SEMANTIC METACOGNITION:
Insights from normal and pathological functioning

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Model of metacognition

1st Axis

Metacognitive level
2nd-order

Cognitive level
1st-order

MONITORING
Self-assessment of performance

CONTROL
Use and choice of strategies

Nelson & Narens (1990)
Metacognitive judgments

Global judgements

How many items do you think you can recall?

How well will you do on this test?

Item-by-item judgements

Is your answer for this item will be/is correct?

In episodic or semantic memory
Metacognitive judgments

Global judgements

How many items do you think you can recall?

How well will you do on this test?

Item-by-item judgements

Prospective

How likely are you to later recall this item?

At encoding

At retrieval

Retrospective

How confident are you that your answer is correct?

In episodic or semantic memory
What guides our metacognitive judgments?

- Retrieval fluency
- Processing fluency
- Partial information
- Familiarity with the cue
- Expertise in the domain

Hertzog, Dunlosky, Robinson, & Kidder (2003); Kelley & Lindsay (1993); Koriat (2008); Metcalfe, Schwartz, & Joaquim (1993); Mueller, Tauber, & Dunlosky (2013); Reder (1988); …
Fractionation of metacognition in AD

Souchay (2007), Genon et al. (2016), Souchay et al. (2002)
Problematic

• Do metacognitive abilities depend on the first-order (cognitive) task?
  • Are the same metacognitive processes involved whether episodic or semantic memory is being tested?
  • Is semantic processing involved in metacognition?
  • Do different first-order deficits (i.e., episodic or semantic) lead to distinct metacognitive abilities?
Introduction

1st Axis

Experimental psychology

Does semantic processing allow predictions to be more accurate?

Are specific cues used in episodic and semantic metacognition?

2nd Axis

Neuropsychology

What metacognitive performance in semantic dementia?

Do metacognitive deficits depend on the 1st-order impairment?
Introduction

1st Axis

2nd Axis

2 approaches

1st Axis

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Semantic processing in episodic metacognition: FOK

The Feeling-of-knowing paradigm (Hart, 1965)
Semantic processing in episodic metacognition

**Procedure**

**1st Axis**

**Bloc 1**

- **Encoding**
  - cue - target

- **Distractive task**
  - Which item was presented with the following item?

- **Recall**

- **FOK**
  - How likely is it that you will later recognize the item?
    - 1 - Very unlikely
    - 2 - Unlikely
    - 3 - Neither
    - 4 - Likely
    - 5 - Very likely

- **Recognition**
  - Which item was presented with the following item?
    - cue
cue
target
distractor

**Bloc 2**

- **Encoding**
  - cue - target

- **Distractive task**
  - Which item was presented with the following item?

- **Recall**

- **FOK**
  - How likely is it that you will later recognize the item?
    - 1 - Very unlikely
    - 2 - Unlikely
    - 3 - Neither
    - 4 - Likely
    - 5 - Very likely

- **Recognition**
  - Which item was presented with the following item?
    - cue
cue
target
distractor
### Design

2x2 within-subject

<table>
<thead>
<tr>
<th>Type of cue</th>
<th>Word</th>
<th>Pseudo-word</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word</td>
<td>moto - rasoir</td>
<td>cactus - onvade</td>
</tr>
<tr>
<td>Pseudo-word</td>
<td>lodan - drapeau</td>
<td>mutrole - satusse</td>
</tr>
</tbody>
</table>
# Semantic processing in episodic metacognition

## Measures

<table>
<thead>
<tr>
<th>1st order performance (memory)</th>
<th>2nd order performance (metamemory)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Recall</td>
<td>• Bias: <em>do people under or over-estimate their performance?</em></td>
</tr>
<tr>
<td>• Recognition</td>
<td>• Efficiency: <em>can people discriminate between items they will be able to recognize and items they won't be able to recognize?</em></td>
</tr>
</tbody>
</table>
Semantic processing in episodic metacognition

Expected results

1st order performance (memory)

- Recall

- Recognition

Gardiner & Java (1990)

2nd order performance (metamemory)

- Bias:

- Efficiency

Gardiner & Java (1990)
Semantic processing in episodic metacognition

Future directions

<table>
<thead>
<tr>
<th>Type of cue</th>
<th>Type of target</th>
<th>Object</th>
<th>Non-object</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object</td>
<td>-</td>
<td><img src="" alt="Image" /></td>
<td><img src="" alt="Image" /></td>
</tr>
<tr>
<td>Non-object</td>
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2 approaches

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Semantic dementia

Fronto-temporal Degeneration (FTD)

Semantic Dementia
Loss of semantic knowledge and concepts
Damage in anterior temporal lobe

Behavioral variant
Impaired executive functioning, changes in behavior and personality
Damage in frontal lobe

Non-fluent PPA
Impairment in phonological and syntactic aspects of language
Damage in frontal and temporal lobe

Metacognition

Moreaud et al. (2008), Neary et al. (1998), Snowden et al. (1989; 1992)
Banks & Weintraub (2008), Bastin et al. (2012), Rosen et al. (2014), Souchay et al. (2003)
Metacognition in SD

**Participants**
- Sementic dementia
- Alzheimer’s disease
- Vascular aphasia

**Tasks**
- Global judgements
  - Prospective
    - At encoding
  - Retrospective
  - At retrieval
- Episodic
- Semantic
Thank you for your attention!
REFERENCES


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