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What breaks in A- and A'-bar chains under incomplete acquisition

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Background

Long-distance dependency formation:

A-chain	<ul style="list-style-type: none"> Unaccusatives The paper_i burned ____j; Passives The paper_i was burned ____j after reading Raising John_i happened [____j to burn the paper after reading]
A'-chain	<ul style="list-style-type: none"> Wh-questions Who_i did you see ____j? Topicalization John_i, I saw ____j; Relative clauses The person_i [that I noticed ____j] in the corner]

A-dependency vs. A'-dependency

A-chain	<ul style="list-style-type: none"> A-dependencies take time to develop in L1 (Wexler & Hirsch, 2006), and are impaired in special populations (aphasia: Grodzinsky, 1990, 2000; Friedmann, 2001; down syndrome: Fabretti et al., 1997; Kernan & Sabsay, 2001; Clahsen, 2008; SLI: Leonard, 1998). However, in these populations, the linguistic deficits may be due to non-linguistic impairment.
A'-chain	<ul style="list-style-type: none"> A'-dependencies are acquired relatively early in L1 and are generally spared in special populations.

Research Question

Q: A-chains seem generally difficult, while A'-chains do not. Is the difficulty associated with A-chain formation purely linguistic—independent of non-linguistic impairments?

Prediction: If so, we should find a similar asymmetry between A- and A'-chains in incomplete language acquisition.

Heritage language:

A language, usually spoken at home, which an individual does not learn to “full capacity”
The acquisition is interrupted by the switch to a different dominant language and is thus **incomplete**.

Heritage speaker (HS):

A person who grew up hearing (and possibly speaking) a language, who can understand and perhaps speak it to some degree, but who now feels more at home in another, more dominant language (Valdés 2001)

Exp 1: A-chains in Russian heritage language speakers

Materials: 2 x 2 x 2 design

- voice (active vs. passive)
- argument order (agent-before-patient vs. patient-before-agent)
- verb type: actional verbs vs. psych-verbs
- 36 items

Participants:

- 29 heritage speakers of Russian; all born in the US, English-dominant, age of interruption 5-7, pre-screened for proficiency
- Control: 22 age-matched monolingual native speakers

Method:

- Sentence-picture matching with auditory sentence presentation

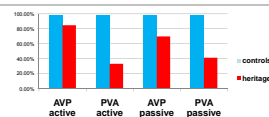
Sample stimuli:

- The girl_i is painting the boy
- The girl_i is being painted by the boy

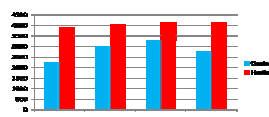


Results:

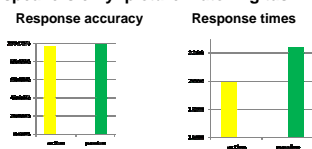
Response accuracy



Response times (ms)



Heritage speakers only: picture matching task in English



- Group effect:** Heritage speakers showed significantly lower accuracy rate and slower response time than controls
- No verb type effect:** no difference between transitive verbs and psych-verbs
- Voice effect:**
 - Controls:** passive significantly more difficult than active (same result for English in the heritage group)
 - Heritage group:** no asymmetry between passive and active in response time, but response accuracy with passives is close to chance
- Word order effect:**
 - Controls:** agent-first order in the passive (AVP) is significantly more difficult than patient-first order (PVA)
 - Heritage group:** no response time difference between agent-first and patient first order, but significantly lower accuracy rate for patient-first than agent-first (PVA) order, regardless of voice

Heritage speakers: Discussion

• HS use salient surface cues (word order, salient morphology) to interpret clauses:

• **Fixed word order:** all orders are treated as starting with the external argument; the first DP is interpreted as subject (external argument)

• **Unexpected effect of morphology:** End-stressed verbal forms in the passive (5 items) show more accurate processing, in a subset of subjects (N=16)

• The apparent difficulty with A-chains is an artifact of processing

• Outstanding question: No A-chains are involved in the PVA actives, which are processed as AVP actives instead. Assuming PVA active and AVP passive clauses instantiate topicalization, will heritage speakers also have problems with A'-chains?

Exp 2: A'-chains in Russian heritage speakers (ongoing)

(Polinsky, 2008)

Materials: 2 x 2 design

- subject vs. object RC
- pre- vs. post-verbal DP inside the RC: [_{wh} Verb DP] vs. [_{wh} DP Verb]

Participants:

- 11 heritage speakers of Russian
- Control: 12 native speakers of Russian

Method:

- Sentence-picture matching with auditory presentation

Sample stimuli:

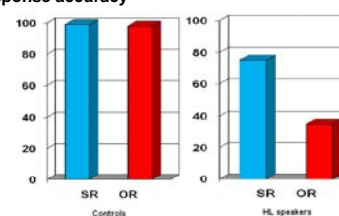
- Subject relative**
sobaka_i [kotoraja ___ dagonjaet košku] zljaja
'the dog that is chasing the cat is mean'
- Object relative**
sobaka_i [kotoruju dagonjaet, kaška ___] zljaja
'the dog that the cat is chasing is mean'



Frequency: SR > OR
(Levy et al. 2007; Saj 2005)



Results: Response accuracy



• **Group effect:** Heritage speakers showed significantly lower accuracy rate than controls in relative clause processing

• **Subject vs. object RCs:** Heritage speakers showed significantly more difficulty with OR than SR, while controls did not have such an asymmetry.

Discussion:

o Adult HS appear to have problems with A-bar dependencies, known to be unproblematic for children (Hamburger & Crain 1982, Hirsch & Hartman 2007, Guasti 2000).

o The problem is **NOT** syntactic in nature:

- Heritage speakers ignore morphological cues in processing RCs.
- "Shallow processing": Strong subject preference in RC is indicative of reliance on the "first-pass" external argument

o Only the highest structural argument (i.e., external argument) is accessible to A-bar movement. This could be due to:

- the parser's efforts to minimize processing load (parsing only the highest nodes)

General discussion

o Heritage speakers show deficits both in A- and A'-dependencies

o There is no reason to assume the chains have not developed in this population

o What is not accessible: syntax or morphology?

- The evidence from heritage speakers suggests that morphological under-differentiation and insensitivity to word order variation are implicated in the deficits of A- and A'-dependencies
- If this is the case, the source of difficulty may be a controlled (non-automatic) process, which is too costly to follow

Conclusions

o Deficits in A- and A'-chains in heritage speakers have a more obvious non-syntactic analysis.

o Other cases of deficits in long-distance dependencies may need to be reconsidered to determine whether they are indeed syntactic in nature.

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