

Multilingualism and Rule Extraction in the Linguistic and Visual Domains

ESR: Dávid György¹

Supervisors: Julie Franck¹, Doug Saddy², Antonella Sorace³

1. Université de Genève, Geneva, Switzerland
2. University of Reading, Reading, UK
3. University of Edinburgh, Edinburgh, UK



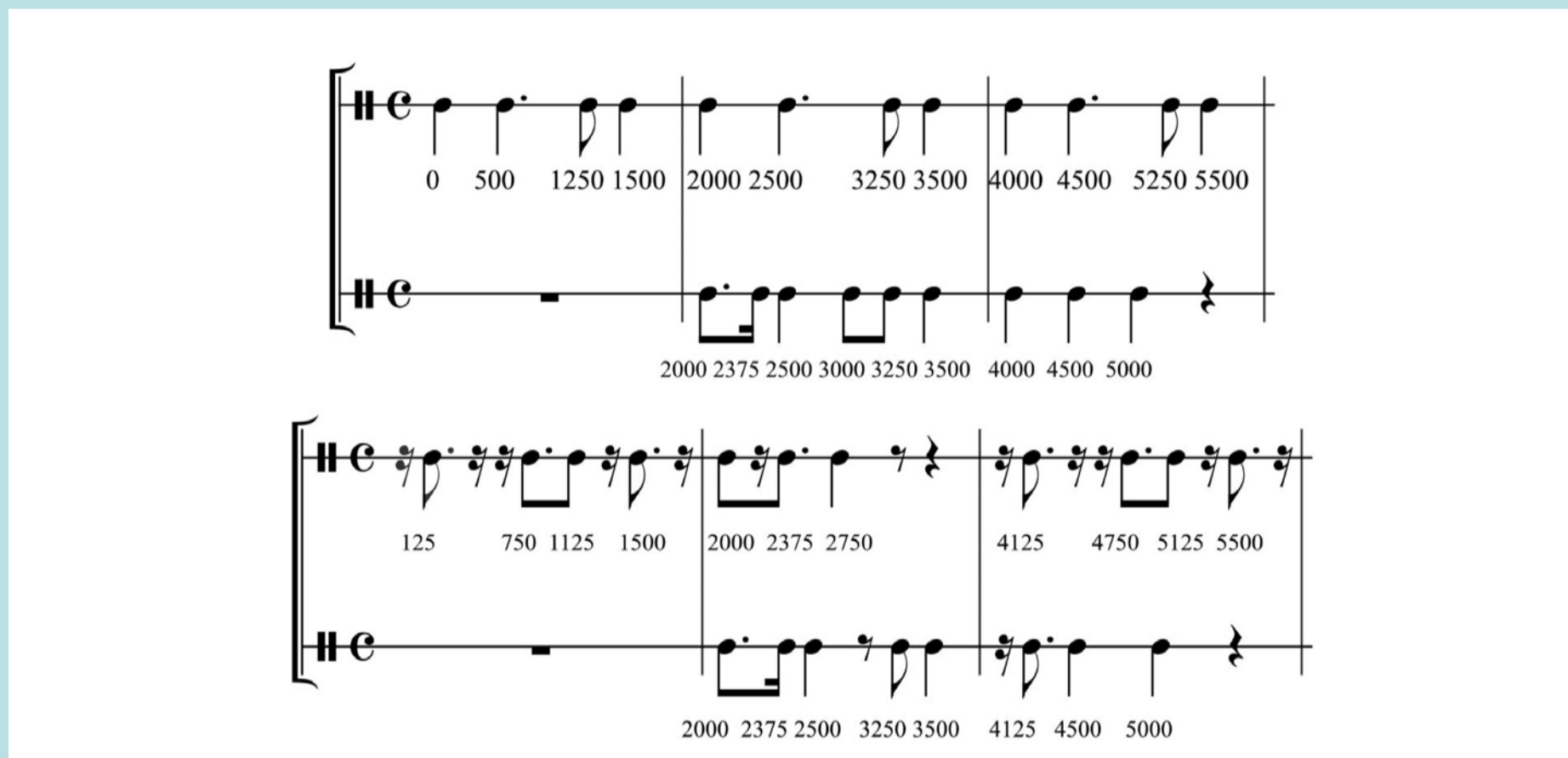
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Aims of the project

