How early should we teach pronunciation?

Sound category formation in beginner and intermediate learners

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Focus of Study

- Explicit instruction of pronunciation/phonetics seems to have a positive impact on second language (L2) learner's production of the L2 sounds.

- We explore whether explicit phonetics instruction affects beginner and intermediate learners differently:
  - Examining the acquisition of Spanish voiceless stops by learners with L1 American English
  - Taking into account the hypothesis that sound category formation might go through a learning plateau
  - Considering different phonological contexts
  - Keeping in mind pedagogical implications

IMPACT OF PHONETICS INSTRUCTION

- Growing interest in SLA of phonology/phonetics:
  - Including the impact of phonetics instruction on learner's production and perception of L2
- Focusing on L2 Spanish by L1 English learners, phonetics instruction has been shown to help improve the acquisition of many L2 sounds (e.g. Elliott 1995, Gonzalez-Bueno 1997, Lord 2005, Gonzalez Lopez and Counselman 2012, Camus Oyarzun 2016; but see Kissling 2013):
  - Degree of impact might depend on the type of sound.

IMPACT OF PHONETICS INSTRUCTION

- There is some evidence suggesting that phonetics instruction benefits different levels of L2 proficiency (Lee et al. 2014)
  - It is still ***unclear whether this type of instruction benefits beginners and intermediate/advanced learners similarly*** (Camus-Oyarzún 2016)
    - Addressing this would allow us to evaluate curriculum content for different levels.

L2 SOUND CATEGORIES FORMATION

- Effect of phonetics instruction could be different depending on the proficiency level:
  - Sound category formation, which seems to speed up with instruction, might go through a “learning plateau” (Flege 1988, Munro & Derwing 2008).
- **Hypothesis:**
  - Beginners, starting to create their L2 sound categories, might present a more malleable system and exhibit greater improvements from phonetics instruction;
  - More advanced learners, whose L2 categories are more formed, might show more resistance to improvement due to instruction.

SPANISH & ENGLISH VOICELESS STOPS

- American English:
  - /p t k/ are aspirated in stressed position, esp. word-initial positions, when not part of a complex onset.
  - /t/ is usually produced as a flap in unstressed positions.
- Spanish:
  - /p t k/ are always unaspirated voiceless stops
- VOT is the acoustic measure used to capture differences in aspiration for voiceless stops - from Amengual (2012):
  - In Spanish, VOT range for [p t k] is 0-20 ms
  - In English, VOT range for [p^h t^h k^h] is 30-120 ms.

VOT AND PHONETICS INSTRUCTION

- Some studies have explored the impact of phonetics instruction on VOT:
  - González López & Counselman (2012) found that novice learners that received instruction improved VOT production of /p t k/, contrary to learners who didn't receive instruction.
  - Camus-Oyarzun (2016) found that instruction improved learners' VOT for three different proficiency levels:
    - There seemed to be no apparent differences for the overall data across levels
    - But the study didn't explore potential differences in certain contexts vs. others.

RESEARCH QUESTION

- Are there differences in the impact of explicit phonetics instructions on the production of Spanish voiceless stops /p t k/ by L1 English learners depending on the proficiency level?

