**Supplementary materials**

Supplementary tables

Table S1. Four versions of structures in which the sentences were arranged in a block. Each experimental condition contained two blocks for each version of the structures. A and B represent two narratives, and the numbers following A or B represent the order of the sentences within the narrative.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | version 1 | version 2 | version 3 | version 4 |
| sentence 1 | A1 | A1 | A1 | A1 |
| sentence 2 | B1 | B1 | B1 | B1 |
| sentence 3 | A2 | A2 | B2 | B2 |
| sentence 4 | B2 | A3 | A2 | B3 |
| sentence 5 | B3 | B2 | B3 | A2 |
| sentence 6 | B4 | B3 | A3 | B4 |
| sentence 7 | A3 | A4 | A4 | A3 |
| sentence 8 | A4 | B4 | B4 | A4 |

*Note*. Each experimental condition contained two blocks of each version of structures. A and B represents two stories and the numbers following A or B represents the order of the sentence within the story.

Table S2. Coherence rating scores of the paired sentences to be decided in the fMRI task

|  |  |  |
| --- | --- | --- |
|  | Conditions | Coherence rating scores |
| Within-narrative sentence pairs | HSHL | 6.18 (0.61) |
| HSLL | 6.23 (0.56) |
| LSHL | 6.09 (0.51) |
| LSLL | 6.32 (0.51) |
| Between-narrative sentence pairs | HSHL | 1.30 (0.35) |
| HSLL | 1.20 (0.32) |
| LSHL | 1.21 (0.30) |
| LSLL | 1.20 (0.32) |

Note. The coherence rating scores were presented in the form of mean (standard deviation). Condition labels: HSHL - high social semantic richness and high working memory load; HSLL - high social semantic richness and low working memory load; LSHL - low social semantic richness and high working memory load; LSLL - low social semantic richness and low working memory load.

Table S3. Mean (SD) accuracy and reaction time in the second preliminary behavioral experiment

|  |  |  |
| --- | --- | --- |
| Conditions | Accuracy  | Reaction time |
| HSHL | 91.0% (4.0%) | 2689 (1263) |
| HSLL | 96.9% (8.1%) | 1850 (926) |
| LSHL | 91.6% (8.1%) | 2663 (1330) |
| LSLL | 96.1% (3.4%) | 1707 (827) |

Note. Condition labels: HSHL - high social semantic richness and high working memory load; HSLL - high social semantic richness and low working memory load; LSHL - low social semantic richness and high working memory load; LSLL - low social semantic richness and low working memory load.

Table S4. Supplementary ROI analysis results

|  |  |
| --- | --- |
| ROI | Contrast |
| Social semantic effect: HSHL + HSLL - LSHL - LSLL | Difficulty effect: HSHL - HSLL + LSHL - LSLL | Interaction: HSHL - HSLL - LSHL + LSLL | Task effect: HSHL + HSLL + LSHL + LSLL |
| beta | SE | t | beta | SE | t | beta | SE | t | beta | SE | t |
| Social semantic network defined using the Neurosynth database | 0.285 | 0.021 | 13.64\*\*\* | -0.081 | 0.021 | -3.86\*\*\* | -0.078 | 0.042 | -1.867 | 0.021 | 0.06 | 0.349 |
| Left AG c1 | -0.026 | 0.03 | -0.893 | 0.457 | 0.03 | 15.45\*\*\*+ | 0.014 | 0.059 | 0.244 | 0.684 | 0.095 | 7.198\*\*\*+ |
| Right AG c1 | -0.006 | 0.033 | -0.172 | 0.409 | 0.033 | 12.226\*\*\*+ | 0.05 | 0.067 | 0.742 | 0.513 | 0.1 | 5.149\*\*\*+ |
| Left AG c2  | 0.003 | 0.028 | 0.122 | 0.272 | 0.028 | 9.753\*\*\*+ | 0.07 | 0.056 | 1.262 | 0.265 | 0.077 | 3.433\*\*+ |
| Right AG c2  | -0.008 | 0.027 | -0.288 | 0.19 | 0.027 | 7.157\*\*\*+ | 0.065 | 0.053 | 1.226 | 0.077 | 0.066 | 1.16 |
| Left AG c3  | 0.223 | 0.035 | 6.454\*\*\*+ | 0.116 | 0.035 | 3.346\*\*+ | -0.031 | 0.069 | -0.446 | -0.135 | 0.107 | -1.259 |
| Right AG c3 | 0.117 | 0.028 | 4.139\*\*\*+ | 0.066 | 0.028 | 2.348\* | -0.049 | 0.056 | -0.869 | -0.174 | 0.073 | -2.392\* |
| Left AG c4  | 0.275 | 0.027 | 10.265\*\*\*+ | -0.052 | 0.027 | -1.936 | -0.103 | 0.054 | -1.923 | 0.075 | 0.087 | 0.862 |
| Right AG c4  | 0.213 | 0.025 | 8.592\*\*\*+ | -0.075 | 0.025 | -3.045\*\*+ | -0.059 | 0.05 | -1.186 | -0.03 | 0.071 | -0.422 |

*Note*. \*P < 0.05; \*\*P < 0.01; \*\*\*P < 0.001. + *t*-values surviving the Bonferroni correction in which the significance level is divided by the number of ROIs within AG (N = 8). Condition labels: HSHL - high social semantic richness and high working memory load; HSLL - high social semantic richness and low working memory load; LSHL - low social semantic richness and high working memory load; LSLL - low social semantic richness and low working memory load. ROI labels: AG, angular gyrus

Supplementary figure captions

Fig. S1. Supplementary ROIs used in the study. **a** ROI of the social semantic network based on the Neurosynth database (Zhang et al., 2021). **b** ROIs of the Neurosynth-based functional subdivisions of the bilateral AG (4-cluster parcellation).

Fig. S2. Silhouette scores for the clusters from k = 1 to 10 for the AG ROI mask, in which k = 2 (red dots) had the best performance.

Fig. S3. Inspection of the within-ROI spatial functional homogeneity as reflected by the voxel-wise activation results. The supplementary ROIs are not shown. Condition labels: HSHL, high social semantic richness and high working memory load; HSLL, high social semantic richness and low working memory load; LSHL, low social semantic richness and high working memory load; LSLL, low social semantic richness and low working memory load. ROI labels: DMN core, core subnetwork of the default mode network; DMN DMPFC, dorsal medial prefrontal cortex subnetwork of the default mode network; DMN MTL, medial temporal lobe subnetwork of the default mode network.

Fig. S4. Social semantic effects and task effects of the three subnetworks of the DMN in the study and five previous experiments using different types of stimuli and tasks. Condition labels: HS, high social semantic richness; LS, low social semantic richness. ROI labels: DMN core, core subnetwork of the DMN; DMN DMPFC, dorsal medial prefrontal cortex subnetwork of the DMN; DMN MTL, medial temporal lobe subnetwork of the DMN. The significance of the single-condition effects (HS or LS, black labels) and the social effects (HS to LS, red labels) was labeled in each subplot. †*p* < .05 but the *t*-values did not survive the Bonferroni correction in which the significance level was divided by the number of ROIs (N = 3). \**p* < .05 and the *t*-values survived the Bonferroni correction.