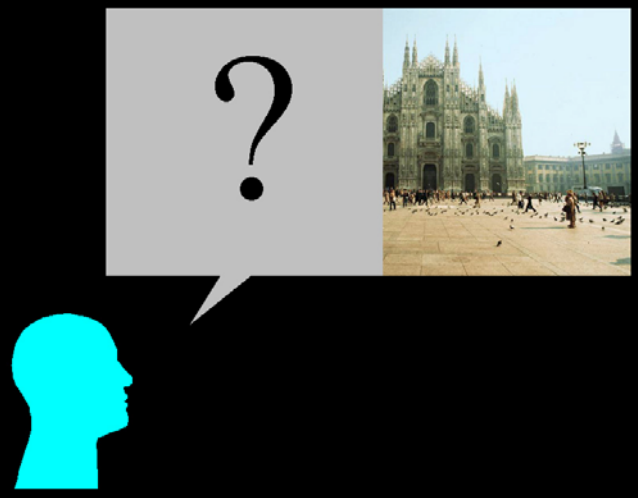
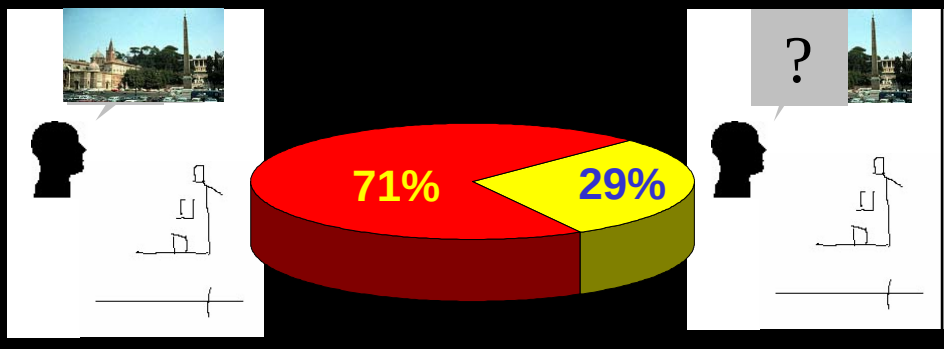
Space amputation in neglect?



Bisiach & Luzzatti, *Cortex* **14**:129-33, 1978

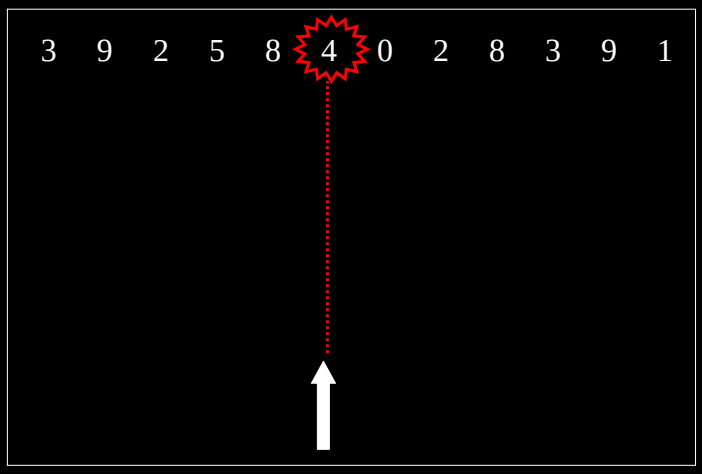
Space amputation in neglect? Revisited!



■ **Visual only** ■ **Imaginal + visual**

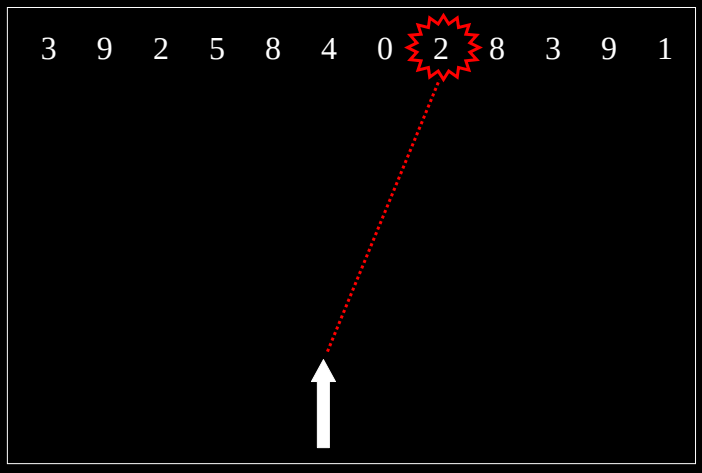
Bartolomeo, D'Erme & Gainotti, *Neurology* **44**:1710-4, 1994

Space compression in neglect?



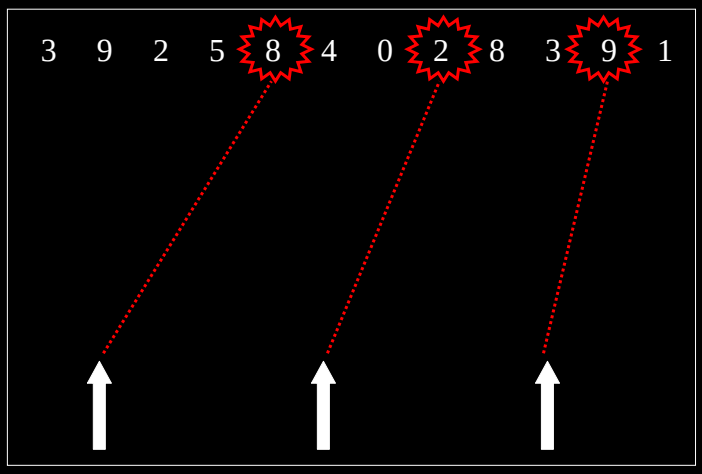
Halligan & Marshall, *Cortex* **27**:623-9, 1991

Space compression in neglect?



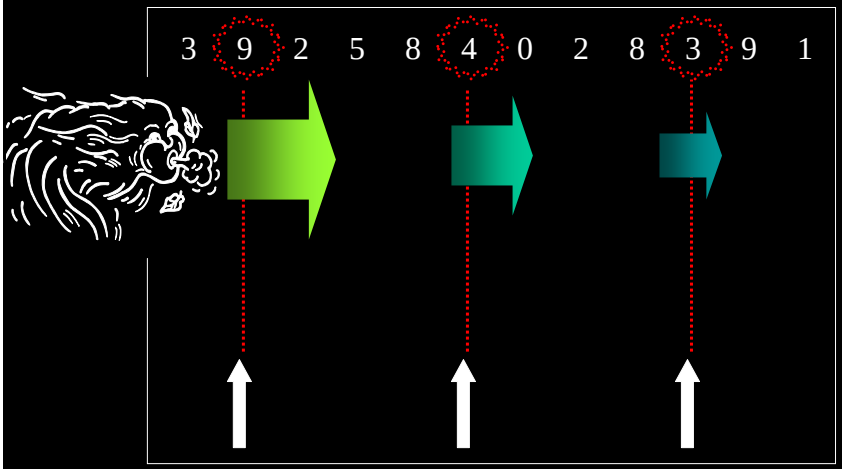
Halligan & Marshall, *Cortex* **27**:623-9, 1991

Space compression in neglect?



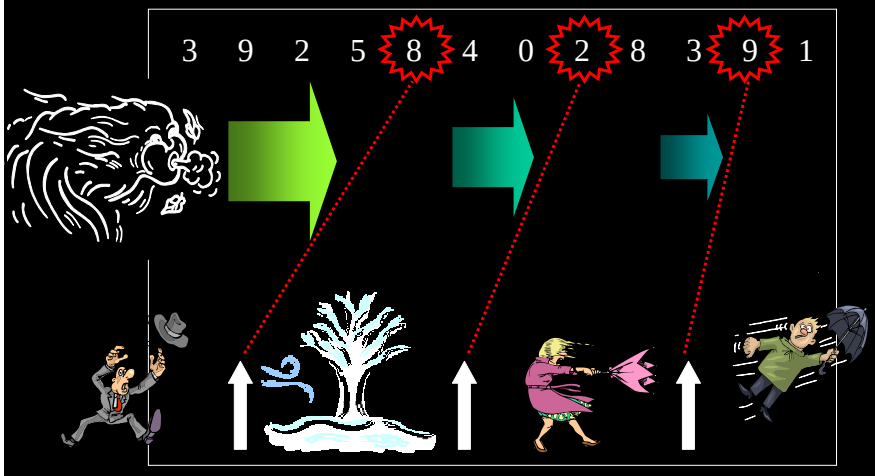
Halligan & Marshall, *Cortex* **27**:623-9, 1991

Space compression in neglect?



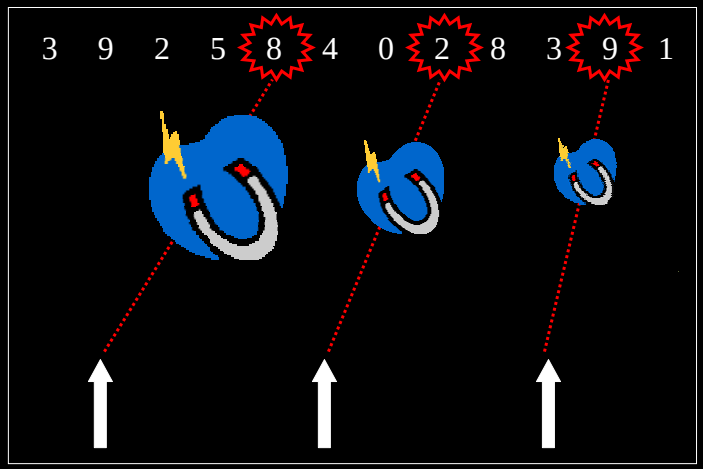
Halligan & Marshall, *Cortex* **27**:623-9, 1991

Space compression in neglect?

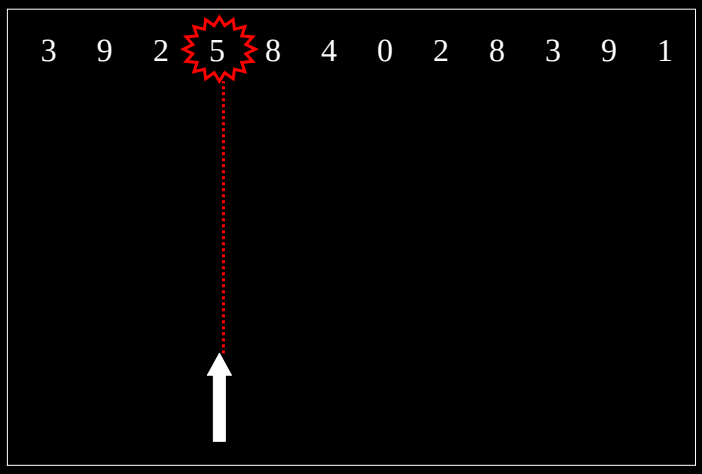


Halligan & Marshall, *Cortex* **27**:623-9, 1991

Space compression in neglect?

