Measuring short term memory for serial order and incidental learning as aptitudes for L2 idiomaticity

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1 Introduction

Increasing numbers of cross-sectional studies of **ultimate L2 attainment** are using **individual difference** (cognitive aptitude) measures to infer past learning processes on the basis of present day associations (e.g. DeKeyser 2000, Abrahamsson & Hyltenstam 2008, Granena & Long 2013). In order for any conclusions to be valid, the cognitive measure must be stable over time, and independent of other predictor variables.

This poster reports on the **stability** and **independence** of two versions of a short term memory task which simultaneously measures **serial recall ability** and **incidental learning of statistical structure (IPL)**, a partial replication of Karpicke and Pisoni 2004. This instrument was used as an individual difference measure in **two studies** investigating **ultimate idiomatic (lexical) attainment** in bilingual adults (n=79 and n=33) with advanced proficiency and long experience in their L2 (between 12 and 70 years).

Idiomatic lexical competence

	Bilinguals inside TL community		Bilinguals outside TL community	
	AoO ≤ 12	AoO>12	AoO ≤ 12	AoO>12
pSTM	x	√	x	x
IPL	√	x	x	x

Results indicated that knowledge of idiomatic lexical selections in adult onset, immersed bilinguals is associated with better phonological short term memory. This relationship is not present in child onset, immersed bilinguals, or bilinguals living outside the target language community. There was no association between incidental pattern learning and idiomatic competence (Bolibaugh & Foster 2013, and Foster, Bolibaugh & Kotula (in press)).

2 Research questions

(stability): Do UGSpan or IPL show age or L1 attrition related decline?

(independence) Is greater serial recall ability related to increased incidental learning?

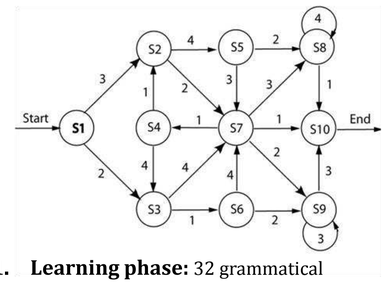
3 Method

Participants

≥ B2 CEFR ***L1*** ***L2***

STUDY 1	STUDY 2
N = 39 Living in the UK > 12 yrs (*M*= 37.49, *SD*=18.46) Age of onset 1-35 years (*M*=18.85, *SD*=9.91) Age at testing (*M*=56.32, *SD*=16.61)	*N* = 33 Living in UK > 10 yrs (*M*= 12.27, *SD*=3.25) Age of onset > 18 years (*M*= 23.88, *SD*=5.50) Age at testing < 50 years (*M*=37.15, *SD*=5.65)
N = 40 Living in PL, > 12yrs L2 use (*M*=16.68, *SD*=4.95) Age of onset 5-30 years (*M*=12.72, *SD*=6.25) Age at testing (*M*=29.40, *SD*=8.96)	

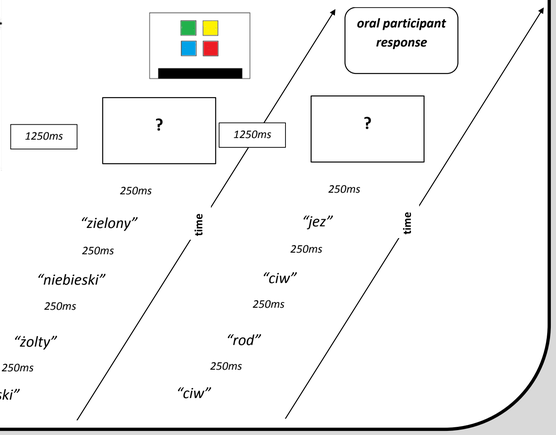
4 Method



1. **Learning phase:** 32 grammatical sequences
2. **Testing phase**: 15 novel grammatical & 15 ungrammatical sequences

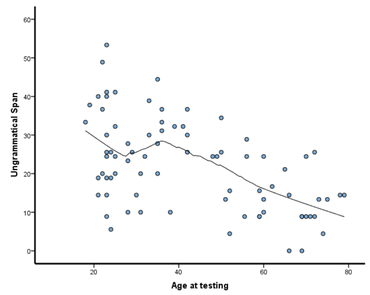
List elements: (in Polish)
Study 1, colour names aural-visual
Study 2, CVC nonwords aural-oral

UGSpan: measure of serial recall of ungrammatical sequences
Incidental pattern learning (IPL): measure of improvement in memory for novel grammatical sequences (Gspan –UGSpan)



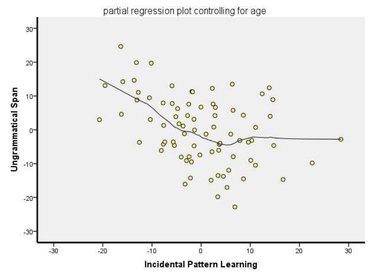
5 Results

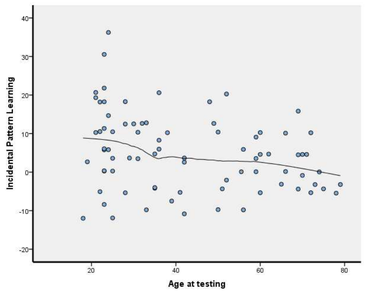
Stability (Age, Study 1, N =79)

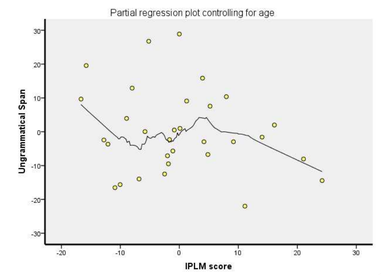


Stability (L1 attrition, Study 1, N= 39)

Independence (UGSpan & IPL, Study 1 N =79, Study 2, N =33)







6 Discussion

UGspan **declines with age** (*r*= -.53, *p*<.001); IPL does as well, but less so (*r*=-.29, *p*=.01). In order to avoid the **'age-onset-length' problem in ultimate attainment** studies, participants should either be under 45 or alternative measures to length of exposure should be used to allow age to be controlled statistically.

Even after decades of daily L2 use, there is **no evidence** that measuring serial recall or incidental learning with L1 stimuli (colour words) is affected by **L1 attrition**.

Contrary to expectations, participants with **lower serial recall ability** demonstrate **greater incidental learning** even when controlling for age (*r*= -.40, *p*<.001). This is only evident with visual response mode in Study 1, suggesting lower spans benefit more from redundant cues.

Abrahamsson, N. & Hyltenstam, K. (2008). The robustness of aptitude effects in near-native second language acquisition. *Studies in Second Language Acquisition, 30*, pp.481–509.

Bolibaugh, C., & Foster, P. (2013). Memory-based aptitude for native-like selection: The role of phonological short-term memory. *Sensitive periods, language aptitude, and ultimate L2 attainment*, *35*: 205-230.

DeKeyser, R. M. (2000). The robustness of critical period effects in second language acquisition. *Studies in Second Language Acquisition, 22*, pp.499–533.

Foster, P., Bolibaugh, C. & Kotula, A. (to appear 2014) Knowledge of nativelike selections in an L2: the influence of exposure, memory, age of onset and motivation in foreign language and immersion settings. *Studies in Second Language Acquisition*.

Granena, G., & Long, M. H. (2013). Age of onset, length of residence, language aptitude, and ultimate L2 attainment in three linguistic domains. *Second Language Research*, *29*(3), 311-343.

Karpicke, J. D., & Pisoni, D. B. (2004). Using immediate memory span to measure implicit learning. *Memory & cognition*, *32*(6), 956-964.