum-Cortex (1%) Left-Cerebellum-Cortex (97%) <br><br> Vermis IX (76%), Left IX (14%)[1] | -2.75 | -55 | -40 |
| 13 | 6.3208 | ctx-lh-superiorparietal (26%) | -30.25 | -55 | 68 |
| 14 | 7.6908 | Left-Pallidum (5%) Left-VentralDC (15%) | -8.25 | -5.5 | -8 |
| 15 | 5.9768 | ctx-rh-middletemporal (56%) | 57.75 | -8.25 | -20 |
| 16 | 8.3868 | ctx-lh-lingual (3%) ctx-lh-pericalcarine (46%) | -13.75 | -74.25 | 8 |
| 17 | 8.3571 | ctx-lh-insula (6%) | -33 | 0 | -20 |
| 18 | 10.9539 | ctx-rh-fusiform (10%) ctx-rh-inferiortemporal (20%) ctx-rh-lateraloccipital (19%) ctx-rh-middletemporal (1%) | 46.75 | -63.25 | -8 |
| 19 | 7.4373 | ctx-lh-lateralorbitofrontal (21%) ctx-lh-insula (54%) | -30.25 | 13.75 | -16 |
| 20 | 8.8163 | ctx-lh-isthmuscingulate (55%) ctx-lh-precuneus (17%) | -5.5 | -49.5 | 28 |
| 21 | 8.527 | Brain-Stem (24%) Right-VentralDC (61%) | 13.75 | -22 | -12 |
| 22 | 10.537 | ctx-lh-medialorbitofrontal (3%) ctx-lh-rostralanteriorcingulate (68%) ctx-lh-superiorfrontal (10%) | -2.75 | 44 | 0 |
| 23 | 11.869 | ctx-rh-inferiortemporal (23%) ctx-rh-lateraloccipital (35%) ctx-rh-middletemporal (8%) | 52.25 | -66 | -4 |
| 24 | 8.3787 | ctx-rh-lateralorbitofrontal (67%) ctx-rh-insula (12%) | 30.25 | 16.5 | -20 |
| 25 | 7.9919 | ctx-rh-insula (90%) | 35.75 | 11 | -12 |

| 26 | 9.1318 | Right-Amygdala (98%) | 19.25 | -5.5 | -16 |
|---|---|---|---|---|---|
| 27 | 10.1738 | ctx-lh-medialorbitofrontal (6%) ctx-lh-rostralanteriorcingulate (10%) ctx-lh-superiorfrontal (51%) | -2.75 | 52.25 | 4 |
| 28 | 10.7336 | ctx-lh-inferiorparietal (4%) ctx-lh-inferiortemporal (16%) ctx-lh-lateraloccipital (13%) ctx-lh-middletemporal (37%) | -52.25 | -68.75 | 4 |
| 29 | 10.4155 | ctx-rh-inferiorparietal (2%) ctx-rh-inferiortemporal (18%) ctx-rh-lateraloccipital (10%) ctx-rh-middletemporal (34%) | 52.25 | -60.5 | 0 |
| 30 | 9.0748 | ctx-lh-caudalanteriorcingulate (6%) ctx-rh-caudalanteriorcingulate (29%) ctx-rh-corpuscallosum (1%) CC_Anterior (3%) | 2.75 | 27.5 | 16 |

Table S3. Increased activity during successful emotional memory encoding in the discovery sample (N = 944). Table shows the local maxima per region of interest (ROI). Regions are in accordance to FreeSurfer nomenclature. Percentages denote the share of participants with a certain label located at a given coordinate (see Materials and Methods, paragraph "*Anatomical localization of ROIs based on a population-averaged anatomical probabilistic atlas*"). [1] Assignment based on FSL atlas "Cerebellar Atlas in MNI152 space after normalization with FNIRT" (Diedrichsen et al., 2009).

| ROI from parcellation | Maximum t value within ROI | Regional correspondence of the local maxima within ROI | MNI coordinates at maximum | | |
|---|---|---|---|---|---|
| | | | X | Y | Z |
| 1 | 8.3442 | ctx-lh-fusiform (4%) ctx-lh-inferiortemporal (12%) ctx-lh-lateraloccipital (43%) ctx-lh-middletemporal (1%) | -46.75 | -71.5 | -4 |
| 2 | 4.9721 | ctx-lh-supramarginal (55%) | -55 | -35.75 | 28 |
| 3 | 6.9116 | ctx-lh-fusiform (47%) ctx-lh-inferiortemporal (16%) ctx-lh-lateraloccipital (7%) | -44 | -63.25 | -12 |
| 4 | 6.1305 | ctx-rh-superiorparietal (56%) | 22 | -85.25 | 44 |
| 5 | 4.6385 | ctx-rh-postcentral (2%) ctx-rh-supramarginal (24%) | 66 | -19.25 | 44 |
| 6 | 4.9083 | ctx-lh-inferiorparietal (3%) ctx-lh-superiorparietal (67%) | -19.25 | -85.25 | 40 |
| 7 | 4.285 † | ctx-lh-posteriorcingulate (56%) ctx-rh-posteriorcingulate (14%) | 0 | 0 | 36 |
| 8 | 4.4662 | ctx-rh-superiorparietal (46%) | 33 | -52.25 | 68 |
| 9 | 5.4453 | ctx-rh-caudalmiddlefrontal (4%) ctx-rh-precentral (70%) | 49.5 | 2.75 | 48 |
| 10 | 5.2734 | ctx-rh-lingual (43%) | 8.25 | -60.5 | 4 |
| 12 | 5.122 | Right-Cerebellum-Cortex (93%) Left-Cerebellum-Cortex (6%)<br><br>Right IX (75%), Vermis IX (22%), Vermis VIIIb (2%) [1] | 2.75 | -57.75 | -44 |
| 13 † | 3.5337 | ctx-lh-superiorparietal (43%) | -30.25 | -49.5 | 60 |
| 14 | 6.2463 | Left-Pallidum (1%) Left-Amygdala (6%) Left-VentralDC (49%) | -13.75 | -5.5 | -12 |

| | | | | | |
|---|---|---|---|---|---|
| 15 | 5.626 | ctx-rh-middletemporal (68%) ctx-rh-superiortemporal (2%) | 55 | -8.25 | -20 |
| 16 | 6.1707 | ctx-lh-cuneus (2%) ctx-lh-lingual (1%) ctx-lh-pericalcarine (54%) | -8.25 | -74.25 | 12 |
| 17 | 8.051 | Left-Amygdala (92%) | -19.25 | -5.5 | -16 |
| 18 | 8.1444 | ctx-rh-fusiform (10%) ctx-rh-inferiortemporal (20%) ctx-rh-lateraloccipital (19%) ctx-rh-middletemporal (1%) | 46.75 | -63.25 | -8 |
| 19 | 5.5845 | ctx-lh-lateralorbitofrontal (64%) ctx-lh-insula (11%) | -30.25 | 16.5 | -16 |
| 20 | 6.8923 | ctx-lh-isthmuscingulate (7%) ctx-lh-precuneus (39%) ctx-rh-precuneus (10%) | 0 | -55 | 28 |
| 21 | 5.406 | Brain-Stem (95%) | 5.5 | -30.25 | -4 |
| 22 | 7.362 | ctx-lh-medialorbitofrontal (1%) ctx-lh-rostralanteriorcingulate (52%) ctx-lh-superiorfrontal (27%) | -2.75 | 46.75 | 4 |
| 23 | 8.8366 | ctx-rh-fusiform (5%) ctx-rh-inferiortemporal (19%) ctx-rh-lateraloccipital (34%) ctx-rh-middletemporal (2%) | 49.5 | -66 | -8 |
| 24 | 5.6773 | ctx-rh-lateralorbitofrontal (22%) ctx-rh-insula (50%) | 27.5 | 13.75 | -16 |
| 25 | 3.8598 † | ctx-rh-lateralorbitofrontal (5%) ctx-rh-parsorbitalis (40%) ctx-rh-parstriangularis (17%) | 46.75 | 27.5 | -8 |
| 26 | 6.836 | Right-Hippocampus (1%) Right-Amygdala (85%) Right-VentralDC (6%) | 16.5 | -5.5 | -16 |
| 27 | 7.1583 | ctx-lh-rostralanteriorcingulate (25%) ctx-lh-superiorfrontal (49%) | -2.75 | 49.5 | 8 |
| 28 | 7.7959 | ctx-lh-inferiorparietal (4%) ctx-lh-inferiortemporal (16%) ctx-lh-lateraloccipital (13%) ctx-lh-middletemporal (37%) | -52.25 | -68.75 | 4 |
| 29 | 7.4797 | ctx-rh-inferiortemporal (27%) ctx-rh-lateraloccipital (8%) ctx-rh-middletemporal (21%) | 55 | -60.5 | -4 |
| 30 | 6.0532 | ctx-lh-caudalanteriorcingulate (42%) ctx-lh-corpuscallosum (2%) ctx-rh-caudalanteriorcingulate (2%) CC_Anterior (4%) | 0 | 27.5 | 16 |

