# L1 Transfer to English: Focus on Phonetics and Phonology

October 29, 2024

K202

Noriko Yamane

Hiroshima University

## L1 Transfer: Influence of the native language (L1) on learning a second language (L2)

#### Positive transfer (or facilitation):

The influence of the native language leads to immediate or rapid acquisition or use of the target language

Negative transfer (or Interference):

The native language leads to errors in the acquisition or use of a target language

(e.g., Plural forms of Spanish)

Spanish: gatos

-> cats

(e.g., adj-N order of Spanish)

Spanish: un gato blanco

-> \*cats white

English: a white cat

English: cats

#### Interlanguage

Interlanguage hypothesis is that the language produced by the adult learner when he or she attempts meaningful communication in a foreign language is systematic at every level: phonology, morphology, syntax, semantics, and pragmatics. The interlanguage system is fundamentally autonomous and patterned.

It is not a random hodgepodge collection of unsystematic errors but, clearly, neither is it a native language (NL) or target language (TL); it is a separate transitional linguistic system that can be described in terms of evolving linguistic patterns and rules, and explained in terms of specific cognitive and sociolinguistic processes that shape it.

https://onlinelibrary.wiley.com/doi/pdf/10.1002/9781405198431.wbe al0561.pub2

#### Larry Selinker



#### Why interlanguage study is so important?

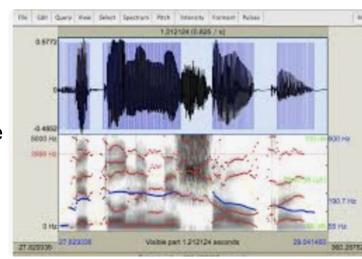
- 1. Understanding human language acquisition and development
  - > a new perspective on second language learning, insights into the rules, stages of language acquisition (Jiang et al., 2019; Chen et al, 2019; Hao et al. 2021)
- 2. Designing effective teaching strategies
  - > increasing cultural information teaching, optimizing language input environments, and applying proper error-correction strategies (Guo et al., 2022; Wang et al., 2020; Zeng Kai et al., 2003)
- 3. A general bias against non-native accents
  - > Accented speakers can be perceived negatively, which can disadvantage them in job and educational markets (Nejjari et al., 2012; Eisenchlas & Tsurutani, 2011; Tan et al., 2021)

Introduction to L1
Transfer

 This presentation focuses on how phonetic and phonological differences affect learners' pronunciation of English.

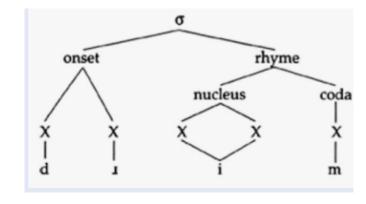
# Phonetics: The Physical Aspect of Speech

- •Phonetics studies the **concrete details** of how sounds are:
- •Produced: Using articulators like the tongue, lips, and vocal cords (Articulatory Phonetics).
- •Example: The English /t/ is produced with the tip of the tongue touching the alveolar ridge.
- •**Transmitted**: As sound waves through the air (Acoustic Phonetics).
- •Example: We can measure the difference between /t/ and /d/ using a spectrogram.
- •Perceived: By the ear and processed by the brain (Auditory Phonetics).
- •Example: How native speakers differentiate between subtle sounds like /p/ and /b/.



# Phonology: The Abstract Patterns of Sounds

- •Phonology studies **how languages organize sounds** into meaningful units and systems.
- •A **phoneme** is the smallest unit of sound that changes meaning. For example:
- •In English, /p/ and /b/ are **phonemes** because changing /pɪn/ ("pin") to /bɪn/ ("bin") alters meaning.
- •Phonology also explains:
- •Allophones: Variants of a phoneme that do not change meaning.
- •Example: [ph] (aspirated /p/) in the initial of stressed syllables (e.g., pin), but [p] (unaspirated /p/) elsewhere (e.g., spin).
- •Phonological rules: Patterns like how English speakers pronounce [ph].