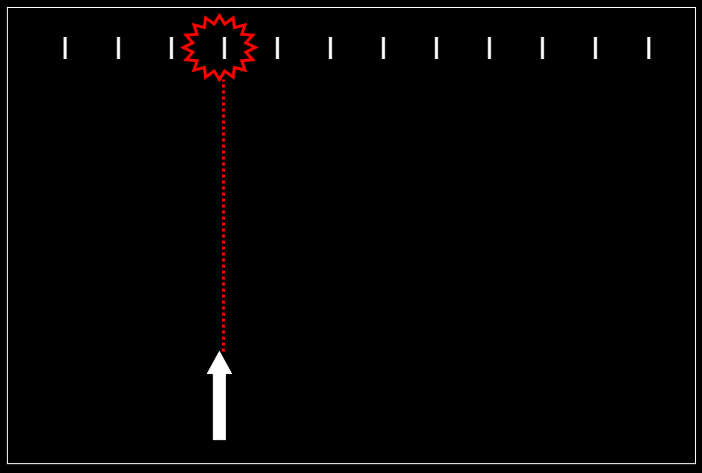


Space compression in neglect?



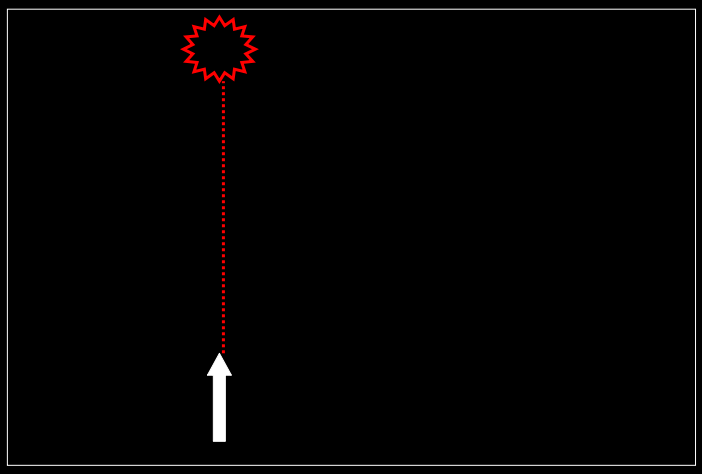
Bartolomeo, Urbanski, Chokron, Chainay, Moroni, Siéroff, Belin, Halligan, *Neuropsychologia*, 2004

Space compression in neglect?



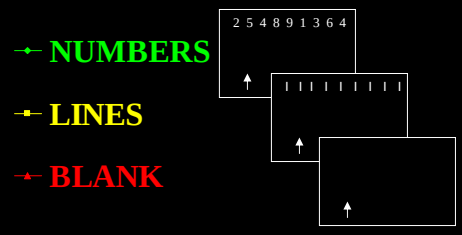
Bartolomeo, Urbanski, Chokron, Chainay, Moroni, Siéroff, Belin, Halligan, *Neuropsychologia*, 2004

Space compression in neglect?



Bartolomeo, Urbanski, Chokron, Chainay, Moroni, Siéroff, Belin, Halligan, *Neuropsychologia*, 2004

Results N-

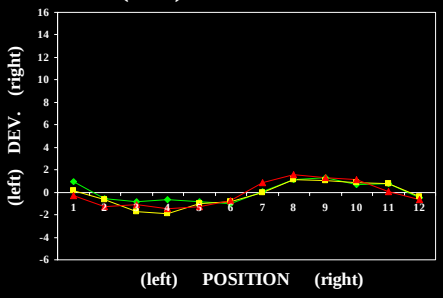


NUMBERS

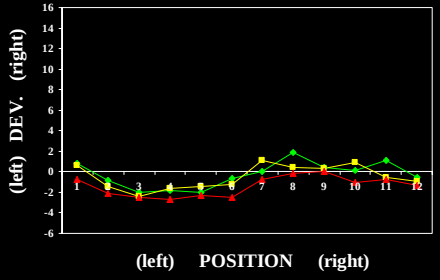
LINES

BLANK

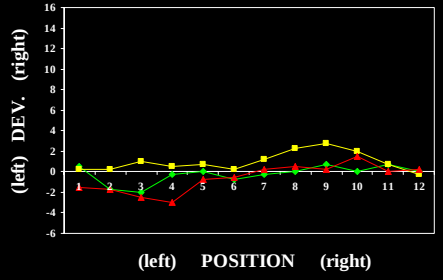
CTR (n=8)



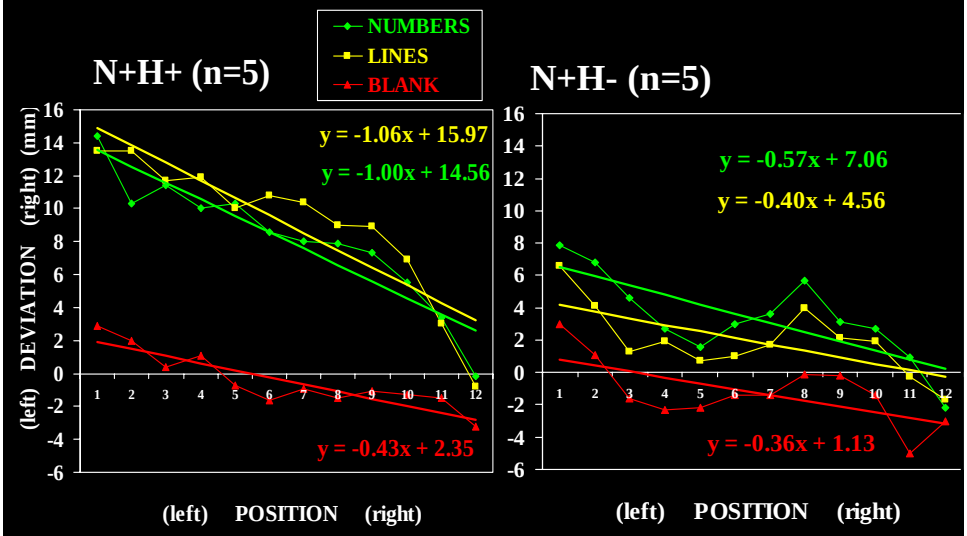
N-H- (n=5)

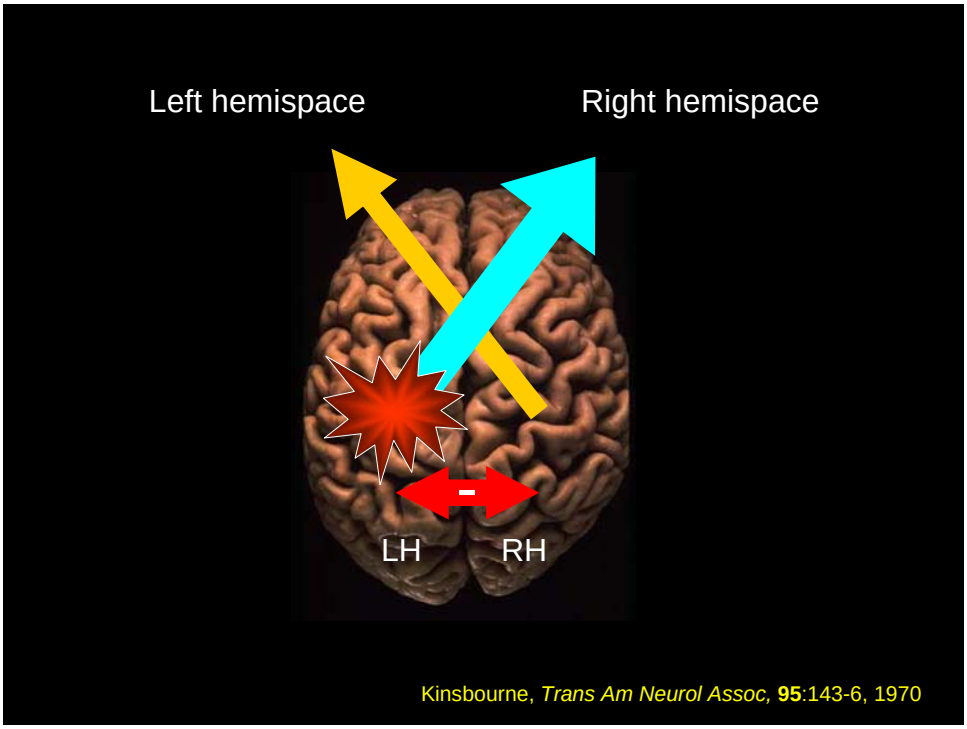


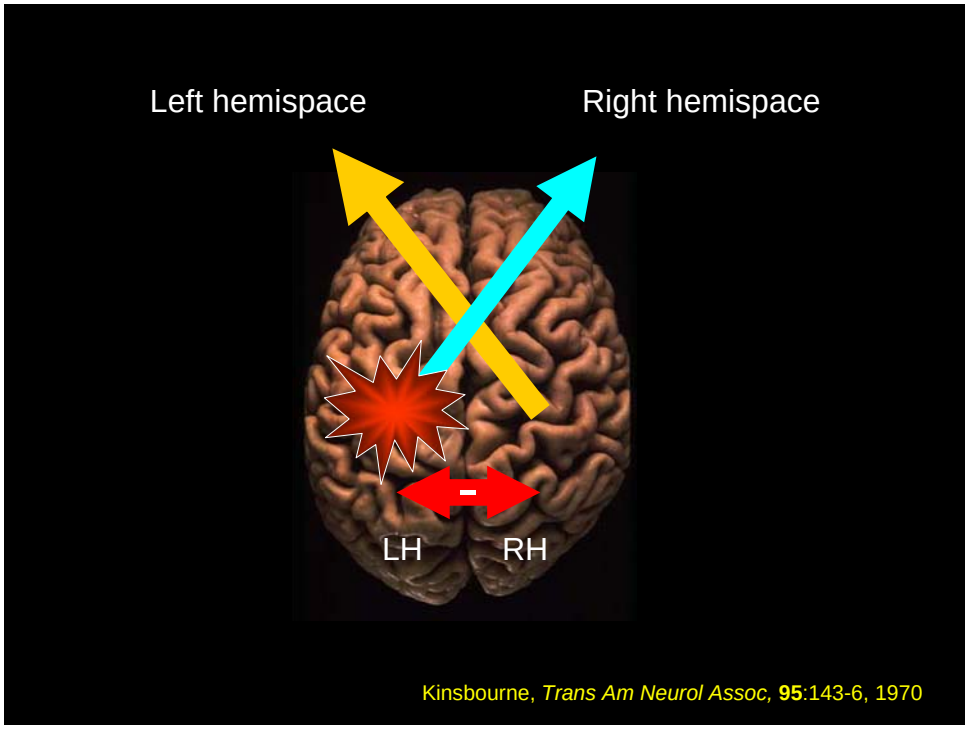
N-H+ (n=3)

