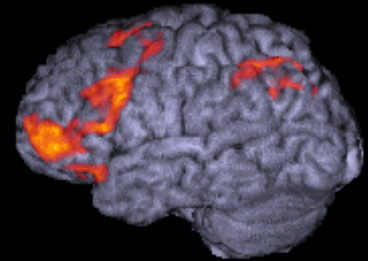


# Giftedness and the brain

## Session 3: 1430-1600

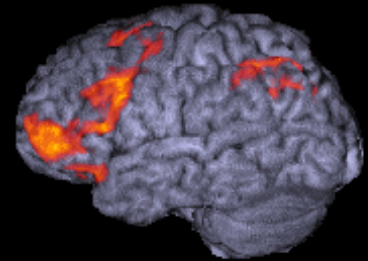
- Neuromyths and fads
  - The 10% myth
  - The dolphin myth
  - The L & R Thinking myth
  - The MI myth
  - The VAK myth
  - The brain gym myth
- Neural basis of emotion
  - Phineas Gage
  - Love vs fear
  - Attitudes in education research



# Giftedness and the brain

## Session 3: 1430-1600

- Neuromyths and fads
  - The 10% myth
  - The dolphin myth
  - The L & R Thinking myth
  - The MI myth
  - The VAK myth
  - The brain gym myth
- Neural basis of emotion
  - Phineas Gage
  - Love vs fear
  - Attitudes in education research



# Popular nonsense about the brain

## 1

“We only use 10% of our brains”

# Sources of the 10% myth

- Italian neuro-surgery removing scoops of brains of psychiatric patients (1890)
- Einstein imploring us to think more (1920)
- American advertisers of home-help manuals (1930)
- Wishful thinking educationists (1980 - 2000)

# The absurdity of the 10% myth

Evolution does not produce excess, much less 90% excess.

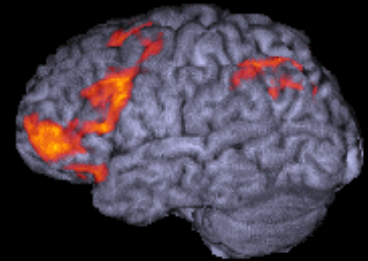
In the millions of neurological studies ever conducted, no one has ever found an unused portion of the brain!

Beyerstein, 2004

# Giftedness and the brain

## Session 3: 1430-1600

- Neuromyths and fads
  - The 10% myth
  - The dolphin myth
  - The L & R Thinking myth
  - The MI myth
  - The VAK myth
  - The brain gym myth
- Neural basis of emotion
  - Phineas Gage
  - Love vs fear
  - Attitudes in education research



# Popular nonsense about the brain

## 2

“Other animals, especially dolphins, have larger brains and therefore are more intelligent”

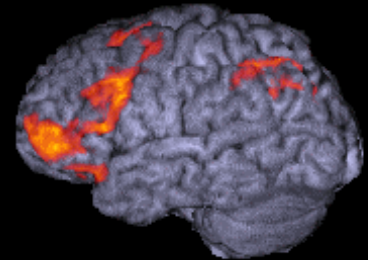
# Animal brains

	brain vol	EQ	area of cortex
rat	2.3 ml	0.4	postage stamp
cat	25 ml	1.0	drinks coaster
chimp	440 ml	2.5	handkerchief
human	1350 ml	6.3	table cloth

# Giftedness and the brain

## Session 3: 1430-1600

- Neuromyths and fads
  - The 10% myth
  - The dolphin myth
  - The L & R Thinking myth
  - The MI myth
  - The VAK myth
  - The brain gym myth
- Neural basis of emotion
  - Phineas Gage
  - Love vs fear
  - Attitudes in education research



# Popular nonsense about the brain

## 3

“There is left and right-brain thinking”

**Incidence of Left, Right, and Bilateral Speech Representation  
Derived from Unilateral Brain Injury Data (%)**

	Speech lateralization		
	Left	Bilateral	Right
Right-handers	95.5	—	4.5
Left-handers	61.4	19.8	18.8

