Interpreting intonation depends on regional indexing

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Overview

• Background: the SIRL Project
  ○ Social-contextual information are part of linguistic representations

• Specifically
  ○ “Empirical test of exemplar-driven effects of social-indexical information on *prosodic* production and perception”

• The case under study
  ○ Regional variation of the intonation of French spoken in Corsica

• Type of task
  ○ Interpretation
Theoretical background

Production and perception systems rapidly adapt to contextual cues

Production
- Social features attributed to the listener (Bell, 1984; Coupland, 1984)
- Social features attributed to a referee (Hay et al., 1999)
- The topic of conversation (Rickford & McNair-Knox, 1994)

Perception
- Gender (Johnson, Strand & D’Imperio, 1999)
- Social class (Hay, Warren & Drager, 2006)
- Age (Drager, 2011)
- Nationality (Niedzelski, 1999; Hay, Nolan & Drager, 2006; Hay & Drager, 2010)
Implicit contextual cues

- In some studies, the varied contextual cues were *implicit*.
- Perception
  - Hay and Drager (2010): stuffed toy kangaroos and koalas (Australia) or kiwis (New Zealand)
  - Influence of the *concept* of a region
  - Perceptual bias towards the primed variety although speaker explicitly identified as NZ
- Production
  - Mendoza-Denton, Hay & Jannedy, 2003: effect of the cultural group (Afro-American) of the topic of conversation on Oprah Winfrey “monophtongization” of diphtong /ay/
  - Sanchez, Hay & Nilson, 2015: effect of discourse topic (Australia) on NZ speakers production of vowels in a corpus and an experimental task
Exemplar approaches to Speech

These findings call for a model of linguistic (phonological) representations that rapidly adapt to contextual variations: dynamic and context sensitive.

Exemplar approaches:

- Linguistic representations emerge from aggregates of stored experiences of speech, which are enriched with details about the social context in which they occurred (Goldinger, 1998; Johnson, 2006; Pierrehumbert, 2001)
Beyond phonetic variation

- Other levels of representation depend on speech experiences in a similar way
  - Syntactic parsing of word strings (Bod, 2009, 2006; Möbius et al., 2010)
  - Alignments between abstract phonological categories (German et al., 2013)
  - Morphological productivity (Racz et al. 2014): correlated with gender
  - Semantic interpretation of wordforms (Bybee, 2006)

- What about phonological representations of Intonation?
Research questions

- Are alignments between/among categorical units in the grammar (as opposed to those between continuous phonetic scales and phonemes) sensitive to implicit social cues?

- Does this sensitivity arise from differences within the set of specific linguistic experiences that a listener has encountered during his/her lifetime?

- Is intonational meaning analogous to wordform and syntactic representations in the sense that it emerges from aggregates of stored experiences involving specific pairings that are indexed with contextual information?
Intonation in Corsican vs “continental” French

- Working hypothesis:

- A formal similarity but a pragmatic difference between two rising-falling intonation contours

- Corsican French penultimate rise-fall (CorsPRF) conveys regular polar questions (a simple rise in Continental variety)

- Continental French penultimate rise-fall (ContPRF) conveys a strongly committed assertion, and secondarily an incredulous confirmation request
Boula de Mareuil et al. (2012)
- Production study of polar declarative questions comparing Corsican, Corsican French and Parisian French varieties

Results
- Corsican French polar declarative questions = final rising-falling intonation with the f0 pic aligned with the penultimate syllable like in Corsican
- An additional rise-fall on the subject NP
- Parisian French items = final rising intonation

Pragmatic function
- No relevant literature
- The claim that the PRF corresponds to polar questions in Corsican French is consistent with our informal observations during various visits in Corsica
Corsican french polar question

- Waveform, spectrogram and Fo contour of the declarative polar question “Jacques a taillé les amandiers?” (Did jack cut the almond tree?) realized with a final penultimate rise-fall by a speaker of Corsican French

- We use the tonal labeling of French ToBI (Delais-Roussarrie et al., 2015)
• Martin (1998, 1999):  
  ○ a rise-fall [+circumflex, -rising] with temporal alignment corresponding to a penultimate peak.

• Post (2000):  
  ○ AM account of French intonation  
  ○ bitonal H+H* combined with L%  
  ○ H+!H*L% (Delais-Roussarrie et al. 2015), or H+L*L% (Portes & Beyssade, to appear; Sichel-Bazin, 2015)

• Pragmatic function  
  ○ Assertion with various attitudinal connotations:  
  ○ statements of the obvious (Martin, 1999)  
  ○ contradiction statements (Delais-Roussarrie et al., 2015)  
  ○ adamant statements (Sichel-Bazin, 2015; Portes & Beyssade, to appear)
Waveform, spectrogram and Fo contour of the sentence “La question de l’élargissement se posera beaucoup moins” (the question of the enlargement will be less relevant) realized with a final penultimate rise-fall by a speaker of Continental French.