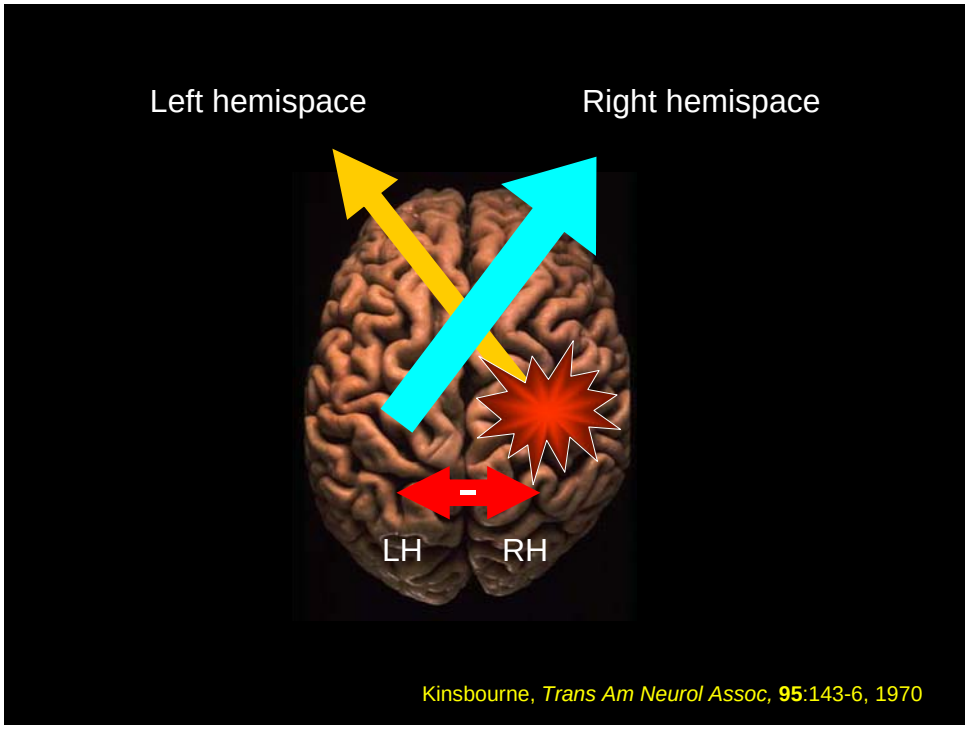


Results N+


NUMBERS
LINES
BLANK
N+H+ (n=5)
N+H- (n=5)
y = -1.06x + 15.97
y = -1.00x + 14.56
y = -0.43x + 2.35
y = -0.57x + 7.06
y = -0.40x + 4.56
y = -0.36x + 1.13
(left) DEVIATION (right) (mm)
(left) POSITION (right)
(left) POSITION (right)


Left hemispace
Right hemispace
LH
RH
Kinsbourne, *Trans Am Neurol Assoc*, **95**:143-6, 1970


Left hemispace
Right hemispace
LH
RH
Kinsbourne, *Trans Am Neurol Assoc*, **95**:143-6, 1970


Left hemispace
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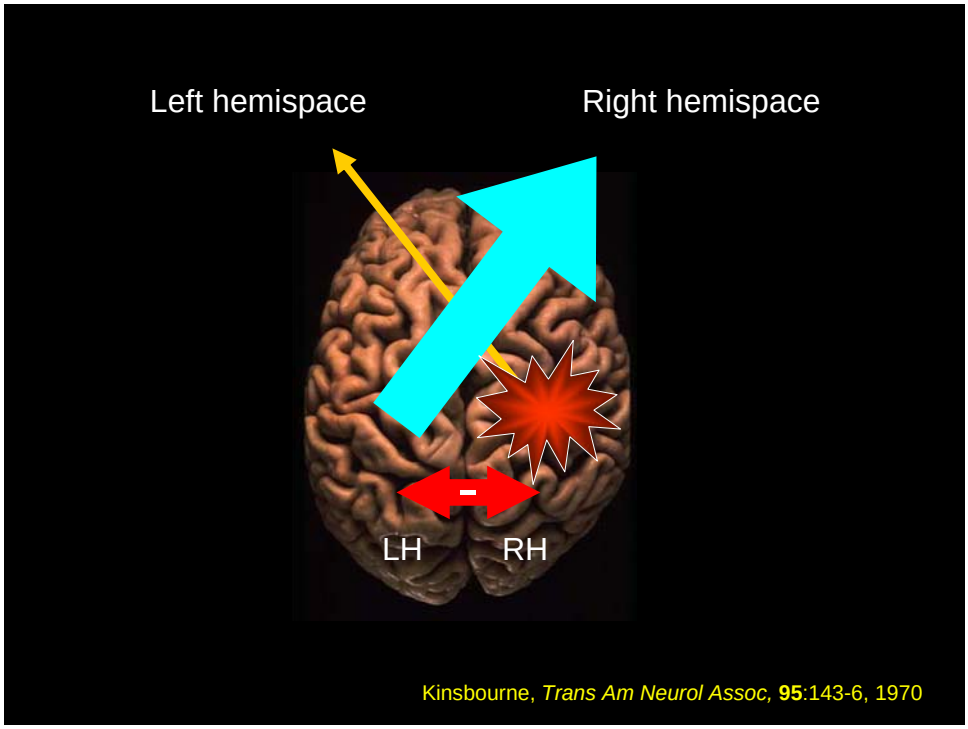
LH
RH
Kinsbourne, *Trans Am Neurol Assoc*, **95**:143-6, 1970


Left hemispace
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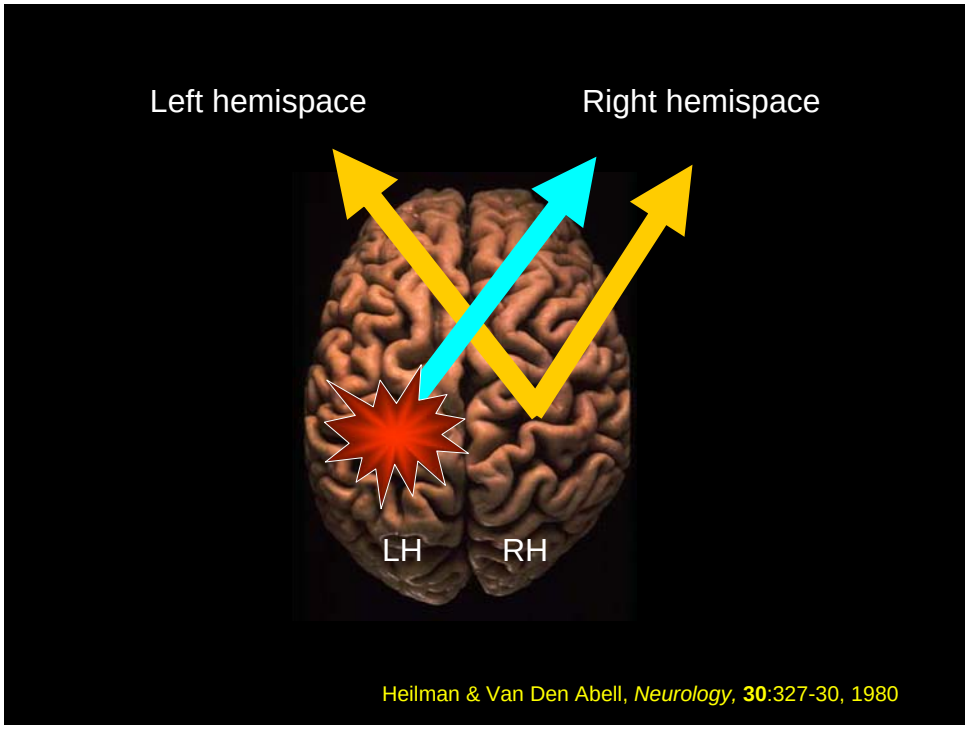
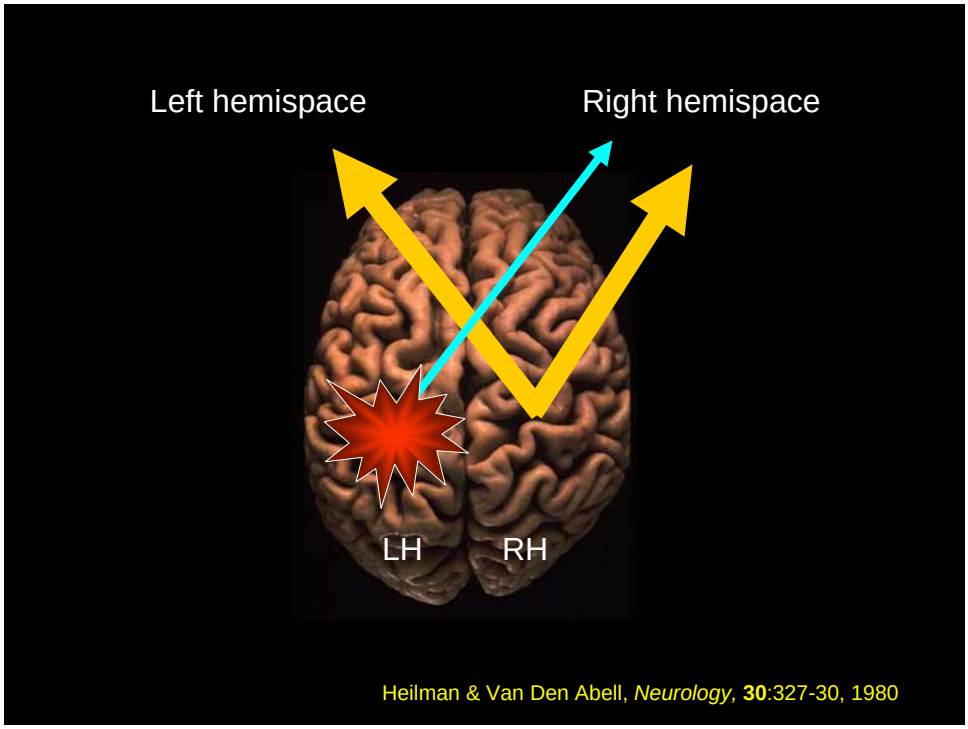
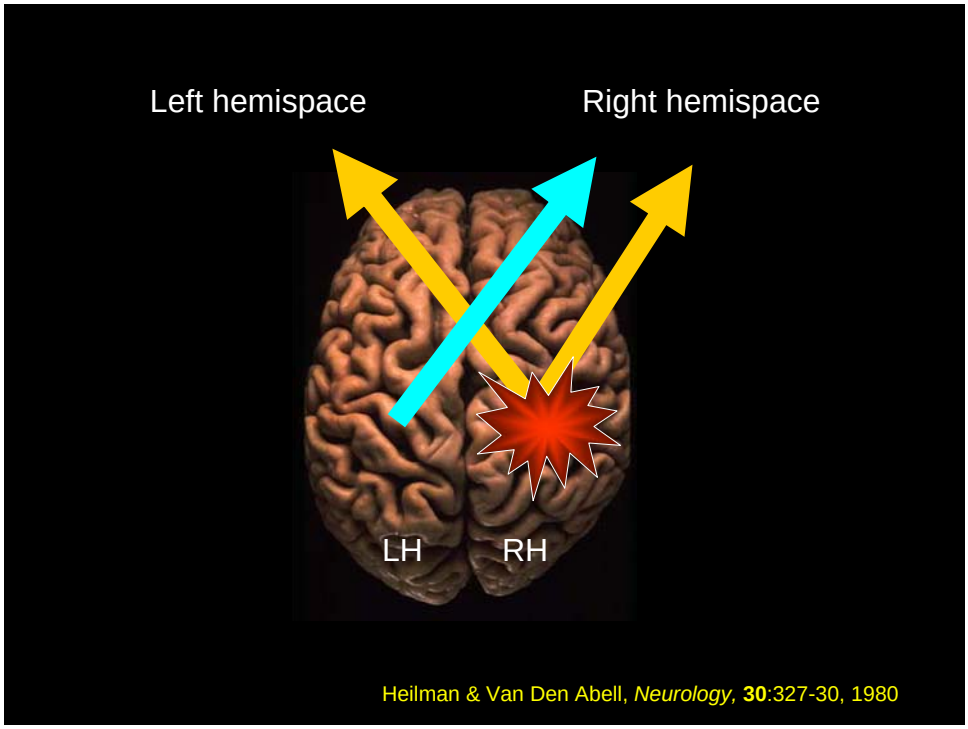
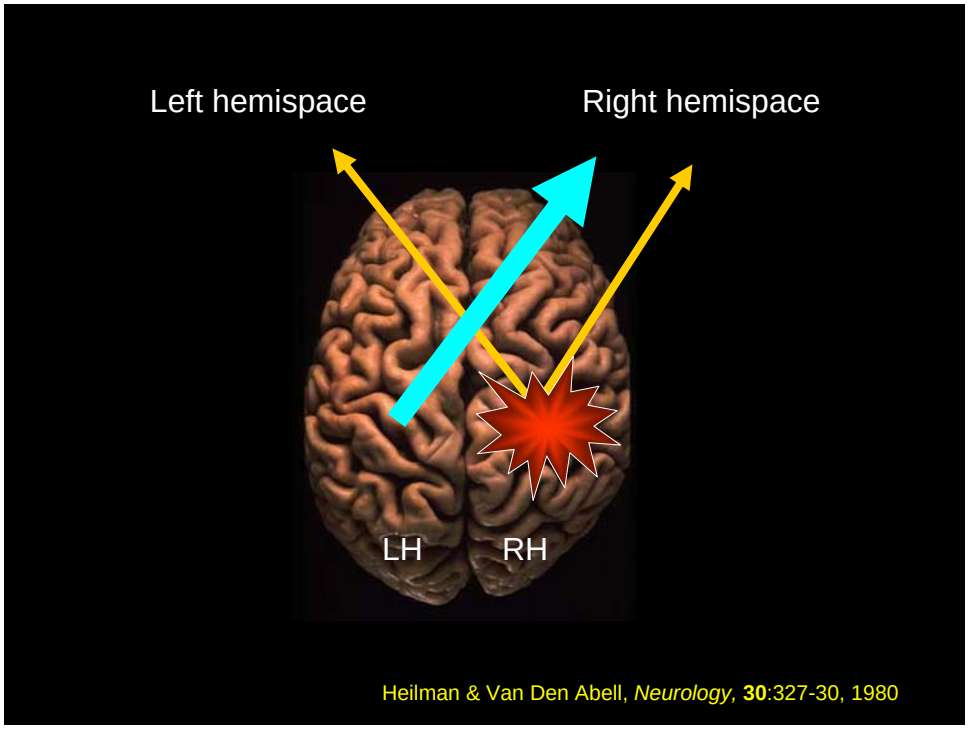
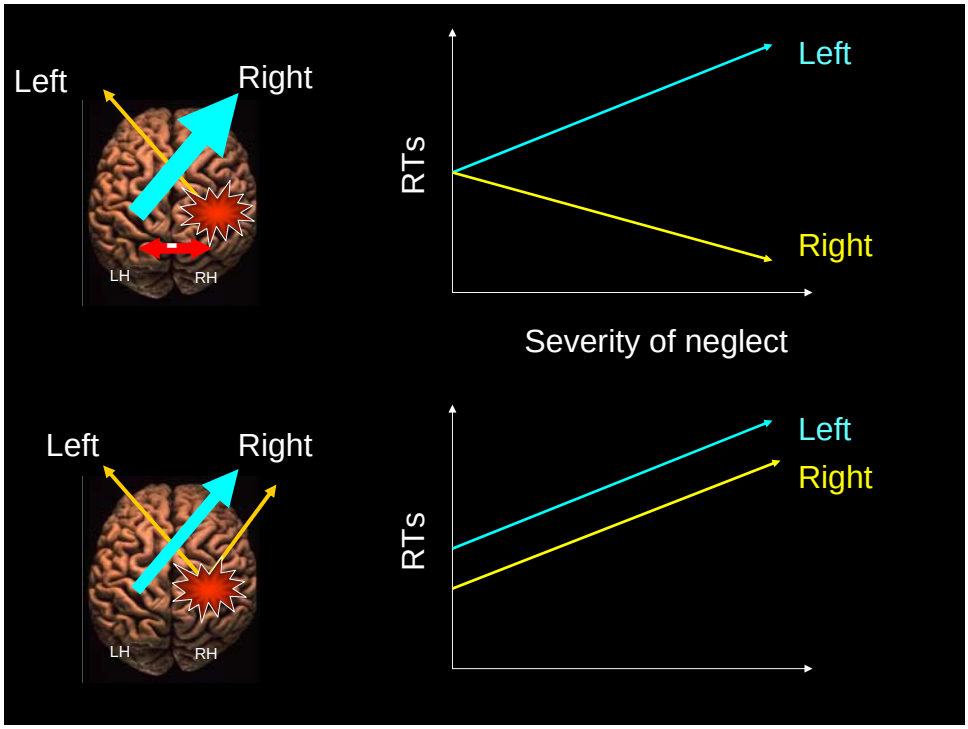
LH
RH
Kinsbourne, *Trans Am Neurol Assoc,* **95**:143-6, 1970