Table S4: Increased activity during successful emotional memory encoding in the replication sample (N = 470). Table shows the local maxima per region of interest (ROI). Regions are in accordance to FreeSurfer nomenclature. Percentages per coordinate denote the population-average probability of an anatomical label (see Materials and Methods, paragraph "*Anatomical localization of ROIs based on a population-averaged anatomical probabilistic atlas*"). [1] Assignment based on FSL atlas "Cerebellar Atlas in MNI152 space after normalization with FNIRT" (Diedrichsen et al., 2009). † Maxima for clusters 7, 13 and 25 did not reach significance threshold ($T$ = 4.4056, $P$ < 0.05, one-sided, Bonferroni corrected for 7635 tests).

| ROI from parcellation | Size of ROI | Anatomical correspondence of centroid [MNI] | Anatomical regions spanned by ROI | Average percentage regional correspondence |
|---|---|---|---|---|
| 1 | 462 | ctx-lh-lateraloccipital (53%) Left-Cerebral-White-Matter (36%) [-44 -77 0] | ctx-lh-fusiform | 6.9 |
| | | | ctx-lh-inferiortemporal | 5.97 |
| | | | ctx-lh-lateraloccipital | 32.34 |
| | | | Left-Cerebral-White-Matter | 24.08 |
| | | | ctx-lh-middletemporal | 2.26 |
| | | | ctx-lh-inferiorparietal | 5.07 |
| 2 | 232 | ctx-lh-postcentral (4%) ctx-lh-supramarginal (59%) Left-Cerebral-White-Matter (31%) [-60.5 -27.5 32] | ctx-lh-supramarginal | 44.83 |
| | | | ctx-lh-postcentral | 8.46 |
| | | | Left-Cerebral-White-Matter | 14.25 |
| 3 | 181 | ctx-lh-fusiform (59%) ctx-lh-inferiortemporal (10%) Left-Cerebral-White-Matter (22%) [-41.25 -52.25 -16] | Left-Cerebellum-Cortex | 8.81 |
| | | | ctx-lh-fusiform | 32.74 |
| | | | ctx-lh-inferiortemporal | 24.09 |
| | | | Left-Cerebral-White-Matter | 21.1 |
| 4 | 127 | ctx-rh-superiorparietal (42%) Right-Cerebral-White-Matter (53%) [19.25 -85.25 36] | Right-Cerebral-White-Matter | 31.58 |
| | | | ctx-rh-lateraloccipital | 2.64 |
| | | | ctx-rh-superiorparietal | 39.21 |
| 5 | 101 | ctx-rh-postcentral (1%) ctx-rh-supramarginal (64%) Right-Cerebral-White-Matter (31%) [63.25 -24.75 32] | Right-Cerebral-White-Matter | 13.24 |
| | | | ctx-rh-superiortemporal | 1.21 |
| | | | ctx-rh-supramarginal | 50.59 |
| | | | ctx-rh-postcentral | 5.88 |
| 6 | 141 | ctx-lh-superiorparietal (24%) Left-Cerebral-White-Matter (72%) [-16.5 -85.25 32] | Left-Cerebral-White-Matter | 38.86 |
| | | | ctx-lh-inferiorparietal | 1.41 |
| | | | ctx-lh-lateraloccipital | 4.54 |
| | | | ctx-lh-superiorparietal | 34.41 |
| | | | ctx-lh-cuneus | 3.36 |
| 7 | 66 | ctx-lh-posteriorcingulate (61%) Left-Cerebral-White-Matter (3%) ctx-rh-posteriorcingulate (17%) [0 -11 36] | ctx-rh-posteriorcingulate | 20.73 |
| | | | ctx-lh-posteriorcingulate | 48.75 |
| | | | Left-Cerebral-White-Matter | 12.27 |
| 8 | 177 | ctx-rh-postcentral (1%) ctx-rh-superiorparietal (49%) Right-Cerebral-White-Matter (43%) [30.25 -49.5 64] | Right-Cerebral-White-Matter | 18.24 |
| | | | ctx-rh-superiorparietal | 42.09 |
| | | | ctx-rh-postcentral | 1.67 |
| 9 | 76 | ctx-rh-caudalmiddlefrontal (4%) ctx-rh-precentral (70%) | Right-Cerebral-White-Matter | 10.14 |
| | | | ctx-rh-caudalmiddlefrontal | 5.51 |

| | | | | |
|---|---|---|---|---|
| | | Right-Cerebral-White-Matter (21%) [49.5 2.75 48] | ctx-rh-precentral | 44.31 |
| 10 | 201 | ctx-rh-lingual (24%) ctx-rh-pericalcarine (5%) Right-Cerebral-White-Matter (69%) [13.75 -63.25 4] | ctx-rh-lingual | 25.07 |
| | | | Right-Cerebral-White-Matter | 39.46 |
| | | | ctx-rh-pericalcarine | 11.13 |
| | | | ctx-rh-precuneus | 3.8 |
| | | | ctx-rh-cuneus | 3.11 |
| 11 | 60 | Left-Caudate (54%) Left-Cerebral-White-Matter (35%) [-16.5 -8.25 24] | Left-Cerebellum-Cortex | 13.25 |
| | | | ctx-rh-fusiform | 6.52 |
| | | | Right-Cerebral-White-Matter | 8.76 |
| | | | ctx-lh-middletemporal | 3.21 |
| | | | Left-Cerebral-White-Matter | 5.8 |
| | | | Left-Putamen | 1.46 |
| | | | ctx-lh-superiorfrontal | 9.89 |
| | | | ctx-lh-precentral | 12.19 |
| | | | ctx-rh-superiorfrontal | 7 |
| 12 | 65 | Right-Cerebellum-Cortex (41%) Left-Cerebellum-Cortex (59%) [0 -55 -40] | Left-Cerebellum-Cortex | 38.82 |
| | | | Left-Cerebellum-White-Matter | 3.96 |
| | | | Right-Cerebellum-Cortex | 46.53 |
| | | | Right-Cerebellum-White-Matter | 6 |
| 13 | 110 | ctx-lh-postcentral (2%) ctx-lh-superiorparietal (47%) [-33 -46.75 68] | Left-Cerebral-White-Matter | 7.16 |
| | | | ctx-lh-superiorparietal | 32.43 |
| | | | ctx-lh-postcentral | 3.27 |
| 14 | 147 | Left-Thalamus-Proper (53%) Left-Cerebral-White-Matter (1%) Left-VentralDC (31%) [-2.75 -5.5 -4] | Left-VentralDC | 15.25 |
| | | | Left-Cerebral-White-Matter | 19.22 |
| | | | Left-Pallidum | 4.65 |
| | | | Left-Thalamus-Proper | 26.01 |
| | | | Right-Cerebral-White-Matter | 7.01 |
| | | | Right-Thalamus-Proper | 17.33 |
| | | | Right-VentralDC | 1.64 |
| 15 | 61 | ctx-rh-middletemporal (29%) Right-Cerebral-White-Matter (71%) [57.75 -11 -20] | Right-Cerebral-White-Matter | 40.22 |
| | | | ctx-rh-middletemporal | 44.95 |
| | | | ctx-rh-superiortemporal | 5.74 |
| 16 | 354 | ctx-lh-cuneus (4%) ctx-lh-lingual (22%) ctx-lh-pericalcarine (33%) | Left-Cerebellum-Cortex | 2.69 |
| | | | ctx-lh-lingual | 18.92 |
| | | | Left-Cerebral-White-Matter | 36.72 |

