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Background

Regressive Cross-Linguistic

Sneech Rhythr

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Regressive Cross-Linguistic Influence in Multilingual Speech Rhythm The Role of Typological Similarity

Megan M. Brown & Charles B. Chang

Boston University

Virtual Workshop on L3 Development After the Initial State October 2nd, 2021





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Regressive Cross-Linguistic

Influence

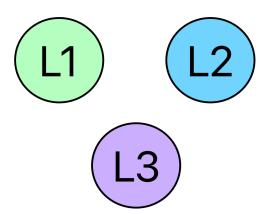
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Cross-Linguistic Influence



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Speech Phythi

Methods

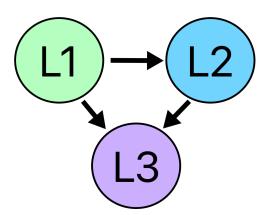
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Progressive Cross-Linguistic Influence (pCLI)



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Regressive Cross-Linguistic Influence

Speech Phythi

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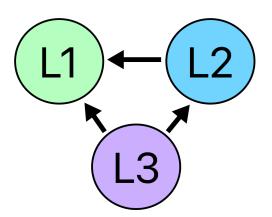
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Regressive Cross-Linguistic Influence (rCLI)



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Models of Trilingual rCLI

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Models of Trilingual rCLI

Phonological Permeability Hypothesis (PPH: Cabrelli Amaro and Rothman, 2010)

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Models of Trilingual rCLI

Phonological Permeability Hypothesis (PPH: Cabrelli Amaro and Rothman, 2010)

 Phonological systems developed in childhood more stable than those developed in adulthood.

Models of Trilingual rCLI

Phonological Permeability Hypothesis (PPH: Cabrelli Amaro and Rothman, 2010)

- Phonological systems developed in childhood more stable than those developed in adulthood.
- rCLI from an L3 is more likely to impact the L2 than the L1

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Typological Similarity in CLI

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Typological Similarity in CLI

The overall similarity between a speakers languages has been found to significantly impact **bilingual rCLI**

Schmid and Köpke (2017)

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Typological Similarity in CLI

The overall similarity between a speakers languages has been found to significantly impact bilingual rCLI

Schmid and Köpke (2017)

as well as trilingual pCLI

• Rothman (2010 et seq), Westergaard et al., (2017)

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Research Quesitons

Does typological similarity play a role in rCLI from L3 to L1/L2?

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Speech Knythi

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Research Quesitons

Does typological similarity play a role in rCLI from L3 to L1/L2?

This project examines this question in regards to **speech rhythm**.

Background

Regressive Cross-Linguist

Speech Rhythm

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Speech Rhythm

• Rhythm is the sense of movement in speech

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- Rhythm is the sense of movement in speech
 - Syllable-timed (Spanish, French)
 - Stress-timed (English, German)

Background

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Speech Rhythm

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Discussion

- Rhythm is the sense of movement in speech
 - Syllable-timed (Spanish, French)
 - Stress-timed (English, German)
- Adult learners are unlikely to develop an L2 rhythmic system that is comparable to that of a native speaker,

Speech Rhythm

- Rhythm is the sense of movement in speech
 - Syllable-timed (Spanish, French)
 - Stress-timed (English, German)
- Adult learners are unlikely to develop an L2 rhythmic system that is comparable to that of a native speaker, BUT...

Speech Miyen

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Procedure Analysis

Result

Discussio

- Rhythm is the sense of movement in speech
 - Syllable-timed (Spanish, French)
 - Stress-timed (English, German)
- Adult learners are unlikely to develop an L2 rhythmic system that is comparable to that of a native speaker, BUT...
- They <u>are</u> able to develop an L2 rhythmic system which is distinct from the L1 (Guilbault, 2002; Ordin & Polyanskaya, 2015)

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Regressive Cross-Linguistic

Speech Rhythm

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Research Questions

English

German

Spanish

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Research Questions

English (Stress-timed)

German (Stress-timed)

Spanish (Syllable-timed)

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Research Questions

English (Stress-timed)

German (Stress-timed)

Spanish (Syllable-timed)

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Research Questions

English (Stress-timed)

German (Stress-timed)

Spanish (Syllable-timed)

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Research Question

Which language is more susceptible to rCLI?

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Speech Knythi

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Research Question

Which language is more susceptible to rCLI?

Does **similarity** play a role?