- Explore the hypothesis that bilinguals/multilinguals, being exposed to various implementations of natural language syntax, are able develop increased abilities to process natural language structure and to learn abstract properties in new natural or artificial languages.
- In particular, we aim to explore the interplay between multilingualism, structural processing, and rhythm processing.

Rhythm and language processing

- Rhythm is found in both music and language, albeit with different characteristics¹
- Performance on rhythmic tasks found to correlate with performance at various linguistic levels in TD children, children with SLI, and children with dyslexia^{1,2}
- Comorbidity of rhythm and language processing deficits has been observed in SLI, dyslexia, basal ganglia lesion, and Idiopathic Parkinson's Disease^{1,2}
- A musical prime with a regular rhythmic structure can facilitate subsequent language (syntactic) processing²⁻⁶
 - Improving grammaticality judgements in TD children, children with SLI, and dyslexic children



- Restoring the P600 in adults with IPD and BG lesions

Research questions

1. Does level or type of multilingualism influence structural processing in a semi-artificial Jabberwocky language?
2. Both bilingualism and musicianship have been suggested to influence language processing. Is there a link between multilingualism and general rhythmic skills?
3. Does rhythm also affect language processing in a semi-artificial language in healthy adults? If so, does this effect depend on level or type of multilingualism?

Experimental measures

- Multilingualism: LEAPQ⁷ and LSBQ⁸ questionnaires
- Selective and sustained attention: auditory oddball
- Beat anticipation: Warning Imperative
- General rhythm and beat perception: Profile of Music Perception Skills
- Rhythmic Priming experiment – Grammaticality Judgement

Methods

- **Participants:** 50 L1 French adults with varying levels of multilingualism
- **Linguistic stimuli:**
 - Linguistic stimuli were constructed in a semi-artificial Jabberwocky language based on recent work in agreement attraction⁹.
 - 50% of experimental items were OSV object relatives. The rest contained various simpler syntactic structures. Ex:
Voici les dafrans que le bostron décrit/décrivent.
Here is the.PL dafran.PL that the.SG.MASC bostron describe.3SG/3PL
 - Ungrammatical sentences always contained a subject-verb number agreement violation.
- **Procedure:**
 - Stimuli were presented auditorily.
 - Each miniblock was preceded by a 32s musical prime or 32 seconds of silence.
 - 8 subsequent miniblocks preceded by the same prime made up one experimental block.
 - The order of the musical primes (Regular-Silence-Irregular, Irregular-Silence-Regular) and sentence-prime pairings were counterbalanced across participants.

Preliminary results

	Grammaticality (%correct)		Prime (%correct)			Block (%correct)			
	Gramm	Ungramm	Reg	Irreg	t	1	3		
All	0,95	0,89	*t = 4,36	0,91	0,93	t = -1,13	0,90	0,94	*t = -3,58
RSI	0,95	0,91	*t = 3,89	0,90	0,95	*t = -3,38	0,90	0,95	*t = -3,38
ISR	0,96	0,86	*t = 3,31	0,92	0,90	t = 1,63	0,90	0,92	t = -1,63

- Main effect of Grammaticality – Jabberwocky materials are processed like natural language
- We have not found the main Prime effect that we expected.
- Habituation/learning effect – better performance on block 3 than 1.
- This interacts with the order of primes – higher improvement when starting with a regular prime.
- No clear effect of Multilingualism on the language task.

Conclusions

- The block design may have affected/masked a potential priming effect
→ mixed design
- Typical adults may not be sensitive enough to show behavioural priming effects
- Semantics may be the primary locus of the priming effect
- Multilingualism: massively multilingual population – to be compared to different multilinguals or monolinguals