

Investigating regressive transfer of L3 on L1/L2: Production and perception of bilabial stops by Mandarin learners of English and Spanish

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INTRODUCTION

L2 phonological acquisition

Relation between perception and production (Flege, 1987):

- without accurate perception, difficult production.
- but perception and production may not be aligned in L2.

Merger Hypothesis (Flege, 1987):

- a compromise value between L1 and L2 values (Lord, 2008)

L3 acquisition and Cross linguistic influence (CLI)

L3 acquisition may be affected by L1 and/or L2. Different views:

- Typological Primacy Model (Cabrelli Amaro & Rothman, 2010)
- Cumulative Enhancement Model (Flynn et al., 2004)
- L2 Status (Llama et al., 2010)
- Combined effect (Wunder, 2011; Lipńska, 2015)

L3 may also have an effect on L2/L1

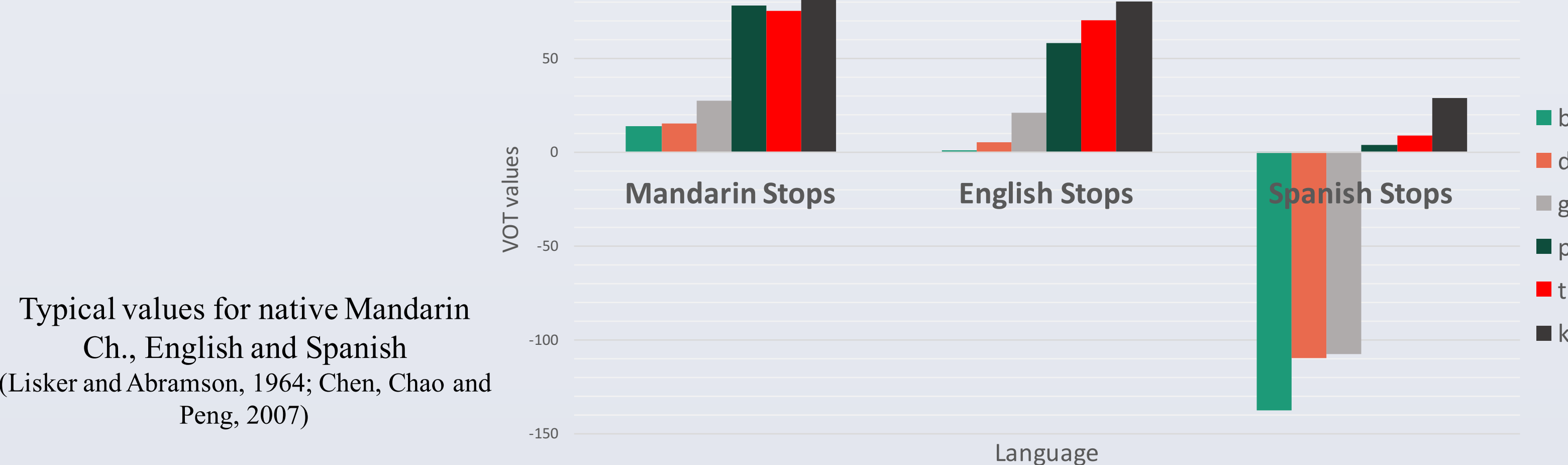
- backward; regressive transfer (Sypiańska, 2016; Cabrelli Amaro & Wrembel, 2016)

The transfer can be facilitative or non-facilitative (Double-edged sword):

- negative; positive (facilitative transfer)

Many L3 studies on production (Llama et al., 2010; Wunder, 2011; Wrembel, 2011), **few on perception.**

Crosslinguistic difference in VOT (Voice Onset Time)



GOAL

To examine the effect of learning a L3 on L2 and L1 by comparing the perception and production of Spanish, English and Mandarin stops by bilingual and trilingual speakers.

