**《“自我参照”神经成像研究的认知本体论数据库》的补充方法与结果**

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Supplementary methods and results for

**A cognitive ontology database for neuroimaging studies of "self-reference"**

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补充材料目录

[1 补充方法 2](#_Toc116113482)

[2. 补充结果 2](#_Toc116113483)

[参考文献 3](#_Toc116113484)

## **1. 补充方法**

为展示本数据库中神经成像坐标点数据的优势，本文采用激活可能性估计法（Activation Likelihood Estimation，ALE）对这些数据进行元分析。其基本原理是：以激活峰值为中心，将坐标点还原成3D高斯分布球体。体素越靠近激活峰值点，其激活的可能性越高，反之则越低[1]。随后对所有坐标点所还原形成的激活可能性在体素水平进行叠加。最后通过置换检验的方法进行统计检验。

本研究共涉及675篇文献，其中66篇文献与本文研究目的相关，65篇文献含有元分析所需坐标点，最终选择83个基于控制条件的实验结果进入元分析。

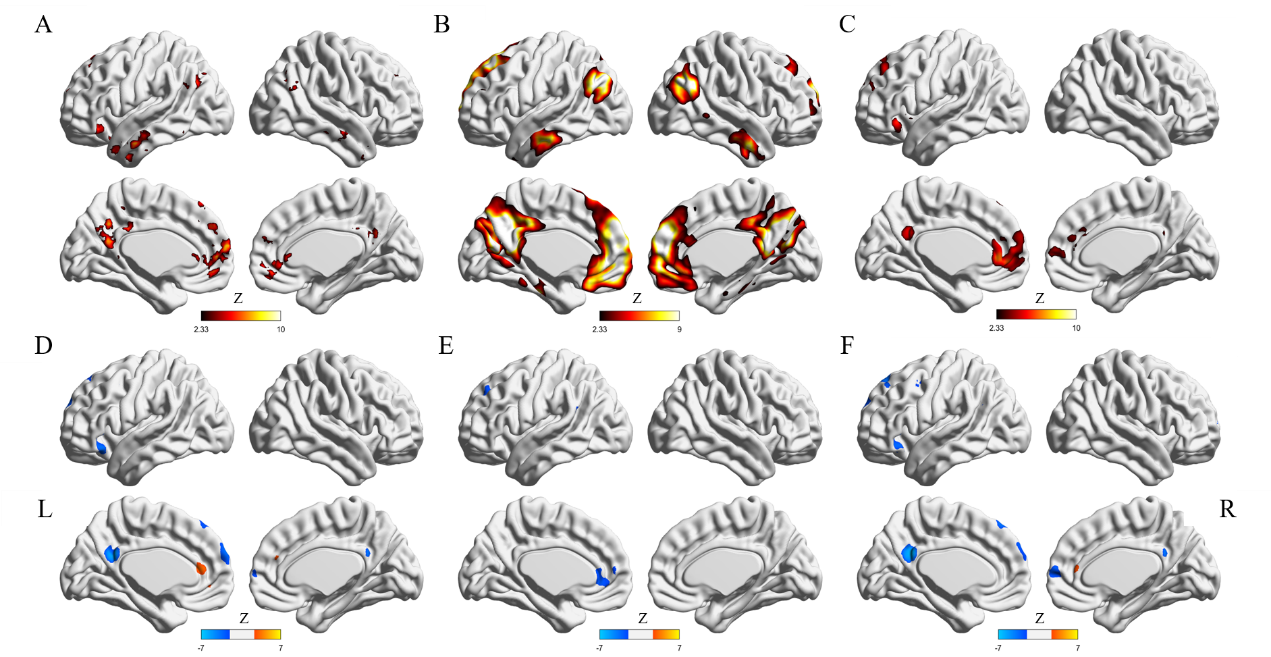
正文图5的结果来自Python工具NiMARE工具包[2]（https://nimare.readthedocs.io/）进行ALE元分析，分析环境为Python 3.8.5。对ALE进行统计检验的设置如下：置换检验中进行10 000次随机，采用cluster-level familywise error rate[3]进行多重比较校正，体素水平上显著性阈限为*p* < 0.05，形成cluster的显著性阈值为0.001。

