Quantifier scope in heritage bilinguals: a comparative experimental study
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Objectives
Investigate the interaction of different scope systems in English-Hungarian heritage bilingual speakers:
- general transfer always in one direction?
- simplification across the board due to processing considerations?

Background
Doubly quantified sentences exhibit scope ambiguities:
1. Every pirate fed a shark. (Every - A)
   - Surface scope (V > 3): For every pirate, there is a shark that he fed.
   - Inverse scope (3 > V): There is a shark such that every pirate fed it.
2. A pirate fed every shark. (A - Every)
   - Surface scope (3 > V): There is a pirate such that he fed every shark.
   - Inverse scope (V > 3): For every shark, there is a pirate that fed it.

Scope-rigid languages do not allow ambiguities, only surface readings are available.

Scontras et al. (2017) investigated English-dominant heritage speakers of Mandarin:
- their Mandarin grammar is like native Mandarin: scope-rigid
- their English grammar is also like native Mandarin: scope-rigid
This suggests that there is no transfer from the dominant L2 to the heritage (L1) grammar in the domain of scope. Puzzle: why would the scope system of the weaker language not only be retained, but even transferred to the dominant language?

These results are compatible with two hypotheses. The population to tease them apart: heritage speakers of English who are dominant in a scope-rigid language.

Hypotheses
Hypothesis 1: The heritage grammar, by virtue of being acquired first, is preserved and transferred to the L2 even though the L2 is dominant.
Prediction: the scope ambiguity of their English is preserved.

Hypothesis 2: Regardless of temporal order of acquisition, the simpler (defined as not allowing ambiguities) grammar is preserved and carried over to the other language.
Prediction: their English becomes scope-rigid.

In Hungarian (a scope-rigid language), the surface reading of (1) is encoded by (3), the literal translation, and its inverse reading by (4) (i.e. É. Kiss, 2002).

1. Minden kalóz megetett minden cápát.
2. Minden kalóz megetetett egy cápát. (surface scope)
3. Minden kalóz megetetett egy cápát. (inverse scope)
4. Minden kalóz megetetett egy cápát. (Every - A)

Predictions tested on the L1 of:
- Experiment 1: 77 native monolingual Hungarians
- Experiment 2: 15 English-dominant heritage speakers of Hungarian
- Experiment 3: 8 Hungarian-dominant heritage speakers of English

Experimental design
- Participants rated on a 7-point scale how accurately a doubly quantified sentence described a disambiguating (surface vs. inverse) picture.
- Two factors manipulated:
  - Word Order (Every - A vs. A - Every)
  - Scope Interpretation (Surface vs. Inverse)
- Under the Every - A condition, the inverse reading entails the surface reading. Therefore the critical test case to demonstrate inverse scope is A - Every inverse.

Results
Experimental design:
- Word Order: significant effect of Word Order (p<.001), Scope Interpretation (p<.05), their interaction (p<.05). Critical A - Every inverse condition received the lowest rating. → empirical confirmation of scope-rigidity in Hungarian
- Word Order: significant main effect of Word Order (p<.05), their interaction (p<.01). The overall pattern was very similar to Experiment 1, even though the interaction was n.s. (p=4). → replicates Scontras et al.
- Word Order: significant main effect of Word Order (p<.05), Scope Interpretation (p<.001), their interaction (p<.05). → supports Hypothesis 2

Discussion
A - Every inverse ratings: low across all three experiments. → None of the three grammars (native and heritage Hungarian, heritage English) allow inverse scope.

A processing-related explanation:
- Calculation of inverse scope is independently known to be costly, e.g. the principle of Processing Scope Economy (Anderson, 2004).
- Heritage speakers have to employ a less dominant grammar → additional processing cost.
- A preference for simpler grammars is especially pronounced in their case, to the extent that they default to scope-rigidity across the board.

Conclusion
In the domain of scope, the interaction of a dominant and a heritage grammar results in simplification (i.e. loss of ambiguity) across the board.

Future research
Does a simpler scope-rigid grammar need to be available from L1/L2 to see these effects, or would heritage speakers default to it anyway?
- Test: speakers whose heritage and dominant languages both allow ambiguities.

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References