RESEARCH QUESTIONS

- Do bilinguals/trilinguals differ from monolinguals in their perception of VOT?
It is assumed that CLI is bidirectional and affects all previously learned languages and thus, L2/L3 learners may perform differently from the monolinguals in their respective languages.
- Does L3 exert an influence on L1/L2?
It is predicted that acquiring an L3 exerts a regressive transfer on L1/L2. Since L3 Spanish stops possess a shorter VOT, it is likely that trilinguals display a preference for earlier VOT boundaries than bilinguals.
- Do L2/L3 learners possess a combined system or a separate one for each language?
Following Flege's Merger Hypothesis, bilinguals/trilinguals may merge the different phonological systems of these languages and create a compromise value.

METHODOLOGY

Participants

Bilinguals/Trilinguals	Monolinguals (control)
Bilinguals (N=10): L1 Mandarin, L2 English Trilinguals (N=10): L1 Mandarin, L2 English, L3 Spanish	S (N = 2): L1 Spanish E (N = 2): L1 English M (N = 4): L1 Mandarin

Stimuli

Perception:

Task: Identification task

- Two-alternative forced choice task
- Inserted in a carrier sentence in each language to control for language mode

Stimuli: male production of word initial /b p p^h/ followed by vowel /i/

- A modified continuum ranging from -105 ms to 135ms (33 tokens; 4.5ms and 9ms step):
- Voiced part: manually extracted cycles
- Voiceless part: created with Praat script

Production:

Task: Sentence reading task.