Aspect	Phonetics	Phonology				
Focus	Physical properties of sounds	How sounds function and interact in a system				
Units of Study	Phones (individual sounds)	Phonemes (abstract units of sound)				
Questions Asked	"How is the sound produced and perceived?"	"What sounds and sequences of sounds are meaningful in this language?"				
Example of Study	How is X produced and perceived in language Y?	Is X meaningful in language Y?				
Measurement Tools	Acoustic analysis, spectrograms, IPA symbols	Rules, phonological features, and allophones				

### 'r' vs 'l' — same phones in J, different phonemes in E



Headturn preference procedure: Babies are trained to turn their heads to the rabbit whenever they hear a new sound

(da, da, ba > A rabbit appears and hits a drum)

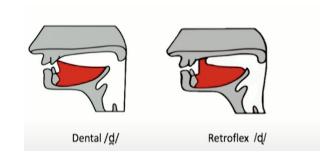
#### Perceptual Narrowing

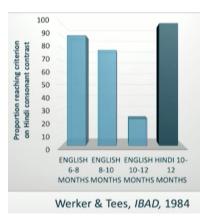
Werker, J. F., & Tees, R. C. (1984). Cross-language speech perception: Evidence for perceptual reorganization during the first year of life. Infant Behavior & Development, 7(1), 49–63. https://doi.org/10.1016/S0163-6383(84)80022-3

## retroflex [d] dental [d]

Hindi - two different phonemes

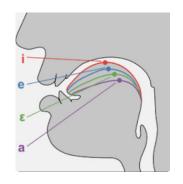
English - no contrast

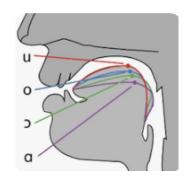


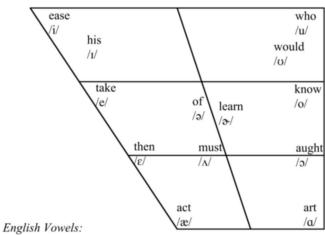


The contrast becomes inaudible around 10 months of English babies.

#### **Vowel Chart - International Phonetic Alphabets**



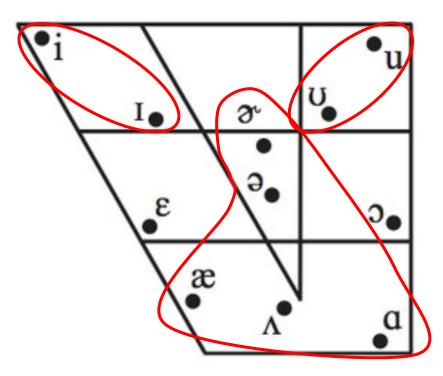


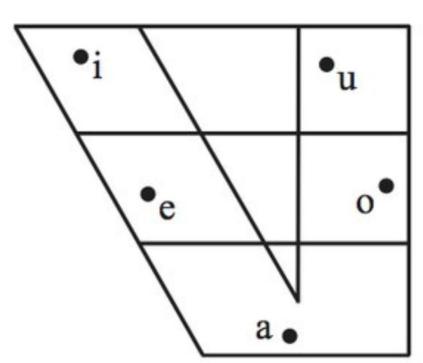


## American English









Examples of Japanese negative transfer to L2 English: sit vs seat, pool vs pull, batter vs. butter, etc

#### Low front V vs low central V vs hooked schwa → low central V

$$a \rightarrow a$$

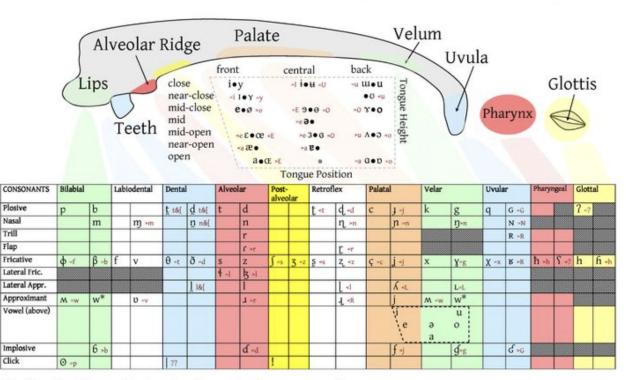
$$\Lambda \rightarrow a$$

$$\rightarrow$$
 a

- batter, butter
- hat, hut
- heard, hard

#### Consonant Chart - International Phonetic Alphabets





Lateral flap: J . Other symbols: ' | ph ph nc nc p pl t' te' e el m mal t tates Use these typing combinations with: "IPA MSKLC Keyboard", and any Unicode font that supports IPA, e.g. Doulos SIL, Charls SIL, or Gentlum.

