

第五章：大脑

as the seat of the soul

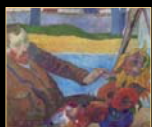
- 大脑的功能定位
- 头脑中的社会
- 大脑功能偏侧化

Art-Bot
(MEART, multi-electrode array art)

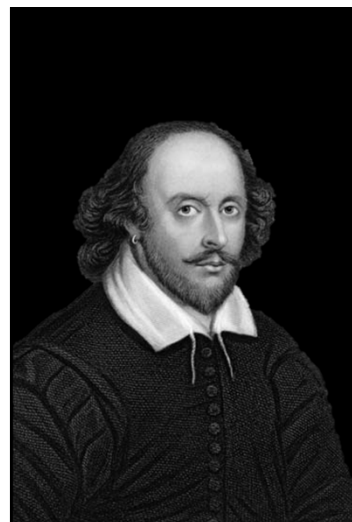
<http://www.fishandchips.uwa.edu.au/>

Art-Bot (MEART, multi-electrode array art)

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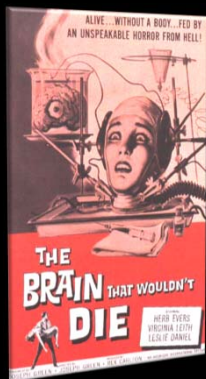
Vincent Van Gogh-Bot



“人是一件多么伟大的作品！”

理性高贵，能力无穷；
行动疾速，令人赞叹；
动若天使，思若上帝；
世界之美，万物之灵！”

