

《认知神经科学》课外研学活动



图 1 与博士研究生一起做脑电图采集实验（于心理学系脑电实验室）脑电记录和分析是心理学和认识神经科学领域的重要研究手段，用于无损无创伤的记录神经活动。教师与助教通过实地实物讲解和演示，帮助学生理解脑电工作原理和实验分析流程。



图 2 脑电原理实地讲解（于心理学系脑电实验室电磁屏蔽间）



图 3 眼动技术实地讲解和实践（于心理学系眼动实验室）



图 4 基于核磁共振结构成像的大脑解剖结构和常用研究分析软件讲解（于心理学系神经影像和数据分析实验室）。大脑作为人类最复杂的器官，其解剖结构及其功能划分相关课程中的重点也是难点。本课程通过使用专业的神经影像分析和可视化软件，展示科学研究中实际应用的 3D 核磁共振神经影像数据，向同学们讲解大脑的解剖特征和结构与功能分区。同学们通过实际操作、教师讲解和讨论，加深了对大脑解剖结构的认识 and 对其功能分区的理解。

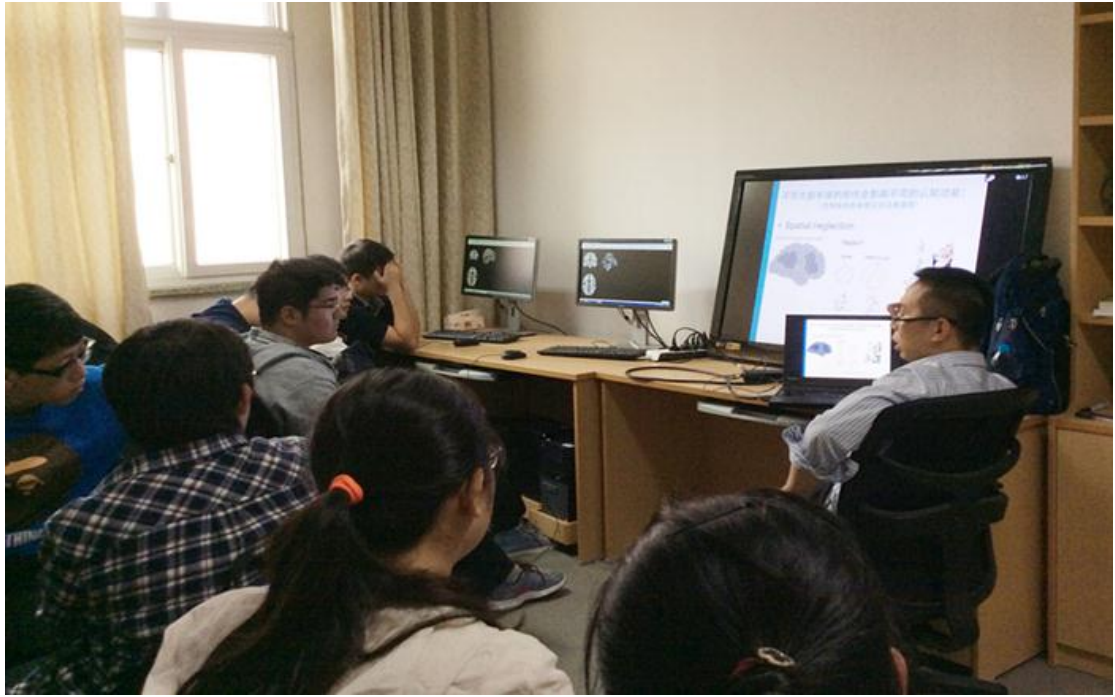


图 5 关于脑结构损伤和单侧空间忽视的师生互动讨论（心理学系神经影像和数据分析实验室）



图 6 鼓励学生参与教师课题组组会，体验科研过程

Topographic maps in human frontal and parietal cortex

Michael A. Sillitoe

Retinotopic maps (fMRI) responses to the identification and a description of representation in have recently been that involve high spatial attention, execution of actions has led to the differential and frontal map of visual spatial anatomical locational specialized topographic cortex insights into the processes and, in non-human primates, Topography, a functional cerebral cortex. Topographic representations of the spatial cortex contains locations, auditory reflecting the representation of the cochlea, and corresponding to maps have been processing of areas involved in the close spatial proximity [1].

In early visual cortex, a visual stimulus location activates topographic visual field. The layout of the cortex, or area V1, study of soldiers' occipital cortex (tr study, a map of the

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The Brain's Default Network

Anatomy, Function, and Relevance to Disease

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has converged to define the brain's default network—a baseline system that participates in internal modes of cognition to provide strong evidence that the default network system preferentially active when individuals are at rest. Analysis of connective anatomy in the monkey sagittal brain system. Providing insight into function, the default

Sex differences in the structural connectome of the human brain

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Edited by Charles Gross, Princeton University

Sex differences in human brain connectivity and structure. Males have better memory than females in memory tasks. This is due to differences in connectivity and structure. Males have larger brain volume and higher connectivity. This is due to differences in brain structure and connectivity. Males have larger brain volume and higher connectivity. This is due to differences in brain structure and connectivity.