Methodology

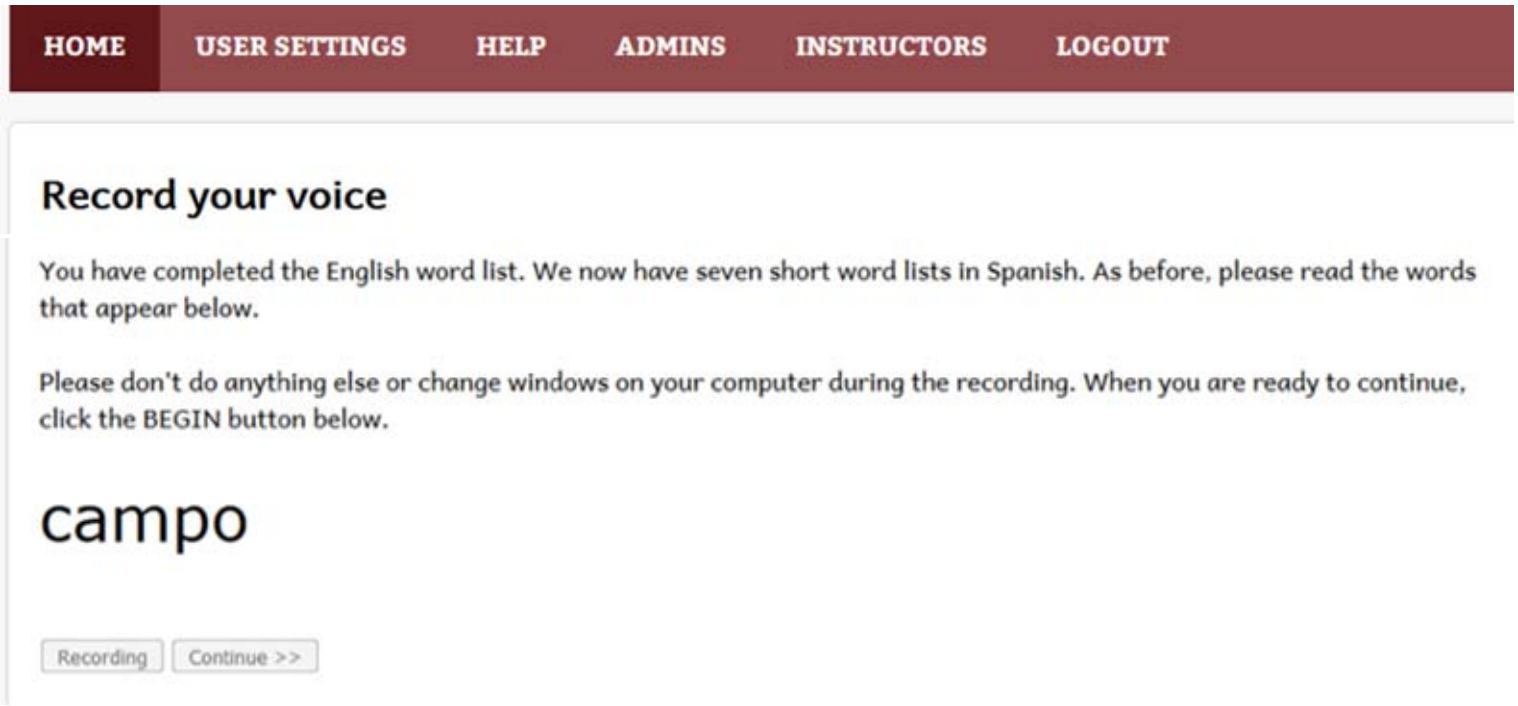
DATA COLLECTION

- Data was collected as part of ***See your Speech***, an OSU project that combines research and teaching:
  - Data comes from a module presented to college students.
- *See your Speech* module:
  - Using a web-based interface, students record themselves reading word lists in Spanish and in English:
    - At the beginning and at the end of the semester (T1 & T2)
  - Pedagogical component:
    - Instant and in-class feedback is provided to students
    - This determines the unique nature of our data

STIMULI

- Module includes 71 Spanish words presented to participants one by one:
  - Words target a variety of Spanish sounds
- /p t k/ appear in different contexts:
  - Word-initial and medial position:
    - Examples: cham**p**ú, **c**omida
  - Stressed and unstressed syllables:
    - Examples: **p**i**t**o, **p**i**t**ó

SEE YOUR SPEECH INTERFACE



PARTICIPANTS

- **Group I** (N=10):
  - College students in third-semester Spanish language course that includes explicit phonetic instruction
  - 5 females; 5 males
- **Group II** (N=27):
  - Spanish majors and minors taking an upper-level Spanish pronunciation course.
  - 13 females; 11 males
- All participants:
  - L1 = American English
  - Started learning Spanish after 12 years

PRONUNCIATION INSTRUCTION CURRICULUM

- **In Spanish Language Course:**
  - Three phonetic topics were covered:
    - Vowels, voiceless and voiced stops
    - Basic description of phonetic differences in English and Spanish
    - Practice exercises
- **In Spanish Pronunciation Course:**
  - Semester-long course on Spanish pronunciation:
    - All Spanish sounds were discussed
    - Phonetic terms were introduced
    - Practice exercises

ACOUSTIC ANALYSIS

- Each token of /p t k/ was:
  - Categorized by its type of production (tap, voiceless stops, approximant, etc.)
  - Measured for VOT

