

*Stress pattern  
and  
reduction correlations  
in Spanish*

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related languages:

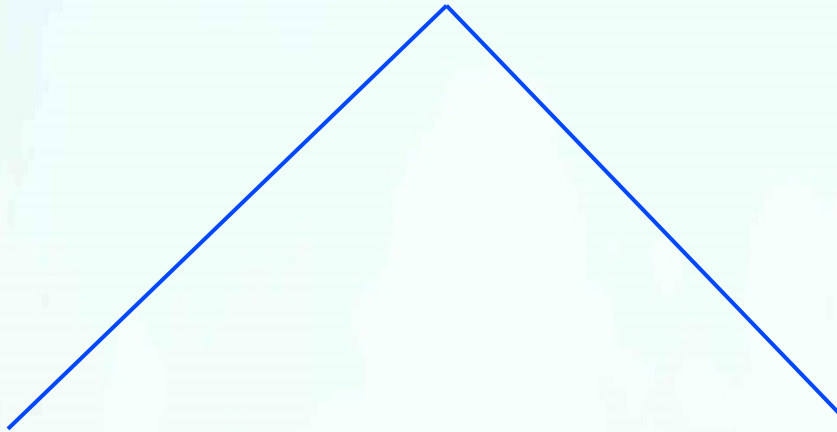
**CATALAN**

**PORTUGUESE**

**exhibit vowel reduction**

# no freedom of reduction in SPANISH

## REDUCTION



**VOWELS**

**CONSONANTS**

- syllable-timed language
- all vowels have the same length
- very limited variability
- stressed/unstressed: no significant difference
- not a very 'crowded' vowel space: /i, e, a, o, u/  
(Sessarego 2012)
- reducing vowels might affect:
  - comprehension
  - speech perceptibility
  - intonation

# EXPERIMENT

## **PERCEPTION ANALYSIS TO DETERMINE:**

1. the correlation between stress and reduction
2. cues to stress and reduction perception in Spanish speakers
3. sensitivity to stress shift and vowel quality changes

# EXPERIMENT

## WORKING HYPOTHESES:

1. The stress pattern is strictly connected with the freedom of reduction
2. A disruption of this pattern might inhibit comprehension and speech perceptibility
3. Stress-related comprehension problems may point to an interesting correlation between consonant and vowel reduction

# EXPERIMENT

## **2 TESTS consisting of audio stimuli**

### TEST 1

#### 1. MINIMAL CONTEXTUAL INFORMATION

(stimuli presented in the form of sentences)

#### 2. NONCE WORDS RESEMBLING SPANISH LEXICAL ITEMS

(in context, multiple choice answers)

### TEST 2

#### NO CONTEXTUAL INFORMATION

(bare audio stimuli, individual words)

# EXPERIMENT

## **PARTICIPANTS:**

- 37 (32) Spanish native speakers
- ideally no knowledge of Catalan/Galician/Portuguese (7)
- aged 18-60 (mostly 25-40)



# EXPERIMENT

## CONTEXT PHRASE TEST:

### **30 sentences**

- 9 stimuli with stress shift
- 14 stimuli with vowel reduction to schwa, /i/ or /u/
- 4 stimuli with segment elision or gliding
- 3 stimuli with both vowel reduction and stress shift

# EXPERIMENT

## CONTEXT-FREE TEST:

### **43 single word stimuli**

- 18 stimuli with stress shift
- 15 stimuli with vowel reduction to schwa, /i/ or /u/
- 4 stimuli with segment elision or gliding
- 6 stimuli with both vowel reduction and stress shift

# EXPERIMENT

## NONCE WORD TEST:

### **15 phrases with stimuli**

- all imitating Spanish syllable and word structure
- the same stress pattern (penultimate, ultimate when ending in consonant other than /n/ or /s/, antepenultimate)
- all stimuli with vowel weakening (centralised vowel or elision/near-elision)

# EXPERIMENT

## RESPONDENTS' COMMENTS:

- stimuli sounded like Spanish words but modified in terms of vowels, syllables and stress
- some stimuli difficult to understand
- dialectal variants
- badly pronounced, Spanish words read by a foreigner
- Catalan/Portuguese items
- invented words
- definitely not Spanish words