Trill

Flap

#### CONSONANTS (PULMONIC)

(MUNUMIN)											
	Bibbial	Labiodental	Dental	Alveobr	Postalweo la r	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	рb			t d	•			k g			
Nasal	m			n				ŋ			
Trill											
Tap or Flap											
Pricative		f v	θδ	s z	J 3						h
Affricate					tf d3						
Lateral fricative											
Approximant				J			j				
Lateral approximant				L							

### American English

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

## Japanese 👤

#### CONSONANTS (PULMONIC)

PULMONIC				y	100		93		15			
	Bib	bial	Labiodental	Dental	Alwohr	Postalweo la r	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	P	b			t d	•			k g			
Nasal		m			n				ŋ			
Trill												
Tap or Flap					ı							
Pricative	ф				s z	l		ç				h
Affricate					ts	tf d3						
Lateral fricative												
Approximant								j				
Lateral approximant												

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

#### International Phonetic Alphabet (IPA)

https://en.wikipedia.org/wiki/International\_Phonetic\_Alphabet\_chart#/media/File:IPA\_chart\_2020.svg

- Voice (voiceless vs voiced)
- Place of Articulation (Bilabial, Labiodental, Dental, etc.)
- Manner of Articulation (Plostive, Nasal, Trill, Tap/Flap, etc.)

#### CONSONANTS (PULMONIC)

@ ⊕ @ 2020 IPA

	Bila	bial	Labiod	lental	Den	tal .	Alveola	ar l	Postalveola	Retr	oflex	Pal	atal	Ve	elar	Uv	ular	Phary	ngeal	Glo	ottal
Plosive	р	b					t d	l		t	d	С	J	k	g	q	G			?	
Nasal		m		m			n	ı			η		n		ŋ		N				
Trill		в					r										$\mathbf{R}$				
Tap or Flap				$\mathbf{V}$		b	ſ				τ										
Fricative	ф	β	f	v	θ	ð	SZ		J 3	ş	Z.	ç	j	x	γ	χ	R	ħ	S	h	ĥ
Lateral fricative							4 13	5													
Approximant				υ			J				J		j		щ						
Lateral approximant							1				l		Λ		L						

#### Voiceless **dental** fricative → Voiceless **alveolar** fricative

$$\theta \rightarrow s$$

$$\check{\mathsf{O}} \longrightarrow \mathsf{Z}$$

- thank vs sank
- three
- they
- thank [t] in Portuguese

#### International Phonetic Alphabet (IPA)

https://en.wikipedia.org/wiki/International\_Phonetic\_Alphabet\_chart#/media/File:IPA\_chart\_2020.svg

- Voice (voiceless vs voiced)
- Place of Articulation (Bilabial, Labiodental, Dental, etc.)
- Manner of Articulation (Plostive, Nasal, Trill, Tap/Flap, etc.)

#### CONSONANTS (PULMONIC)

@ ⊕ @ 2020 IPA

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retr	oflex	Pal	atal	Ve	lar	Uv	ular	Phary	ngeal	Glo	ottal
Plosive	рb			t d		t	d	С	J	k	g	q	G			?	
Nasal	m	m		n			η		n		ŋ		N				
Trill	В			r									R				
Tap or Flap		V		ſ			r										
Fricative	φβ	f v	θð	s z	<b>√</b> ∫ 3	ş	Z.	ç	j	x	γ	χ	R	ħ	ſ	h	ĥ
Lateral fricative				4 3													
Approximant		υ		I			J		j		щ						
Lateral approximant				1			l		Λ		L						

Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

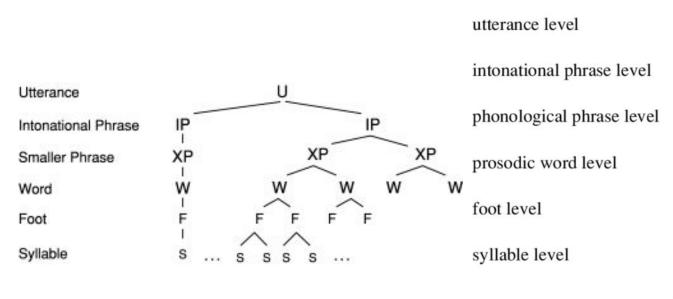
Alveolar **approximant** (or Retroflex approximant) vs. Lateral **approximant** merge into **tap** 

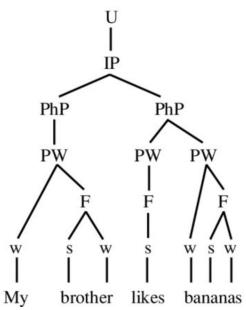
- right vs. light,
- Portuguese, Japanese

#### **Prosodic Hierarchy**

Sounds are not just consonants and vowels.

