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Posterior Cortical Atrophy: The effects on Perception and Action.

Jonathan Marotta¹, Loni Desanghere¹, Benjamin Meek¹, Lee Baugh¹,
Jane Lawrence¹, Keri Locheed¹ & Paul Shelton²

¹Perception and Action Lab, Department of Psychology, University of Manitoba

²Section of Neurology, Health Sciences Centre, University of Manitoba, Winnipeg, MB, Canada.



Introduction

Posterior cortical atrophy (PCA) is a rare progressive neurodegenerative disorder that can target the occipital, temporal and parietal lobes¹⁻².

In early stages, PCA is characterized by impairments in higher level visual processing, while memory, language, and reasoning remain relatively intact. Symptoms can include problems in colour perception, face and object recognition, visually guided action, reading, writing, and problems seeing multiple objects in an array – depending on the location of atrophy³⁻⁴.

RB

74 year old, right-handed female who has been experiencing progressively worsening visual disturbances over the last 3 years.

Agnosias

RB shows severe deficits in recognizing faces (including gender and race) and line drawings of common objects and, despite being a talented artist, she now has difficulty reproducing even simple line drawings.

Benton Face Recognition: Severely impaired



“Is that Michelle Obama?”

Famous Faces: 1/50

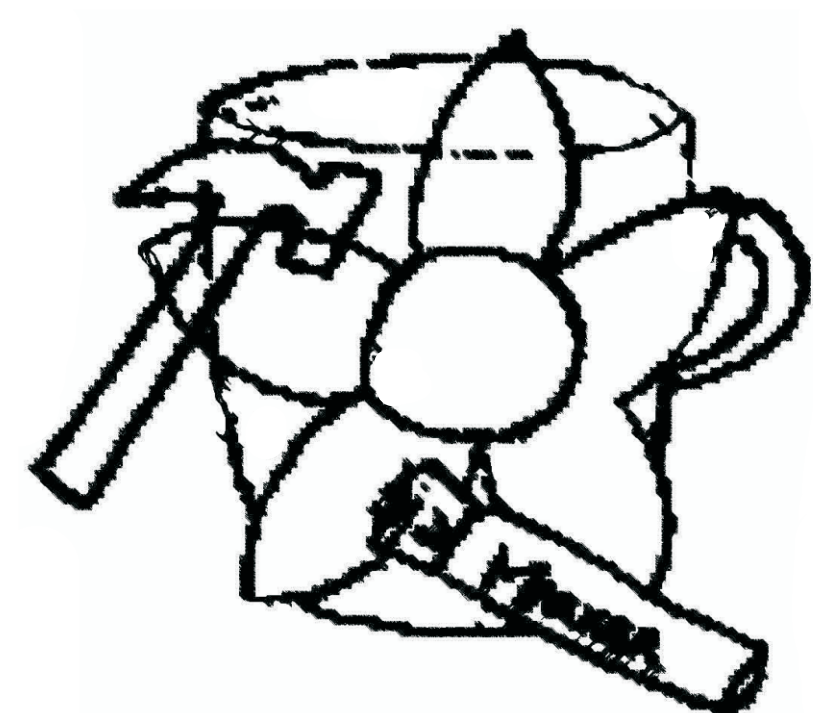


“It looks like a path.”

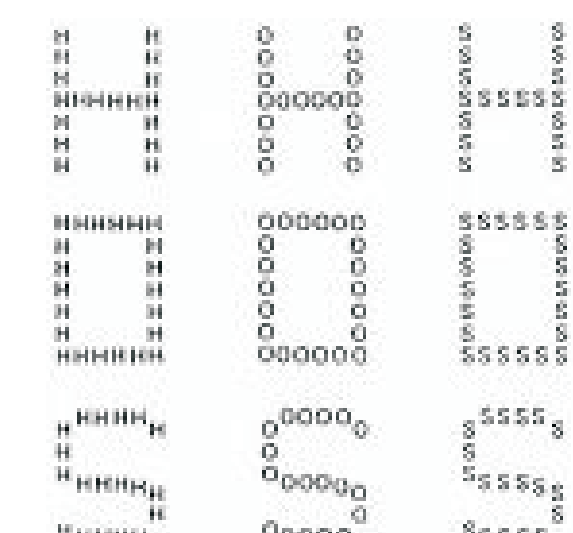
Boston Naming: 5/15

Simultanagnosia

RB’s deficits involve problems with integrating factors into a concept of the whole – she focuses her attention on one aspect or one detail of the visual form.



