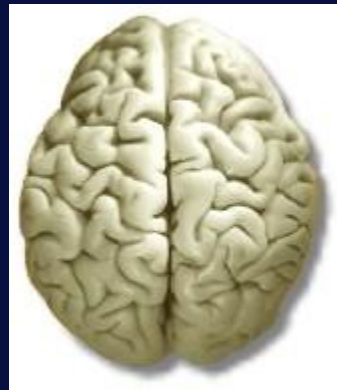


# AS level Psychology The Core studies

## The Biological Approach



# The Split Brain Studies - R Sperry 1968

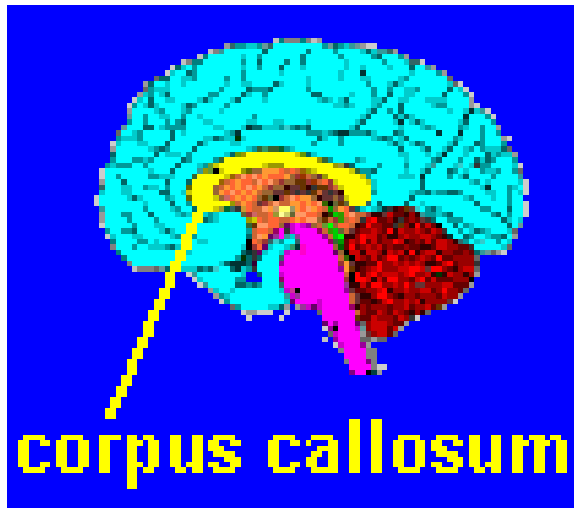
- THREE Questions...
- What happens when the two halves of the brain are disconnected?
- **Do the hemispheres perform different functions?**
- **Does each hemisphere have its own memories, perceptions and concepts?**

## Some background....

- Why are there two halves to the brain?
- The corpus callosum joins the two halves of the brain
- **A commissurotomy is the division of the two hemispheres by surgery**

## Some background....

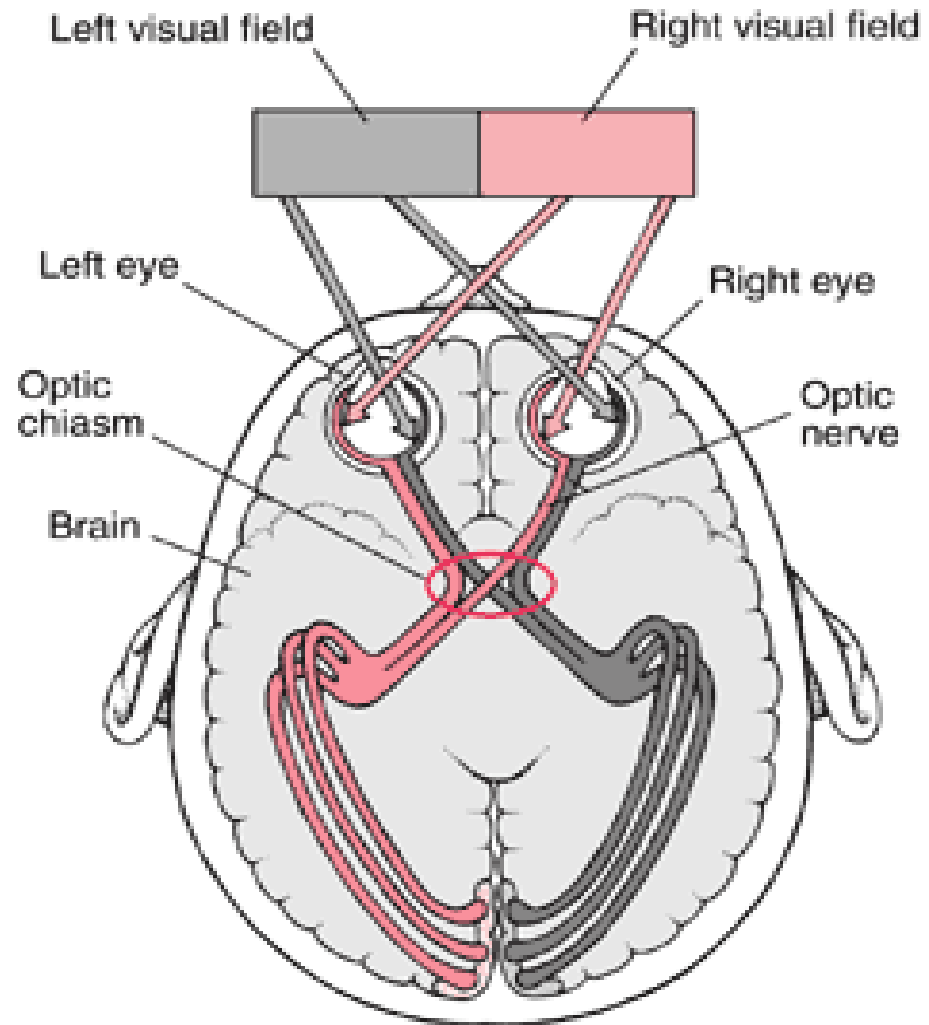
- The corpus callosum joins the two halves of the brain