It includes prosody - syllables, stress, rhythm, intonation and pause.





Selkirk, E. O. (1980). The role of prosodic categories in English word stress. *Linguistic inquiry*, *11*(3), 563-605. Selkirk, E. (2014). The prosodic structure of function words. In *Signal to syntax* (pp. 199-226). Psychology Press. Nespor, M., & Vogel, I. (2007). *Prosodic phonology: with a new foreword* (Vol. 28). Walter de Gruyter.

#### Syllable structure level

Japanese CCVC\*

/kju:.shu:/, /bjo:.iN/ /saN/, /kaN.to:/ English CCCVCCC(C\*\*)

strict /strikt/

- → /s<u>u.</u>t<u>o.</u>ri.ku.to/
- sixths /siksθs/
- → /si.ku.s<u>u.</u>s<u>u.</u>s<u>u</u>/

<sup>\*</sup> Possible only if N, or a part of geminate

### Foot level (stress placement)

- Stress accent & stress-timed rhythm of English
- → Pitch accent & mora-timed rhythm of Japanese
- •Christmas /ˈkɹɪs.məs/ (2 syllables)
  - → [ku.ri.su.ma.su] (5 syllables, 5 mora)
    HL
- McDonald /mək. 'da. nəld/ (3 syllables)
  - → [ma.ku.do.na.ru.do] (6 syllables, 6 moras)
    HL

#### Phonological phrase level (Pause between boundaries)

Inappropriate relative prominence



E: He at apples.  $\rightarrow$  J: He at apples.

#### Inappropriate pause locations

J: 持って行きました。<u>[そして</u>, **[**窓の近くで...

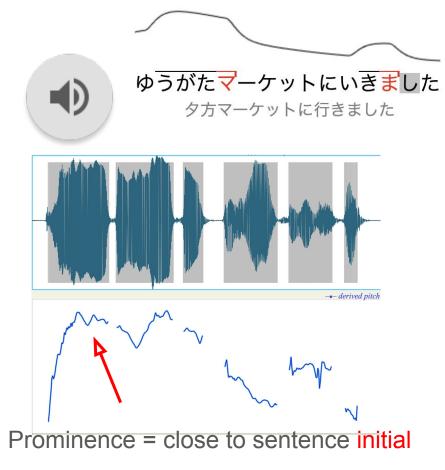
E: The dog took it away [and ate it near the window. (pause before CP)

 $\rightarrow$ J: The dog took it away [and [ate it near the window. (pause after CP)

#### Intonation level - downstep



Prominence = close to sentence final



https://www.gavo.t.u-tokyo.ac.jp/ojad/phrasing/index 23

#### Summary so far

- Contrastive analysis can be executed between the native language and the target language
- Contrastive analysis can predict what errors can happen at all levels:
- **Segmental** level: consonants and vowels
- **Prosody** level: syllable, foot, word, phrase, intonation, and utterance

#### Questions

What properties of your native language transfer to L2?

And which levels of transfer are they?

### Limitation of Contrastive Analysis

Case 1: L1 English learners of L2 French

French /ʒ/ - available in all positions, whereas in English it is not in word-initially.

- Word-initial: N.A.
- Word-medial: Pleasure (/ˈplεʒər/), Measure (/ˈmεʒər/), Vision (/ˈvɪʒən/)
- Word-final: Beige (/beiʒ/), Mirage (/məˈrɑːʒ/), Rouge: (/ruːʒ/)
- -> For English speakers, L2 French /3/ should be difficult word-initially.

Jour /ʒus/ "day", Jouer /ʒwe/ "to play", Jaune /ʒon/ "yellow"

Case 2: L1 German learners of L2 English

English /b, d, g/ - available in all positions, whereas in German they lack word-finally.

- Word-initial: Buch (/buːx/)"book", Dank (/daŋk/) "thanks", Garten (/ˈgaʁtn̩/) "garden"
- Word-medial: Leben (/ˈleːbən/) "to live", Laden (/ˈlaːdən/) "shop" or "store" Regen (/ˈʁeːgən/) "rain"
- Word-final: N.A.
- -> For German speakers, L2 English /b, d, g/ should be difficult in word-finally.

Club /klnb/, Friend /frɛnd/) Dog /dpg/ or /dɔːg/

- -> CA predicts both are equally difficult.
- ! Actually, case 2 is a much greater challenge than Case 1.