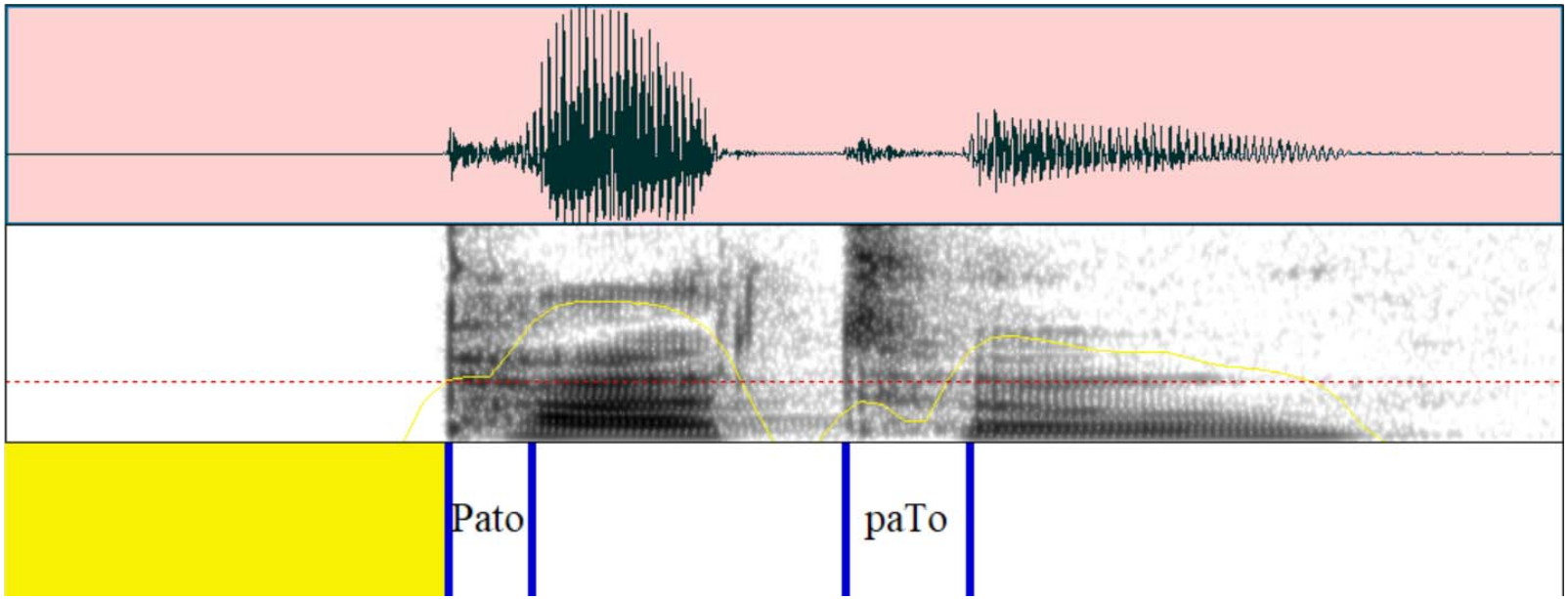


Fig. 1 Examples of VOT measurement for /p/ and /t/ in the word *pato*

STATISTICAL ANALYSIS

- Number of tokens: Group I: 1,139 & Group II: 3,476
- Linear regression on all VOT data to test effect of:
  - Group (G1, G2)
  - Timepoint (T1; T2)
  - Interaction between timepoint and group
- Linear regression on VOT data by Group to test effect of:
  - Timepoint (T1; T2)
  - Place of articulation (/p/ vs. /t/ vs. /k/)
  - Stress (stressed vs. unstressed)
  - Word position (initial vs. medial)
  - Interaction between timepoint and the other factors
- Further pairwise comparisons to check sig. interactions

❖ Speaker and word are included as random factors in regression analyses

Results

Types of Realizations

- Types of realizations of /p t k/ by timepoint and group:
  - Virtually same realization for both levels: voiceless stops
  - Note some approximants for Group II

Group I	**T1**	**T2**
fricative	0	1
tap	1	0
voiced stop	5	3
voiceless stop	544	585
Group II	**T1**	**T2**
approximant	2	8
deletion	0	1
tap	5	0
voiced stop	1	1
voiceless stops	1740	1718

➢ Following VOT analyses are based only on voiceless stops.