作为对比，同时采用Eickhoff课题组的Matlab ALE分析代码进行分析，采用同样的统计检验设置，见补充结果图S1和表S1。

Neurosynth采用错误发现率（false discovery rate, FDR）,设置P < 0.01为阈值，进行自动化元分析。NeuroQuery利用监督学习和术语语义相关性，使用线性回归进行预测图的形成，它对术语的变化不太敏感，比如在Neuroquery搜索“self referential”，术语“大脑默认网络（DMN）”对预测图的贡献最大为1，而“self”和“referential”贡献占比仅有0.1和0.02，与本文的研究重心“自我参照”有所偏离，故不在正文进行详细阐述，Neuroquery得到的预测图结果见图S1 B。

元分析结果的可视化采用BrainNet Viewer[4]，通过SPM Anatomy Toolbox工具包[5]标记显著激活的簇所在的脑区解剖位置，利用脑成像数据处理和分析工具包DPABI 6.1[6]导出具体的激活脑区的解剖结构名称。

## **2. 补充结果**



**补充材料 图S1 使用Matlab进行分析得到的不同数据库间自我参照的元分析比较图。（C）本数据库的元分析结果图；（D）自我vs名人与自我vs非人称的元分析结果差异图；（E）自我vs亲密他人与自我vs名人的元分析结果差异图；（F）自我vs亲密他人与自我vs非人称的元分析结果差异图。**

**Supplementary Figure 5 Self-reference meta-analysis comparison between different databases using Matlab.**

**( C ) Meta-analysis results for this database ;** **(D) Map of self vs celebrity and self vs impersonal meta-analysis results difference; ( E) Map of self vs intimate others and self vs celebrity meta-analysis results difference; (F ) Map of self vs intimate others and self vs impersonal meta-analysis results difference.**

**补充材料 表格S1 元分析的结果**

**Supplementary Table 1 Results of meta-analysis using Matlab.**

| **脑区** | **体积**  **(voxel)** | **Z-值峰值坐标** | | | **解剖位置** |
| --- | --- | --- | --- | --- | --- |
| **x** | **y** | **z** |
| (Self - Close\_other) > (Self > non-Person) | | | |  |  |
| 1 | 69 | 6 | 36 | 14 | Cingulate Gyrus, anterior division (R) |
| (Self - non-Person) > (Self - Close\_other) | | | |  |  |
| 1 | 467 | 10 | 64 | 10 | Frontal Pole R |
| 2 | 422 | -6 | -52 | 26 | Precentral Gyrus (L) |
| 3 | 329 | -52 | 30 | -6 | Inferior Frontal Gyrus, pars triangularis (L) |
| 4 | 171 | -8 | 38 | 50 | Superior Frontal Gyrus (L) |
| 5 | 128 | -48 | -62 | 20 | Lateral Occipital Cortex, superior division (L) |
| 6 | 114 | -40 | 6 | 46 | Middle Frontal Gyrus (L) |
| (Self - Celebrity) > (Self - non-Person) | | | |  |  |
| 1 | 576 | 0 | 34 | 12 | Cingulum\_Ant\_L |
| 2 | 109 | -26 | 42 | 36 | Frontal Pole (L) |
| 3 | 77 | -60 | -46 | 16 | Supramarginal Gyrus, posterior division (L) |
| 4 | 29 | -8 | 56 | 6 | Paracingulate Gyrus (L) |
| (Self - non-Person) > (Self - Celebrity) | | | |  |  |
| 1 | 391 | -6 | -52 | 26 | Cingulate Gyrus, posterior division (L) |
| 2 | 376 | -4 | 62 | 26 | Frontal Pole (L) |
| 3 | 324 | -46 | 28 | -14 | Frontal Orbital Cortex (L) |
| 4 | 120 | -4 | 38 | 50 | Superior Frontal Gyrus (L) |
| 5 | 94 | -40 | 6 | 46 | Middle Frontal Gyrus (L) |
| 6 | 66 | -44 | -64 | 26 | Lateral Occipital Cortex, superior division (L) |
| (Self - Close\_other) > (Self - Celebrity) | | | |  |  |
| NA | NA | NA | NA | NA | None |
| (Self - Celebrity) > (Self - Close\_other) | | | |  |  |
| 1 | 408 | -10 | 36 | 10 | None |
| 2 | 133 | -18 | 40 | 44 | Frontal Pole (L) |
| 3 | 108 | -56 | -52 | 20 | Angular Gyrus (L) |
| 4 | 15 | -26 | 56 | 26 | Frontal Pole (L) |

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