Residual biological motion perception in a case of cortical blindness

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Fribourg University
• 59 years old patient, right-handed, financial director (university degree), married, 4 children
• Suffered from a heart attack in 2010
• Severe post-anoxic encephalopathy
- moderate cortical atrophy
- bilateral posterior white matter hyperintensity in regard to both striate area (green arrows)
BC

- Amnesic syndrome, apraxia, anosognosia
- Normal ophthalmological examination
- Cortical blindness
  - Does not recognize shapes, letters, faces, objects, colors
  - Totally dependent for activities of daily living
Patient wearing eye-tracking glasses, in his apartment

- 4 years after heart attack
Patient wearing eye-tracking glasses, in his apartment
BC: Clinical evolution

• Slow recovery of:
  • Low-level visual saliency processing
Saliency

Oculomotor responses towards visual saliency

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BC: Clinical evolution

- Slow recovery of:
  - Low-level visual saliency processing
  - Motion processing
Motion processing

- Video 6 months post heart attack
Please sit down on this chair
Motion processing

- Conservation of motion processing
- Rehabilitation: could it help object recognition?
Motion does not improve object recognition

- YouGrabber system (YouRehab Ltd.)
BC’s motion processing abilities?

Motion processing

- Biological motion (STS)
- Non-biological motion (V5/MT)
Biological motion processing: Point-light walker (Johansson, 1973)

- static image: impaired
- moving human: impaired
Biological motion
Shuffle dots vs Human

«Which one is the human walker?»

85% correct responses
⇒ residual biological motion processing, despite impaired object recognition

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Human: upright vs inverted

«Which on is the upright walker?»
⇒ 80% correct responses
Human motion or biological motion in general?

Preservation of motion perception

Biological motion?

Human motion

General biological motion

Non-biological motion?
Cat: upright vs inverted

«Which on is the upright cat?»
→ 80% correct responses
Non biological motion?

Preservation of motion perception

Biological motion?

Non-biological motion?
Non-biological motion
Shape from motion: impaired
Shape from motion: impaired
Conclusions

- Bottom-up processing partly spared (visual saliency)
- Non-biological shape-from-motion recognition impaired
- Residual biological motion perception despite cortical blindness
- **Spared object recognition is not necessary for biological motion processing**
- Perspectives: faces processing
Reconnaissance des visages

Reconnaissance visages
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