L1 Attrition:
Accuracy and Age of Emigration

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Overview

- Effects of Age at Emigration (AaE) in L1 attrition
- Possible causes: critical period (CP) or spurious effect?
- Proposals for a CP in L1 attrition
- Data: L1 German L2 English oral history interviews
- Results & Discussion
Frequent finding: More severe attrition in children than in adults

Many studies on either child OR adult attriters:

- Children: complete L1 loss seems possible (Nicoladis & Grabois 2002; Pallier et al. 2003, Ventureyra et al. 2004)
- Teenagers/adults: no dramatic loss; often still in monolingual L1 range (e.g., Scherag et al. 2004)

Fewer studies across whole AaE range, e.g.:

- Yeni-Komashian et al. 2000 on pronunciation: the lower the AaE, the less native-like (L1 Korean, L2 English)
- Bylund 2009 on describing motion events: non-native expressions only for AaE<12 (L1 Spanish, L2 Swedish)

Can the AaE effect be confirmed in a group including pre- and post-puberty attriters?
AaE Effects in L1 Attrition

- Why should AaE matter for the amount of attrition?

- Several possibilities:
  - Incomplete acquisition
  - L1 entrenchment / amount of L1 input/use
  - No real AaE effect, but confounded by e.g.:
    - Literacy / schooling in the L1 (Köpke 2004)
    - Attitude / attachment to L1 (Schmid 2002)
    - Social contacts in the L1 (Jia & Aaronson 2003)
  - Maturational effect:
    - L1 representations not stable enough until end of a ‘critical period’ (CP)
    - Therefore, vulnerable to attrition if emigration happens before end of CP
AaE Effects in L1 Attrition

- Resulting AaE effect:
  - Linear / steady
  - Non-linear / break-off point

- Different factors may stack
  - E.g., literacy and attitude effect on top of maturational effect

If an AaE effect is found, are there indications of a CP?
Errors in the free speech of L1 German L2 English attriters

- Two recent CP proposals for L1 attrition:
  1) Pallier, Ventureyra and colleagues
  2) Abrahamsson, Bylund, Hyltenstam and colleagues
Pallier / Ventureyra

- Pallier et al. 2003:
  - 8 L1 Korean, L2 French adoptees (pre-puberty) in France
  - Controls: monolingual L1 French
- 3 tasks:
  - Identify Korean speech (vs Japanese, Polish, Swedish, Wolof)
  - Recognize Korean translation of French word
  - In fMRI scanner: pay attention to Korean, Japanese, French, Polish speech
- Results: any L1 remnants?
  - No sign. difference with L1 French controls on any task
Proposals of a CP for Attrition

- Interpretation:
  - Complete loss of L1 Korean
  - Replacement by L2 French (sequential monolingualism)
  - Confirmed by Ventureyra et al. 2004

- During CP (pre-puberty):
  - Brain completely plastic
  - Amount of L1 use impedes / filters L2 acquisition
  - If L1 use stops during CP, complete replacement by L2 possible
During CP (pre-puberty):
- Strong L1 use effect
- No AaE effect then L1 use is controlled for
Abrahamsson / Bylund / Hyltenstam

- Question complete loss found by Pallier / Ventureyra (see also Pierce et al. 2014)
- Does retraining help to reactivate L1 remnants?

Hyltenstam et al. 2009:
- 21 L1 Korean, L2 Swedish (pre-puberty) adoptees in Sweden
- 11 L1 Swedish
- All took Korean language class

2 tasks:
- Grammaticality judgment test
- Phonemic contrast identification
Results: any L1 remnants?

- GJT: No; adoptees sign. worse than L1 Swedes
- Phon. perception: No; adoptees = L1 Swedes
  - but greater range in adoptees
  - 7 of 21 L1 Koreans better than best L1 Swede
  - Two best adoptees had two highest AaE (9 and 10 yrs)

Interpretation:

- Relearning advantage: L1 not completely lost
- Attrition moderated by AaE
Bylund 2009:
- During CP, brain plasticity decreases
- AaE fundamentally governs attrition
- L1 use moderates AaE effect, especially in pre-puberty group
During CP (pre-puberty):
- Probably AaE effect (moderated by L1 use)
- Clear AaE effect when L1 use is controlled for
Is there an AaE effect in a population of pre- and post-puberty attriters?  
If so, are there indications of a CP?

- **No CP:**
  - L1 use (or other) effect
  - Or weak AaE effect without sharp drop around puberty

- **CP:**
  - Clear AaE effect
  - Group difference pre- vs. post-puberty attriters
Is there an AaE effect in a population of pre- and post-puberty attriters?

If so, are there indications of a CP?