Left hemispace
Right hemispace
LH
RH
Heilman & Van Den Abell, *Neurology,* **30**:327-30, 1980

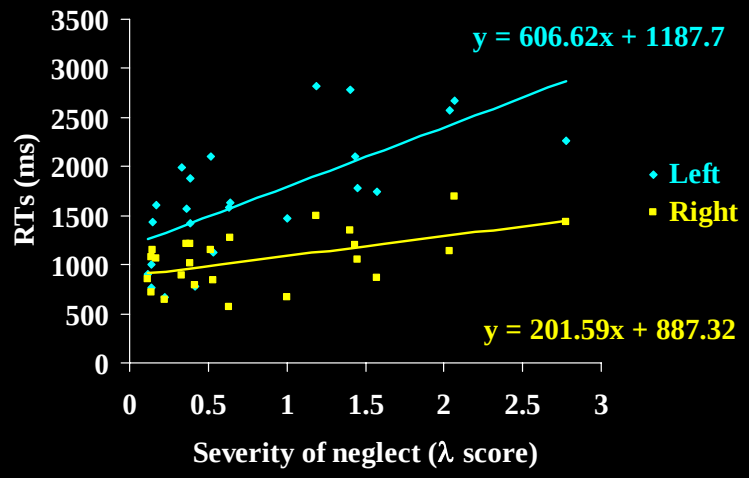

Left hemispace
Right hemispace
LH
RH
Heilman & Van Den Abell, *Neurology*, **30**:327-30, 1980


Left hemispace
Right hemispace
LH
RH
Heilman & Van Den Abell, *Neurology*, **30**:327-30, 1980

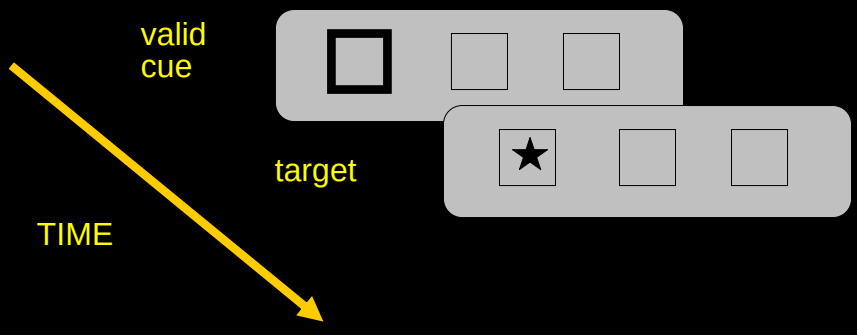

Left hemispace
Right hemispace
LH
RH
Heilman & Van Den Abell, *Neurology*, **30**:327-30, 1980


Left
Right
LH
RH
RTs
Left
Right
Severity of neglect
Left
Right
LH
RH
RTs
Left
Right

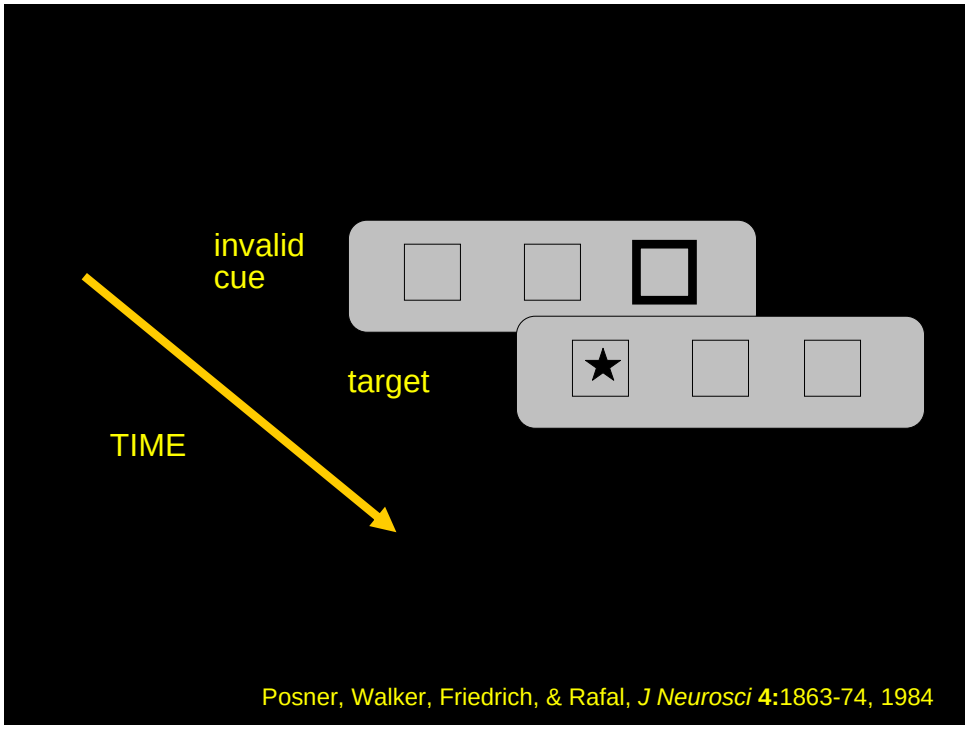
Left neglect or right hyperattention?