Markedness Differential Hypothesis (MDH) (Eckman 2004; 20

The Markedness Differential Hypothesis (MDH) is a theoretical framework in second language acquisition (SLA) that attempts to explain the relative difficulty learners face when acquiring a second language. It posits that the difficulty of learning a second language is influenced by the markedness of linguistic structures, where marked structures are **less common** and **more complex** than unmarked ones.

H: More marked structures are more difficult to learn.

#### Phonological Universals

Crosslinguistically, voicing contrast in final position implies the contrast in initial position, but the reverse is not known to be true.

	Voice contrast						
	Initial (unmarked)	Final (marked)					
System A	yes	yes					
System B	yes						

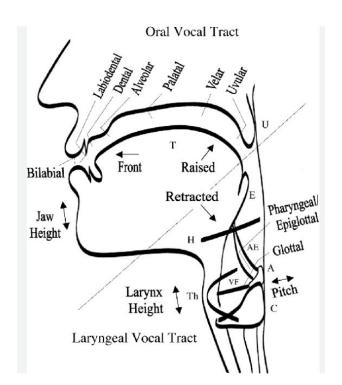
> The difficulty of acquiring the voiced stops is a result of the more marked nature of voicing contrast in final position.

## Degree of difficulty cannot be explained by CA

- Among /k/ vs /g/, /t/ vs /d/, /p/ vs /b/, /g/ is most difficult (and /b/ is least difficult)
  - areodynamic (phonetic) explanation

The larger the supraglottal area for a stop, the longer the oral cavity continue to expand in response to airflow.

• \*g: >> \*d: >> \*b: >> \*g >> \*d >> \*b (>> = 'marked than') (Hayes & Steriade,



#### **Limitations of Contrastive Analysis**

- CA lacks predictive power, oversimplifies the complexity of transfer, and does not fully account for degree of difficulty.
- L2 changes over time it can evolve to get closer to NS, but stops evolving and remain same (fossilization) in plateau.
- CA must be supplemented with other models and approaches to fully understand interlanguage.
- Phonological universals play a role in shaping L2 phonological patterns, suggesting that some errors are due to universal constraints rather than L1 influence alone
- Phonological universals are crosslinguistic distribution tendency, which is often aligned with phonetic (aerodynamic/anatomical) groundings.

#### Another potential reasons why CA has limitations:

- Segmental errors and syllable errors are easy to find and transcribe. -> target of CA.
- Prosodic characteristics above syllables are hard to transcribe. (Information of stress, rhythm, pause, and intonation is often missing.)

Please call Stella. Ask her to bring these things with her from the store: Six spoons of fresh snow peas, five thick slabs of blue cheese, and maybe a snack for her brother Bob. We also need a small plastic snake and a big toy frog for the kids. She can scoop these things into three red bags, and we will go meet her Wednesday at the train station.

[pliz kol ste:la æşk h<sup>j</sup>a tu biĭn dĭş θĭŋz wĭş hə fiam də stor siksa spūnz at fre: sno pi:z faɪv θɪk slæbz əv blu: tji:z ænde meibi o snæk fo har binda pap mi arso ni:da smol plæstik sneik ?ʌp¬ æ̃nd ə big thoi fiag fə də khidz ∫i kến skup ởi? Đĩng intu sai let? bægz æ̃na wi wīl go mi:t hæ wɛ̃zdei æt dæ? tiein steiſə̃n]

#### 1. Chinese English Characteristics

in function words

L vocalisation

•  $\theta \to [s]$ 

 $\cdot /3/ \rightarrow [1]$ 

•  $\langle v \rangle \rightarrow [w]$ 

· Vowel Epenthesis

Absence of vowel reduction

· Diphthongs are shortened

#### 2. Hindi English Characteristics

and velarised-1 contrast

•  $/t, d/ \rightarrow [t, d]$ 

•  $\theta$ ,  $\delta \to [t]$  or  $[t^h]$  and [d]

• The absence of the clear-1

'thanks', 'these' 'world', 'cold'

• /eI/ and  $/eV/ \rightarrow /eV/$  and /oV/'blame', 'goat'

Examples

'ton', 'dozen'

4. Thai E

n	$\mathbf{g}$	Ц	S.	11

'the', 'this'

'please', 'split'

