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British Sign Language Grammaticality Judgement Task: Exploring age of acquisition effects in British deaf adults
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Language transmission in Deaf communities

- A critical/sensitive period in first language acquisition? (Lenneberg 1967)
- Age of acquisition (AoA) effects
  - "Whether and how variation in age of acquisition affects ultimate language attainment and processing is a complex question with important theoretical and applied ramifications" (Boudreault & Mayberry, 2006: 608)
- Deaf communities as test case for AoA effects in language acquisition
  - Only ≤5% of American deaf children are native signers (Mitchell & Karchmer, 2004)
  - Most (≥95%) are born to hearing families which do not sign

Non-native sign lg acquisition: L1 vs L2

- Some clear cases of delayed L1 sign language acquisition
  - e.g. where spoken lg acquisition and literacy has failed
- But in some cases, sign language could be L2
  - e.g. where there is skill in spoken/written language
- Distinguishing L1 vs L2 status of a sign language can be difficult

Sign language as L1 vs L2

- Attempts to distinguish L1 vs L2 in studies of AoA effects in sign languages
  - E.g. ASL as L2 when born hearing (English L1) but deafened in childhood between ages 8 & 12 (Mayberry 1993)
  - Various studies: ASL as L1 determined by inability to use spoken English or “limited knowledge of English”, as determined by self-report
  - Problem with self-report: Bilingualism
  - Determining degree of bilingualism in deaf individuals can be difficult, esp in late learners

Sign language as L1

- Other possibility for determining L1: reading ability
  - Reading correlates with speechreading in deaf individuals (Mohammed et al. 2006)
- Current study: A grammaticality judgement task based on ASL GJT (Boudreault & Mayberry 2006)
- BSL version considers reading performance and nonverbal IQ to more directly assess critical period hypothesis

ASL grammaticality judgement task

- Boudreault & Mayberry (2006)
- Aim: to test whether AoA affected off-line grammaticality judgement of different syntactic structures
- Stimuli: grammatical and ungrammatical sentences
  - Ungrammatical sentences were created by moving a constituent to an incorrect position in the sentence
- Participants were instructed to focus on detecting errors in the structure of the stimuli, including non-manual marking, sign order and/or the use of space
Participants in the ASL study

- Native (N=10)
  - AoA from birth
- Early (N=10)
  - AoA ages 5 - 7
- Late (N=10)
  - AoA ages 8-13
- All participants:
  - born deaf
  - minimum 10 years daily ASL experience each
  - none reported ability to navigate through daily life via speech & speechreading alone

BSL Grammaticality Judgement
Task: Aims

- To test the claims made about delayed L1 acquisition of ASL morphosyntax...
- On an unrelated signed language (BSL)
- Using external measurements of:
  - Reading, as proxy measure of English language proficiency (General Reading Test II, Vernon-Warden/Kirklees Reading Test)
  - Nonverbal IQ (Wechsler Abbreviated Scale of Intelligence)

Example: Simple sentences

Simple sentences with plain verbs
Ungrammatical item produced by moving verb into an incorrect position in subject noun phrase:

HEARING BOY FROM FRANCE WANT HOME NOW
The hearing boy from France wants to go home now

*HEARING BOY FROM WANT FRANCE HOME NOW

BSL participants recruitment

- **ASL GJT**
  - ASL as primary language for 10 years minimum
  - Deaf from birth
  - AoA groups as native, ages 5-7, and ages 8-13
  - Inability to navigate everyday life through the exclusive use of speech and speech-reading

- **BSL GJT**
  - BSL as primary language for 10 years minimum
  - Deaf from birth (most)
  - AoA from birth (native) and from ages 2-17 (non-native) - continuous variable
  - Some (esp late learners) reported ability to navigate everyday life through the exclusive use of speech and speech-reading

ASL study: results & implications

- **Results**
  - Strong AoA effects on accuracy, and an interaction between grammaticality and AoA for most structures

- **Conclusions**
  - Delayed L1 acquisition affects ultimate attainment of ASL morphosyntax
BSL participants

<table>
<thead>
<tr>
<th>N Total</th>
<th>N Deaf from birth*</th>
<th>AoA^ (mean)</th>
<th>AoA^ (range)</th>
<th>Mean years of BSL use (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native</td>
<td>10</td>
<td>9</td>
<td>0</td>
<td>0 (20-57)</td>
</tr>
<tr>
<td>Early</td>
<td>11</td>
<td>8</td>
<td>4.4</td>
<td>2-8 (17-51)</td>
</tr>
<tr>
<td>Late</td>
<td>9</td>
<td>7</td>
<td>12.8</td>
<td>9-17 (10-26)</td>
</tr>
</tbody>
</table>

*All participants deaf before age 5  *AoA analysed continuously not categorically

Results: Regression analyses

<table>
<thead>
<tr>
<th>Reading age &amp; nonverbal IQ factored out</th>
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<tbody>
<tr>
<td>Age of learning BSL</td>
</tr>
<tr>
<td>Overall</td>
</tr>
<tr>
<td>p&lt;0.001</td>
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</tbody>
</table>

AoA and reading age

- Mean reading age for late learners (13.4 yrs) significantly higher than for early learners (10.7 yrs, p<0.030)
- Suggesting late learners have higher level of proficiency in English than early learners
- However, both groups: far lower reading ages than minimum "adult"-level norms

Early learners: L1 age of acquisition effects

- Even when possible confounds of reading age and nonverbal IQ are factored out, still significant effect of AoA in early learners (AoA up to around age 8)
- First unequivocal evidence of L1 acquisition effects in a sign language
- Supports and strengthens other research on AoA effects in delayed L1 signers via self-report (e.g. Boudreault & Mayberry 2006)
- Late learners, different story...

Late learners: L1 differs from L2 acquisition

- Mayberry (1993)
  - Differences between prelingually deaf L1 signers (deaf from birth) and postlingually deaf L2 signers of ASL (born hearing, deafened between age 8-12)
  - Here we have evidence of L1 vs L2 acquisition effects even in two groups of prelingually deaf signers (early and late learners)
  - This group of BSL late learners appear to have English as L1, which may then have scaffolded learning of BSL (as L2) later in life

Implications

- Early acquisition of a first language is crucial, whatever the modality
- L1 proficiency of written language may be possible for some deaf children...
- But a risky strategy to rely on this alone
- Bilingual education is best way to ensure that every deaf child has the best chance for successful acquisition in either/both languages (Grosjean 2001)
Thank you!

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