Stimuli: Three vowel contexts: /a/, /e/, /i/

- Use of fillers
- Inserted in carrier sentences in respective language

Procedure

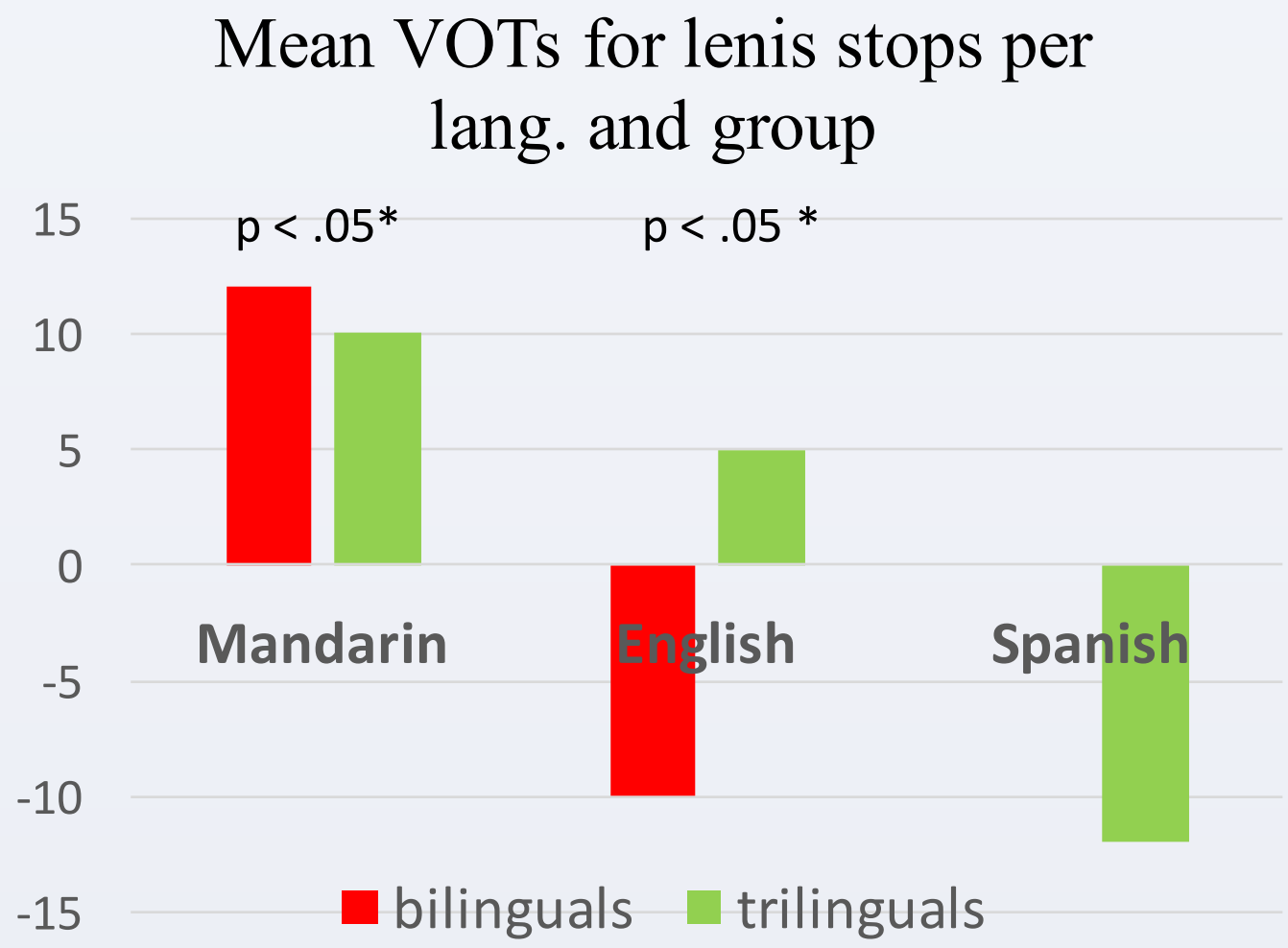
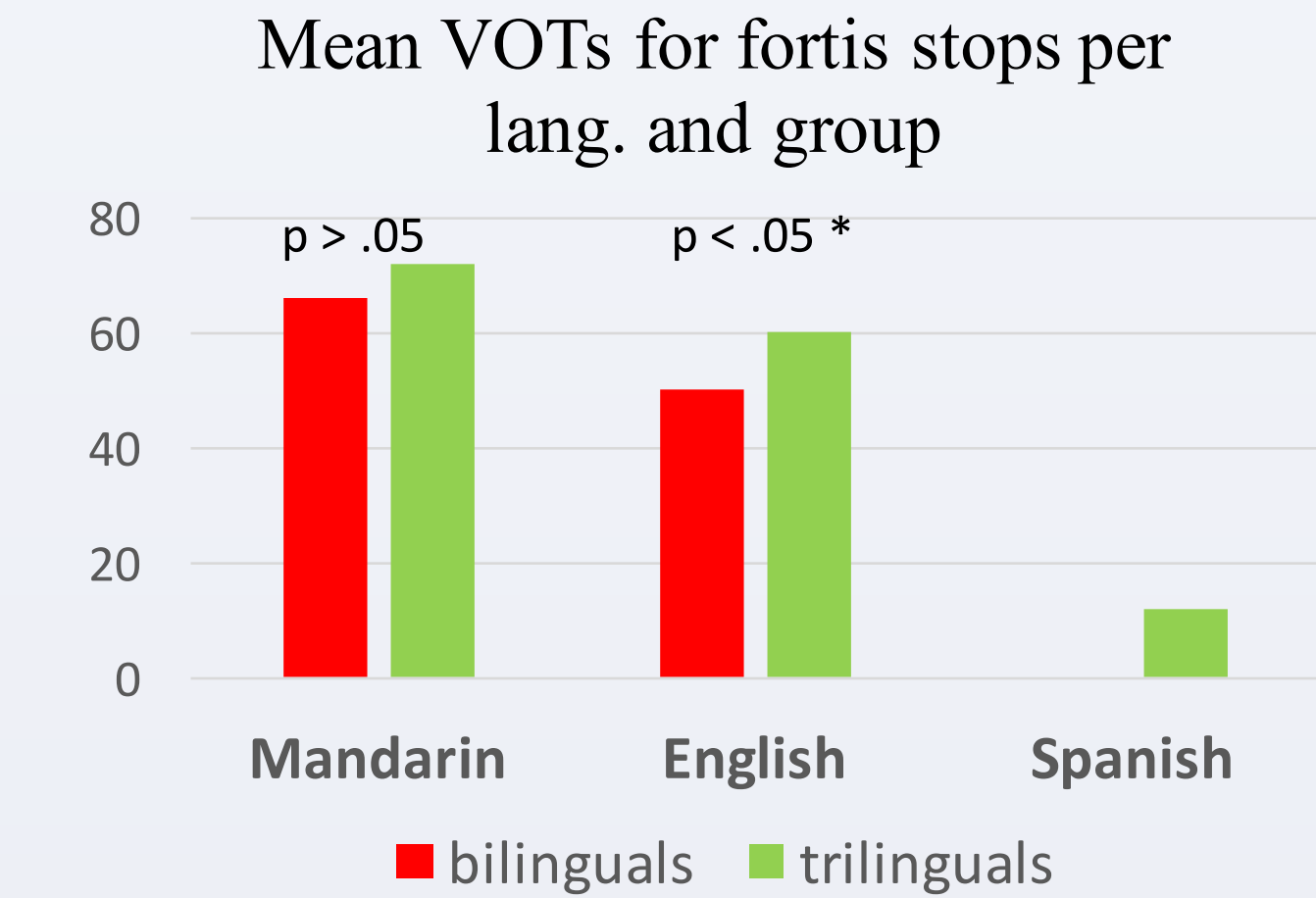
Order of experiment: production previous to perception; English < Mandarin < Spanish