# The two hemispheres

- The **RIGHT** side of the brain processes info from **LEFT** half of body
- The **LEFT** side of brain processes info from **RIGHT** half of body
- **VISUAL PATHWAYS CROSS OVER**

# The visual pathways



## Brain Functions

- **The supposition**
- The left half of the brain is specialised for language
- **linguistic expression both symbolic and logical**
- The right half of the brain is specialised for perception
- **visuospatial and artistic**

# SPERRY (1968)

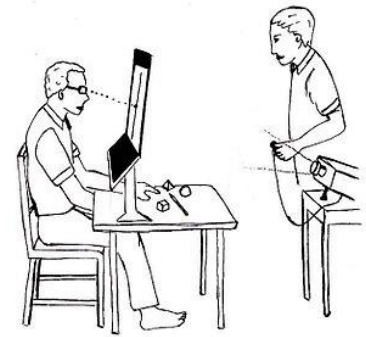
- **Aims:**
  - To demonstrate that hemispheres have different functions/abilities
  - Each hemisphere has it's own conscious awareness & memory
- **Method:** A NATURAL EXPERIMENT
- **Participants:** 11 participants, all male.  
Epileptics who had all undergone commisectomy





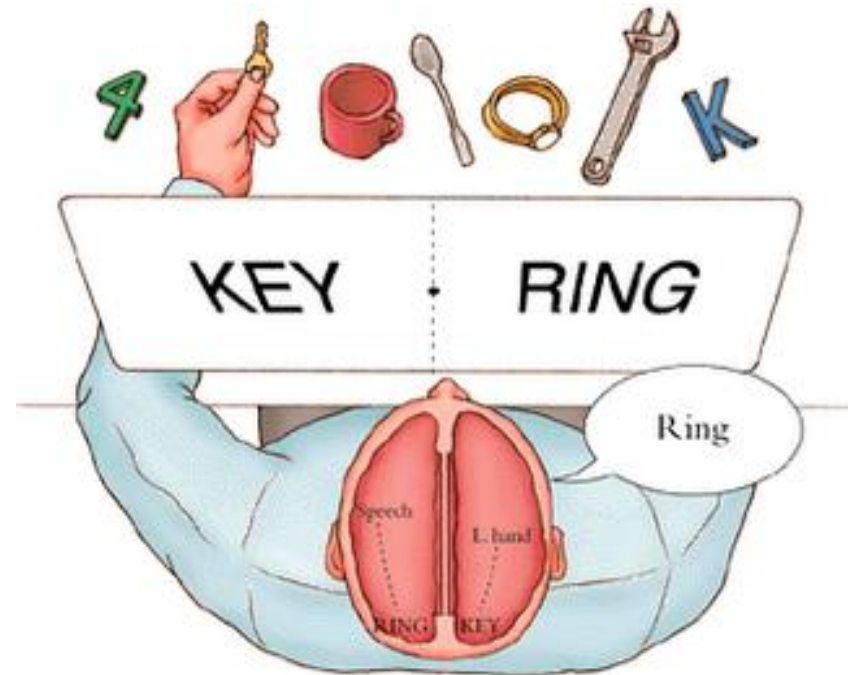
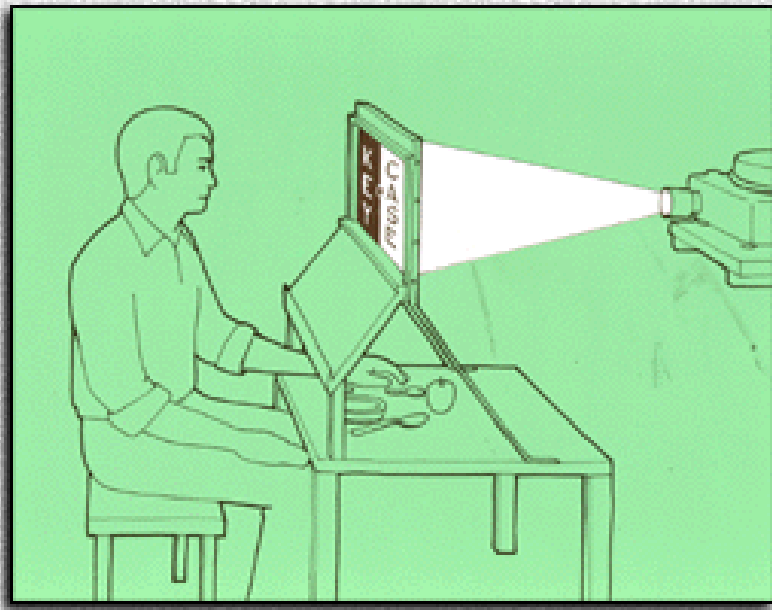
# Sperry: The split brain procedure