“Are those chicks?”



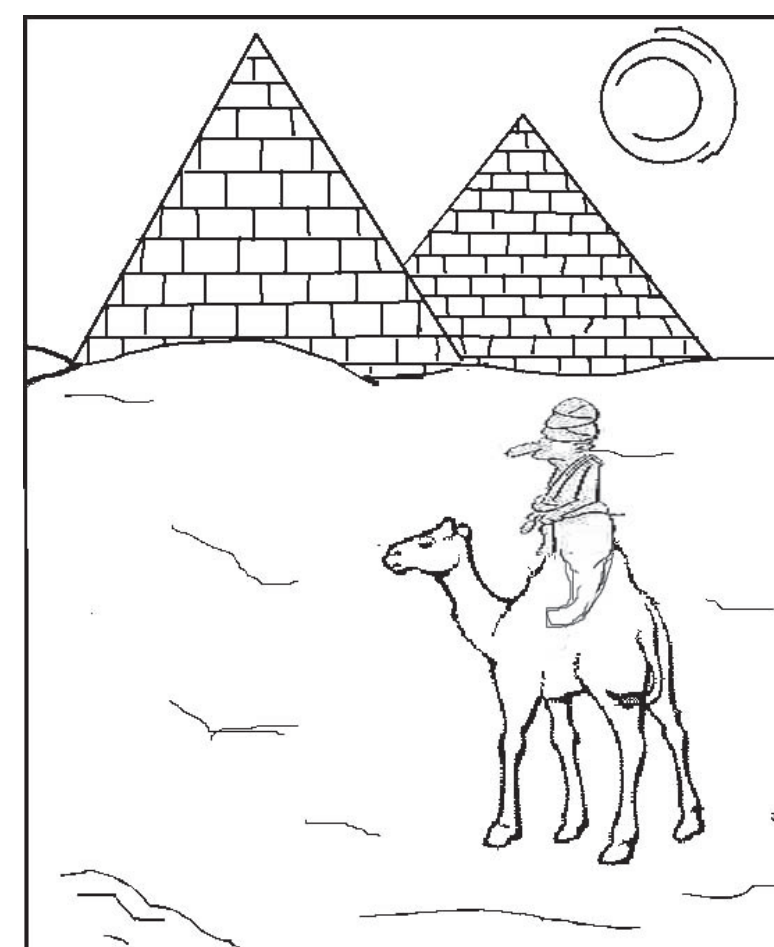
Global: 91.7% correct
Local: 95.8% correct

Object counting: 13/14

Colour “hallucinations”

RB reports experiencing colour “hallucinations”.

