Conceptualisation Deficits in Aphasia
What Evidence can be Gained from a Picture Description Task?
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What is Conceptualisation?

**Conceptualiser**

Generating a preverbal message

(Levelt, 1989)
What is Conceptualisation?

**CONCEPTUALISER**

- **Macroplanning**
- **Microplanning**

- Forming *speaking intention*
- Selecting information with regard to speaking intention
- Ordering information

(Levelt, 1989)
What is Conceptualisation?

**CONCEPTUALISER**

- Macroplanning
- Microplanning

- Taking **perspective**
- Forming **semantic relations** between elements of the message
- Determining **argument structure**

(Levelt, 1989)
What is Conceptualisation?

What happens if our speaking is impaired?
Conceptualisation Deficits in Aphasia

- 4 cases of individuals with aphasia with hypothesised conceptualisation deficits (Cairns et al., 2007; Marshall, Pring, & Chiat, 1993; Dean & Black, 2005; Byng, Nickels and Black, 1994)

- Reported symptoms:
  1. Deficits in focusing on the central elements (Cairns et al., 2007)

RON:
“tap, hose, and pixies, elf, woman, long hair - no, short - no, bob, and pixie and then swimming woman, and cap, obviously, and (gestures goggles)“ (Cairns et al., 2007)
Conceptualisation Deficits in Aphasia

- 4 cases of individuals with aphasia with hypothesised conceptualisation deficits (Cairns et al., 2007; Marshall, Pring, & Chiat, 1993; Dean & Black, 2005; Byng, Nickels and Black, 1994)

- Reported symptoms:
  1. Deficits in focusing on the central elements (Cairns et al., 2007)
  2. Assigning information to fore- and background
  3. Identifying semantic relations between individual events
     - verbal and non-verbal

- Other symptomatic similarities
  1. Non-fluent agrammatic speech
  2. Verb-retrieval difficulties
  3. Reduced verb-argument structure
Aim of the Study

1. Evaluating prevalence of conceptualisation deficits

2. Identifying key symptoms in a standard diagnostic task
METHOD
“Cat Rescue“ - Scenario

Nicholas and Brookshire (1993)
Method

Participants:
- 50 healthy participants and 50 PWA
  - Randomly selected from AphasiaBank database (MacWhinney et al., 2011)
  - Exclusion: neglect, hemianopia

Procedure:
- Extract …
  1. “Verb Naming Test” (VNT) scores of PWA
  2. “Western Aphasia Battery” (WAB) scores
     - Object naming
     - Aphasia quotient (WAB-AQ)
  3. Transcripts of picture descriptions
- Concept analysis of picture descriptions
Method

Concept analysis:

- Identifying and analysing relevant main concepts (Nicholas & Brookshire, 1995, Capilouto et al., 2005, Richardson & Dalton, 2016)
  - What is relevant?
  - What is a concept?

- Analysing picture descriptions of healthy participants
  1. Listing all phrases that contain 1 verb and add a new idea to the narrative
     - 182 different phrases

The cat **ran up** the tree
vs.
The cat **climbed** the tree
Method

Concept analysis:

- **Identifying and analysing relevant main concepts** (Nicholas & Brookshire, 1995, Capilouto et al., 2005, Richardson & Dalton, 2016)
  - What is relevant?
  - What is a concept?

- **Analysing picture descriptions of healthy participants**
  1. Listing all phrases that contain 1 verb and add a new idea to the narrative
    - 182 different phrases
  2. 3 raters identified phrases that express the same idea
    - 61 different ideas = concepts

The man thinks he is a squirrel
Concept analysis:

- Identifying and analysing relevant main concepts (Nicholas & Brookshire, 1995, Capilouto et al., 2005, Richardson & Dalton, 2016)
  - What is relevant?
  - What is a concept?