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INVITED REVIEW

Frontal lobes and human memory

Insights from functional neuroimaging

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Summary
The new functional neuroimaging techniques, PET and functional MRI (fMRI), offer sufficient experimental flexibility and spatial resolution to explore the functional neuroanatomical bases of different memory stages and processes. They have had a particular impact on our understanding of the role of the frontal cortex in memory processing. We review the insights that have been gained, and attempt a synthesis of the findings from functional imaging studies of working memory, encoding in episodic memory and retrieval from episodic memory. Through these different aspects of memory have usually been studied in isolation, we suggest that there is sufficient convergence with respect to frontal activations to make such a synthesis worthwhile. We concentrate in particular on three regions of the lateral frontal cortex—ventro-

Keywords: frontal; memory; functional MRI; PET

Abbreviations: AFC = anterior frontal cortex; DLFC = dorsolateral frontal cortex; ERP = event-related potential; FC = frontal cortex; fMRI = functional MRI; HERA = hemispheric encoding-retrieval asymmetry; LTM = long-term memory; VLPFC = ventrolateral frontal cortex; WM = working memory.

Introduction
PET and functional MRI (fMRI) have demonstrated consistent activations of the frontal cortex (FC) in a number of memory tasks. Interpretations of these activations vary widely, however, as do their precise locations within FC. In this article, we review these findings and offer a new interpretation that takes heed of the broad anatomical variation of activations within FC.

Our main hypothesis is that functional specialization, within the context of memory-related processes, exists across at least three anatomically distinct frontal regions. This principle of functional-anatomical specialization has proved remarkably successful in, for example, the study of the visual cortex, and we see no *a priori* reason why analogous specialization might not exist within FC. We believe this approach will prove more fruitful than attempting to define a general and abstract function for FC as a whole. Ultimately however, the validity of this level of functional specialization is best judged by its success in explaining existing neuroimaging and neuropsychological data.

Neuroimaging offers a number of advantages over neuropsychology with regard to understanding the functional parcellation of FC. First, neuropsychological studies deal with lesions that often differ markedly in size and location across different patients. PET and in particular fMRI offer a more precise spatial characterization of functional differentiation across FC. Secondly, the memory deficits

图 7 《认知神经科学》课外研学文献库建设

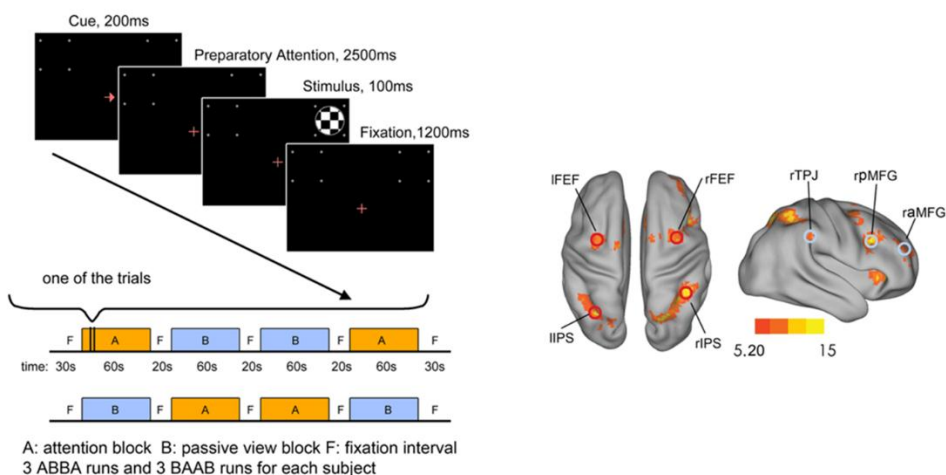


图 8 《认知神经科学》课外研学用实验数据库建设示例：视觉空间注意实验数据库及分析结果

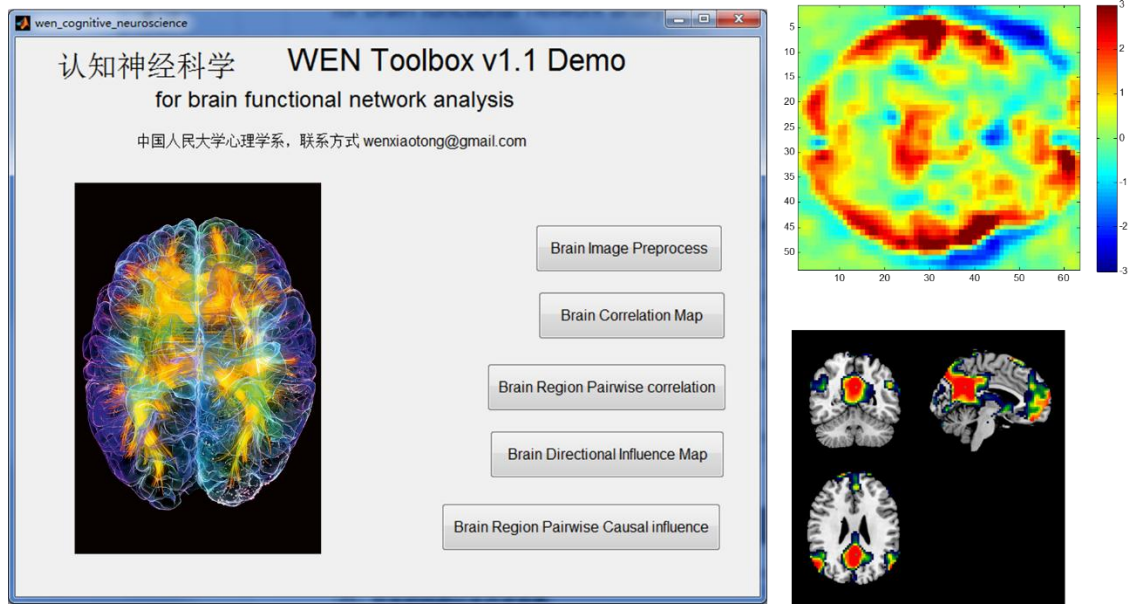


图 9 认知神经科学 fMRI 分析方法课外学习演示用程序界面