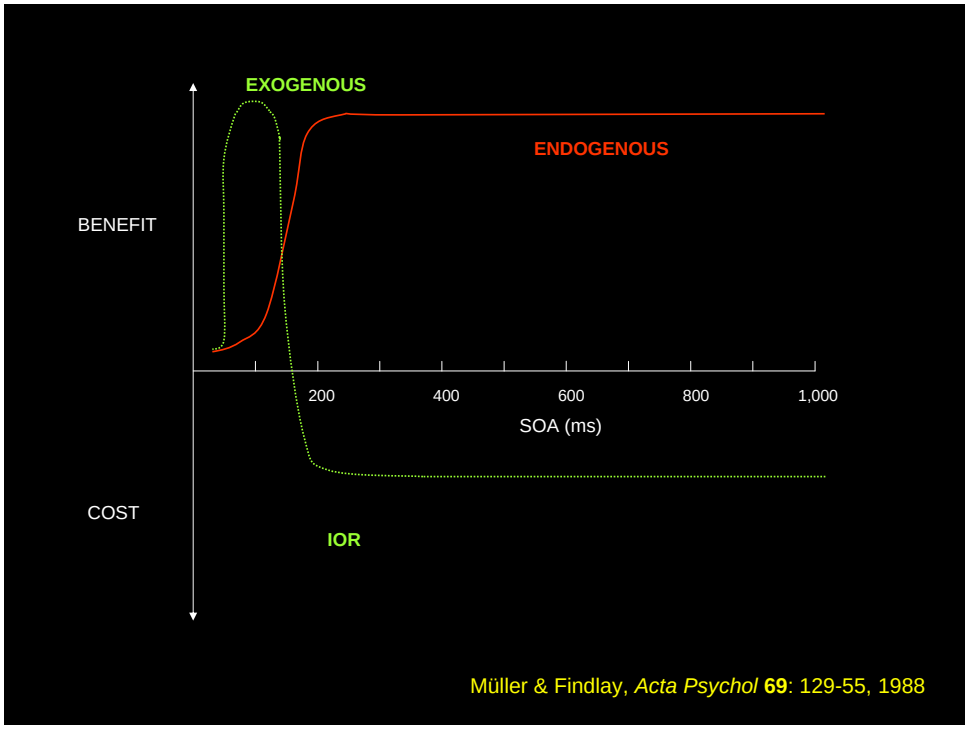
Bartolomeo & Chokron, *Neurology* **53**:2023-7, 1999



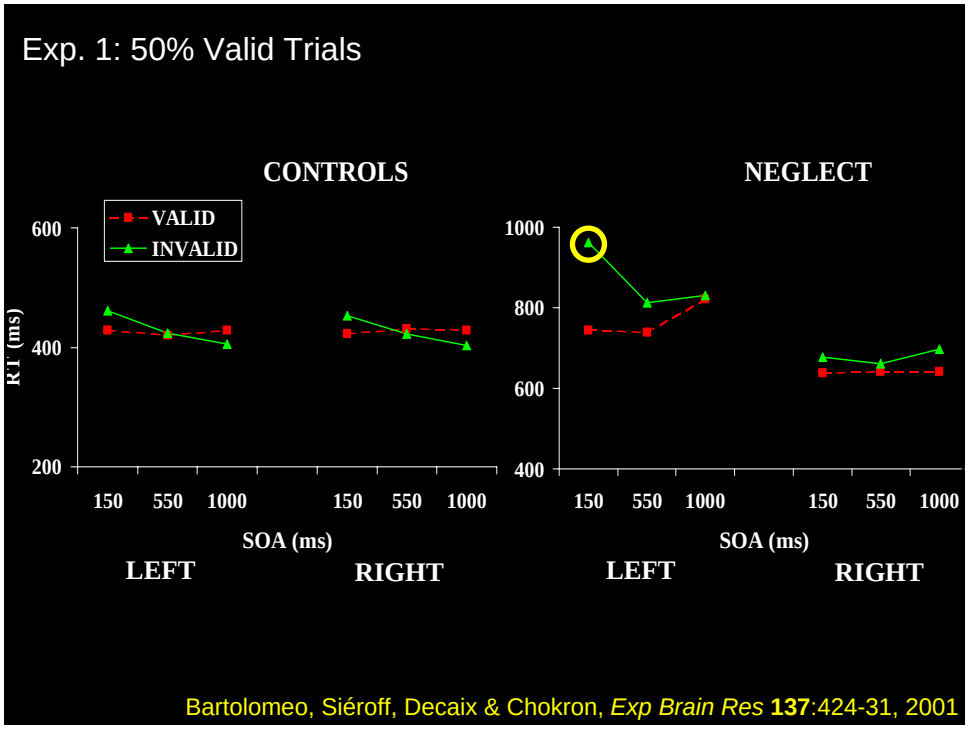
Posner, Walker, Friedrich, & Rafal, *J Neurosci* **4:**1863-74, 1984



Posner, Walker, Friedrich, & Rafal, *J Neurosci* **4:**1863-74, 1984



Müller & Findlay, *Acta Psychol* **69**: 129-55, 1988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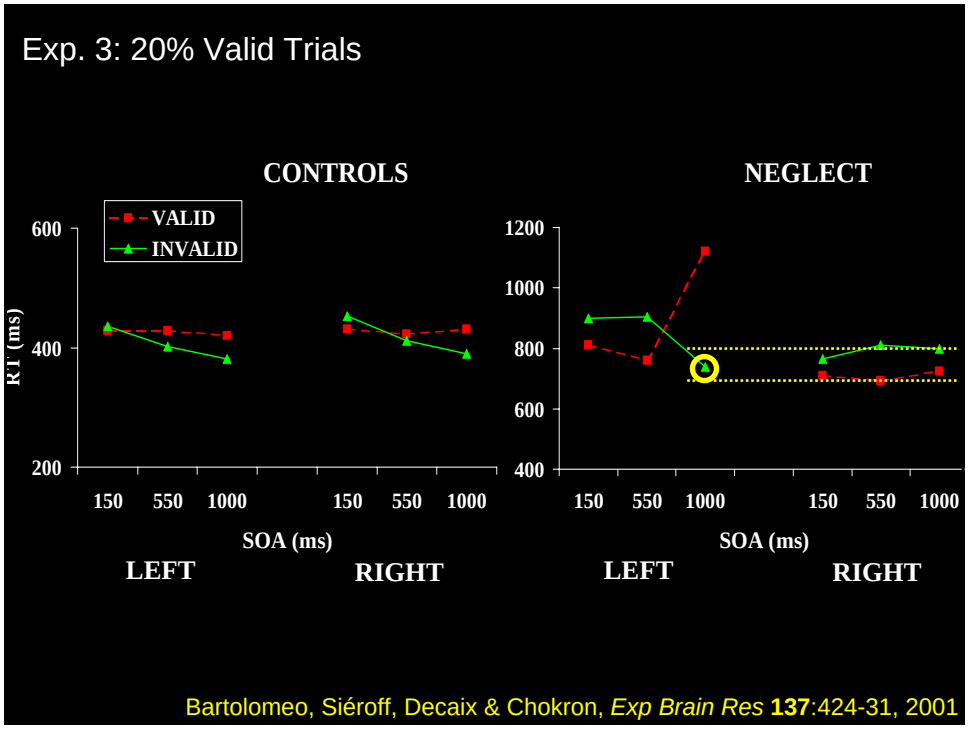
CONTROLS
NEGLECT
VALID
INVALID
RT (ms)
600
400
200
1000
800
600
400
150
550
1000
SOA (ms)
LEFT
RIGHT
Bartolomeo, Siéroff, Decaix & Chokron, Exp Brain Res 137:424-31, 2001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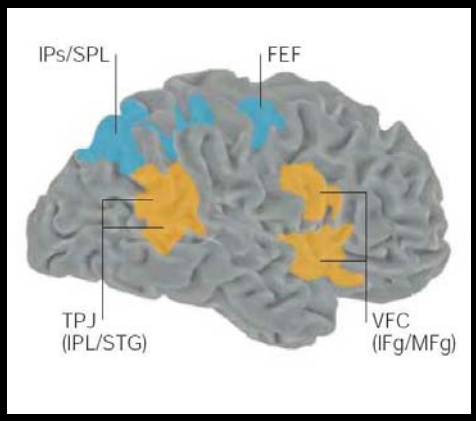
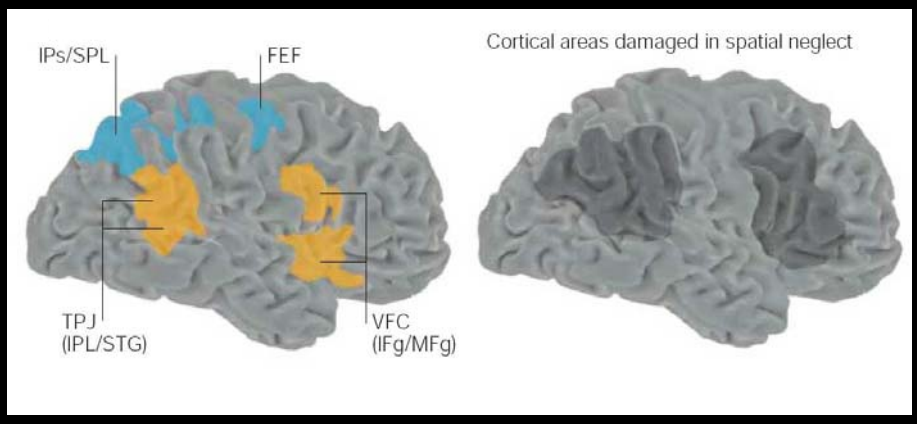
NEGLECT
VALID
INVALID
RT (ms)
600
400
200
1200
1000
800
600
400
150
550
1000
SOA (ms)
LEFT
RIGHT
Bartolomeo, Siéroff, Decaix & Chokron, Exp Brain Res 137:424-31, 2001

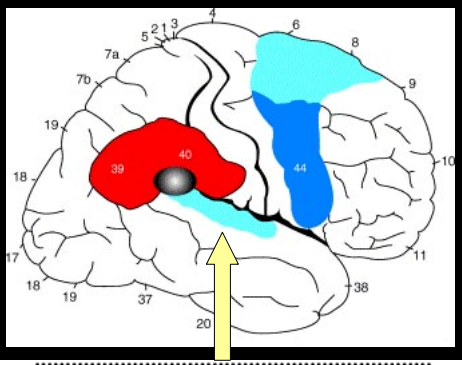


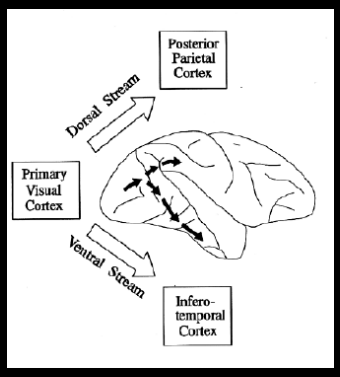
Corbetta & Shulman, *Nat Rev Neurosci* **3**:201-15, 2002



Corbetta & Shulman, *Nat Rev Neurosci* **3**:201-15, 2002

The anatomy of neglect





Spatial awareness is a function of the temporal not the posterior parietal lobe

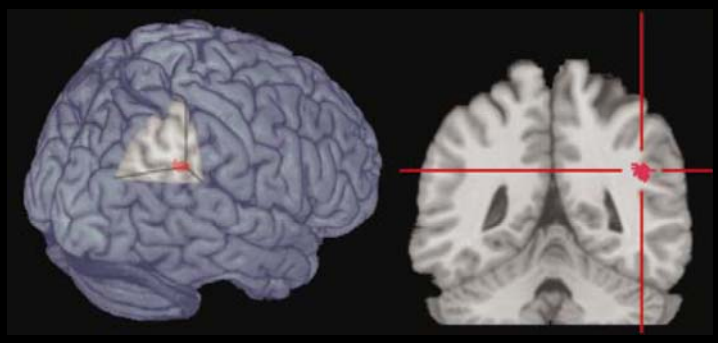
Hans-Otto Karnath, Susanne Ferber & Marc Himmelbach