- Analysing picture descriptions of healthy participants
  1. Listing all phrases that contain 1 verb and add a new idea to the narrative
     - 182 different phrases
  2. 3 raters identified phrases that express the same idea
     - 61 different ideas = concepts
  3. Identify concepts that are mentioned by ≥60% of controls
     - 10 main concepts
## 10 main concepts

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The cat climbed/is in the tree [motion or static]</td>
</tr>
<tr>
<td>2</td>
<td>Any mention of the girl [concerned/ playing/ wants the cat back]</td>
</tr>
<tr>
<td>3</td>
<td>The man climbed/is in the tree [motion or static]</td>
</tr>
<tr>
<td>4</td>
<td>The man wants to get the cat [motivation to climb the tree]</td>
</tr>
<tr>
<td>5</td>
<td>The ladder was lost</td>
</tr>
<tr>
<td>6</td>
<td>Any mention of the dog [comes/ barks/ is worried]</td>
</tr>
<tr>
<td>7</td>
<td>Someone called the fire brigade</td>
</tr>
<tr>
<td>8</td>
<td>The fire brigade comes</td>
</tr>
<tr>
<td>9</td>
<td>The fire brigade brings a ladder</td>
</tr>
<tr>
<td>10</td>
<td>The fire brigade rescues/helps them</td>
</tr>
</tbody>
</table>
Method

Concept analysis:

- Picture descriptions of PWA analysed for:
  1. Number of main concepts
  2. Order of main concepts
  3. Number of words & verbs

- Verbal and non-verbal reactions were taken into account
  - correct main concept = 1) “The cat is in the tree”
  2) “{points: cat} up the tree.”
RESULTS
Results

Number of main concepts:

- Group of PWA produced significantly fewer main concepts than controls
  - Cut-off = 7 main concepts

### Graph Details

- **Controls**
  - Mean: 8.41
  - SD: 1.43

- **Aphasia**
  - Mean: 6.1
  - SD: 1.92
Results

Number of main concepts:

- Group of PWA produced significantly fewer main concepts than controls
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- “Dog” concept produced by more PWA than controls
Results

Number of main concepts:

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- “Dog” concept produced by more PWA than controls

![Bar chart showing percentage of participants who produced the concepts](chart.png)
Results

Number of main concepts:

- Group of PWA produced significantly fewer main concepts than controls
  - Cut-off = 7 main concepts
- “Dog” concept produced by more PWA than controls
- Low number of main concepts significantly correlated with:
  - Higher severity of impairment
  - Low number of words
  - Low proportion of verbs
  - Low VNT score
Results

Order of Concepts:

- Mean concept order produced by controls

- Individual concept order of participant

- Calculate an error-in-order ratio
Results

Order of Concepts:

- Mean concept order produced by controls
- PWA produced different concept order than controls
  - Especially in the beginning
Results

Order of Concepts:

Beginning:

End:

% of participants who produced the order

Order

CAT/MAN/GIRL as first 3 concepts  FIRE BRIGADE as last concept

*\( p < 0.001 \)

Controls
Aphasia
Results

Order of Concepts:

- Mean concept order produced by controls

PWA produced different concept order than controls
  - Especially in the beginning
  - High error-in-order ratio was significantly correlated with:
    - Low VNT Score
Discussion and Conclusion
Discussion and Conclusion

- Concept analysis provides valuable information about conceptualisation skills of PWA

1. Significantly smaller number of main concepts in some PWA
   - Suggests deficits to identify most important information

2. Significantly different concept order in some PWA
   - Suggests deficits to identify relations between individual events
   - Suggests deficits to weight the importance of individual information units and to assign them to fore- and background
Discussion and Conclusion

- **Verb retrieval** seems to be crucial
  - Data derived from database: no further testing of these participants possible
  - Influence of other factors need to be further investigated

- Picture descriptions provide valuable information about conceptualisation processes
  - Number of main concepts and order of concepts are potential markers of conceptual deficits in aphasia

- Order of concepts seems to be **less influenced by linguistic features**
  - Reliable marker of conceptualisation deficits?
References