



HAL
open science

L1 intonational categories as “perceptual attractors” during L2 imitation

Caterina Petrone, Leonardo Lancia, Cristel Portes

► **To cite this version:**

Caterina Petrone, Leonardo Lancia, Cristel Portes. L1 intonational categories as “perceptual attractors” during L2 imitation. ILCB meeting, 2017, Ile de Porquerroles, France. halshs-01793257

HAL Id: halshs-01793257

<https://shs.hal.science/halshs-01793257>

Submitted on 16 May 2018

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

L1 intonational categories as “perceptual attractors” during L2 imitation

Caterina Petrone*, Leonardo Lancia** and Cristel Portes*
 *LPL, CNRS & AMU, Aix-en-Provence; **LPP, CNRS, Paris



INTRODUCTION

○ In L2 learning, native (L1) phonological representations act as “perceptual attractors” to which similar non-native sounds are assimilated [1, 2];

○ Competition with the inventory of the language/dialect of origin modulates segmental imitation by selective processes [3]

○ Phonological properties of a speech sound replace its phonetic properties with the passing of time [4], e.g., by matching to exemplars or by rehearsal of articulatory programs [1, 5].

Intonation?

○ Speakers reproduce the phonological form of an utterance, not its phonetic details [6];

BUT: When imitating non-native dialects, the f0 contour is partly modified to approximate the target dialect [7].

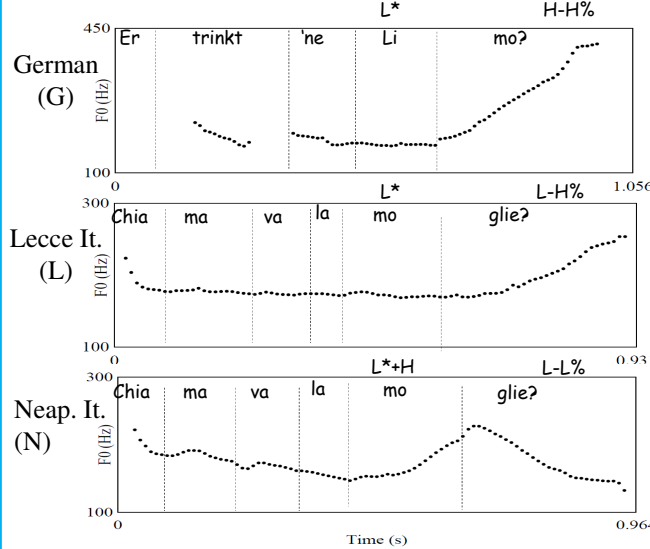
Questions (Q) [8, 9]

Language	Intonational Category	Description
(Northern Standard) German	L* H- H%	Steep rise right after the f0 valley
Lecce Italian	L* L- H%	Shallow rise, late rise onset
Neapolitan	L*+H L-L%	f0 Rise-fall

Hypotheses

H1: Lecce speakers will be less accurate in imitation since they perceive German contours as variants of their native dialect contours

H2: Less accurate reproduction when imitation is delayed/rehearsal is reduced because of a decay of detailed F0 memories.



Wavelet-based functional mixed model [10]:

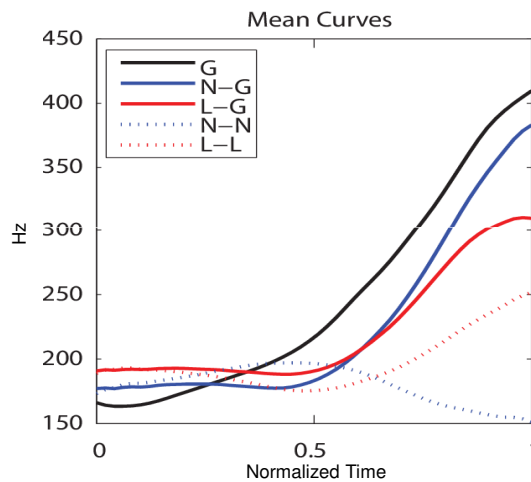
○ Evaluate effects of experimental factors on the f0 contours within the target words:

- (1) Discrete Wavelet Transform (DWT) to obtain a set of wavelet coefficients;
- (2) Markov chain Monte Carlo simulation to get the posterior samples for quantities in the wavelet space version of the functional mixed model;
- (3) Inverse DWT to convert these quantities back to data space.