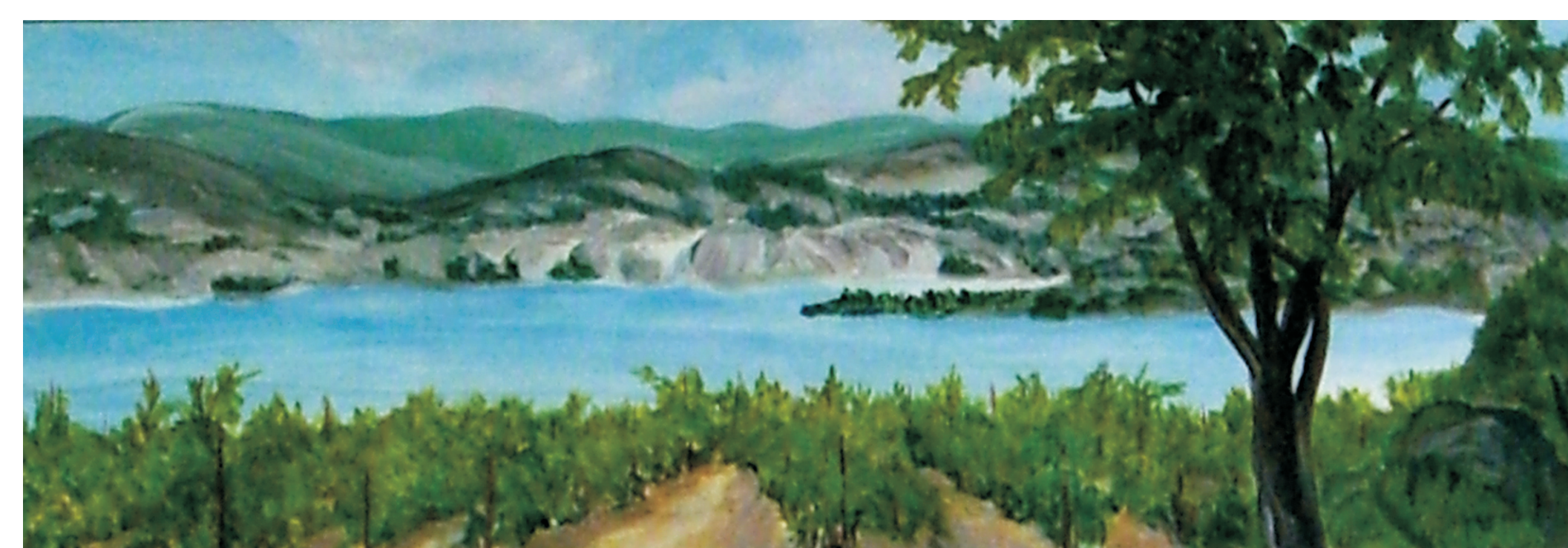
“Sometimes I close my eyes and when I open them again, my kitchen is a different colour”.



“What is with all the colours?
This is all purple and I see red
and orange”