- **Procedure:**
- The subject has one eye covered
- Gazes at a fixation point on an upright translucent screen (**tachistoscope**)
- **Visual Stimuli Tests:**
- slides are projected either side (or both) of the fixation point at a rate of one picture per 1/10 second
- P's have to say or write what they have seen
- **Tactile Stimuli Tests:** Objects are presented to left or right hand (or both) behind screen. P's must point, feel or draw objects (with left hand)
- **Tests to Right hemisphere:** Range of tests/puzzles

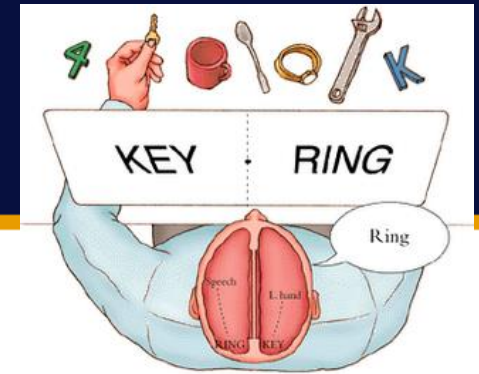


# The split brain procedure

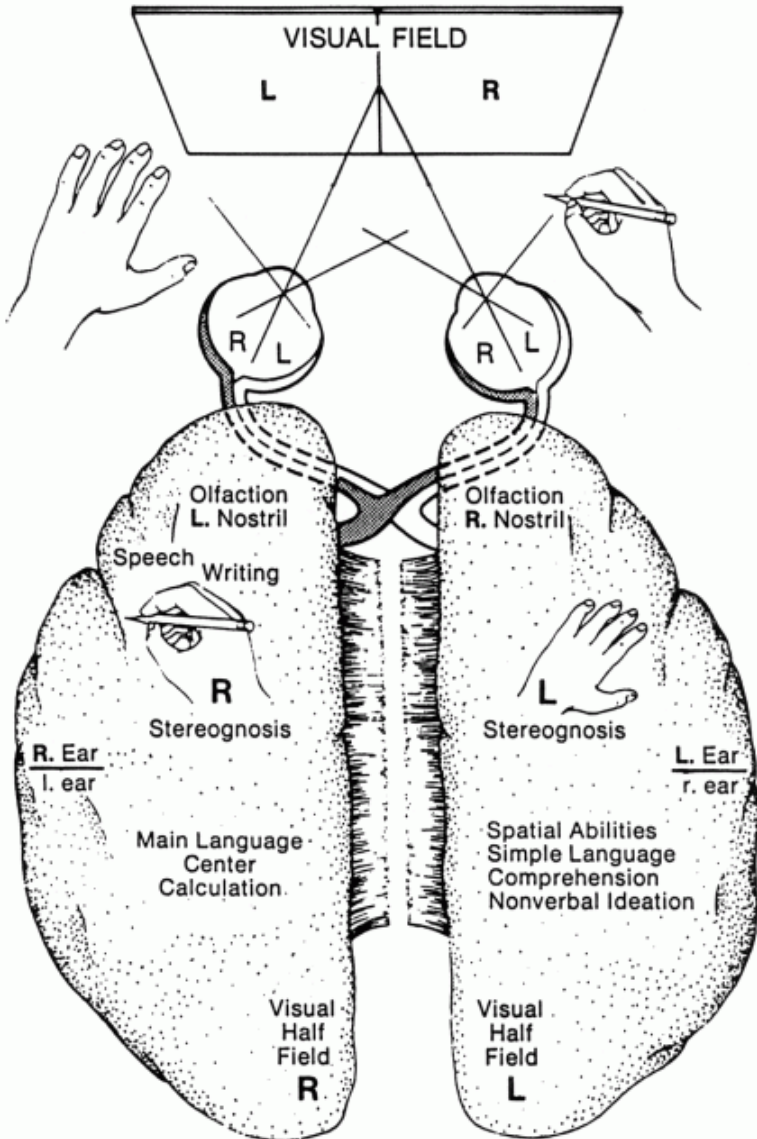
## Tachistoscope



- **Results:**
- Images & objects are only recognised when presented to **same eye or hand**