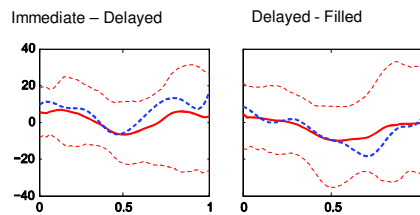
- Fixed factors: Variety, language, memory, repetition;
- Full random structure.

→ Capture changes of f0 in time without assumptions about f0 shape.

1. Language interference RESULTS



2. Memory



- Neapolitans better imitators than Lecce Italians:
 - Shift from rise-fall to rising f0 curve in Neapolitan;
 - Final f0 rise shallower and lower in Lecce It.

- No effects of memory

CORPUS & METHODS

○ Shadowing:

Baseline Task	Main Task
Prendeva la nave? Did s/he travel by ship?	Er malt 'ne Blume? Does he paint a flower?
Guardava il mare? Did s/he look at the sea?	Er trinkt 'ne Limo? Does he drink a lemonade?
Stringeva la mano? Did s/he shake hands?	Sie isst 'ne Möhre? Does she eat a carrot?
Spalava la neve? Did s/he shovel snow?	Er baut 'ne Mühle? Does he build a mill?
Bruciava il legno? Did s/he burn wood?	Er mag Salami? Does he like pepperoni?
Chiamava la moglie? Did s/he call the wife?	Er spielt Violine? Does he play violin?
Comprava la lana? Did s/he buy the wool?	Sie haben 'ne Waage? Do they have a balance?
Cambiava lavoro? Did s/he get a new job?	Er sucht Maroni? Does he look for chestnuts?

○ Imitators with no knowledge of German

○ “Memory” conditions: Speaking onset at the end of Q (Immediate), after a silent pause of 4 s. (Delayed) or an answer of 4 s. to Q (Filled).

8 Qs * 2 Tasks * 3 Memory Conditions * 16 Imitators (8 Lecce + 8 Neap.) * 5 Repetitions = 3840 obs..

DISCUSSION

○ **Language interference:**

- Neapolitan: Imitation of German Qs not mediated by grammar -> + attention to acoustic details;
- Lecce it.: Phonological ambiguity -> Speakers rely on phonetic implementation rules of their own variety.

○ **No memory effects:**

- no rehearsal for continuous f0?
- too simple task?

→ Increase cognitive load by increasing linguistic (i.e. syllabic) complexity (in progress)

CONCLUSION

- Similarly to the segmental level, intonation is anchored by native prosodic representations.
- Functional mixed models: New paradigm for exploring intonation.

References

- [1] Goldinger, S. D. (1998). Echoes of echoes? An episodic theory of lexical access. *Psychological Review*, 105, 251-279.
- [2] Best, C.T. (1995). A direct realist perspective on cross-language speech perception. In W. Strange (Ed.), *Cross-language Speech Research*, 167-200.
- [3] Nielsen, K. (2011). Specificity and abstractness of VOT imitation. *Journal of Phonetics*, 39(2), 132-142.
- [4] Cowan, N. (1984). On short and long auditory stores. *Ps. Bull.*, 96 : 341-370.
- [5] Baddeley, A. (2002). Is working memory still working? *Eur. Bull.*, 7: 85-97.
- [6] Cole, J. and Shattuck-Hufnagel, S., (2011) "The phonology and phonetics of perceived prosody: What do listeners imitate?". *Proc. Interspeech*.
- [7] Gerslender, J. (2012) Dialect Adaptation and Two Dimensions of Tune. *Proc. Speech Prosody*.
- [8] Grice, M. & Baumann, S. (2002). Deutsche Intonation und GToBI. *Linguistische Berichte*, 191: 267-298.
- [9] Savino, M. (2012). The intonation of polar questions in Italian: Where is the rise? *JIPA*, 42(1): 23-48.
- [10] Morris, J. and Carrol, R. (2006). Wavelet-based functional mixed models. *Journal of the Royal Statistical Society Series B*, 68 (2): 179-199.