- **CP - full plasticity (Pallier):**
  - Pre-puberty: strong L1 use effect
  - Pre-puberty: no AaE effect when L1 use is controlled for

- **CP - decreasing plasticity (Hyltenstam):**
  - Pre-puberty: both AaE effect and L1 use effect possible
  - Pre-puberty: clear AaE effect when L1 use is controlled for
73 German Jewish children

Escaped from Germany in 1938/39 before WW II
  - on their own: „Kindertransport“ (children‘s transport)
  - or with their family

To UK, US, Australia

Age at Emigration: 7-17

Free speech: oral history interviews (~20 mins)

Interviewed in L1 German
  - Transcription: CHAT (CLAN)

26 monolingual German controls
Data

- Independent variables:
  - Age at Emigration (AaE)
  - Level of L1 exposure (to German) after emigration
  - Age at testing, length of residence, attitude, origin of partner, professional use of German

- L1 exposure: 1 to 7 (low to high)
  - Emigrated alone?
  - Placed in foster family?
  - Used German at work?
  - Married to German-speaking partner?
  - ...

- Median score of 3 or 4 raters for each subject
  - Interrater agreement: for all pairs $r \geq .7$
Data

- L1 Attriters (N = 73)
- Dependent variables: Error counts
- 7 error types
  - Prone to L2 English influence
  - Morphosyntax
  - Errors in obligatory contexts
- Noun phrase morphology
  - Case, Gender, Plural inflection
- Verb phrase morphology
- Syntax
  - Main clauses: verb-second / non-finite verb form last
  - Subordinate clauses
**Method**

- **Binomial logistic regressions**
  - Zero-inflated count data
  - ‘Successes’ against ‘failures’:
    ‘# of errors’ against ‘# of error-free obligatory contexts’
- **Mixed models**
  - Subject as random factor
  - Error Type as fixed factor
Effect of AaE or L1 use in pre-puberty group?

CP - full plasticity (Pallier):
  - strong L1 use effect
  - no AaE effect when L1 use is controlled for

CP - decreasing plasticity (Hyltenstam):
  - both AaE effect and L1 use effect possible
  - Clear AaE effect when L1 use is controlled for
L1 use effect?
- No subjects with no / very little L1 use in pre-puberty group
- n.s. for all errors / n.s. for any single error type
Results

- AaE effect?
  - n.s. for all errors / n.s. for any single error type
  - Age, Attitude, LoR, Prof. L1 Use, Origin of Partner also n.s.
Effect of AaE or L1 use in pre-puberty group?

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Results

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AaE effect when L1 use is controlled for?

- n.s. for all errors / n.s. for any single error type
- Mixture of (nearly) flat and clear slopes; all n.s.
Results

- Effect of AaE or L1 use in pre-puberty group?

- CP - full plasticity (Pallier):
  - strong L1 use effect
  - no AaE effect when L1 use is controlled for

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  - Clear AaE effect when L1 use is controlled for
Results

So far:
- No AaE, L1 use, or other significant effect in pre-puberty attriters
- No clear AaE effect when L1 use is controlled for
- CP-related hypotheses not confirmed

What about the whole group?
- No CP:
  - L1 use (or other) effect
  - Or weak AaE effect without sharp drop
- CP:
  - Clear AaE effect / group difference pre- vs. post-puberty attriters
What about the whole group?

- Significant L1 use effect
  - $\beta = -.12$, $p < .05$; $R^2$: 10.7% (18.2% including random effects)
- The more L1 use, the fewer errors
- Also: significant effect of professional L1 use ($p < 0.1$)
- No other factor significant, incl. AaE or AaE-group
  - Exception: case errors ($p < 0.01$)
No indications of a strong maturational effect
  ▪ (Mostly) no difference between pre- and post-puberty group
  ▪ No significant AaE effect in either group or whole population, even with L1 use controlled for

Significant L1 use effect in whole population
  ▪ Possibly underlying effect of professional use of L1
    ▪ L1 use effect weaker predictor than prof. use
    ▪ L1 use n.s. in population where professional L1 use is known
Possible effect of professional L1 use?

- Prof. use often only sign. predictor for attrition in spontaneous speech of post-puberty attriters (Schmid & Dusseldorp 2010)
- Here: population including pre-puberty
- Professional L1 use may help in L1 maintenance because
  - L2 highly activated in professional contexts
  - But use of L2 frowned upon
  - Practice of inhibition (Schmid 2007)
Discussion

Limitations:

- Task (errors in free speech) possibly too easy
- Maturational effects only visible in more controlled / more demanding settings?
- However, Schmitt (2010) reports very high case error rates in L1 Russian L2 English pre-puberty attriters
Limitations:

- Fewer subjects in pre-puberty group
- No pre-puberty attriters with no / very little L1 use in sample: total attrition in adoptees untestable
- Possibly a problem of self-selection
Rounding up:

- No clear or consistent AaE effects in these data
- Instead, positive effect of continued L1 use
  - Possibly related to professional L1 use

- Further research needed
  - More pre-puberty subjects with low L1 use / adoptees
  - More demanding areas of proficiency

- Thank you!