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Research Question

• L1 English, L2 German, L3 Spanish

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Research Question

- L1 English, L2 German, L3 Spanish
- L1 German, L2 English, L3 Spanish

Speech Rhythm

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Research Question

- L1 English, L2 German, L3 Spanish
- L1 German, L2 English, L3 Spanish
- L1 English, L2 German
- L1 German, L2 English

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Research Question

- L1 English, L2 German, L3 Spanish
- L1 German, L2 English, L3 Spanish
- L1 English, L2 German
- L1 German, L2 English

Do linguistic similarity and/or order of acquisition influence the degree of rCLI to each language?

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Background

Influence

Speech Rhyth

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Participants

Language Background	Number of Participants
L1 English L2 German L3 Spanish	5
L1 German L2 English L3 Spanish	3
L1 English L2 German	6
L1 German L2 English	3

Speech Rhythr

Methods

Participants

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Participants

- 12 female, mean age = 35, age range = 18-58
- Sequenital trilinguals with L2/L3 AoA > 7
- Sufficient proficiency and fluency in all of the target languages
- No knowledge of other non-target languages

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Background

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Speech Rhythr

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Procedure

Picture Description Task

Background

Regressive Cross-Linguistic

Speech Rhyth

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Picture Description Task









- 4 images per language
- 5-20 minutes of speech per language

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Speech Rhythi

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Analysis

 Recordings annotated in TextGrids via Praat (Boersma & Weenink, 2009). Background

Speech Knyth

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Analysis

- Recordings annotated in TextGrids via Praat (Boersma & Weenink, 2009).
- Duration of all vowels and consonants marked.

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Analysis

- Recordings annotated in TextGrids via Praat (Boersma & Weenink, 2009).
- Duration of all vowels and consonants marked.
- ullet pprox 1 minutes of recorded speech per participant per language.

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Regressive Cross-Linguistic

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Speech Rhythm Measurements

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Participants

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Speech Rhythm Measurements

$$%V = \frac{\text{sum of all vocalic interval durations}}{\text{total duration of vocalic and consonantal intervals}} \times 100$$

Analysis

Speech Rhythm Measurements

$$\%V = \frac{\text{sum of all vocalic interval durations}}{\text{total duration of vocalic and consonantal intervals}} \times 100$$

Best for non-native speech analysis between languages (White & Mattys, 2007)

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Speech Rhythm Measurements

$$\%V = \frac{\text{sum of all vocalic interval durations}}{\text{total duration of vocalic and consonantal intervals}} \times 100$$

Best for non-native speech analysis **between languages** (White & Mattys, 2007)

$$VarcoV = \frac{\text{SD of vocalic interval duration}}{\text{mean vocalic interval duration}} \times 100$$

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Speech Rhythm Measurements

$$\%\,V = \frac{\text{sum of all vocalic interval durations}}{\text{total duration of vocalic and consonantal intervals}} \times 100$$

Best for non-native speech analysis **between languages** (White & Mattys, 2007)

$$VarcoV = \frac{\text{SD of vocalic interval duration}}{\text{mean vocalic interval duration}} \times 100$$

Best for non-native speech analysis between speakers of the same langauge (White & Mattys, 2007)

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L3 Spanish Rhythm

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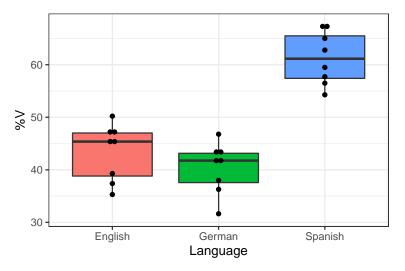
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Results L3 Spanish Rhythm



%V in L3 Spanish



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Rhythm By Language English

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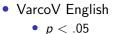
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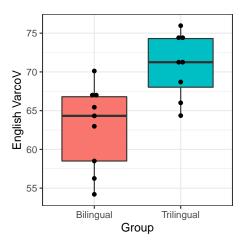
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Rhythm By Language English



 Trilinguals have a higher (more Spanish-like)
 English VarcoV



VarcoV in Bilingual vs. Trilingual English



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Rhythm By Language German

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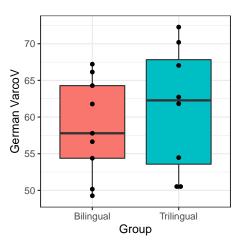
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Rhythm By Language

No significant differences were found between bilingual and trilingual German rhythm.