Activation of language mode: watching videos in between tasks
instructions were given in respective language

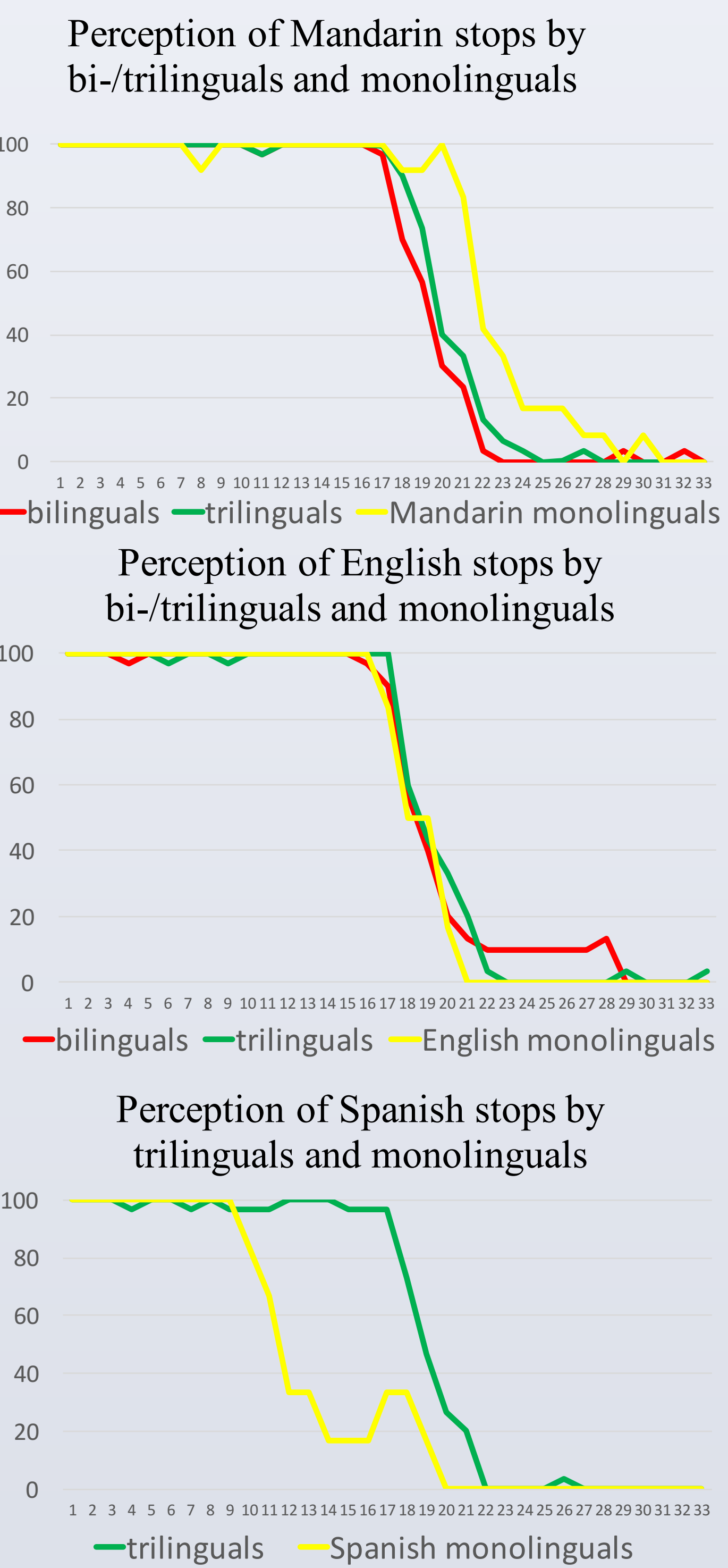
Monolinguals took part only in perception.