| | | | | |
|---|---|---|---|---|
| | | Left-Cerebral-White-Matter (18%) [-8.25 -68.75 8] | ctx-lh-pericalcarine | 10.09 |
| | | | ctx-lh-precuneus | 5.69 |
| | | | ctx-lh-cuneus | 7.68 |
| 17 | 205 | Left-Amygdala (54%) [-27.5 -2.75 -20] | Left-Cerebral-White-Matter | 25.56 |
| | | | ctx-lh-temporalpole | 1.06 |
| | | | Left-Amygdala | 19.39 |
| | | | ctx-lh-superiortemporal | 3.57 |
| | | | Left-Hippocampus | 1.93 |
| | | | ctx-lh-insula | 7.44 |
| | | | Left-Putamen | 1.12 |
| 18 | 261 | ctx-rh-fusiform (53%) ctx-rh-inferiortemporal (10%) ctx-rh-lateraloccipital (2%) Right-Cerebral-White-Matter (30%) [44 -55 -16] | Right-Cerebellum-Cortex | 9.77 |
| | | | ctx-rh-fusiform | 33.55 |
| | | | ctx-rh-inferiortemporal | 14.49 |
| | | | Right-Cerebral-White-Matter | 27.58 |
| | | | ctx-rh-lateraloccipital | 3.35 |
| 19 | 210 | ctx-lh-lateralorbitofrontal (13%) ctx-lh-superiortemporal (6%) [-35.75 13.75 -20] | Left-Cerebral-White-Matter | 7.79 |
| | | | ctx-lh-middletemporal | 3.71 |
| | | | ctx-lh-superiortemporal | 11.93 |
| | | | ctx-lh-temporalpole | 3.69 |
| | | | ctx-lh-lateralorbitofrontal | 20.11 |
| | | | ctx-lh-insula | 20.82 |
| 20 | 348 | ctx-lh-isthmuscingulate (44%) ctx-lh-precuneus (38%) Left-Cerebral-White-Matter (3%) [-2.75 -52.25 28] | ctx-rh-precuneus | 13.26 |
| | | | ctx-lh-isthmuscingulate | 14.17 |
| | | | ctx-lh-precuneus | 24.89 |
| | | | Left-Cerebral-White-Matter | 16.85 |
| | | | ctx-rh-isthmuscingulate | 7.93 |
| | | | Right-Cerebral-White-Matter | 3.49 |
| 21 | 303 | Brain-Stem (95%) Left-VentralDC (5%) [-2.75 -27.5 -12] | Brain-Stem | 39.72 |
| | | | Right-VentralDC | 10.37 |
| | | | Left-VentralDC | 19.28 |
| | | | Left-Cerebral-White-Matter | 2.76 |
| | | | Left-Hippocampus | 4.83 |
| | | | Left-Thalamus-Proper | 4.21 |
| | | | Right-Thalamus-Proper | 1.17 |
| 22 | 604 | ctx-lh-rostralanteriorcingulate (45%) ctx-lh-superiorfrontal (2%) | Left-Cerebral-White-Matter | 13.67 |
| | | | ctx-lh-medialorbitofrontal | 6.44 |
| | | | ctx-lh-rostralanteriorcingulate | 14.73 |

| | | | | |
|---|---|---|---|---|
| | | ctx-rh-rostralanteriorcingulate (11%)<br>[0 41.25 4] | ctx-rh-rostralanteriorcingulate | 10.75 |
| | | | ctx-rh-medialorbitofrontal | 4.24 |
| | | | Right-Cerebral-White-Matter | 7.11 |
| | | | ctx-rh-superiorfrontal | 6.67 |
| | | | ctx-lh-superiorfrontal | 9.46 |
| | | | CC_Anterior | 1.3 |
| | | | ctx-rh-caudalanteriorcingulate | 3.06 |
| | | | ctx-lh-caudalanteriorcingulate | 3.48 |
| 23 | 487 | ctx-rh-inferiorparietal (3%)<br>ctx-rh-inferiortemporal (3%)<br>ctx-rh-lateraloccipital (56%)<br>Right-Cerebral-White-Matter (26%)<br>[46.75 -71.5 0] | ctx-rh-lateraloccipital | 32.03 |
| | | | ctx-rh-fusiform | 3.3 |
| | | | Right-Cerebral-White-Matter | 29.37 |
| | | | ctx-rh-inferiortemporal | 4.77 |
| | | | ctx-rh-middletemporal | 3.28 |
| | | | ctx-rh-inferiorparietal | 12.83 |
| 24 | 259 | ctx-rh-superiortemporal (44%)<br>ctx-rh-temporalpole (31%)<br>[35.75 16.5 -28] | ctx-rh-temporalpole | 8.46 |
| | | | ctx-rh-middletemporal | 6.76 |
| | | | ctx-rh-superiortemporal | 15.08 |
| | | | Right-Cerebral-White-Matter | 10.79 |
| | | | ctx-rh-lateralorbitofrontal | 19.56 |
| | | | ctx-rh-insula | 5.51 |
| 25 | 232 | ctx-rh-parsorbitalis (1%)<br>ctx-rh-insula (47%)<br>[44 16.5 -8] | ctx-rh-insula | 27.66 |
| | | | ctx-rh-superiortemporal | 6.7 |
| | | | Right-Cerebral-White-Matter | 13.36 |
| | | | ctx-rh-lateralorbitofrontal | 2.13 |
| | | | ctx-rh-parsorbitalis | 4.8 |
| | | | ctx-rh-parstriangularis | 11.41 |
| | | | ctx-rh-parsopercularis | 3.76 |
| 26 | 357 | Right-Cerebral-White-Matter (1%)<br>Right-Amygdala (74%)<br>[22 -2.75 -16] | Right-Cerebral-White-Matter | 19.26 |
| | | | Right-Amygdala | 13.32 |
| | | | ctx-rh-lateralorbitofrontal | 1.15 |
| | | | Right-Hippocampus | 10.68 |
| | | | ctx-rh-superiortemporal | 1.02 |
| | | | ctx-rh-insula | 4.61 |
| | | | Right-VentralDC | 13.29 |
| | | | Right-Putamen | 4.76 |
| | | | Right-Accumbens-area | 1.7 |
| | | | Right-Pallidum | 3.1 |
| 27 | 654 | ctx-lh-superiorfrontal (29%) | ctx-rh-medialorbitofrontal | 2.65 |

