Emotion, and
the neuropsychology of false beliefs

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Growing interest in:

- Emotion
  especially biological basis
- Emotion-cognition relationship
The big picture:

- Emotion is critical for decision-making outside conscious awareness? experienced as ‘intuition’
The big picture:

- Over-reliance is probably disadvantageous
  
  Cognition shaped by emotional consequences
  
  Producing false beliefs
  
  Obvious in some neurological patients:
  
  confabulation, anosognosia, loss of dreaming…
Core emotion system:

- limited in number
- found in (sub-cortical) structures
- independent neural /pharmacological

happiness, sadness, anger and fear, disgust, surprise

shared across all mammal
Using emotion in decision-making

- Emotion and executive resources
- Affect preceding choice
  Trial action
Phineas Gage

Preserved ‘intelligence’
Poor decision-making
Personality change

“no longer Gage…”

(Harlow 1948)
• Complexity
  multiple objects...

• Uncertainty
  objects can be both
good and bad..
Measuring emotion-based learning

- The Iowa Gambling Task (Bechara et al)
- Four decks - in any order
  ‘Good’ and ‘bad’ decks
- The game is complex
  No-one seems (subjectively) to understand the system

Ventromesial frontal lesions?
Subjective Experience Ratings

Behavioural Performance

Participant
- schizophrenic  p<0.01
- control  p<0.05
## Gambling Task with reversals

<table>
<thead>
<tr>
<th>Deck</th>
<th>Phase 1</th>
<th>Phase 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td></td>
<td></td>
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<tr>
<td>B</td>
<td></td>
<td></td>
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<tr>
<td>C</td>
<td></td>
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<tr>
<td>D</td>
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![Graph showing performance with reversals](image)

- B: Performance (good-bad)
Participants
N=20 schizophrenia, meeting DSM IV criteria
All medicated, 20 age, education matched controls

Too much intuition?

- Emotion-based knowledge is vital for cognition: let’s get as much as possible...
  
  can you ever have too much intuition?

- Dominance of emotion over cognitive systems
  
  modification of cognitive systems
  
  emotional consequences of an idea
  
  false beliefs?
Traditional ideas about confabulation

**Executive function accounts**
(Moscovitch, Johnson, Burgess etc)

Executive impairment often not severe
Severely dysexecutive patients don’t really confabulate
Doesn’t explain selectivity
Too much of an explanation...
‘Emotion-based’ accounts

- A long *anecdotal* history:
  
  Weinstein, Kinsbourne, Conway, Feinberg...

Confabulation:
  
  minimises disability
  repairs relationships
‘Pleasantness’ and false beliefs

ES, 56 years old, meningioma in pituitary/suprasellar region

Dense anterograde amnesia

Florid confabulation: at work, sports appointments, replacement of eyes, replacement of wife (Capgras)

155 unselected confabulations from 6 sessions

Confabulations Ranked by Pleasantness

- **Pleasant**
- **Unpleasant**

<table>
<thead>
<tr>
<th>Pleasantness</th>
<th>Percentage of Total Confabulations</th>
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<tbody>
<tr>
<td>1 to 2</td>
<td>0%</td>
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<tr>
<td>2 to 3</td>
<td>4.70%</td>
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<tr>
<td>3 to 4</td>
<td>14.76%</td>
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<tr>
<td>4 to 5</td>
<td>20.80%</td>
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<tr>
<td>5 to 6</td>
<td>40.90%</td>
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<tr>
<td>6 to 7</td>
<td>18.70%</td>
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</tbody>
</table>
Percentage of Pleasant and Non-pleasant Confabulations: ES and Controls

P < 0.01
False beliefs about place

- Baseline ‘pleasantness’?
e.g. Capgras delusion
- Unsuitable for investigation?
- Reduplicative paramnesia for place
A survey of the reduplication literature

- 16 cases of confabulation, from 1980–2000
- Rated ‘pleasantness’ of actual and confabulated locations (blind to category)
Actual location:
Hospital / clinic (x15)

Confabulated location
(worst to best):
old secondary school
    at work (x4)
at my doctor’s home
    in my old university
in my mother’s home town
    in a hotel or motel (x2)
on a ferry in the Caribbean
    on holiday on a barge
in a bistro
    at home (x3)

Confabulators in psychotherapy

- Kaplan-Solms & Solms (2000)
- Case material from the original session notes
  8–10 sessions, mean length 4.4 pages
- Episodes of confabulation and associated mood
  Rated on a 7-point Likert scale, by 29 blind raters
  Inter-rater reliability: Cronbach’s alpha .51 to .94

Mr H

65 year-old scientist

Believed the ward was a barge, or a Caribbean cruise

Believed he had 3 children (aged 29, 31 & 33), but actually his only son had died as a child
Pleasantness of mood & confabulation
Confabulation, mood and defence

Pleasant confabulations
In low mood states

- Confabulations to *protect* against low mood
- Emotion regulation?
Concluding remarks

Linking disparate domains:

Emotion and pharmacology...

Pharmacotherapy and psychotherapy
Cathryn Evans, Caroline Bowman, Helen Berry, Mark Solms, Katerina Fotopoulou, Vanessa Owen, Sarah Jenkins, Martina Rowley, Karen Kemish, Sohee Park…

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