— 莎士比亚 《哈姆雷特》



· 大脑的功能定位

功能整体性还是功能定位性？

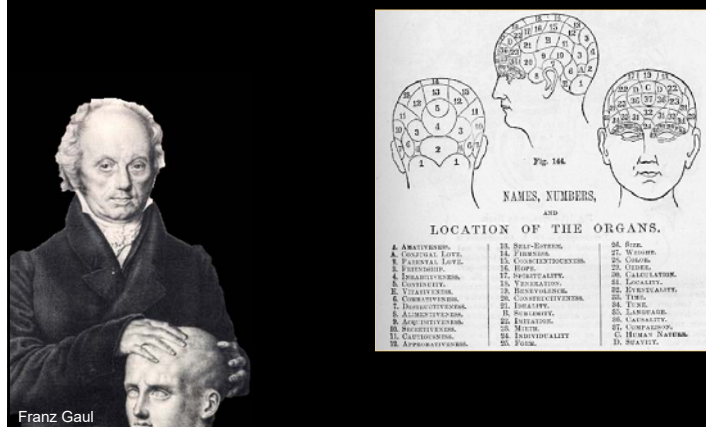
功能整体性



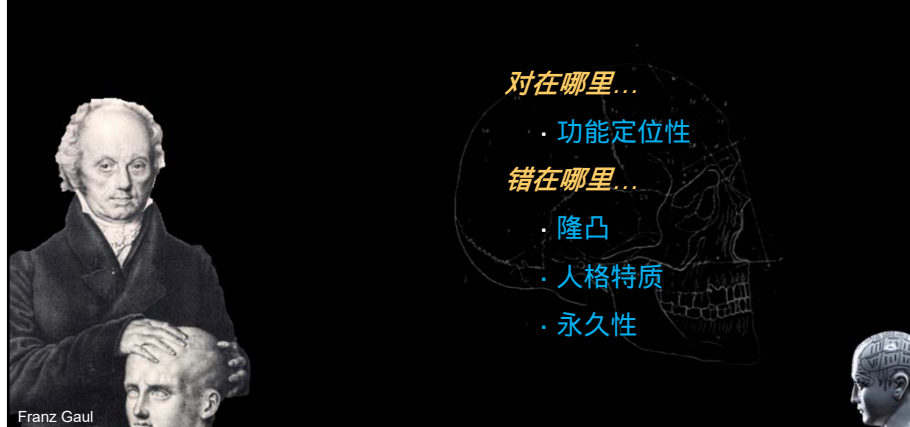
大脑的功能定位

功能定位性





Franz Gall



Franz Gall



2013 福特 Shelby GT500



1908 福特 Model T

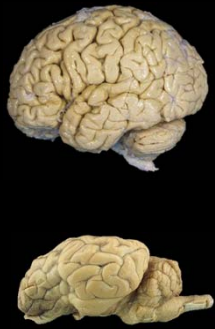


2013 福特 Shelby GT500

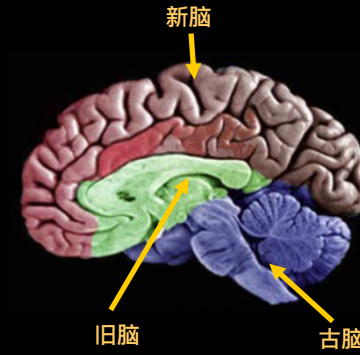


1908 福特 Model T





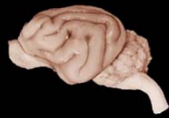
三体脑



不同物种的大脑



树鼩



猫



黑猩猩



大脑的层级结构

奢侈



自主运动，复杂判断，
符号化思维

情绪，动机，简单判断

感觉信息

简单重复性运动

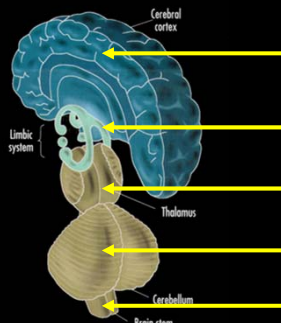
呼吸

必须



奢侈

必须



自主运动，复杂判断，
符号化思维

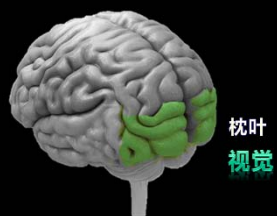
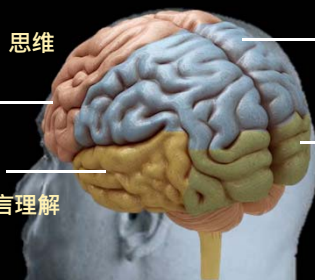
情绪，动机，简单判断

感觉信息

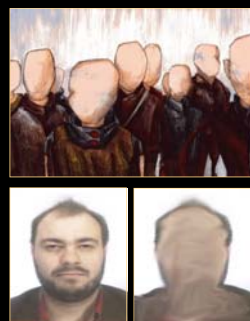
简单重复性运动

呼吸

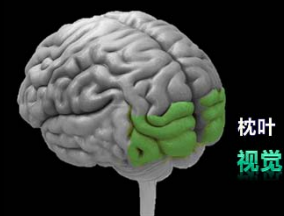
躯体感觉，空间位置
顶叶
说话，表象，思维
额叶
视觉
枕叶
听觉，语言理解
颞叶



面孔失认症
(PROSOPAGNOSIA)



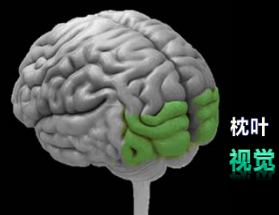
一个面孔失认症病人的丈夫的脸以及她所看到的丈夫的脸
(来自于www.prosopagnosia.com)



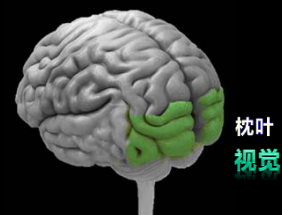
盲视
(BLINDSIGHT)



盲视



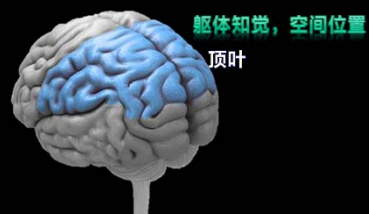
盲视
(BLINDSIGHT)



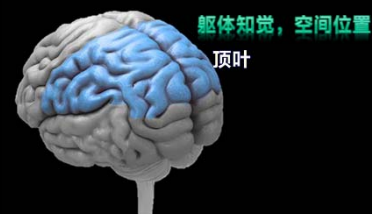
盲视
(BLINDSIGHT)