| | | | | |
|---|---|---|---|---|
| | | ctx-rh-superiorfrontal (4%) [0 57.75 16] | ctx-lh-medialorbitofrontal | 3.18 |
| | | | Left-Cerebral-White-Matter | 9.66 |
| | | | Right-Cerebral-White-Matter | 7.24 |
| | | | ctx-lh-superiorfrontal | 23.64 |
| | | | ctx-rh-superiorfrontal | 21.83 |
| 28 | 503 | ctx-lh-bankssts (3%) ctx-lh-inferiorparietal (48%) ctx-lh-lateraloccipital (2%) ctx-lh-middletemporal (11%) ctx-lh-supramarginal (2%) Left-Cerebral-White-Matter (12%) [-49.5 -63.25 16] | Left-Cerebral-White-Matter | 25.19 |
| | | | ctx-lh-inferiortemporal | 2.54 |
| | | | ctx-lh-lateraloccipital | 3.39 |
| | | | ctx-lh-middletemporal | 11.21 |
| | | | ctx-lh-bankssts | 4.14 |
| | | | ctx-lh-inferiorparietal | 30.18 |
| | | | ctx-lh-supramarginal | 2.66 |
| 29 | 431 | ctx-rh-bankssts (7%) ctx-rh-inferiorparietal (25%) ctx-rh-middletemporal (6%) Right-Cerebral-White-Matter (58%) [55 -52.25 12] | ctx-rh-middletemporal | 14.45 |
| | | | ctx-rh-inferiortemporal | 2.45 |
| | | | ctx-rh-lateraloccipital | 1.54 |
| | | | Right-Cerebral-White-Matter | 26.83 |
| | | | ctx-rh-bankssts | 14.3 |
| | | | ctx-rh-inferiorparietal | 23.02 |
| | | | ctx-rh-supramarginal | 3.67 |
| 30 | 220 | ctx-lh-caudalanteriorcingulate (55%) Left-Cerebral-White-Matter (1%) ctx-rh-caudalanteriorcingulate (10%) [0 16.5 28] | Right-Cerebral-White-Matter | 10.88 |
| | | | CC_Mid_Anterior | 2.79 |
| | | | CC_Anterior | 3.22 |
| | | | Left-Cerebral-White-Matter | 13.16 |
| | | | ctx-rh-caudalanteriorcingulate | 16.86 |
| | | | ctx-lh-caudalanteriorcingulate | 19.71 |
| | | | ctx-lh-superiorfrontal | 2.43 |
| | | | ctx-rh-posteriorcingulate | 3.39 |
| | | | ctx-lh-posteriorcingulate | 5.41 |

Table S5. Number of voxels and anatomical correspondence per ROI. Percentages per centroid denote the population-average probability of an anatomical label. The average percentage of regional correspondence denotes the proportion of voxels mapping to a specific anatomical region. A 100% correspondence would occur if all voxels of a parcellation would be located within an anatomical region such as the brain stem, and each voxel itself had a probability of 100% of being located in the brain stem. Within a specific voxel, probabilities across anatomical labels do not necessarily sum to 100%, and therefore anatomical correspondence per ROI may not sum to 100%. Regions are in accordance to FreeSurfer nomenclature. The procedure is described in Materials and Methods, paragraph "*Anatomical localization of ROIs based on a population-averaged anatomical probabilistic atlas*". Regional probabilities smaller than 1% are not shown.

| ROI | 12 |
|-----|-------|
| 2 | 0.119 |
| 3 | 0.094 |
| 4 | 0.610 |
| 5 | 0.275 |
| 9 | 0.366 |
| 14 | 0.129 |
| 20 | 0.070 |
| 21 | 0.150 |
| 22 | 0.131 |
| 24 | 0.436 |
| 26 | 0.074 |
| 28 | 0.184 |
| 29 | 0.074 |
| 30 | 0.302 |

Table S6. Strength of directed connections from the cerebellum (ROI 12) to other ROIs. Table lists connections for the discovery sample. Connection strength as shown in the table represents the change in connection strength during "successful emotional memory encoding" (posterior probability > 0.99).

| ROI | 3 | 6 | 9 | 10 | 19 | 21 | 22 | 23 | 24 | 28 | 30 |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 12 | 0.051 | 0.110 | 0.121 | 0.159 | 0.152 | 0.119 | 0.248 | 0.041 | 0.596 | 0.266 | 0.160 |

Table S7. Strength of directed connections from other ROIs to the cerebellum (ROI 12). Table lists connections for the discovery sample. Connection strength as shown in the table represents the change in connection strength during "successful emotional memory encoding" (posterior probability > 0.99).

| ROI | 12 |
|-----|-------|
| 2 | 0.256 |
| 4 | 0.188 |
| 9 | 0.778 |
| 14 | 0.155 |
| 20 | 0.128 |
| 21 | 0.284 |
| 22 | 0.060 |
| 26 | 0.650 |
| 28 | 0.093 |
| 29 | 0.118 |
| 30 | 0.091 |

Table S8. Strength of directed connections from the cerebellum (ROI 12) to other ROIs. Table lists connections for the replication sample. Connection strength as shown in the table represents the change in connection strength during "successful emotional memory encoding" (posterior probability > 0.99).

| ROI | 9 | 10 | 22 | 23 |
|---|---|---|---|---|
| 12 | 0.355 | 0.072 | 0.183 | 0.253 |

Table S9. Strength of directed connections from other ROIs to the cerebellum (ROI 12). Table lists connections for the replication sample. Connection strength as shown in the table represents the change in connection strength during "successful emotional memory encoding" (posterior probability > 0.99).
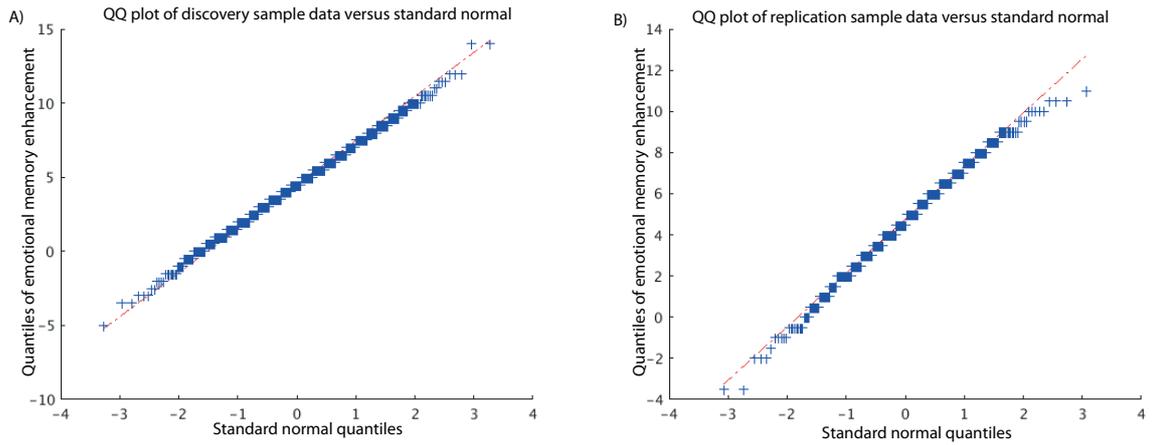