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Results

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Discussion

 Trilinguals had a higher VarcoV in English than bilinguals, suggesting rCLI from L3

Discussion

- Trilinguals had a higher VarcoV in English than bilinguals, suggesting rCLI from L3
 - German does not shows this trend

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Discussion

- Trilinguals had a higher VarcoV in English than bilinguals, suggesting rCLI from L3
 - German does not shows this trend
 - English is more similar to Spanish than German is.

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Analysis

Discussion

- Trilinguals had a higher VarcoV in English than bilinguals, suggesting rCLI from L3
 - German does not shows this trend
 - English is more similar to Spanish than German is.
 - English rhythm is shifting to become more like Spanish rhythm

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Background

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Speech Rhyth

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Discussion

Discussion

Typological Convergence Hypothesis (TCH)

Proficient trilinguals are most likely to experience rCLI in a previously known language which is most **similar** to the L3 source language. This rCLI will occur in a direction which makes the previously known language converge with the newly acquired language.

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Conclusions

 Preliminary findings that English is more vulnerable than German to rhythmic rCLI from L3 Spanish.

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- Preliminary findings that English is more vulnerable than German to rhythmic rCLI from L3 Spanish.
- Typological Convergence Hypothesis (TCH)

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Discussion

- Preliminary findings that English is more vulnerable than German to rhythmic rCLI from L3 Spanish.
- Typological Convergence Hypothesis (TCH)
- Next Steps

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- Preliminary findings that English is more vulnerable than German to rhythmic rCLI from L3 Spanish.
- Typological Convergence Hypothesis (TCH)
- Next Steps
 - Recruitment of additional participants

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- Preliminary findings that English is more vulnerable than German to rhythmic rCLI from L3 Spanish.
- Typological Convergence Hypothesis (TCH)
- Next Steps
 - Recruitment of additional participants
 - Interaction between language similarity and age/order of acquisition

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- Preliminary findings that English is more vulnerable than German to rhythmic rCLI from L3 Spanish.
- Typological Convergence Hypothesis (TCH)
- Next Steps
 - Recruitment of additional participants
 - Interaction between language similarity and age/order of acquisition
 - Typology vs. psychotypology

Cross-Linguistic Influence Speech Rhythn

Speech Rhythn

Participant Procedure

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- Preliminary findings that English is more vulnerable than German to rhythmic rCLI from L3 Spanish.
- Typological Convergence Hypothesis (TCH)
- Next Steps
 - Recruitment of additional participants
 - Interaction between language similarity and age/order of acquisition
 - Typology vs. psychotypology
 - Consideration of other phonological features

Background

Cross-Linguistic Influence Speech Rhythm

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Discussion

- Preliminary findings that English is more vulnerable than German to rhythmic rCLI from L3 Spanish.
- Typological Convergence Hypothesis (TCH)
- Next Steps
 - Recruitment of additional participants
 - Interaction between language similarity and age/order of acquisition
 - Typology vs. psychotypology
 - Consideration of other phonological features
 - The role of additional factors such as proficiency and frequency of use.

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Special Thanks









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Thank You!

These slides can be found at https://www.meganmbrown.com

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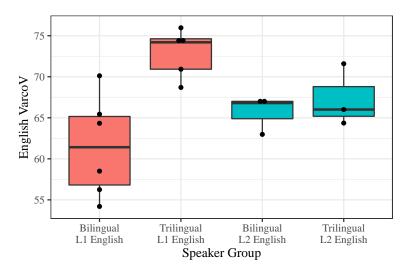
Participa

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Additional Results



English VarcoV Scores By Order of Acquisisition

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Background

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Speech Knyth

Methods

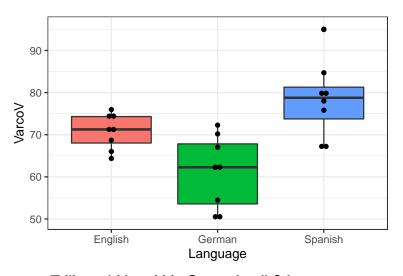
Participan Procedure

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Discussion

Additional Results



Trilingual VarcoV in Scores in all 3 languages

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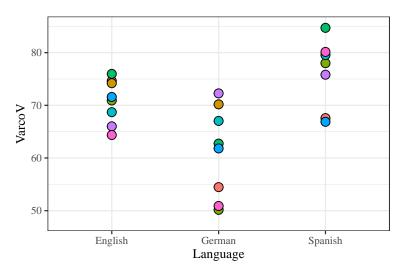
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Trilingual VarcoV in Scores in all 3 languages by participant