- When an object is displayed on one half of the screen (i.e. the left) and then in the other the P has no recollection of seeing it before
- Is this evidence for **TWO SEPARATE MEMORIES?**



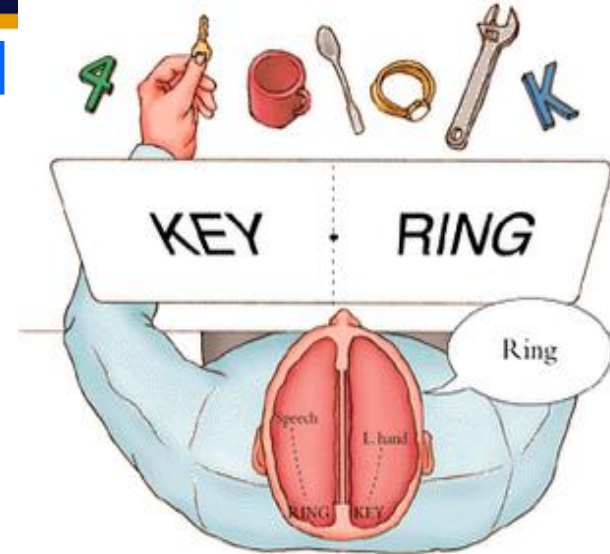
- **Visual Stimuli:**
- When an object is displayed in the **right** visual field (thus processed in the left hemisphere) Ps can describe it in **speech** and **writing**
- When an object is displayed in the **left** visual field (thus processed in the right hemisphere) Ps can only draw it OR
- if asked to use the **left hand** to point to a matching object on the table can do so, while still insisting nothing was seen



## Results:

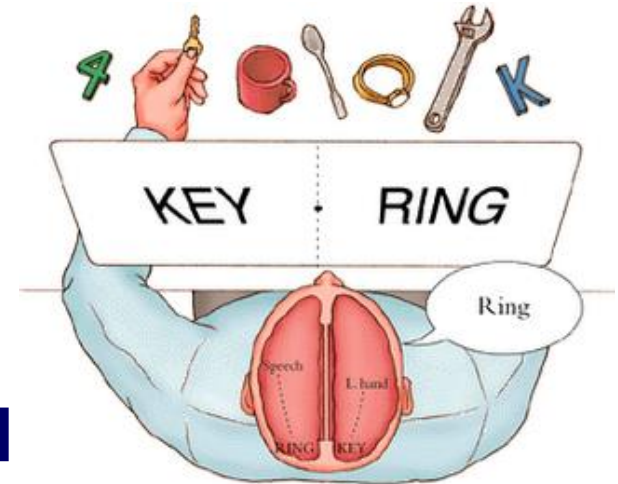
- \* Tests imply that two hemispheres have different abilities & functions.

