Introduction

Semantics-based heuristics interact with syntactic algorithmic mechanisms during sentence processing.

Interplay between syntactic word order processing, pragmatics/semantics and prosody is particularly evident in the processing of garden-path (GP) sentences.

GP sentences: temporarily ambiguous because of the initial interpretation of a postverbal noun as the direct object of the verb, rather than as the subject of a separate clause: While the man hunted the deer ran into the woods.

‘Good-enough’ processing of GP sentences: complete syntactic reanalysis is not always performed. (Ferreira, 2003)

Previous research mostly used a yes/no comprehension task. Possible reasons:
- Increased world knowledge
- Reduced working memory capacity (Just & Carpenter, 1992)
- Decline in inhibitory control (Hasher, Zacks & May, 1999)

Is a qualitative processing difference reflected in older adults’ sentence interpretations, compared to younger adults?

Methods

Focus on GP sentences: conditions A, C, E

Sentence

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>While the man hunted the deer ran into the woods.</td>
<td>The deer ran into the woods while the man hunted.</td>
<td>While the man hunted the deer ran into the woods.</td>
<td>The plane flew over the woods while the man hunted.</td>
<td>While the man hunted the deer ran into the woods in the zoo.</td>
</tr>
</tbody>
</table>

A: Transitive, Plausible, Subordinate-Main
B: Intransitive, Plausible, Main-Subordinate
C: Intransitive, Locally implausible, Subordinate-Main
D: Intransitive, Locally implausible, Main-Subordinate
E: Intransitive, Globally implausible, Subordinate-Main

Sentence-picture matching task: pictures correspond to different types of interpretation E.g., for GP sentences:

- Pic A – correct interpretation (‘the deer’ as the subject of the main clause)
- Pic B – incorrect ‘good-enough’ interpretation (‘the deer’ shared between two clauses)
- Pic C – incorrect ‘initial’ interpretation (‘the deer’ as only the object of the subordinate clause)

Twenty healthy younger participants (mean age 22.7 years, range 18-32 years)

Fifteen healthy older participants (mean age 66.0 years, range 60-75 years)

Sentence-picture matching task: pictures correspond to different types of interpretation E.g., for GP sentences:

Results

Significant effects (p < .01):
- Transitivity: intransitive structure slower.
- Within early closure: Age: older group slower.
- Plausibility: plausible and globally implausible faster.
- Within late closure: Age: older group slower.
- Verb type: OPT verbs slower.

Accuracy (repeated-measures ANOVA):

Significant effects (p < .01):
- Transitivity: more errors in intransitive structure.
- Within early closure: Age: more errors in older group.
- Order: more errors in subordinate-main order.
- Verb type: more errors in RAT verbs.
- Plausibility: more errors in plausible and globally implausible sentences.
- Verb type x Plausibility: verb type effect larger in plausible.
- Verb type x Age: verb type effect larger in older group.

Discussion & Conclusions

Sentence-picture matching task improves on yes/no question task by providing information on the type of incorrect interpretation.

Lexical and semantic factors, not only syntactic structure, influence sentence interpretation:
- Comprehenders are more likely to choose a plausible interpretation (both in ambiguous early-closure and unambiguous late-closure sentences).
- Effect of verb type: RAT verbs inherently ‘prefer’ transitive reading but are ultimately less ambiguous in intransitive structures (the opposite effects of verb type in transitive and intransitive structures).

Older group:
- General decline in accuracy and processing speed.
- Older comprehenders rely more heavily on semantic heuristics (plausibility), even in unambiguous sentences.
- Older comprehenders more often build ‘good-enough’ sentence representations, failing to perform a complete syntactic reanalysis. However, the age groups do not differ in how often they adhere to the initial parsing, suggesting that the differences between the age groups are not due to inhibitory control.

Future directions:
- Conducting the experiment in clinical populations. Hypotheses:
  - Patients with mild agromatagia aphasia would rely more heavily on non-syntactic cues.
  - Patients with mild cognitive impairments following right-hemisphere damage might not be able to use pragmatic and discourse-based cues such as global plausibility.

References


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Garden-Path Sentence Processing: Plausibility Effects
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