Figure S1. Sample quantiles of the behavioral effect of emotional memory enhancement versus theoretical quantiles from a normal distribution. Panels A and B show results for discovery and replication sample, respectively.
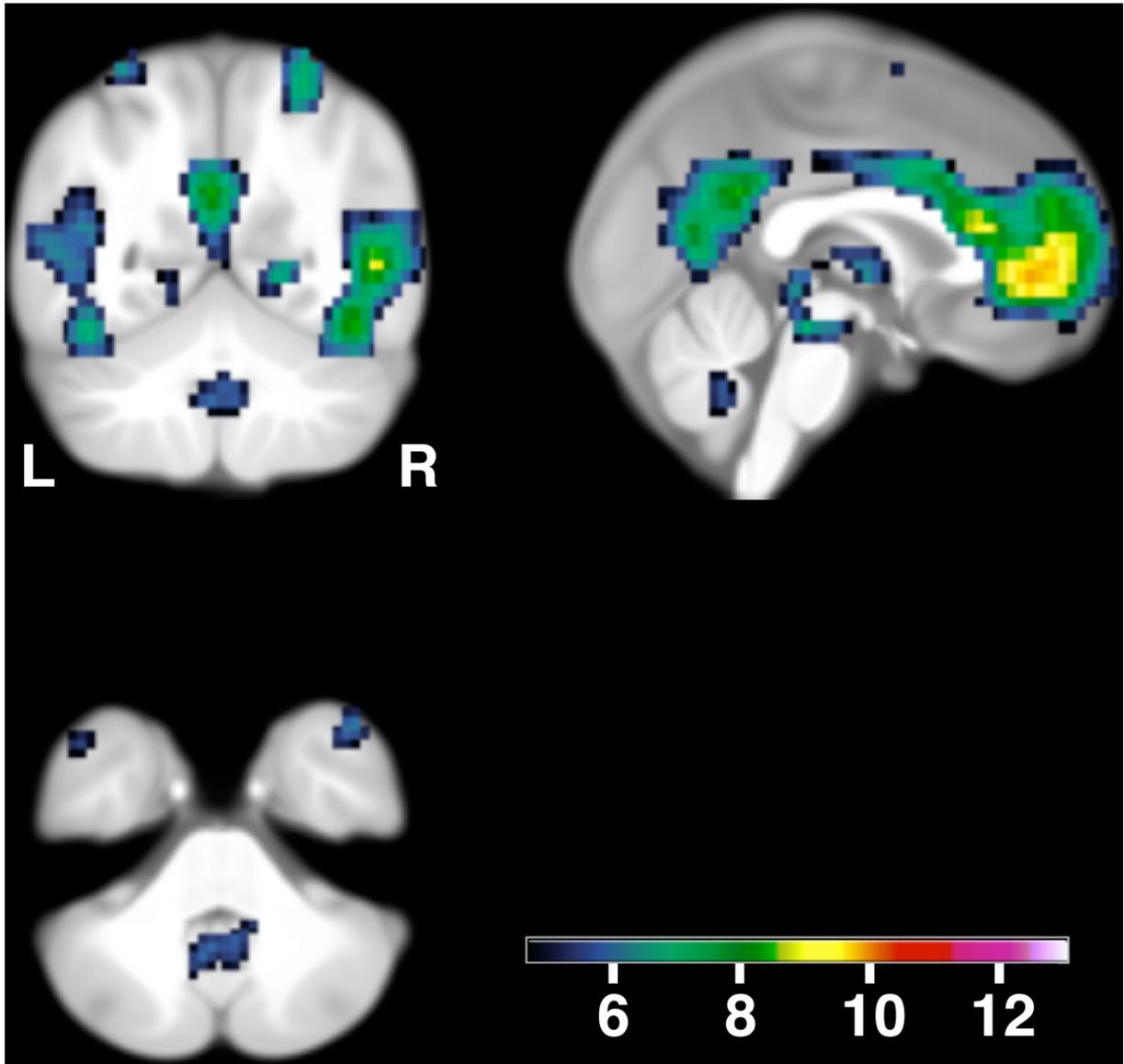
Figure S2. Voxels that show increased activation for successful emotional memory encoding within the discovery sample ($P_{\text{whole-brain-FWE-corrected}} < 0.05$, N = 944). Colors code for T-values.
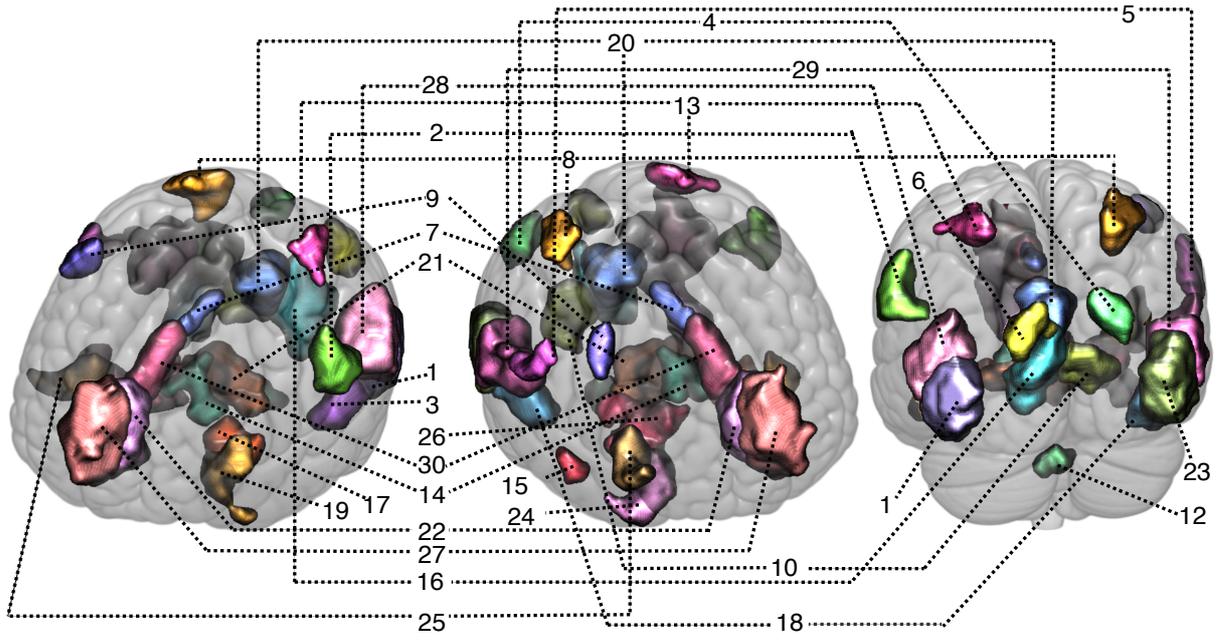
Figure S3. The figure depicts the result of the parcellation, where 29 spatially coherent regions of interest (ROIs) were identified. Different colors denote different ROIs. See Table S5 for anatomical correspondence per ROI.