RESULTS FOR ALL THE DATA

- Linear regression on all the data:
  - Effect of Timepoint: T1 > T2
  - No effect of Group
  - No significant interaction bt. Timepoint & Group

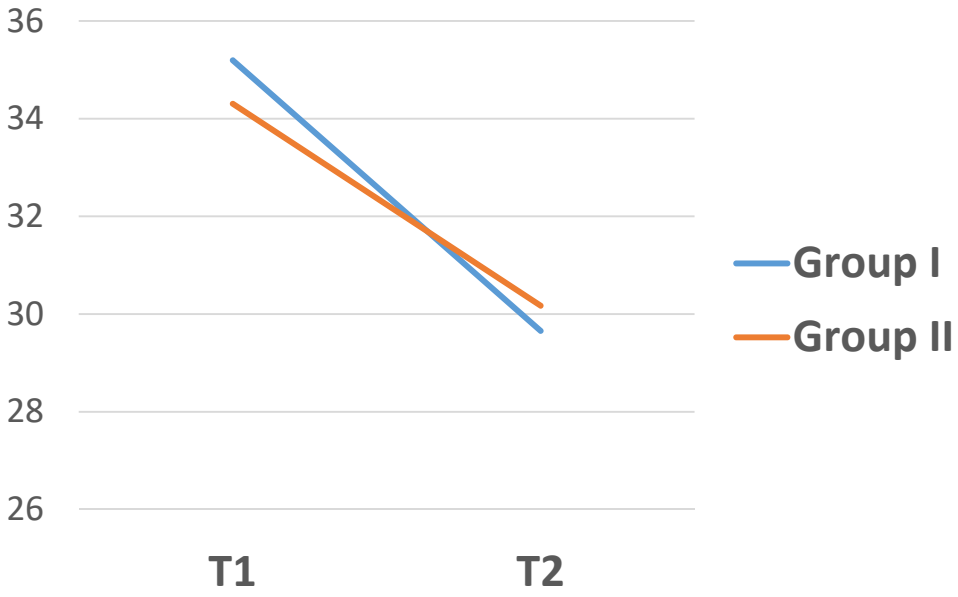


Fig. 1 VOT average by Timepoint and Group

	T1	T2
Group I	35.19 (20.07)	29.66 (17.79)
Group 2	34.30 (22.41)	30.17 (18.49)

Table 1 Average and SD VOT by Timepoint and Group

RESULTS FOR GROUP I

- All fixed factors are significant:
  - Effect of timepoint: T1>T2
  - Effect of place of articulation: k > t > p
  - Effect of stress: stressed > unstressed
  - Effect of word position: initial > medial