RESULTS

Production



Perception: % identification as /b/



Stimulus 1-30: prevoicing to aspiration

Step 15 = 0ms VOT

Earlier drop in identification = perception of fortis stops with **shorter** VOT

Within each group: Spanish < English < Mandarin

Between groups:

Mandarin Stops:

earlier b/p boundary for bi-/trilinguals than for monolinguals ($p < .05^*$).

English Stops:

no difference between groups ($p > .05$).

Spanish Stops:

later b/p boundary for trilinguals ($p < .05^*$).

Within group:

Bilinguals: no difference in perceiving English and Mandarin stops ($p > .05$).

Trilinguals: later b/p boundary for Mandarin ($p < .05^*$) than for English and Spanish, which do not differ.

DISCUSSION AND CONCLUSION

Bi-/Trilinguals vs. Monolinguals

- Results show that acquiring a **L2/L3 may exert regressive influence on L1** in perception. Bi- and trilinguals had an earlier L1 b/p perceptual boundary than Mandarin monolingual speakers.
- Data indicate that bi-/trilinguals showed **native-like perception in L2 English**, possibly showing the result of greater experience with the L2 (Flege, 1995).
- Trilinguals displayed a higher VOT boundary in L3 Spanish than Spanish monolinguals, which may due to the **influence of L1** and **insufficient experience** with L3.

Bilinguals vs. Trilinguals

- Trilinguals produced English /b/ and /p/ with longer VOT than bilinguals. Perhaps learning L3 results in the need for greater contrast between L2 and L3 (Flege, 1987).
- Perceptually, bilinguals and trilinguals differ neither in L1 nor in L2 (Wrembel, 2015). **No transfer from L3 to L2** has been found.
- In production there is a tendency for separate categories for L1 and L2 stops, except for a shared category for L1-L2 /b/ for trilinguals. In perception, bilinguals appear to have single categories for L1 and L2, trilinguals show evidence of two separate systems.

Summary and conclusions

- Evidence of CLI in different directions: regressive transfer from L3 to L2 production, and from L2/L3 to L1 perception.
- L3 acquisition affects not only production, but also perception, although in different ways. All the previously learned languages may jointly shape the learners' phonological systems.
- Further research is needed evaluating the influence, the contributing factors and the direction which the transfer takes place in L3 acquisition.