(银行) BANK (河岸)



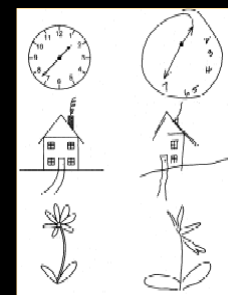
空间忽略
(SPATIAL NEGLECT)



空间忽略
(SPATIAL NEGLECT)

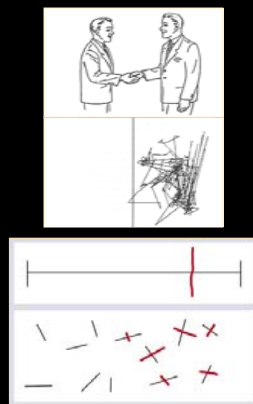
原画

临摹



躯体知觉, 空间位置
顶叶

空间忽略
(SPATIAL NEGLECT)



躯体知觉, 空间位置
顶叶

空间忽略
(SPATIAL NEGLECT)



威尔尼克区
接受性失语症
颞叶
听觉, 语言理解



Karl Wernicke
(1848-1904)

接受性失语症

那个金剛圈尺寸太差, 前重后轻左高右窄, 他带上之后很不舒服, 整晚失眠, 会连累我嘛! 他显然是个猴子, 可是你也不能这样对他, 官府知道了会说我虐待动物的! 说起那个金剛圈, 去年我在陈家村认识了一位铁匠, 他手工精美、价钱又公道、童叟无欺, 干脆我介绍你再定做一个吧!



威尔尼克区失语症: 无内容但语法完整

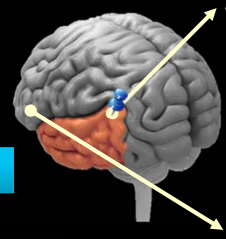
Patient C.B. attempting to explain a picture of a child taking a cookie as a woman spills water



C.B.: Uh, well this is the ... the of this. This and this and this and this. These things going in there like that. This is things here. This one here, these two things here. And the other one here, back in this one, this one look at this one.

Examiner: Yeah, what's happening there?

C.B.: I can't tell you what that is, but I know what it is, but I don't now where it is. But I don't know what's under. I know it's you couldn't say it's ... I couldn't say what it is. I couldn't say what that is. This shu-- that should be right in here. That's bad in there. Anyway, this one here, and that, and that's it. This is the getting in here and that's the getting around here, and that, and that's it. This is getting in here and that's the getting around here, this one and one with this one. And this one, and that's it, isn't it?



威尔尼克区

Karl Wernicke
(1848-1904)

接受性失语症

布洛卡区

Pierre Paul Broca
(1824-1880)

运动性失语症

悟空，看看！

那个金箍圈尺寸太差，前圈后轻左宽右窄，他带上之后很不舒服，整晚失眠，会连累我嘛！他虽然是个猴子，可是你也不能这样对他，官府知道了会说虐待动物的！说起那个金箍圈，去年我在陈家村认识了一位铁匠，他手工精美，价钱又公道，童叟无欺，干脆我介绍你再定做一个吧！

布洛卡区失语症: 有意义但无语法

Patient M. E. attempting to tell the story of Cinderella



M.E.: Cinderella...poor...um 'dopted her...scrubbed floor, um, tidy...poor, um...'dopted...Si-sisters and mother...ball. Ball, prince um, shoe...scrubbed and uh washed and um...tidy, uh, sisters and mother, prince, no, prince, yes. Cinderella hooked prince. Um, um, shoes, um, twelve o'clock ball finished.

Examiner: So what happened in the end?

M.E.: Married.

Examiner: How does he find her?

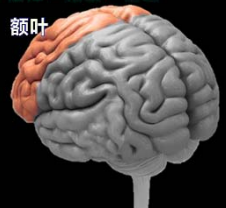

M.E.: Um, Prince, um, happen to, um...Prince, and Cinderella meet, um met um met.

Examiner: What happened at the ball? They didn't get married at the ball.