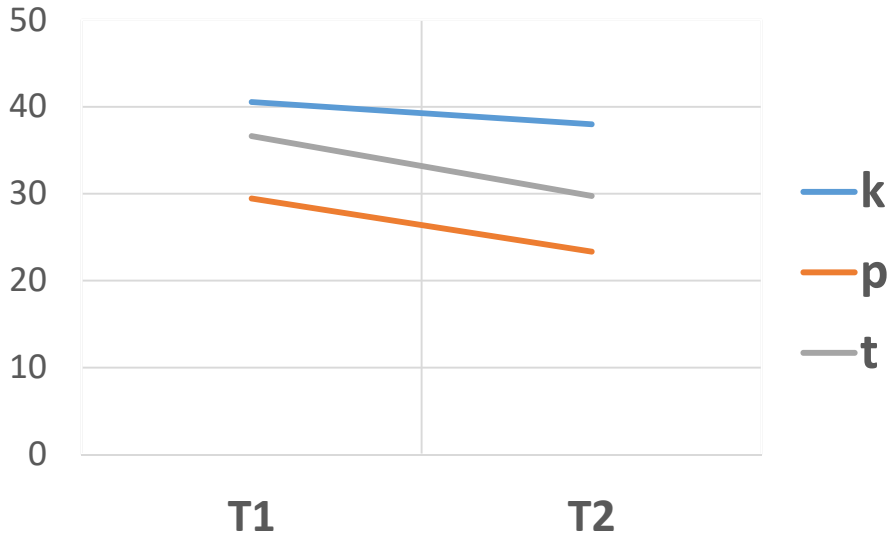


Fig. 2 Group I: VOT average by Timepoint and POA

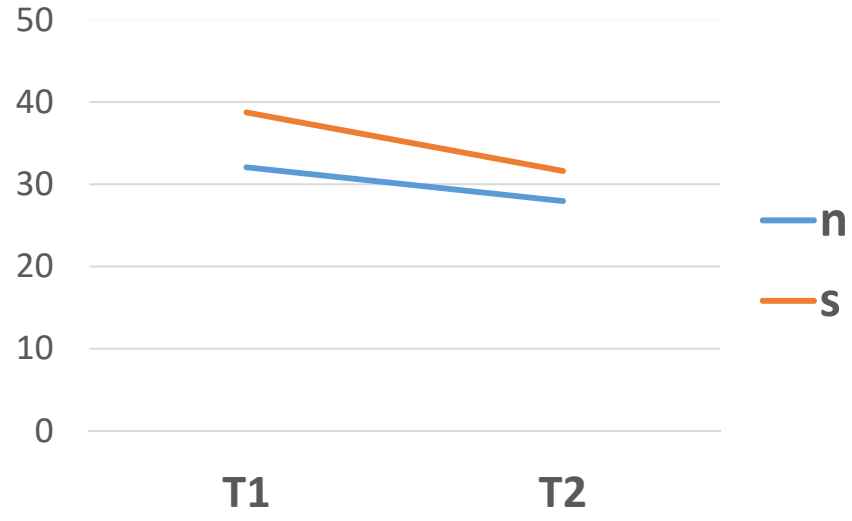


Fig. 3 Group I: VOT average by Timepoint and Stress

RESULTS FOR GROUP I

- Significant interaction bt. timepoint & word position:
  - The change in VOT for initial position is greater than in medial position:
    - both word positions present significant change.

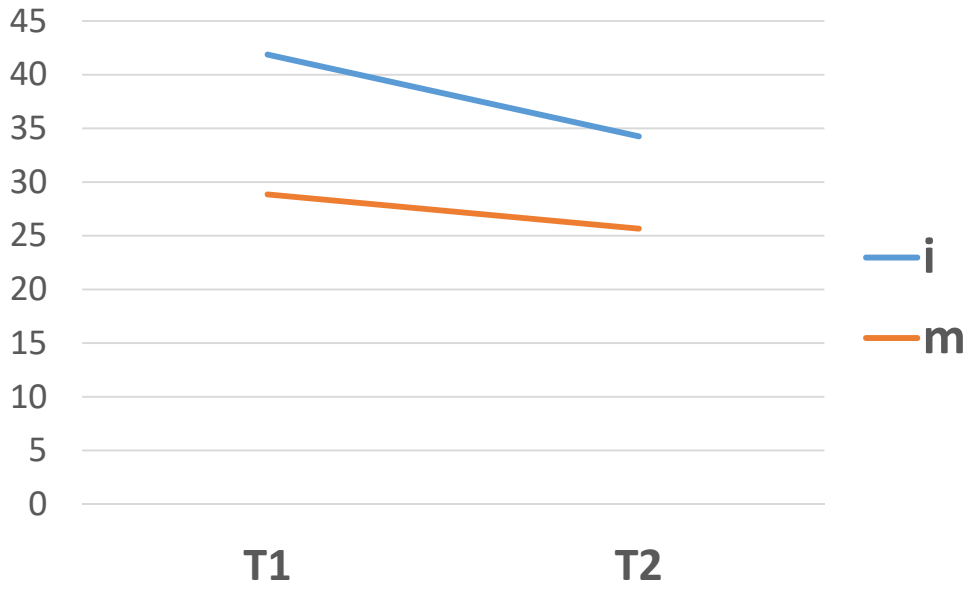


Fig. 4 Group I: VOT average by Timepoint and Word position

RESULTS FOR GROUP II

- All fixed factors are significant:
  - Effect of timepoint: T1>T2
  - Effect of place of articulation: k > t > p
  - Effect of stress: stressed > unstressed
  - Effect of word position: initial > medial

RESULTS FOR GROUP II

- Significant interaction between timepoint & place of articulation and timepoint & stress:
  - No change in VOT for /k/.
  - No change in VOT for unstressed contexts