Department of Cognitive Neurology, University of Tübingen, Hoppe-Seyler-Strasse 3, 72076 Tübingen, Germany

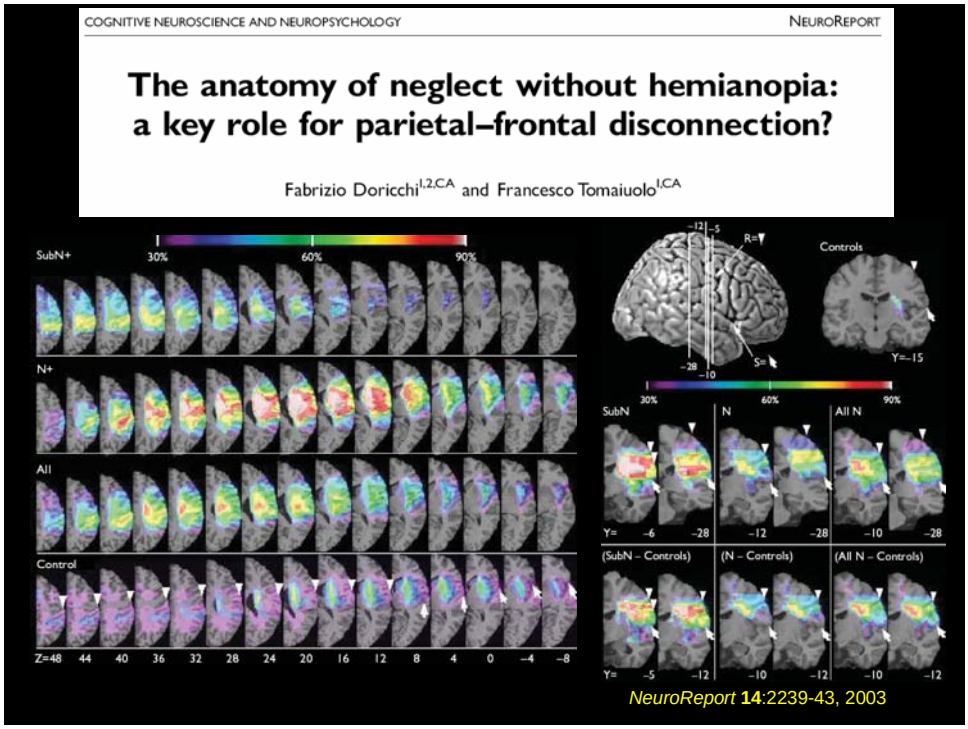
NATURE | VOL 411 | 21 JUNE 2001

Mishkin, Ungerleider & Macko, *Trends Neurosci* **6**:414-7, 1983

Milner & Goodale, *The Visual Brain in Action,* 1995



Mort, Malhotra, Mannan, Rorden, Pambakian, Kennard & Husain, *Brain,* **120:**1986-97, 2003



NeuroReport **14**:2239-43, 2003

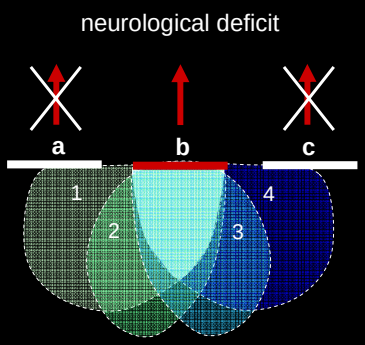
The lesion overlap method has problems

- Lack of spatial resolution
  - coarse boundaries of vascular lesions
  - lesions plotted on a "standard" brain
- Vascular lesions may reflect differences in vascular territories rather than true functional organization of the brain
- In case of multiple lesions, the region of overlap may be identified as the crucial region, whereas the deficit may in fact result from the co-occurrence of distinct lesions
- Relies on a "phrenological" view of anatomo-functional relationships: each brain region is dedicated to, and crucial for, a particular function

Bartolomeo, *Arch Neurol* **63**:1238-41, 2006

Which framework for clinico-anatomical correlations?

TOPOLOGICAL approach

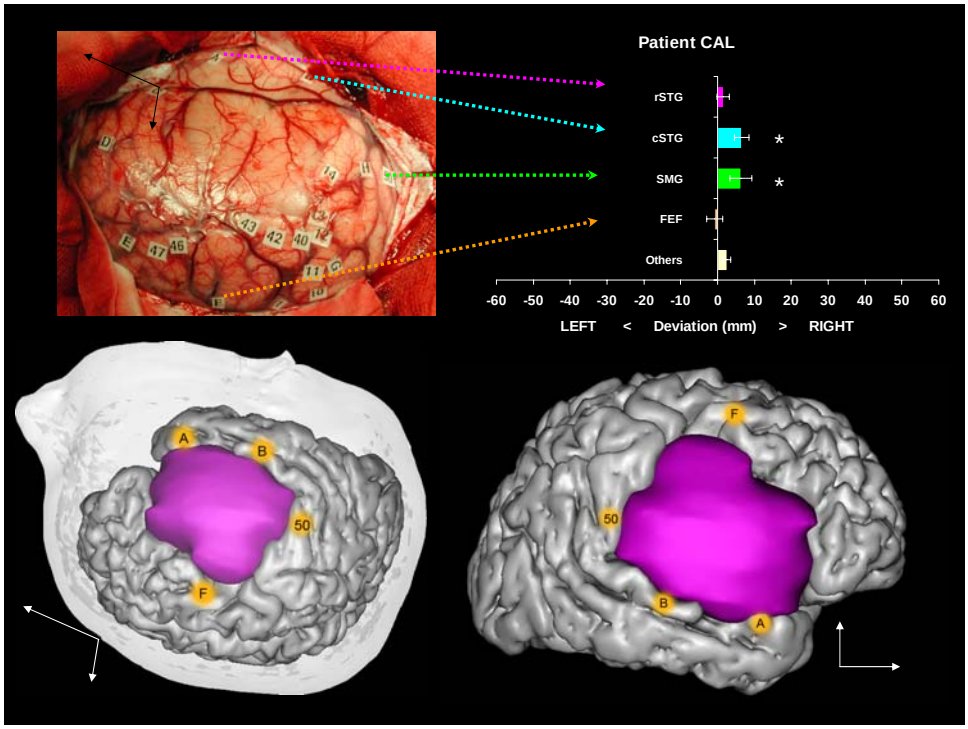


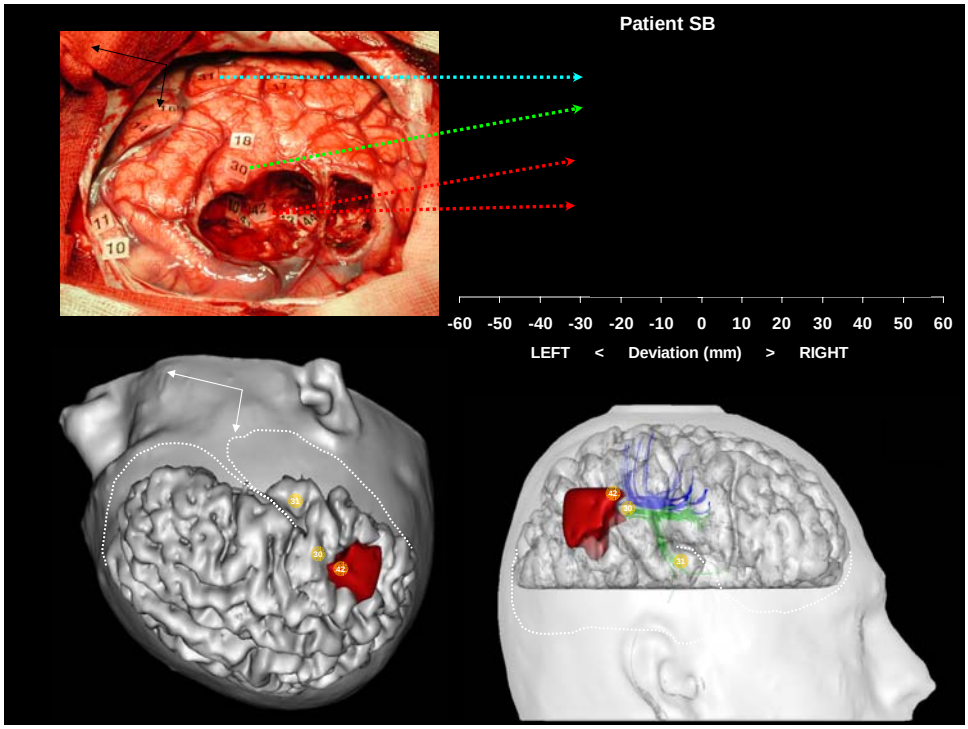
Catani & Mesulam, *Cortex* 2008

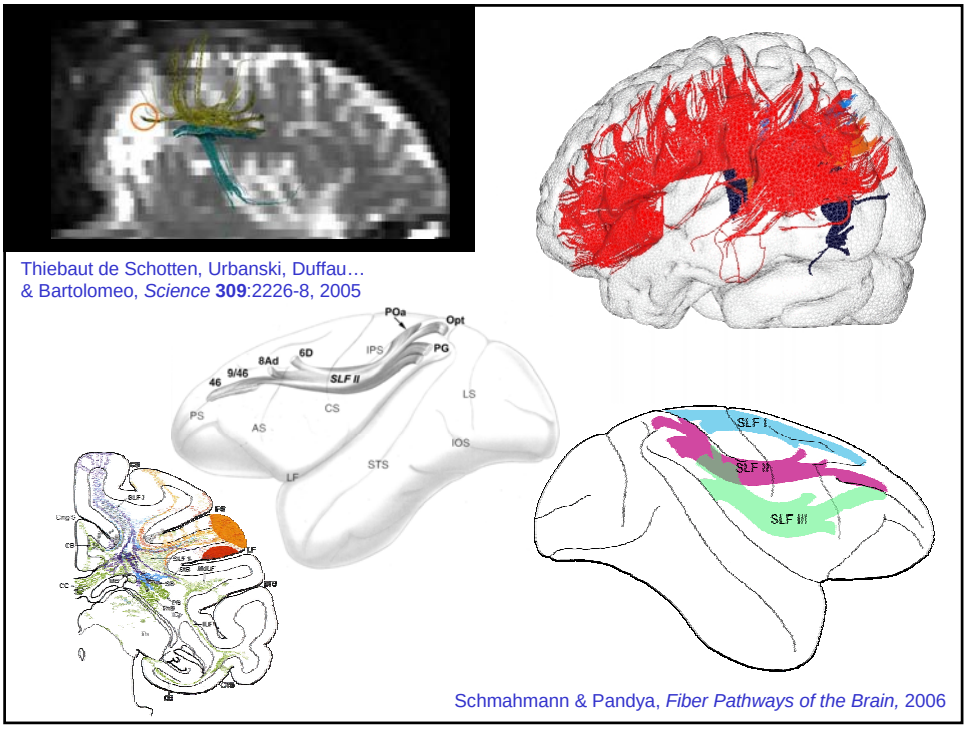
Direct Evidence for a Parietal-Frontal Pathway Subserving Spatial Awareness in Humans