- **TWO different objects displayed simultaneously:**
- **e.g. KEY & RING**
- Ps asked to draw what they see, with their left hand:

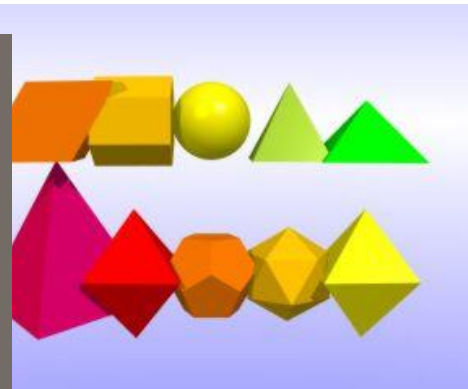


- Drew what was on the **left** half of the screen (KEY)
- But **said** they had drawn what was on the **right** half of the screen (RING)
- Results imply that one side of the brain does not know what the other side has seen.

- **Tactile Stimuli:**
- **Objects placed in right hand:**
- Ps described the object in speech and writing
- **Objects placed in the left hand**
- Ps made wild guesses - seemed unaware of object in their hand, but could draw, point or select object by touch
- When **objects placed in one hand** subjects could point to object with same hand.



- **Extra Tests to right hemisphere:**
- Can carry out simple maths problems
- Can sort objects by size, shape, & texture
- Picture of nude presented amongst geometric shapes produces giggling & blushing, but p's have no awareness of seeing picture.





- **Conclusions:**
- Hemispheres have **different functions**: only the left is able to produce language
- The **right hemisphere** can recall & identify stimuli but can't verbalise this
- Hemispheres have **independent perception, awareness & memory**



# The split brain procedure

- **SUMMARY**
- The **LEFT** hemisphere (in right handed people) is specialised for **speech and writing** and for the organisation of language
- It can communicate the visual experiences of the **RIGHT VISUAL FIELD** and about the experiences of the **RIGHT** half of the body

# The split brain procedure

- **SUMMARY**
- The **RIGHT** hemisphere is MUTE and cannot speak or write
- **(aphasic and agraphic)**
- but can show NON VERBALLY that mental processes, centred around the **LEFT VISUAL FIELD** and the LEFT half of the BODY, are present

## EVALUATION & Criticism

- **Sample:**
- The Ps were epileptic -
- CAN they be said to represent NORMAL brains?
  
- INDIVIDUAL DIFFERENCES - some people have more lateralised brains

## EVALUATION & Criticism

- SEX DIFFERENCES
- Women have less lateralised brains
- Perhaps RIGHT HANDED male brains are more RIGHT <> LEFT specialised?
- KIMURA reported more aphasia in men who had left brain damage

## EVALUATION & Criticism

- A REDUCTIONIST explanation for human behaviour
- (BRAIN not MIND)
- Most tasks involve a mixture of LEFT and RIGHT brain skills
- **When we hear speech we decode meaning from the WORDS AND the EMOTIONAL TONE in the voice**

## The ORNSTEIN STUDY (1986)

- Ps given FOUR passages to read
- 2 technical descriptions
- 2 folk tales
- LEFT half of brain active in all four
- RIGHT half activated while reading folk tales
- **Suggests it is HOW information is processed not TYPE of information, that is important**

## The split brain procedure

- Do the two halves of the brain represent two minds?
- Evidence
- **Hemispherectomy** - the removal of one half of the brain.....
- the SELF remained



# The split brain studies

- SPERRY said...
- When the brain is disconnected we see two separate selves, each with its own memory and will

## The split brain studies

- MACKAY (1987) said...
- Not TWO people with TWO free wills... but one person who under certain circumstances is liable to show a strange form of absent mindedness
- What do you think?

# SPERRY - QUESTIONS

- Does the size of the sample matter?
- What was unusual about the participants?
- Why was this a NATURAL experiment?
- What was the IV?
- Are there any ethical problems?

## Roger Sperry (1968) was given a NOBEL PRIZE for this research

- Can YOU think of a way to find out how each part of the brain functions?
- Click on the picture to have some [fun with Mr Split Brainy!!](#)
- READ this study up