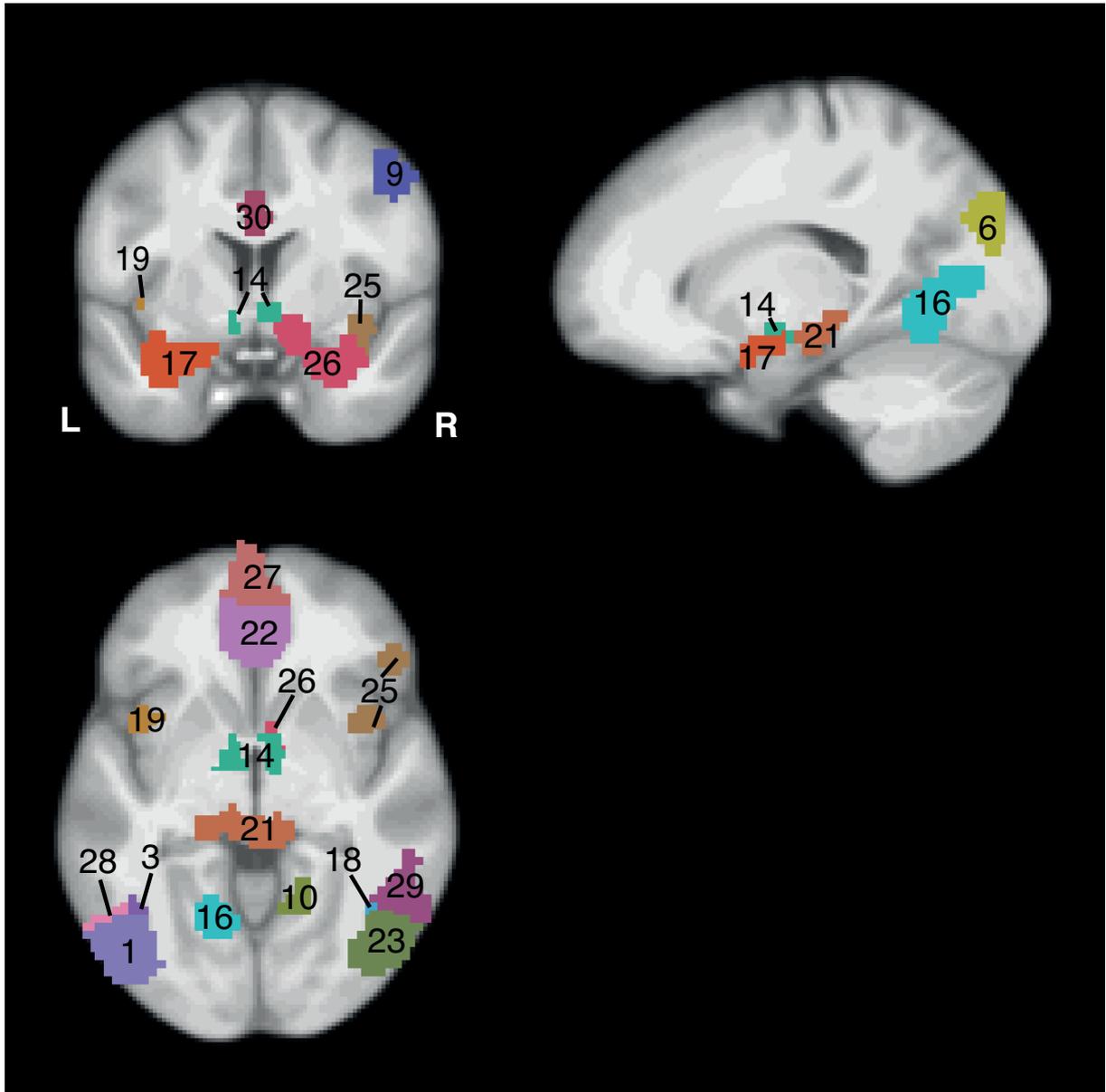
Figure S4. Result of the parcellation, where 29 spatially coherent regions of interest (ROIs) were identified. The figure depicts ROIs: 1, 3, 6, 9, 10, 14, 16, 17, 18, 19, 21, 22, 23, 25, 26, 28, 29, 30. Different colors denote different regions.
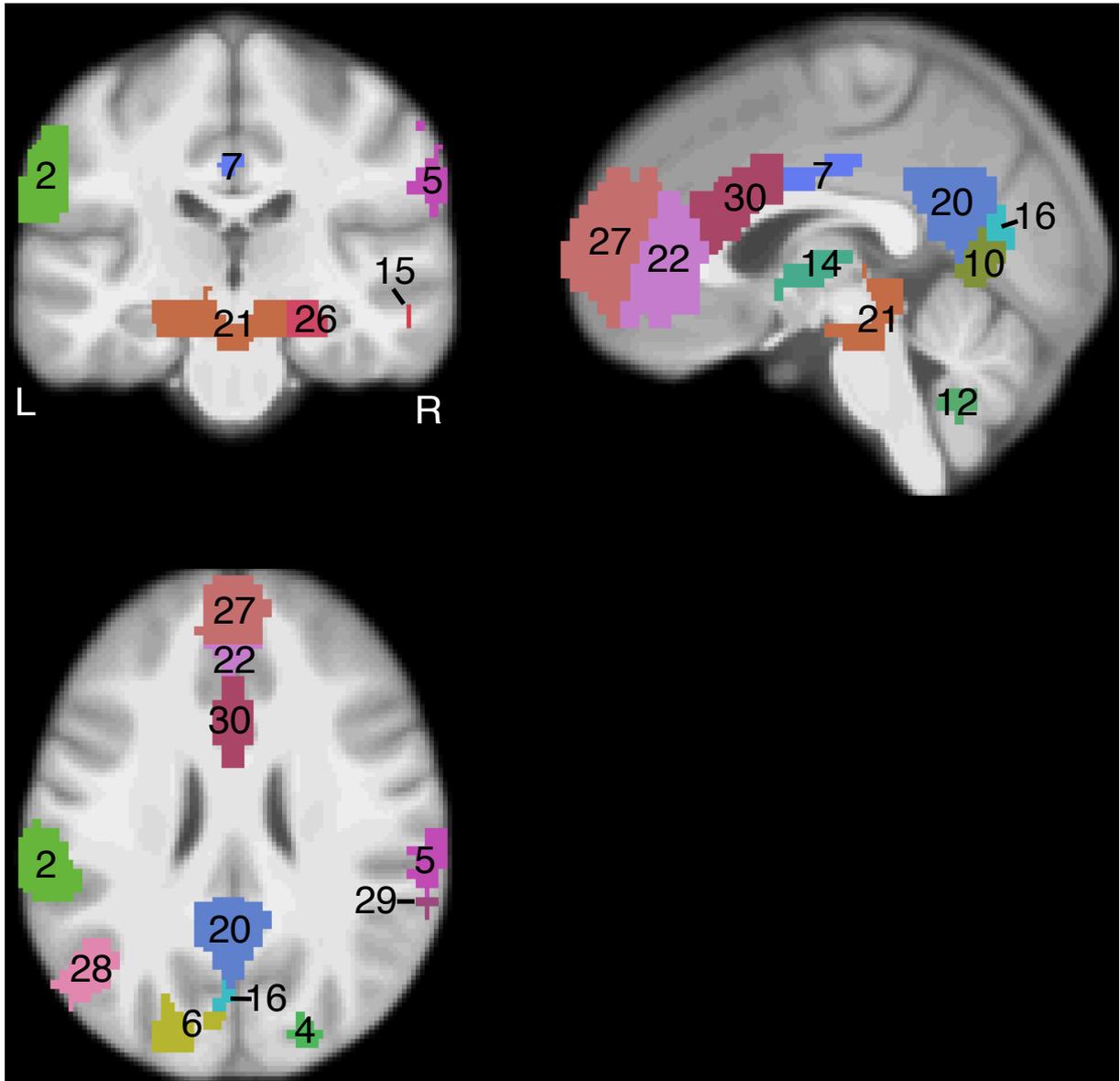
Figure S5. Result of the parcellation, where 29 spatially coherent regions of interest (ROIs) were identified. The figure depicts ROIs: 2, 4, 5, 6, 7, 10, 12, 14, 15, 16, 21, 22, 26, 27, 28, 30. Different colors denote different regions.
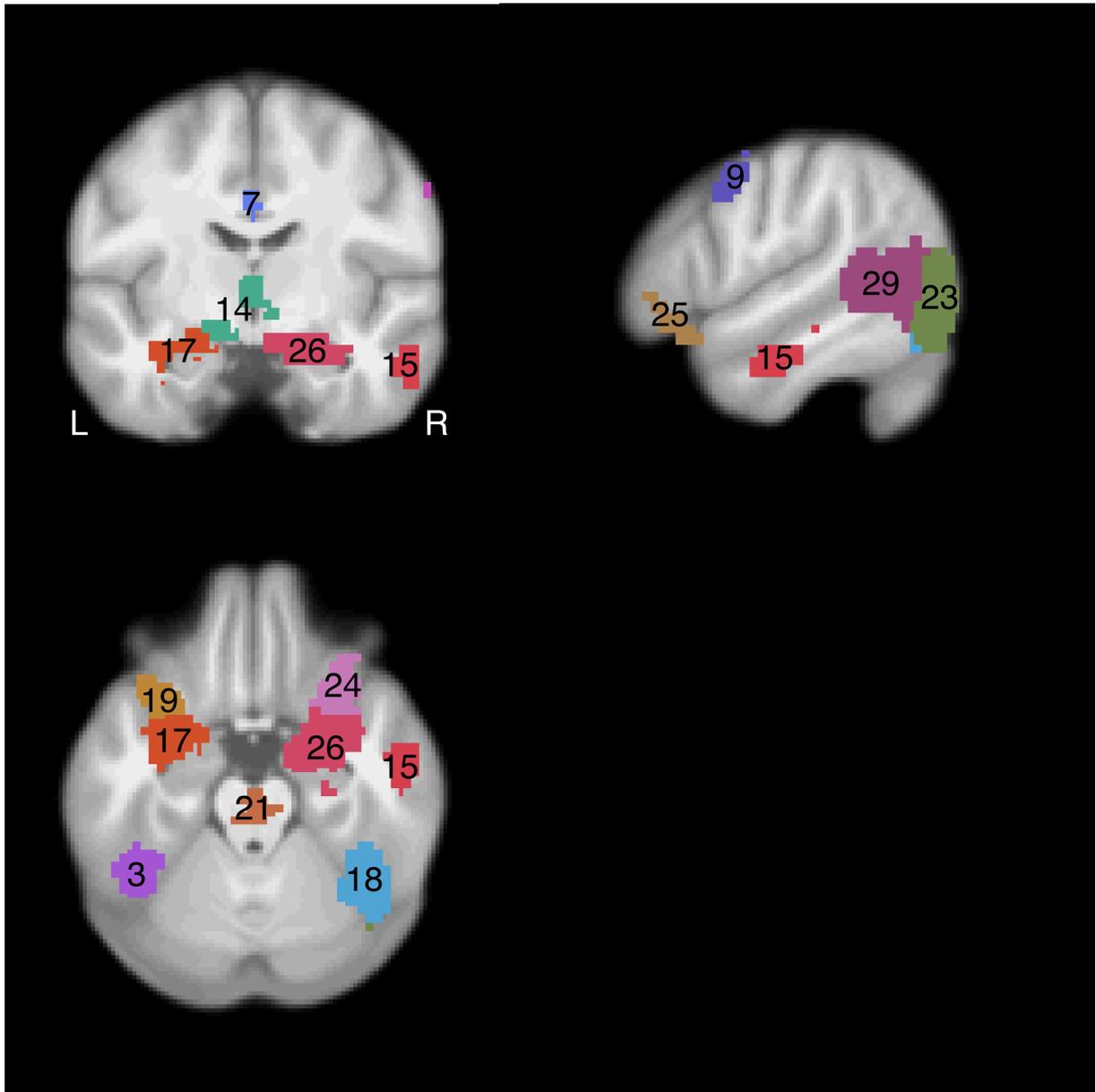
