Summary

We investigate relationships between cognitive IDs thought to underlie implicit learning (pSTM and sequence learning) and auditory GJT performance, in 71 Polish long term (>12years), daily users of English, varying in context of learning and use (second vs foreign language), and age of onset, (1 < AoO < 35 years).

What did we do?

Participants

	UK NNS	**Poland NNS**	**Native Speakers**
N	35	36	30
Length of Exposure	12-67 years (mean 36)	12-35 (mean 17)	28- 62 (mean 45)
Age of onset	1 – 35 (mean 18)	5 -30 (mean 12)	birth
Age at testing	19 -79 (mean 55)	19-59 (mean 30)	28 – 62 (mean 45)

*NNS participants screened for oral proficiency >CEFR B2 level, and daily use of English in personal or professional contexts.

Instruments

Grammaticality judgement test: 108 items (half grammatical); auditory; timed

-----> Presentation1 ---> 2000ms ----> Presentation2 ---> 3000ms-----> *grammatical/ungrammatical*

pSTM: serial recall of unpatterned sequences of L1 colour words

Incidental pattern learning (IPL): measure of improvement in memory for novel patterned sequences (Hebb learning)

"*niebieski*" ---> 250ms --->"*żółty*" ---> 250ms ---> "*niebieski*" ---> 250ms --->"*zielone*" --->*?*

Why did we do it?

To address some overarching questions in SLA:

> How far and under what conditions is implicit learning preserved in post-puberty learners?

> What knowledge sources (implicit/explicit) does GJT performance draw on, and what is the role of sentence grammaticality?

Using an aptitude treatment interaction (ATI) design, we hope to illuminate learning processes that are not directly observable, but are inferable from the interaction of cognitive abilities and age of onset in different learning contexts. Specifically, we ask

> RQ1:   To what extent does participants' performance on grammatical and ungrammatical items in a timed oral GJT relate to their age of onset (early or late) and context of learning (immersed or non-immersed)?

> RQ2:   To what extent does participants' performance on grammatical and ungrammatical items in a timed oral GJT relate to their phonological short-term memory and sequence learning ability, and how do these interact with age of onset (early or late) and context of learning (immersed and non-immersed)?

What did we find?

In immersed NNS in the UK, the age effect slope is driven by performance on ungrammatical sentences, and is mitigated by better pSTM (UGSpan) and sequence learning ability (IPL).
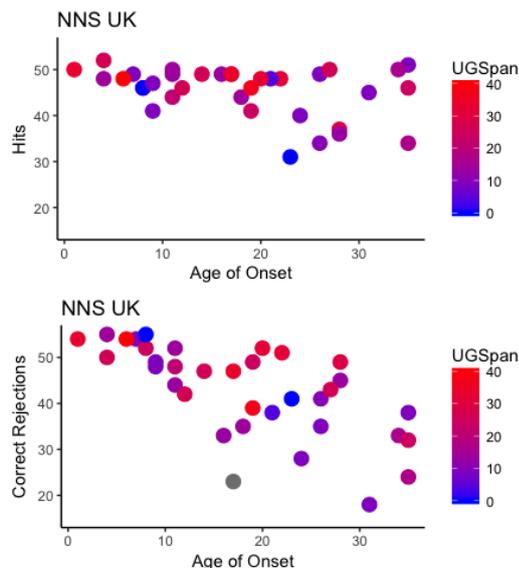
✓ **AoO * grammaticality interaction**
✓ AoO marginally significant for grammatical
✓ AoO strongly constrains ungrammatical.

✓ **pSTM*AoO*grammaticality interaction**.
✓ pSTM mitigates AoO effect on ungrammatical.

✓ **IPL * Grammaticality interaction**.
✓ IPL mitigates performance drop on ungrammatical

In **instructed NNS in PL**, age effects are more pronounced in grammatical sentences, with early starters appearing to have a more stable knowledge base (less false-alarming of grammatical sentences). There is no relationship between performance and pSTM or sequence learning.
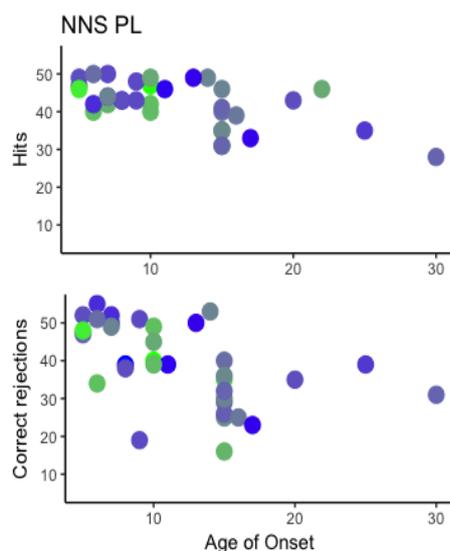
✓ **AoO * grammaticality interaction**
✓ AoO constrains grammatical *more strongly than ungrammatical sentences*

✓ **No relationship with pSTM**

✓ **No relationship with IPL**.

What do these findings mean? Some suggestions...

- no general decline in implicit learning ability, but rather a decline in the ability to use *implicit negative evidence* due to L1 overshadowing and development in selective attention at puberty;
- early starters in a foreign language context may develop implicit knowledge;
- performance on ungrammatical sentences may draw on *either* implicit or explicit knowledge *depending on learner history* (cf R. Ellis 2009)*.*