Space amputation in neglect?

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

Space amputation in neglect?
Revisited!

Bartolomeo, D’Erme & Gainotti, *Neurology* 44:1710-4, 1994
Space compression in neglect?

Space compression in neglect?

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

Results N-

- NUMBERS
- LINES
- BLANK

N-H- (n=5)

N-H+ (n=3)

CTR (n=8)
Results N+

N+H+ (n=5)

y = -0.36x + 1.13
y = -0.57x + 7.06
y = -0.40x + 4.56

N+H- (n=5)

y = -0.43x + 2.35
y = -1.00x + 14.56
y = -1.06x + 15.97

Kinsbourne, Trans Am Neurol Assoc, 95:143-6, 1970
Kinsbourne, *Trans Am Neurol Assoc*, 95:143-6, 1970
Kinsbourne, *Trans Am Neurol Assoc*, 95:143-6, 1970

Left neglect or right hyperattention?

![Graph showing RTs (ms) vs severity of neglect (λ score)](image)


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Exp. 1: 50% Valid Trials


Exp. 3: 20% Valid Trials

The anatomy of neglect

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

Milner & Goodale, The Visual Brain in Action, 1995

The anatomy of neglect without hemianopia: a key role for parietal–frontal disconnection?

Fabrizio Dorigo and Francesco Tomaiuolo

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**

-neurological deficit

[Diagram showing interconnections labeled a, b, c, 2, 3, 4]

Catani & Mesulam, Cortex 2008

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**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,¹,² Richard Lévy,³,4 Bruno Dubois,¹,4 Paolo Bartolomeo¹,4*

[Images of anatomical and clinical observations]

Science 309:2226-8, 2005
• **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


Visual neglect after right posterior cerebral artery infarction

C M Bird, P Malhotra, A Porten, E Couthard, M F S Rushworth, M Husain

J Neurol Neurosurg Psychiatry 2006;77:1896-1912, doi: 10.1136/jnnp.2006.094417

Déjerine, Anatomie des Centres Nerveux, 1895

Inferior Longitudinal Fasciculus

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
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

Case

1

2

3

4

Urbanski, Thiebaut de Schotten, Rodrigo, Catani... & Bartolomeo, J Neurol Neurosurg Psychiatry, in press
Towards a *hodological* approach to visual neglect?
Brain Dynamics Underlying the Nonlinear Threshold for Access to Consciousness

Antoine Del Cul**, Sylvain Baillet**, Stéphanie Dehounne***, Jean-François Guillery**

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http://marsicanus.free.fr/cours