RB’s Art

5-7 Years ago



Current work

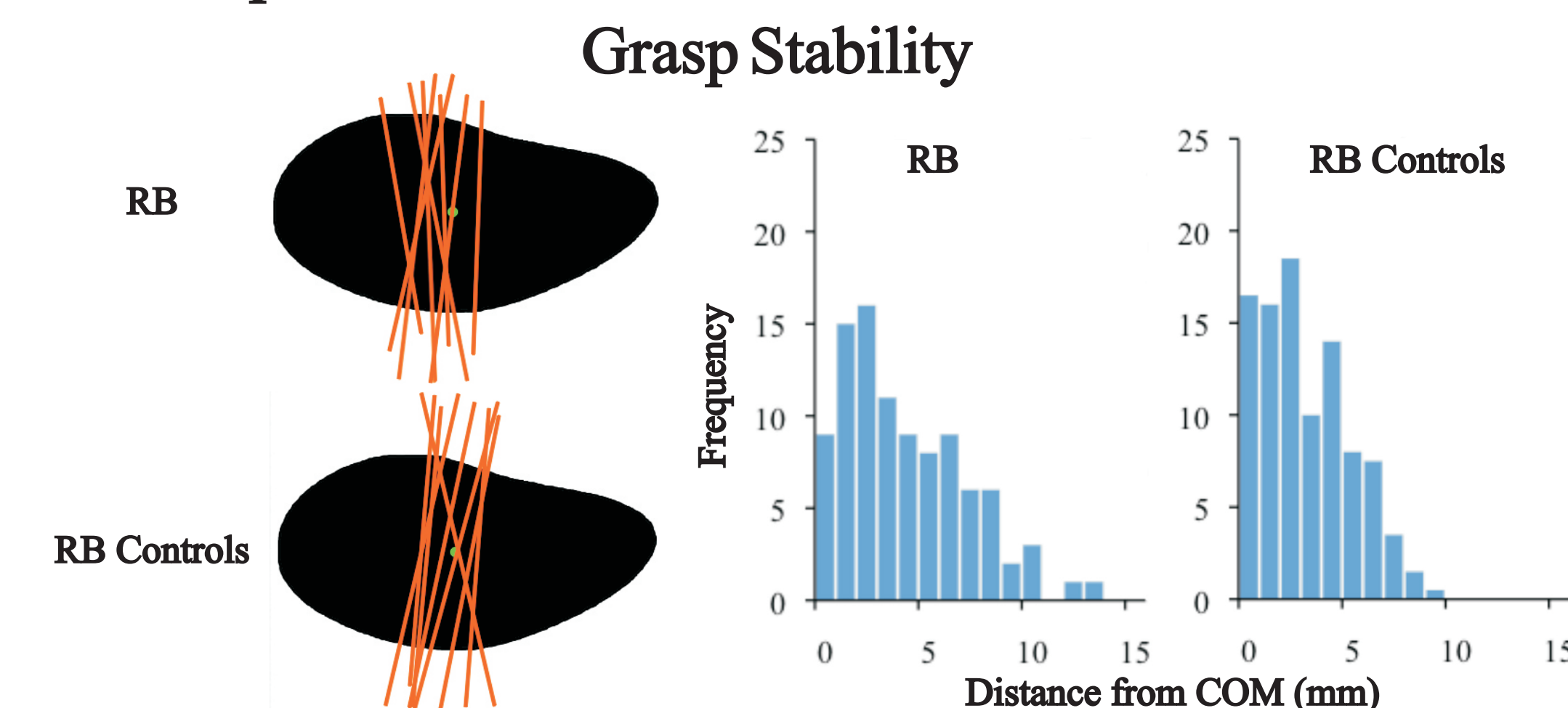


Grasping

Despite RB’s perceptual difficulties, she shows relatively preserved visually guided grasping – properly scaling her grasp and selecting stable grasp points.

Blake Shapes

Perceptual: 70.8% correct



MTB

MTB is a 65 year old, right-handed female who began complaining of reading and visual difficulties 7 years ago.

