Morphological Processing in Children and in Late Bilinguals

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Outline

- Earlier work: Child L1 vs. adult L2 acquisition of grammar
- Current work: Child L1 vs. adult L2 processing of grammar
- Morphological priming in L1 and L2 German

Child L1 vs. adult L2 acquisition

- 'L2 learners face a task parallel to that of L1 acquirers, namely the need to arrive at a linguistic system which accounts for the L2 input...’ (White 2003: 15).
- ‘...one wonders why a task which is mastered so successfully by a child appears to be mission impossible for teenagers and adults’ (Meisel 2011: 2).

→ The comparative investigation of L1 and L2 acquisition provides a window for the systematic study of the properties of different learning systems.

German clause structure

German is a verb-final language that raises finite verb to the 2nd position in main clauses

Verb-final _fin: to send a fax = 'ein Fax senden'

BUT:

V2 _fin: Paul sends a fax = Paul sendet ein Fax

Child L1 German

Early child L1 German: MLUw < 3
- mone auch lump ausziehen
- die auto hier boot umkip
- Julia kann nich pappe schneiden
- geht nicht raus

Later child L1 German: MLUw > 3
- jetzt können die leute dran festhalten
- du kannst da brezel machen
- kann das nicht

Adult L2 German

- ich kaufen brot so türkische
- meine Vater nicht rauchen Zigara
- und dann mitnehmen vielleicht wohnung

'Most of the suggested revisions of the grammatical analysis [of Clahsen & Muysken 1986] ... were less than convincing right from the start' (Meisel, 2009: 127).
Morphological priming in language learners

Purpose: to examine how language learners process different kinds of inflected words online?

Are language learners sensitive to morphological structure?

Do language learners decompose morphologically complex words?

- Cross-modal priming on German (past) participles

Linguistic background: (past) participles

- **t** forms (no stem change):
  - tanz – getanzt: “to dance – danced”

- **n** forms (no stem change):
  - schlafen – geschlafen: “to sleep – slept”

- **n** forms (with stem change):
  - leihen – geliehen: “to borrow – borrowed”

ge- prefixation: prosodically determined, not morphologically

occurs when stem is stressed on the first syllable

From a dual morphology perspective:

(a) /-t/; [+Verb] → [+part]
(b) Store -n participle forms.

Methods

Participants:

- **Adult L1**: 72 adult native speakers of German (mean age: 37.65)
- **Child L1**: 108 monolingual child speakers of German in two age groups (group 1: 7;3-9;1 years, group 2: 9;1-10;7)
- **Adult L2**: 30 advanced L2 learners of German with Russian as L1 (mean age: 27.2; all late learners; all at C1 level according to CEFR)

Materials:

27 experimental prime-target pairs in 3 participle types and 3 prime types; 81 filler prime-target pairs

Test Conditions: (‘Related’)

- t participles: getanzt – tanze
- n participles no stem change: geschlafen – schlafen
- n participles stem change: geliehen – leihe

Two Control Conditions:

‘Identity’: prime=target → maximal priming

‘Unrelated’: prime≠target → no priming

Task: Reading out visually presented target words after auditory primes

L1 Results: -t vs. -n

Mean response latencies for two participles affixes and three prime types

Different priming effects for the two affixes in the three groups:

- Full priming for -t in all 3 groups: \( RT_{\text{ID}} < RT_{\text{Rel}} < RT_{\text{Unrel}} \)
- Reduced priming for -n in adults and older children: \( RT_{\text{ID}} < RT_{\text{Rel}} < RT_{\text{Unrel}} \)
- No priming for -n in younger children: \( RT_{\text{ID}} < RT_{\text{Rel}} = RT_{\text{Unrel}} \)
L2 Results: -t vs. -n

Different priming effects for the two participant groups:
- L1: Full priming for -t, reduced priming for -n
- L2: Reduced priming for both -t and -n participles

Mean response latencies for two participles affixes and three prime types

<table>
<thead>
<tr>
<th>Prime Type</th>
<th>L2 Learners</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>-t</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>-n</td>
<td></td>
<td></td>
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</tbody>
</table>

Child L1 vs. Adult L1

Three observations:
- Priming patterns for -n participles:
  - adult-like priming for children of age group II
  - no reliable priming for children of age group I
- Mean response latencies after -n participles:
<table>
<thead>
<tr>
<th>Prime Type</th>
<th>Children: Age Group I</th>
<th>Children: Age Group II</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>-n: no stem change</td>
<td>729ms</td>
<td>665ms</td>
<td>546ms</td>
</tr>
<tr>
<td>-n: stem change</td>
<td>778ms</td>
<td>666ms</td>
<td>549ms</td>
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</tbody>
</table>
- Overall response speed:
  RT (adults) < RT (children-age group II) < RT (children-age group I)

L2 vs. L1

- L1: -t → full priming, -n → reduced priming
- L2: -t > -n → reduced priming

Effect size differences (Unrelated vs. Related), Cohen’s d:
- L1: -t > -n; L2: -t ≈ -n

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<thead>
<tr>
<th>Prime Type</th>
<th>L1 Adults</th>
<th>L2 Learners</th>
</tr>
</thead>
<tbody>
<tr>
<td>-t</td>
<td>1.00</td>
<td>0.80</td>
</tr>
<tr>
<td>-n</td>
<td>0.36</td>
<td>0.21</td>
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Explaining the priming effects: Non-morphological factors

- Response speed differences?
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>-t</td>
<td>716ms</td>
<td>655ms</td>
<td>716ms</td>
<td></td>
</tr>
<tr>
<td>-n</td>
<td>655ms</td>
<td>537ms</td>
<td>630ms</td>
<td></td>
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<tr>
<td>But: Response speed: adults (L1 &amp; L2) &lt; children (L1 &amp; children) Priming effects: L2 &gt; L1 (adults &amp; children)</td>
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- Surface form overlap?
  But L2 priming: -t without stem change ≅ -n with stem change

- Semantic relatedness?
  But L1 priming: -t ≠ -n

- Distributional properties?
  But: -t and -n are both common in German; unmarked stems with both -t and -n

Explaining the priming effects: L1 representations

Written Targets

- 'sink'  
  - gesunken
- 'tanze'
  - getanzt

Spoken Primes

- gesunken
- getanzt

Morphological Generalization

Explaining the priming effects: L2 representations

Written Targets

- 'sink' 
  - gesunken
- 'tanze'
  - getanzt

Spoken Primes

- gesunken
- getanzt
Conclusions

Dual morphology hypothesis:
→ Language processing makes use of morphologically structured representations, in both L1 children and L1 adults.

L1 children vs. L1 adults:
→ Developmental changes in children's performance on morphologically complex words are due to lexical learning and advances in lexical retrieval.

L2 vs. L1 processing:
→ L2 morphological processing employs real-time grammatical analysis less than L1 processing and relies more on non-structural properties from the L2 input.