Figure S6. Result of the parcellation, where 29 spatially coherent regions of interest (ROIs) were identified. The figure depicts ROIs: 3, 7, 9, 14, 15, 17, 18, 19, 21, 23, 24, 25, 26, 29. Different colors denote different regions.
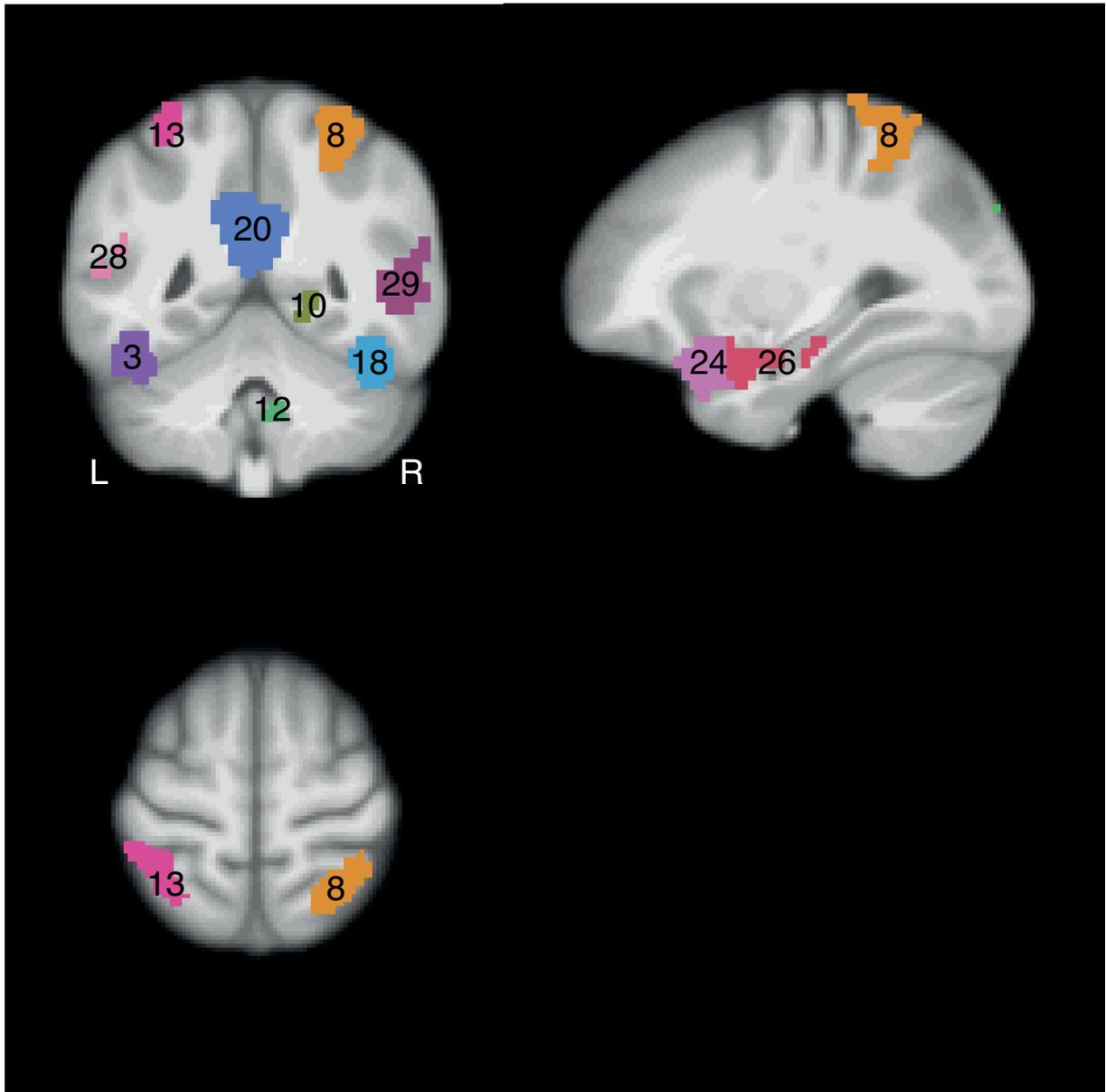
Figure S7. Result of the parcellation, where 29 spatially coherent regions of interest (ROIs) were identified. The figure depicts ROIs: 3, 8, 10, 12, 13, 18, 20, 24, 26, 28, 29. Different colors denote different regions.
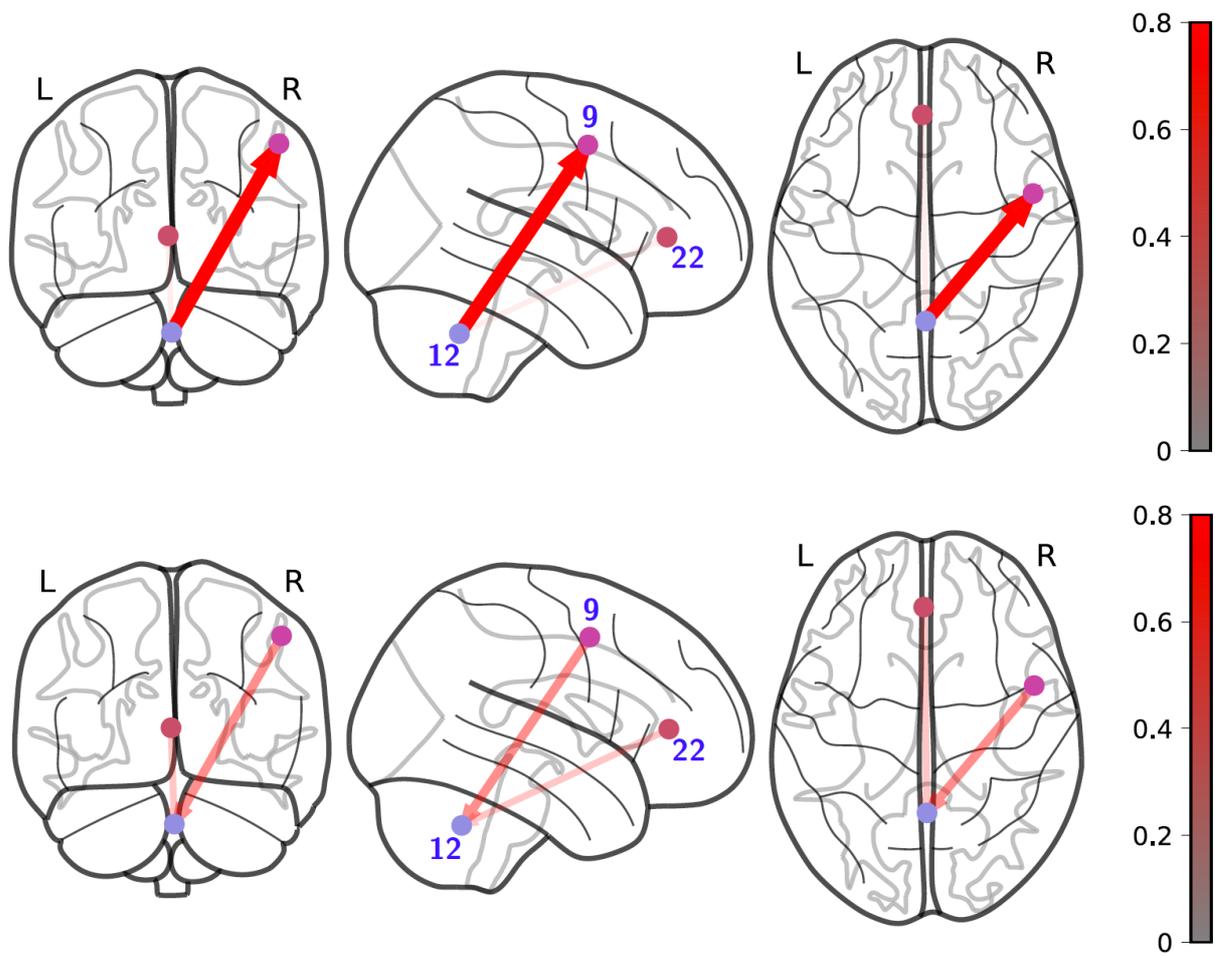
Figure S8. Bidirectional increase in the strength of cerebello-cortical connections during enhanced emotional memory encoding. The