# Semantic system is left lateralised

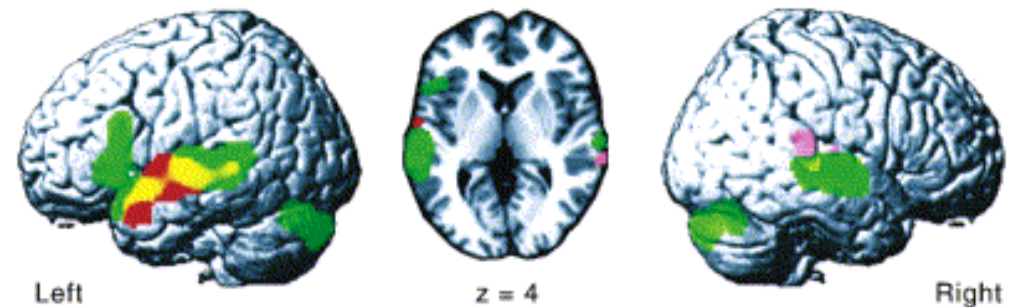
language = left hemisphere

graphic & emotional = right hemisphere

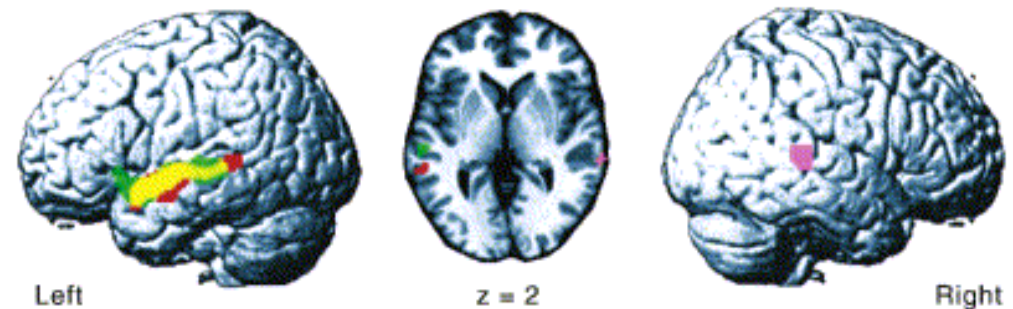
“A significant quantitative bias found in the brains of extremely right-handed subjects.”

“It is dangerous to suppose that language processing only occurs in the left hemisphere of all people.”

A CONTROLLED SEMANTICS



B COMPARISON WITH LISTENING AND NAMING



■ WORDS & SOUNDS  
■ WORDS > SOUNDS

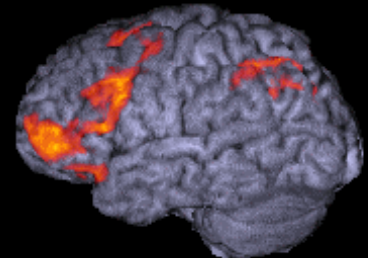
■ OVERLAP ■ & ■  
■ SOUNDS > WORDS

Thierry, Giraud & Price, *Neuron*, 2003

# Giftedness and the brain

## Session 3: 1430-1600

- **Neuromyths and fads**
  - The 10% myth
  - The dolphin myth
  - The L & R Thinking myth
  - **The MI myth**
  - The VAK myth
  - The brain gym myth
- **Neural basis of emotion**
  - Phineas Gage
  - Love vs fear
  - Attitudes in education research



# Popular nonsense about the brain

## 4

“There are multiple intelligences”

# Nothing new here ...

## Plato (500 BC)

- logic
- rhetoric
- arithmetic
- geometry-astronomy
- music
- dance-physical
- *meditation*

## Gardner (1980 AD)

- logic-mathematics
- verbal
- interpersonal
- spatial
- music
- movement
- intrapersonal

# Nothing new here ...

## Plato (500 BC)

## Gardner (1980 AD)

- |                      |   |                     |
|----------------------|---|---------------------|
| • logic              | → | • logic-mathematics |
| • rhetoric           | → | • verbal            |
| • arithmetic         | → | • interpersonal     |
| • geometry-astronomy | → | • spatial           |
| • music              | → | • music             |
| • dance-physical     | → | • movement          |
| • <i>meditation</i>  | → | • intrapersonal     |