We use the tonal labeling of French ToBI (Delais-Roussarie et al., 2015)
Corsican speakers’ experience with varieties of French

- Corsican speakers presumably have significant experience in both varieties: Corsican French and Continental French

- Corsican living in Corsica
  - Corsican French is the usual variety
  - Substantial exposure to Continental French through media and tourism

- Corsican living in “continental” France
  - Close relationship with Corsica and Corsican relatives
  - Regular back and forth to Corsica during holidays and family events
  - Even if Continental French is used regularly, likely able to switch to the Corsican variety in a Corsican context

- Corsican speakers should be able to access either variety depending on the context and on the interlocutor
If intonational phonological representations also are dynamic and sensitive to context:

- The interpretation of the penultimate rise-fall should depend on whether the concept of “Corsica” or “Continental France” is activated during processing of Corsican speakers.

- Those who live or have lived in Corsica should be more sensitive to implicit contextual cues related to “Corsica” or “Continental France”.
General Method

- Between-subject conditions involving a prime that is only in the background of the experiment and not suggestive of the identity of the speaker (following Hay & Drager, 2010)

- Forced-choice continuation of a dialogue that is consistent with interpreting the target sentence as either a question or an assertion (following Portes et al., 2015)
Implicit primes of the regional concepts
Forced choice interpretation task

- **Participants**
  - 48 native speakers of French
    - Born in Corsica
    - Spent most of their childhood in Corsica
    - Power: Based on pilot data (35% question responses), detects a change of 7% with $P(1-\beta)=0.8$

- **Task**
  - A binary forced-choice interpretation task
  - **Participants:**
    - read a short context visually presented
    - hear a sentence produced by one of the protagonist of the context
    - respond to the sentence as if they are the addressee by choosing the most natural response

- Participants’ response tells us if they interpret the contour associated with the utterance as:
  - a statement (Continental interpretation)
  - a question (Corsican interpretation)
The visually-presented context preceding the utterance

<table>
<thead>
<tr>
<th>Context</th>
<th>Neutral context</th>
<th>Social Prime</th>
<th>Question context</th>
<th>Social Prime</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Continental</td>
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<td>Corsican</td>
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<tr>
<th>Context</th>
<th>Antoine cuisine avec sa mère. Il s’adresse à elle:</th>
<th>Experimental utterance</th>
<th>Social Prime</th>
<th>Reaction 1</th>
<th>Reaction 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Antoine cuisine avec sa mère. Il lui demande:</td>
<td>Continental</td>
<td>Continental</td>
<td>Corsican</td>
<td>Tu es sûr</td>
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A trained speaker produced the expected intonation contour.
A native speaker of French naïve about the aim of the experiment was asked to imitate the trained speaker.

Two trained annotators visually and auditorily checked the presence of the expected intonation contour:
- An f0 peak on the penultimate syllable
- A falling contour on the last syllable

**Neutral context**

**Question context**
Materials

- **32 target phrases**
  - × 2 contexts (neutral vs. question-biased)
  - × 2 primes (Corsican vs. Continental)

- **4 counterbalanced lists**
  - 75% neutral contexts, 25% question contexts
  - No repeated targets
  - 8 blocks
  - × 2 response orientation
At the end of the experiment, participants were asked to fill a questionnaire to report:

- Some demographic information
- Their linguistic/language use background
- Their attitude toward Corsica
Tu es sûr
Je crois que oui
Are you ready to do the task?
Paul participe à une compétition d'athlétisme. Son frère Antoine s'adresse à leur père:
Some obstacles we faced

- Prenuclear rise-fall fo movements make the forms of CorsPRF and ContPRF less similar
  - We simplified the experimental sentences to avoid prenuclear constituents

- One possible interpretation of ContPRF is incredulous confirmation request (Michelas et al., 2015)
  - It is a secondary meaning
  - CorsPRF is not ambiguous

- We faced **great** difficulties in recruiting corsican participants!
  - Poor motivation to spend their time coming to the lab and doing the task
  - We hired a Corsican research assistant to help us in recruiting
Social Indices in Hybrid Models

Wordform

Phonemic Parse

Abstract Subphoneme

Exemplar Space

Detailed Phonetic Percept

Social Indices

City

/s/+/[t]/+/[I]/

/r/

[r]

Abstract Subphoneme

Detailed Phonetic Percept

Social Indices
Social Indices in Intonational Meaning

Discourse Meaning

Phonological Parse

Abstract Subcategories

Exemplar Space

Detailed Phonetic Percept

Assertion

Y/N Question

H+ !H* L%

Social Indices

H+ !H* L%

???

???
Merci de votre attention!

Il y a des questions dans la salle?