width and color of the arrows correspond to the strength of increase in connectivity in the replication sample.
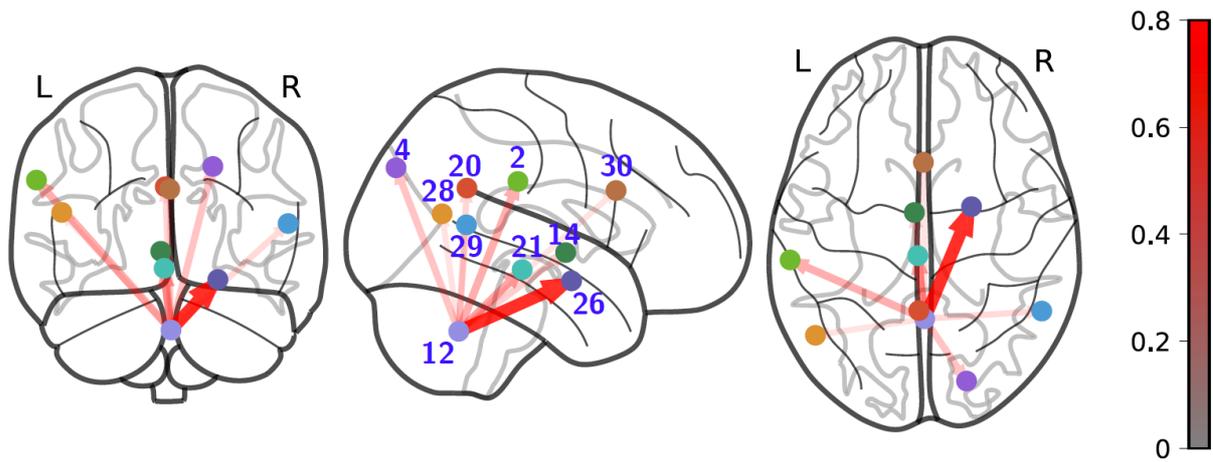
Figure S9. Increase in the strength of connections from cerebellum to cortex during enhanced emotional memory encoding. The width and color of the arrows correspond to the strength of increase in connectivity in the replication sample.
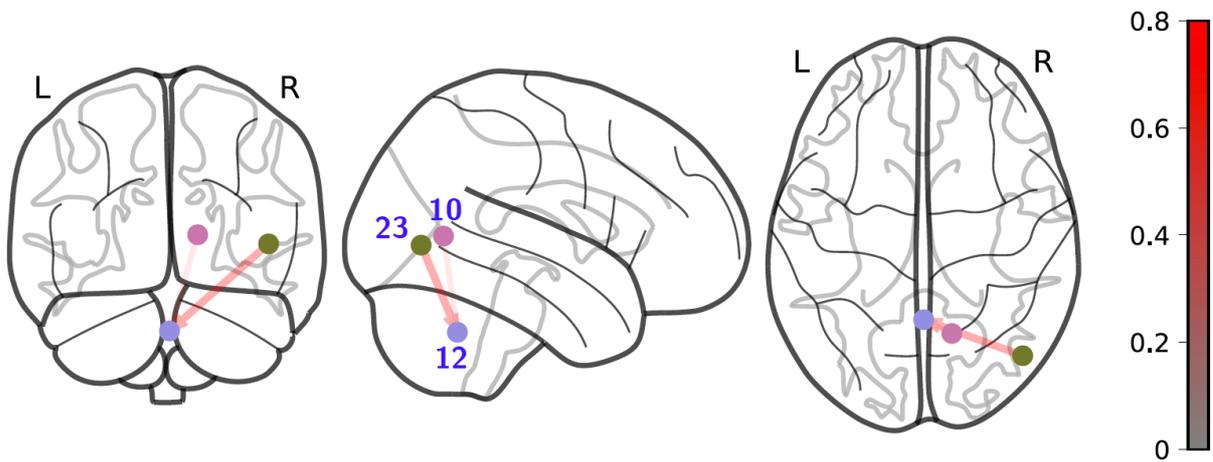


Figure S10. Increase in the strength of connections from cortex to cerebellum during enhanced emotional memory encoding. The width and color of the arrows correspond to the strength of increase in connectivity in the replication sample.