# Common brain functions for all acts of intelligence

- Working memory = lateral frontal cortex
- Long term memory = hippocampus + ...
- Decision making = orbitofrontal cortex
- Emotional mediation = limbic subcortex + ofc
- Sequencing of symbolic representation = fusiform gyrus + temporal lobe
- Conceptual inter-relationships = parietal lobe

# *Accidental Death of an Anarchist*

Darien Fo

Oxford Playhouse February 2005

- Cast:

- *The Maniac* DPhil archeology
- *Inspector Pisani* physics
- *Journalist* DPhil education
- *Constable Luigi* English
- *Constable Giani* philosophy

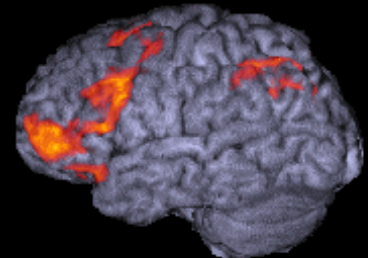
- Production:

- *Director* physics
- *Producer* medicine
- *Production Manager* mathematics
- *Production Manager* law
- *Set Designer* chemistry
- *Lighting Designer* ancient history
- *Sound Designer* medicine
- *Assistant Director* French
- *Stage Builder* pharmacology
- *Deputy Stage Manager* physics
- *Scenic Artist* engineering
- *Seamstress* anthropology
- *Costumes* English
- *Marketing* classics
- *Press Officer* economics

# Giftedness and the brain

## Session 3: 1430-1600

- Neuromyths and fads
  - The 10% myth
  - The dolphin myth
  - The L & R Thinking myth
  - The MI myth
  - **The VAK myth**
  - The brain gym myth
- Neural basis of emotion
  - Phineas Gage
  - Love vs fear
  - Attitudes in education research



# Popular nonsense about the brain

## 5

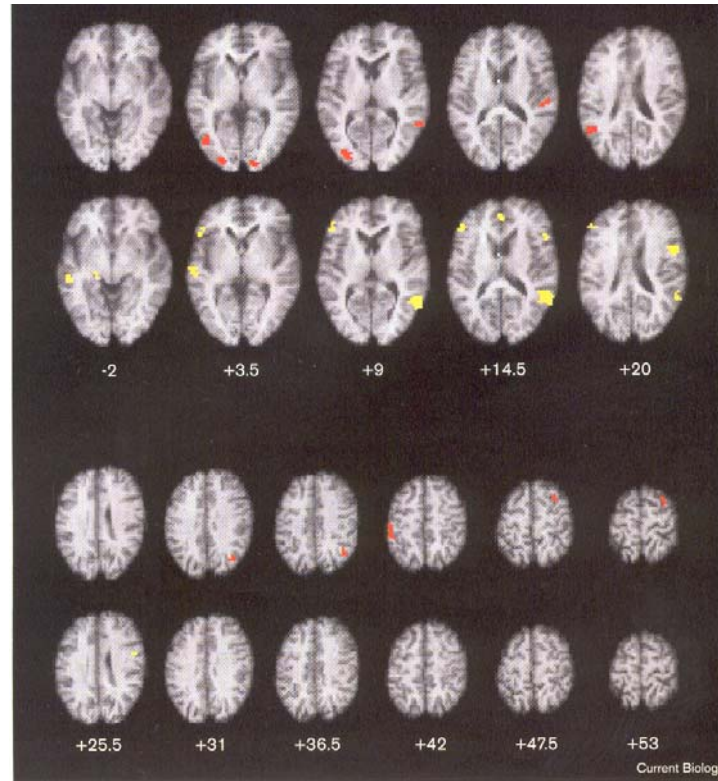
“Everyone has a dominant learning style:

- Auditory
- Visual
- Tactile/kinaesthetic”

# Perception (NOT learning) styles

- Input modalities in the brain are inter-linked
  - Visual-auditory
  - Visual-motor
  - Motor-auditory
  - Visual-taste
- Information is abstracted to be processed, mostly unconsciously (Luria, 1962; Dehaene et al, 2001)

# Visual-auditory cross-modal binding



Calvert et al (2000)

reinforcing = additive

interfering = subtractive

There are modally specific individual differences in perceptual acuities ...

but

1. cross-modal connectivity compensates for differences in perceptual strengths
2. perceptual information is abstracted to process and learn

# Global Workspace Model