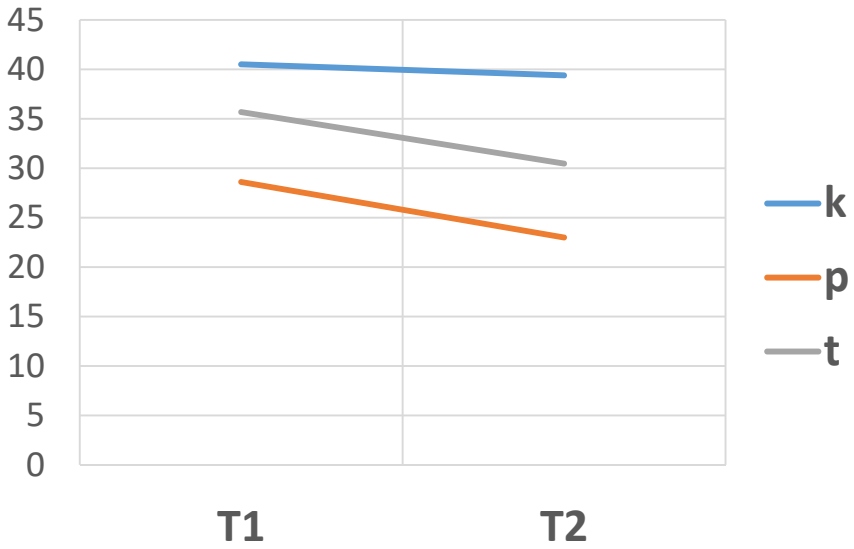


Fig. 5 Group II: VOT average by Timepoint and POA

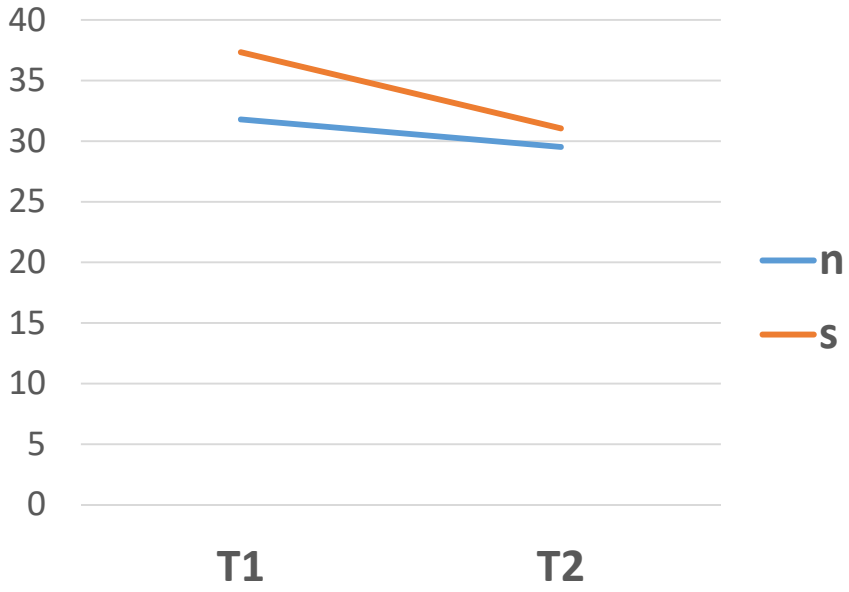


Fig. 6 Group II: VOT average by Timepoint and Stress

INDIVIDUALS DIFFERENCES: GROUP I

- 5 participants: longer T1 >T2
- 2 participants: T1 = T2
- 3 participants: shorter T1<T2
  - All participants with T1>T2 start with VOT above 30ms
  - Other participants start with values around 30 or lower:
    - All participants that “needed” to improve their VOT did and lower their VOT durations to the 30 ms. mark.