Michel Thiebaut de Schotten,[1] Marika Urbanski,[1] Hugues Duffau,[2] Emmanuelle Volle,[1,3] Richard Lévy,[1,4] Bruno Dubois,[1,4] Paolo Bartolomeo[1,4]*

Science **309**:2226-8, 2005


Patient CAL
rSTG
cSTG
SMG
FEF
Others
*
*
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
LEFT < Deviation (mm) > RIGHT
A
B
50
F
F
50
B
A


Patient SB
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
LEFT < Deviation (mm) > RIGHT



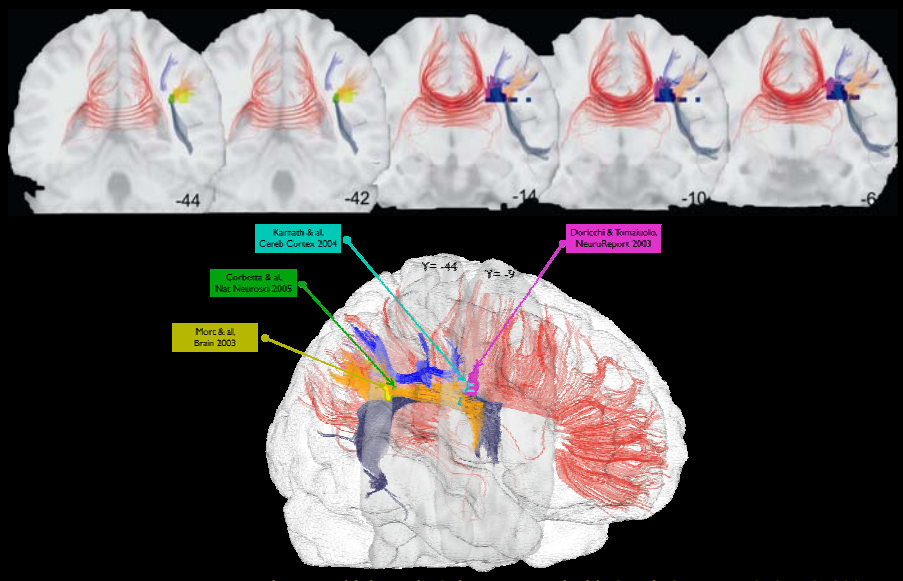
Thiebaut de Schotten, Urbanski, Duffau…
& Bartolomeo, *Science* **309**:2226-8, 2005

Schmahmann & Pandya, *Fiber Pathways of the Brain,* 2006

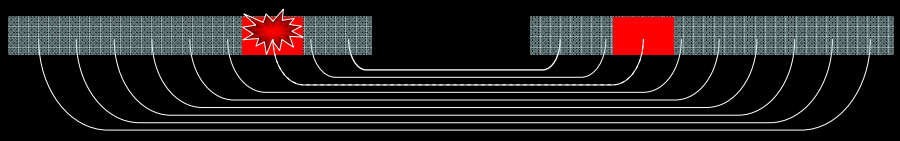
- Parietal component
  - perceptual salience of extrapersonal objects
- Frontal component
  - production of an appropriate response to behaviorally relevant stimuli
  - online retention of spatial information
  - focusing of attention on salient items through reciprocal connections to more posterior regions

Bartolomeo, *Arch Neurol* **63**:1238-41, 2006

Neglect as a disconnection syndrome



Bartolomeo, Thiebaut de Schotten & Doricchi, *Cereb Cortex* **45**:3127-48, 2007

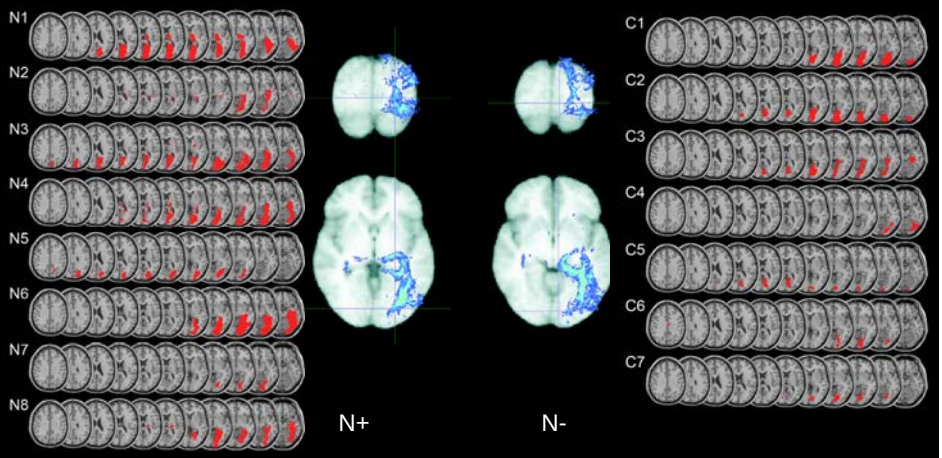


Bartolomeo, Thiebaut de Schotten & Doricchi, *Cereb Cortex* **45**:3127-48, 2007

Visual neglect after right posterior cerebral artery infarction

C M Bird, P Malhotra, A Parton, E Coulthard, M F S Rushworth, M Husain

J Neurol Neurosurg Psychiatry 2006;77:1008–1012. doi: 10.1136/jnnp.2006.094417



Inferior Longitudinal Fasciculus

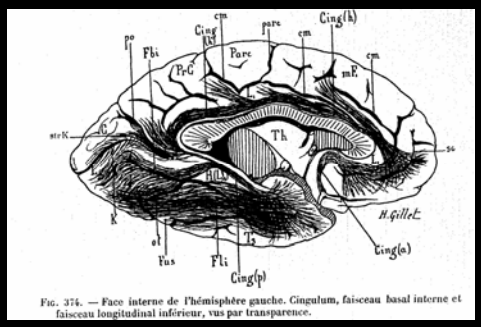
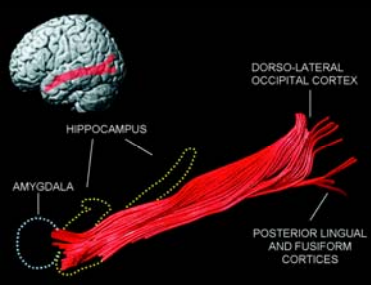


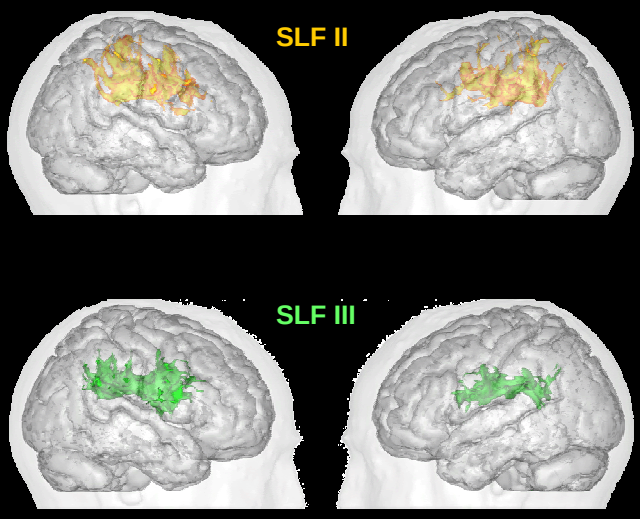
Fig. 374. — Face interne de l'hémisphère gauche. Cingulum, faisceau basal interne et faisceau longitudinal inférieur, vus par transparence.

Déjerine, *Anatomie des Centres Nerveux*, 1895



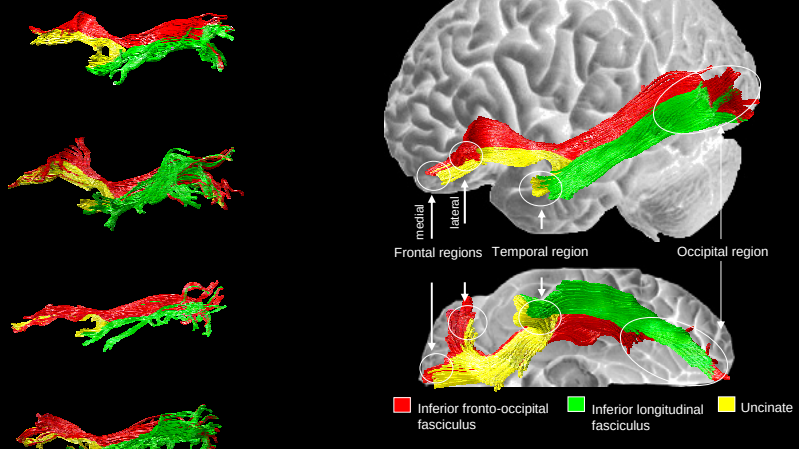
Catani, Jones, Donato & ffytche, *Brain* **126**:2093-107, 2003

Superior Longitudinal Fasciculus

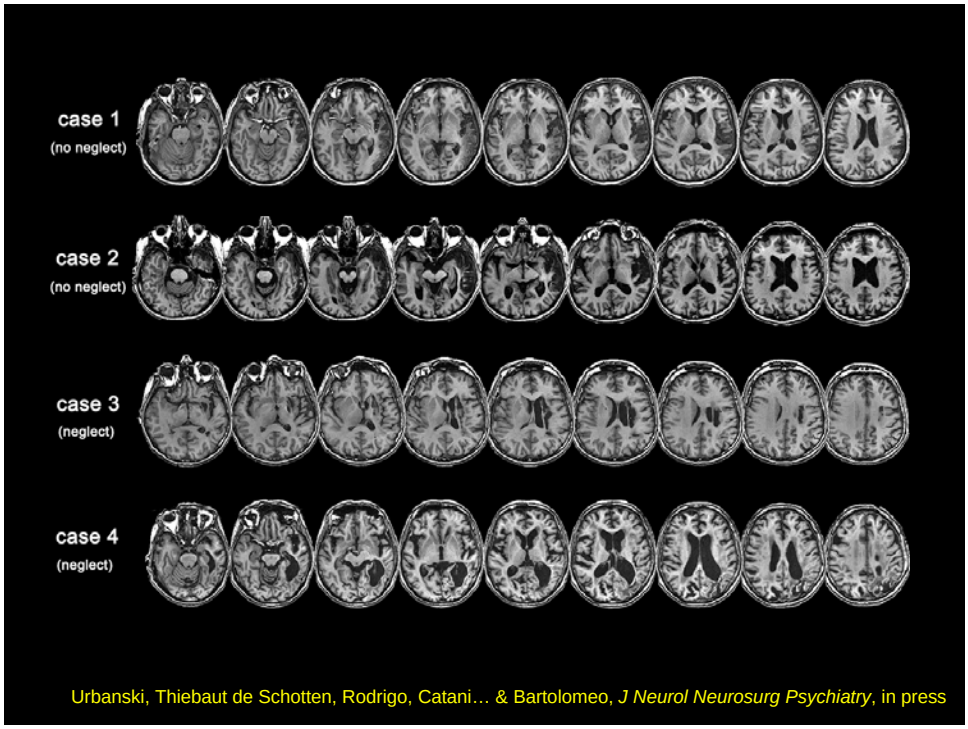


Thiebaut de Schotten, ... & Bartolomeo, *Visualization of disconnection syndromes in humans*, Cortex 2008