Agnosia

Boston naming: 15/15

Famous faces: 32/50

Benton Face Recognition: Moderately impaired

Simultanagnosia

Global: 95.8% correct

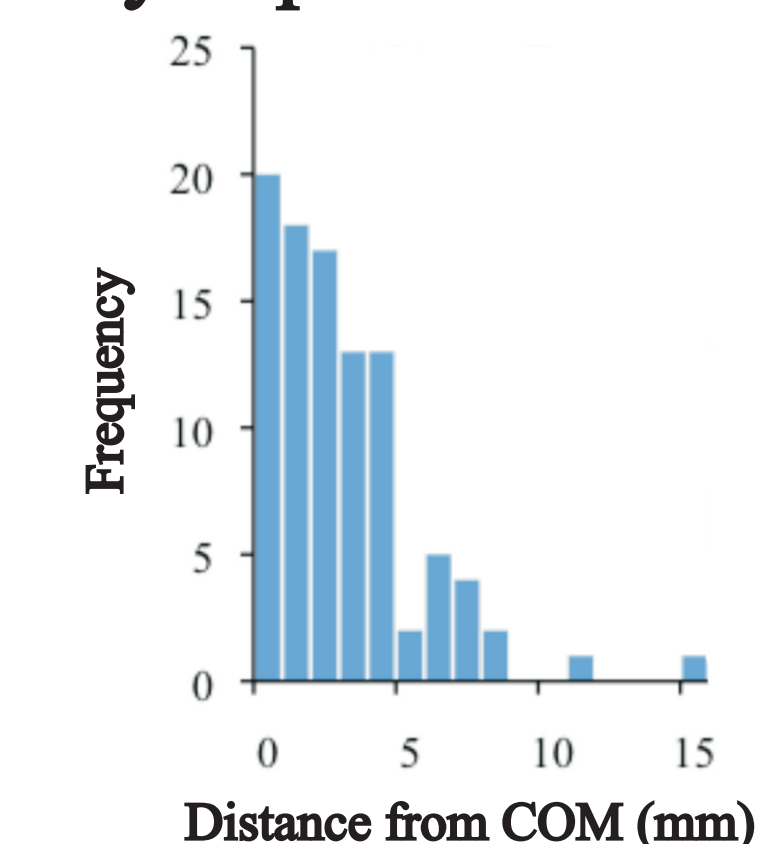
Local: 91.7% correct

Object counting: 7/14

“It is like the objects are dancing.”

Grasping

Perceptual: 70.8% correct



PLH

PLH is a 60 year old, right-handed female who started to complain of “fuzzy” vision 3 years ago. She also finds she gets lost negotiating her way around her neighbourhood.