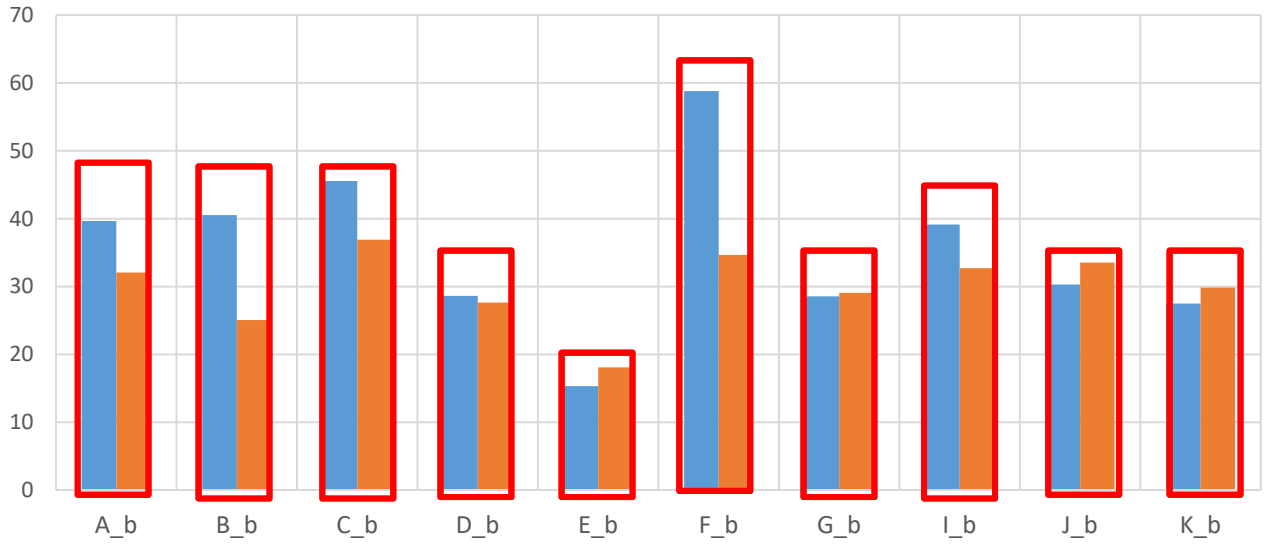


Fig. 7 Group I: VOT average per participant by Timepoint

INDIVIDUALS DIFFERENCES: GROUP II

- 13 participants: longer T1> T2
  - 2 participants that T1>T2 stay well above 30 ms.
- 8 participants: shorter T1 < T2
- 6 participants: T1 = T2
  - 2 participants stay well above 30ms.
- Not all participants improve their VOT to 30 ms. mark.