M.E.: No, um, no...I don't know. Shoe, um found shoe...

说话，想象，思考

额叶

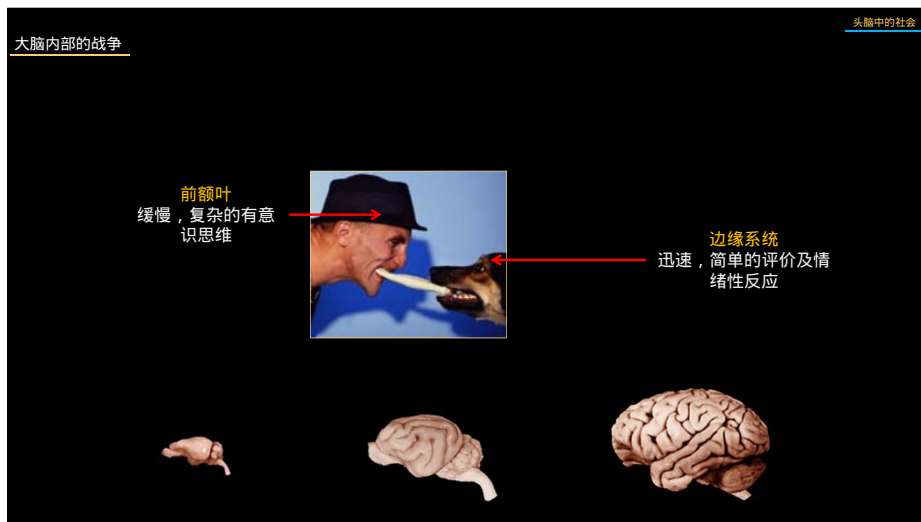
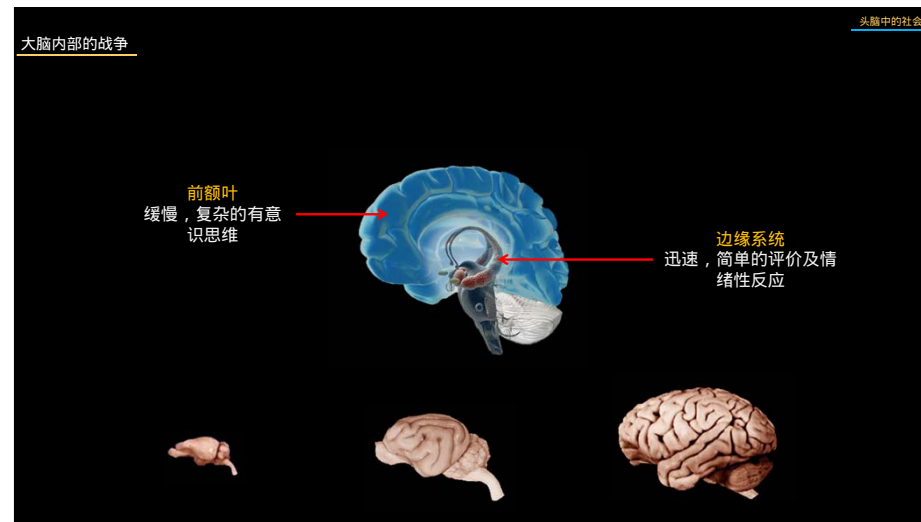
额叶损伤:

时间固着，无计划性，易冲动等

各种高级功能的缺失



· 头脑中的社会



新脑知道旧脑不知道的事情



新脑知道旧脑不知道的事情



Greene, Sommerville, Nystrom, Darley, & Cohen (2001)



当前轨道



另一个轨道



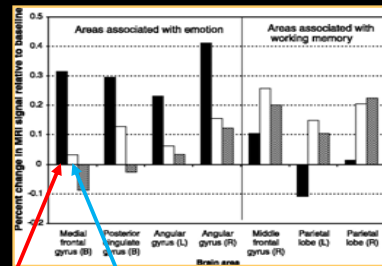
按钮?

Greene, Sommerville, Nystrom, Darley, & Cohen (2001)



推人?