Agnosia

Boston naming: 6/15

Famous faces: 9/50

Benton Face Recognition: Severely impaired

Simultanagnosia

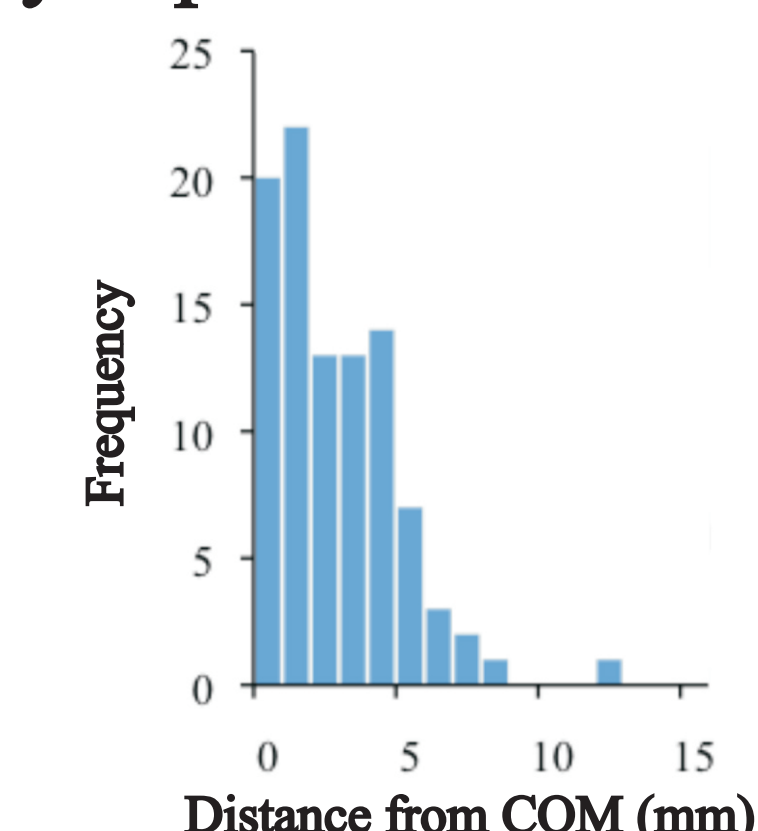
Global: 48.9% correct

Local: 97.9% correct

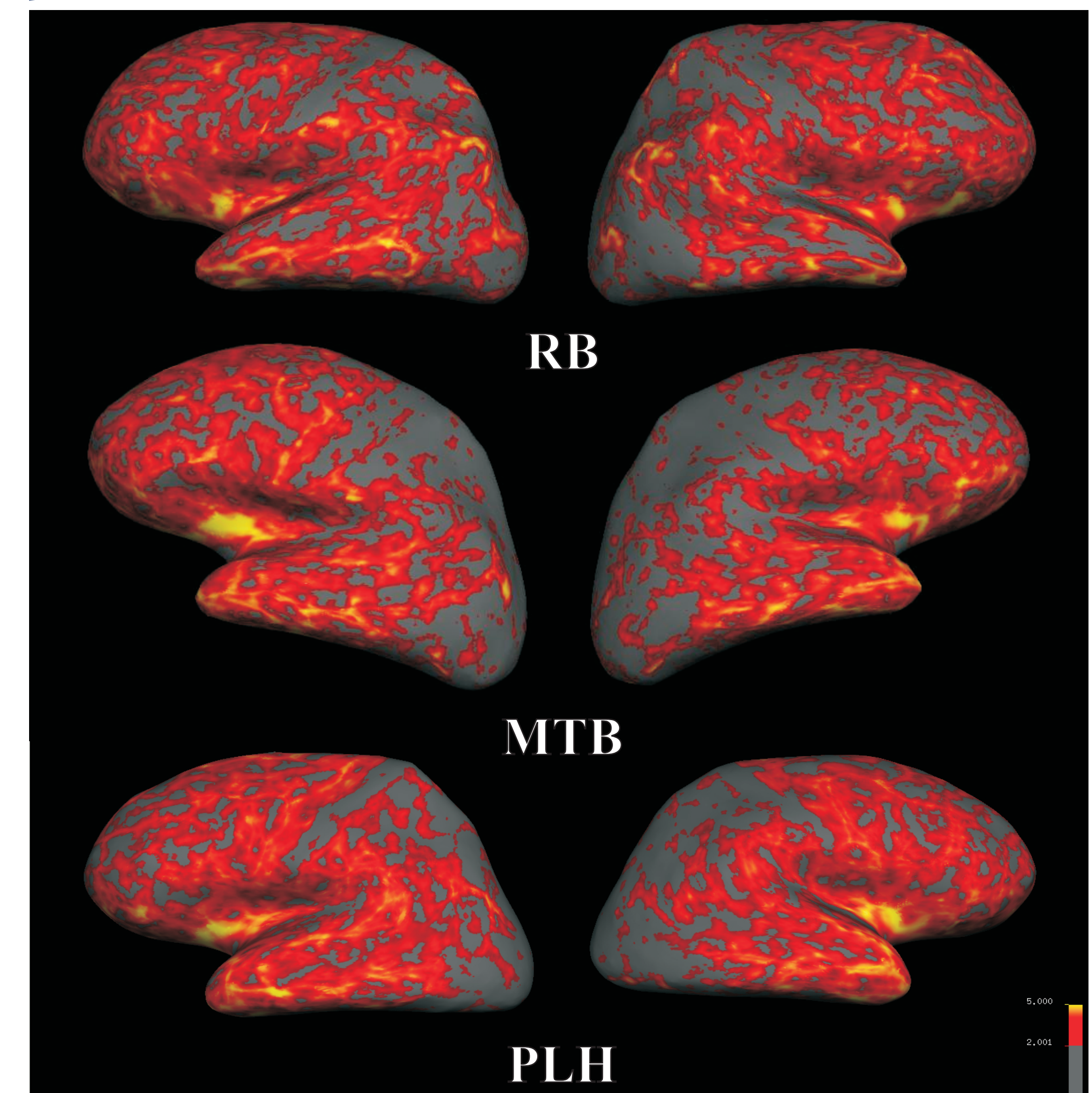
Object counting: 7/14

Grasping

Perceptual: 70.8% correct



Cortical Thickness



Conclusions

Despite severe perceptual difficulties, these PCA patients show relatively preserved abilities in their visually guided actions – properly scaling their grasp for object size and selecting stable grasp points on objects they are impaired at distinguishing perceptually. These cases of PCA reinforce the findings that there are separate visual pathways for visual perception and the visual control of action⁵.

References

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- 4 Tang-Wai, D.F. et al. (2004). Clinical, genetic, and neuropathic characteristics of posterior cortical atrophy. *Neurology*, 63, 1168-1174.
- 5 Milner, A.D. & Goodale, M.A. (2006). The visual brain in action. 2nd edition. Oxford University Press: Oxford.

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