Inferior Fronto-Occipital Fasciculus

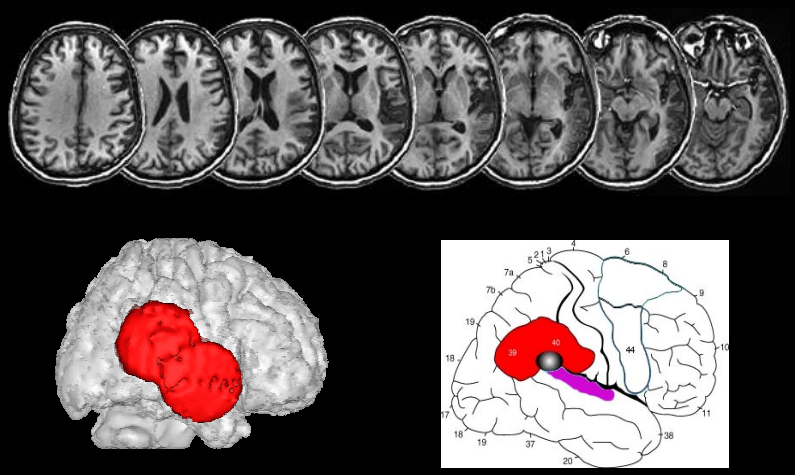


Catani et al, in preparation

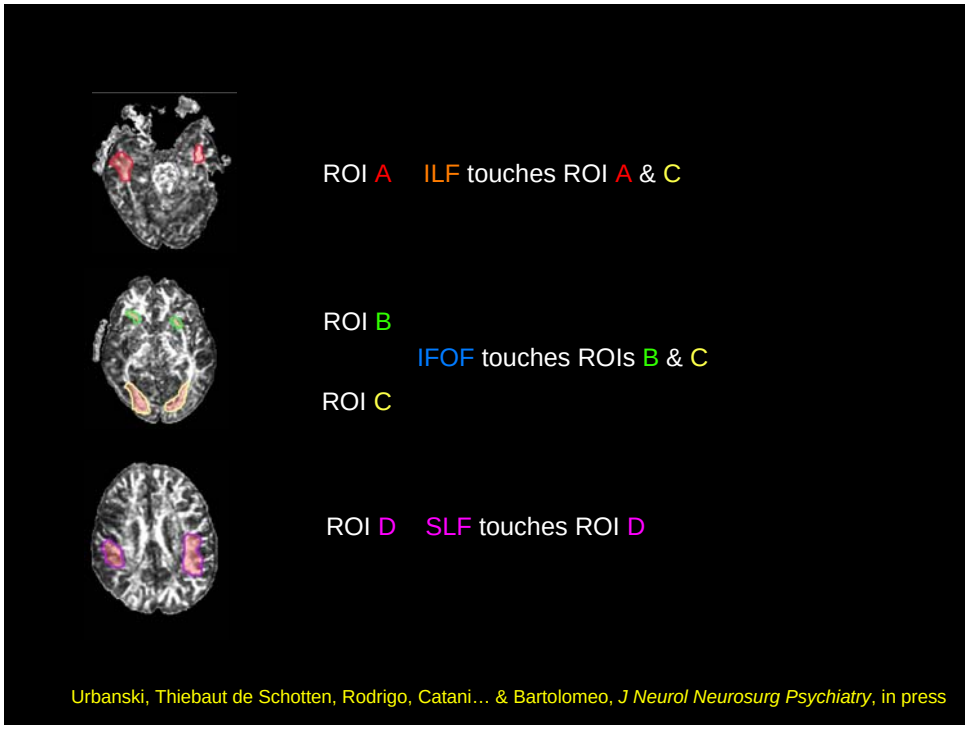


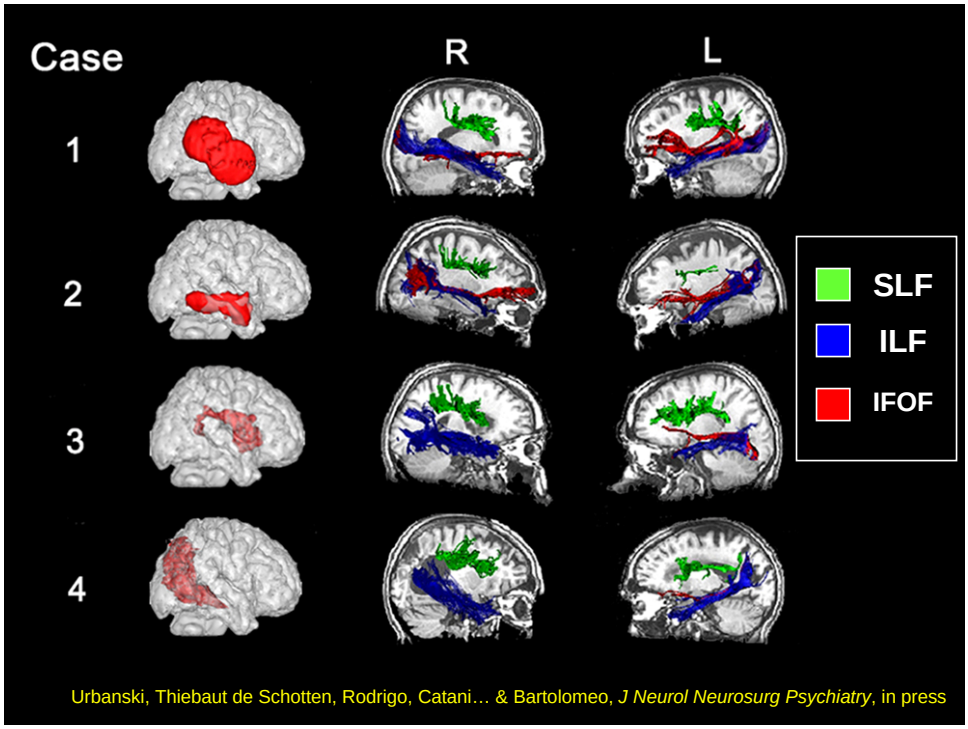
Urbanski, Thiebaut de Schotten, Rodrigo, Catani… & Bartolomeo, *J Neurol Neurosurg Psychiatry*, in press

Case 1



Urbanski, Thiebaut de Schotten, Rodrigo, Catani… & Bartolomeo, *J Neurol Neurosurg Psychiatry*, in press


ROI A
ILF touches ROI A & C
ROI B
IFOF touches ROIs B & C
ROI C
ROI D
SLF touches ROI D
Urbanski, Thiebaut de Schotten, Rodrigo, Catani… & Bartolomeo, J Neurol Neurosurg Psychiatry, in press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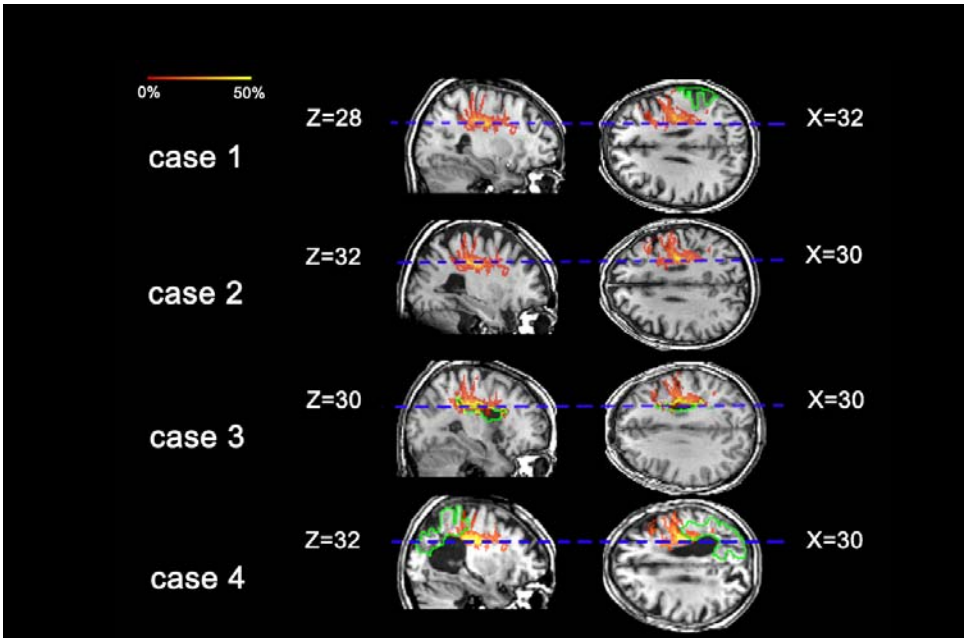
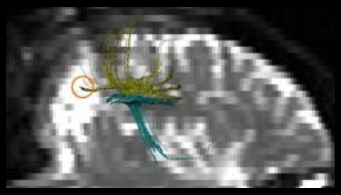
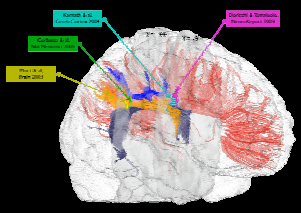
Urbanski, Thiebaut de Schotten, Rodrigo, Catani… & Bartolomeo, J Neurol Neurosurg Psychiatry, in press

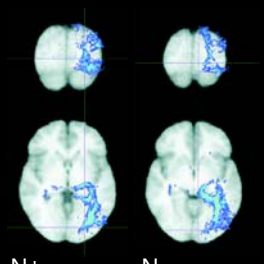


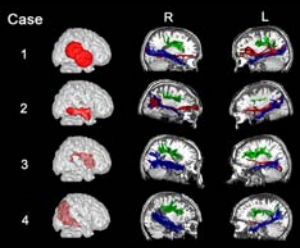
Urbanski, Thiebaut de Schotten, Rodrigo, Catani… & Bartolomeo, *J Neurol Neurosurg Psychiatry*, in press





Towards a **hodological** approach to visual neglect?





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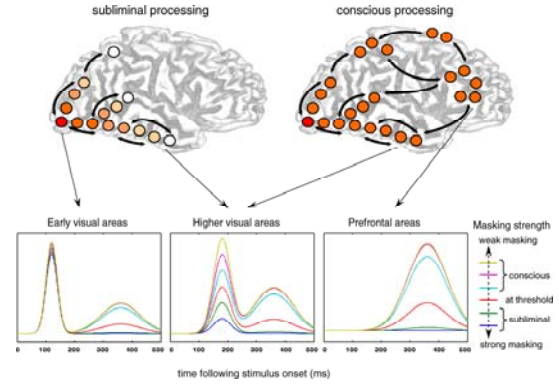
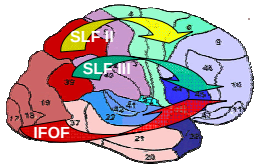
Brain Dynamics Underlying the Nonlinear Threshold for Access to Consciousness

Antoine Del Cul[1,2,3*], Sylvain Baillet[4,5], Stanislas Dehaene[1,2,3,6*]

1 INSERM, Cognitive Neuroimaging Unit, IFR 49, Saclay, France 2 Atomic Energy Commission (CEA), NeuroSpin Center, Saclay, France 3 University of Paris XI, Orsay, France 4 Cognitive Neuroscience and Brain Imaging Laboratory, CNRS UPR640, IFR 49, Paris, France 5 University Pierre & Marie Curie, Paris, France 6 Collège de France, Paris, France





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