# RESULTS

## NONCE WORD TEST – A DIAGNOSTIC

### EXAMPLE

Quieres un par de *camaret's*?  
'Do you want a pair of *camaret's*?'

camaretes

camarets      100%

camaretas

camaretos

# RESULTS

## NONCE WORD TEST – A DIAGNOSTIC

- Spanish speakers ~correctly~ identify stress in unfamiliar words
- reduced vowels either identified or not perceived  
out of 13  
3 not identified by any/most  
3 were 50/50  
7 identified by most/all
- predominant mid vowels /e, o/  
pretonic/initial syllable: /e, o, u, a/

# RESULTS

## NONCE WORD TEST – A DIAGNOSTIC

- default vowel /e/  
(default status of the mid front vowel in word-final position, -es endings?)

out of the total identified stimuli (113)

/e/ in 70%

/o/ in 16%

/a/ in 9,7%

/u/ in 5%

- no confusion in the last syllable of the word

# **RESULTS**

## **CONTEXT AND CONTEXT-FREE**

- 18 stimuli with stress shift
- 17 stimuli with reduction
- 6 stimuli with vowel reduction + stress shift
- 5 stimuli with other changes (control sample)



# RESULTS

## STRESS SHIFT

- 6/18 items incomprehensible for some speakers
- 2 redundantly marked for stress (default = false positive?)
- 1 incorrectly marked for stress with a diacritic
- 13 correctly marked for stress with a diacritic <50%
- no item correctly marked for stress by all respondents

# RESULTS

UNLIKE THE NONCE WORD TEST

**STRESSED SYLLABLE IDENTIFICATION IS *NOT THAT RELIABLE* IN SPANISH SPEAKERS**

**WORD IDENTIFICATION/STRESS PERCEPTION  
DISCREPANCY**

# RESULTS

## VOWEL REDUCTION

- 7/17 completely misheard by some speakers
- items with 2 reductions especially problematic
- 2 stimuli identified correctly by all of the respondents

# RESULTS

## RAISING:

*vinu* reconstructed as *vino* 'wine'

*pulidu* → *pulido* 'polished'

*arinal* → *arenal* 'quicksand'

*clonu* → *clonu* not *clono* 'clone'

hi/low frequency

# RESULTS

## CENTRALISATION:

- in 6 (of 13) stimuli schwa mostly unidentified (discrepancies between context and no context test, may be due to recording quality)

- when schwa recognised:  
never 100%  
mostly a mid vowel /e/ or /o/:

*vamos* 'let's go' (predictable)

*escondidos* 'hidden' (predictable)

sometimes /u/: *c'minu* 'path', *carc'l* 'prison', *escondid's* 'hidden'

# RESULTS

## CENTRALISATION:

- words with schwa perfectly recognised as /e/:

*inteligentes* 'intelligent'

*chistes* 'jokes'

*precipitaciones* 'rainfall'

(regardless of position in a word)

- *pres's* → /e, o/ *presas* 'dams', *presos/as* 'prisoners'

# RESULTS

## STRESS SHIFT + VOWEL REDUCTION

- stress recognised more poorly than vowels
- word familiarity plays a role + confusion in reconstructing the full vowel (*olvidamos/olvidemos* 'we forget' indicative/subjunctive)
- centralised vowel usually identified as /e/  
almost all vowels proposed in one item /e, o, u, a/

# Conclusions

## STRESS SHIFT INHIBITS COMPREHENSION

### FACTORS TO TAKE INTO ACCOUNT:

- word familiarity
- native lexicon bias
  - stress perception alone seems better than stress-based word identification

### CUES TO STRESS:

- vowel quality and duration
- lexicon



# Conclusions

## CENTRALISATION INHIBITS COMPREHENSION

- not all reduced vowels perceived (MEAN 62%)
- word reconstruction from the lexicon rendered difficult
- multiple reductions render words incomprehensible
- possible morphological conditioning (mid Vs, -es endings)
- **default vowel indication**  
(confirmed by unpredictable /e/ indications + nonce word test)

# Conclusions

## **RAISING DOES NOT INHIBIT COMPREHENSION**

- esp. in post-tonic position
- with a possible word frequency effect

***Thank you!***

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