Greene, Sommerville, Nystrom, Darley, & Cohen (2001)



推人

按钮



Greene, Sommerville, Nystrom, Darley, & Cohen (2001)



按钮



是，符合逻辑。



无所谓。

Greene, Sommerville, Nystrom, Darley, & Cohen (2001)



推人



是，符合逻辑。

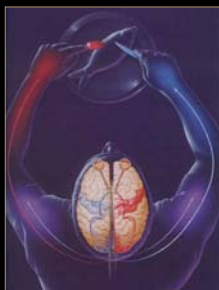


绝不！！

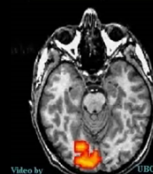
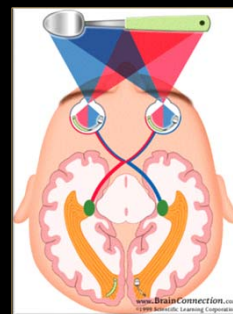


· 大脑功能偏侧化

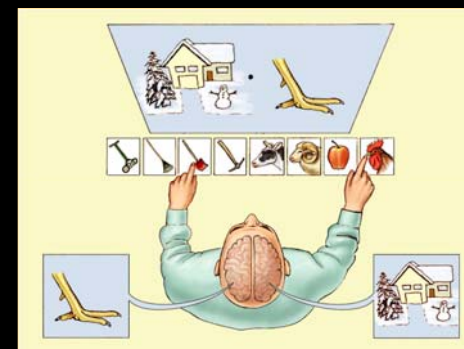
左侧

对侧的感觉加工
及运动控制言语分析, 数学
能力, 抽象思维

右侧

对侧的感觉加工
及运动控制非语言分析
(音乐, 艺术, 空
间定位...)

初级视觉皮层

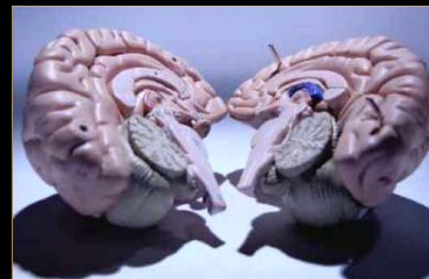


右脑(左手) 画出:



左脑说出:

我什么都没有看到!



我们是真的是有两半大脑吗?



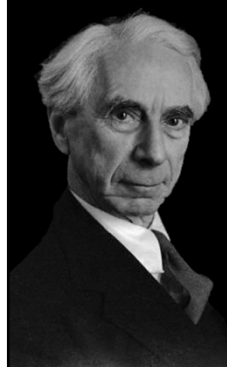
你究竟在哪里?

在现实世界中还是在你的大脑里?



你究竟在哪里?

在现实世界中还是在你的大脑里?



" Common sense, though all very well for everyday purposes, is easily confused, even by such simple questions as... When you feel a pain in the leg that has been amputated, where is the pain? If you say it is in your head, would it be in your head if your leg had not been amputated? If you say yes, then what reason have you for ever thinking you have a leg? "

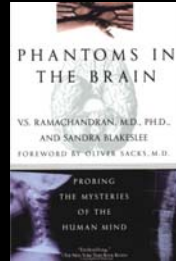
Bertrand Russell

你究竟在哪里？

在现实世界中还是在你的大脑里？

"The experiments I've discussed so far have helped us understand what is going on the brain of patients with phantoms and given us hints as to how we might help alleviate their pain. But there is a deeper message here' your own body is a phantom, one your brain has temporarily constructed. "

Ramachandran, V.S. and S. Blakeslee
Phantoms in the Brain: Probing the Mysteries of the Human Mind
New York: William Morrow, 1998



KEY CONCEPT

- 神经活动产生了主观世界
- 我们有很多方法测量大脑活动，但是没有哪个方法是完美的
- 大脑的功能是定位的和偏侧化的，但是并非是严格的定位和偏侧化
- 大脑就像是一个考古学的挖掘现场
- 大脑中是一个分治的社会，各个系统相互在争斗中保持平衡
- 裂脑人经验着一个跟我们不一样的世界