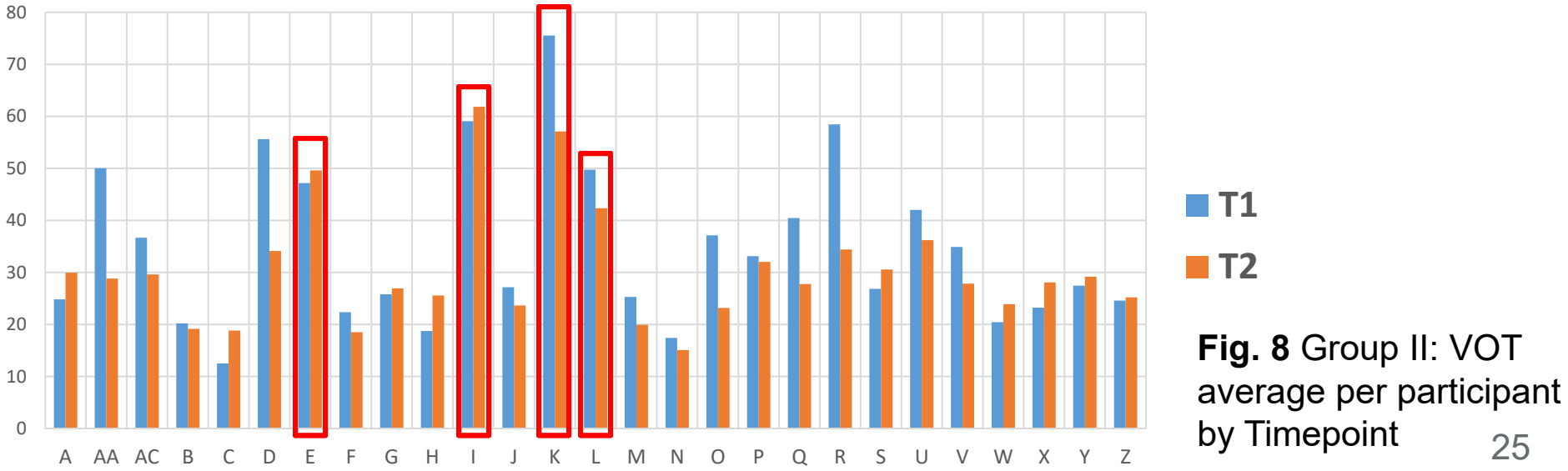


Fig. 8 Group II: VOT average per participant by Timepoint

Discussion

DISCUSSION

- **All learners** present a decrease in VOT duration in T2 vs. T1:
  - Learners present more variability in T1 (see SD in Table 1).
  - Both groups present longer VOT averages than native Spanish speakers but shorter than for English (see ranges from Amengual 2012; Zampini 2014).

	T1	T2
Group I	35.19 **(20.07)**	29.66 **(17.79)**
Group 2	34.30 **(22.41)**	30.17 **(18.49)**

Table 1 Average and **SD** VOT by Timepoint and Group

DISCUSSION

- Beginners present a more dramatic change in T2 vs. T1 (Fig. 9):
  - But no stat. significant difference between groups.

- VOT differences based on POA, stress and word location:
  - Significant for both groups in the expected directions.

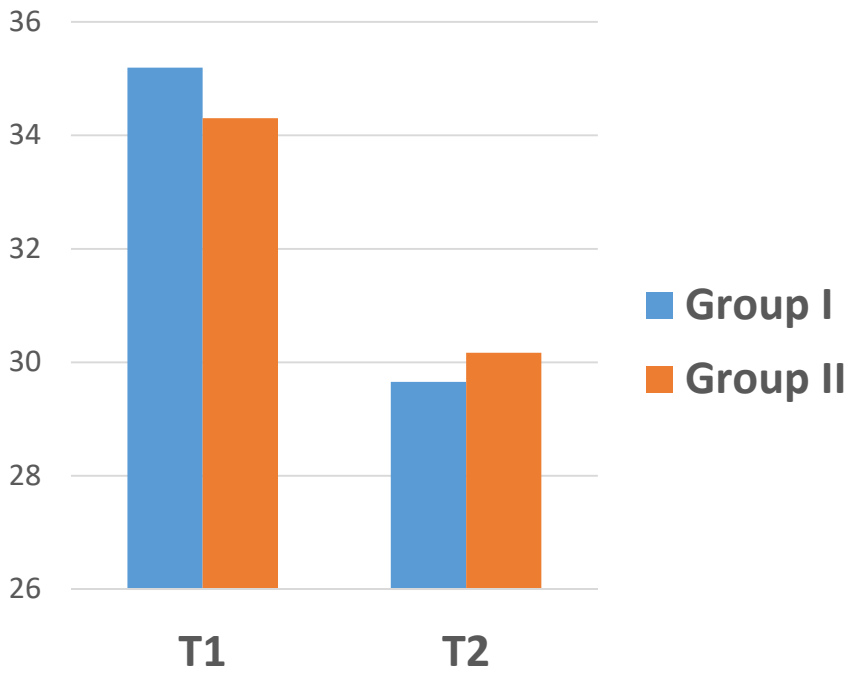


Fig. 9 VOT average by Timepoint and group

DISCUSSION

- **Interactions between timepoint and other factors reveal differences between groups:**
  - Beginners decrease their VOTs in T2 across the board.
  - Intermediates present a more limited decrease:
    - No change for /k/ or for unstressed positions

- Analysis of individual productions show that all beginners show shorter VOT in T2:
  - This is not the case for all intermediate learners.

CONCLUSIONS

1. Results suggest that explicit instruction of phonetics/pronunciation has greater impact on beginners' than on intermediate learners' sound production.
   - This is evidence supporting our hypothesis on differences in degree of category formation:
     - Beginners are prone to greater changes due to instruction because their sound categories are less solid and more malleable than more advanced learners'.
2. Our study presents initial support for a Spanish curriculum that includes explicit phonetics instruction as early as possible.

NEXT STEPS/FUTURE RESEARCH

- Add more data to the beginner group.
- Compare across proficiency levels the impact of phonetics instruction on other sounds (e.g. voiced stops and vowels).

- Analyze delayed effects of instruction across levels.
- Explore the role of production variablity in L2 acquisition and how instruction impacts it.

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Thank you!

¡Muchas gracias!

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