# Examples

'right' vs. 'light' 'kids', 'please' <u>'six'</u>, <u>'sip'</u>

 $\cdot$  /ð,  $\theta$ , v/  $\rightarrow$  [t, d, f]. A consonant cluster

Characteristics

## Characteristics

· /r/ and /l/ are hard to

3. Japanese English

Examples

'first'

'three'

'small'

'usually'

'say', 'gave'

'vital', 'every'

'in', 'the'

distinguish

• /p, t, k/ are unaspirated  $\cdot /s/ \rightarrow [ ]$ 

 $\cdot /\theta / \rightarrow [s]$ 

 $\cdot /\eth / \rightarrow [z]$ •  $\langle v/ \rightarrow [b]$ 

•  $\langle a, \alpha \rangle \rightarrow [o] \text{ or } [a]$ 

Vowel epenthesis

'thought'

'drink', 'bad'

'village', 'very' 'thought', 'hot'

'brother', 'although'

#### Based on error analysis of segmental/syllable levels, ...

Are the degree of **competence** (intelligent, confident, fluent, clear) and the degree of **accentedness** correlated?

H: Stronger the accented they perceive, less competent they evaluate them.

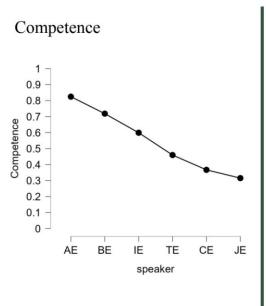
Japanese students evaluated the following speech examples in 7-point scale.

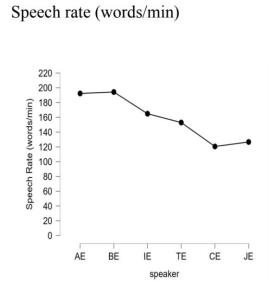
Sound files of English:

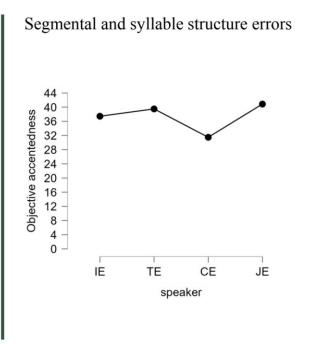
American English (AE), British English (BE) 4M, 4F each

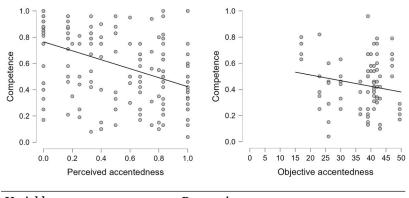
Chinese English (CE), Indian English (IE), Thai English (TE), and Japanese English (JE) - 2M, 2F each

## Segmental and syllable structures errors are not much different among the four types of English

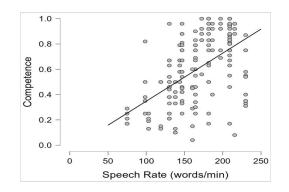








Variables	Pearson's r	p
Perceived accentedness Objective accentedness	Speaker Competence440 (Moderately to strongly)177 (Very weak)	<.001 .091



Variables	Pearson's r	p
	Speaker Competence	
Speech rate	.541 (Moderately to strongly)	< .001

Sato & Yamane (2024)

Objective accentedness (errors) show very weak correlation.

**Perceived (subjective)** accentedness shows moderate/strong correlation with speaker competence.

**Speech rate** shows the strongest correlation with speaker competence.

It is not conclusive whether speech rate is more contributive to the competence evaluation. In order to confirm this, we need to create stimuli whose speech rate is constant but with different number of errors, and test how the errors affect the competence evaluation.

Perceptual Assimilation Model (PAM) (Best et al., 1996; Tyler et al., 2014)

Non-native sounds are assimilated into native categories in different ways:

Two category assimilation (TC): /w/-/j/ in E = /w/-/j/ in J

Single category assimilation (SC): /r/-/l/ in English -> /r/ in J

H: Single category assimilation is more difficult than two category assimilation.

## Speech Learning Model (SLM) - Flege (1995)

'New', 'similar', 'identical' sounds... which is better learned

Identical sounds will present no problem.

New sounds = uncategorized in PAM

H: Similar sounds are more difficult than new sounds.

English /l/ (compared to English /r/) is more similar to Japanese /r/ sound.

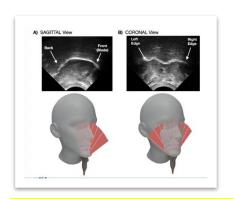
/l/ acquisition is harder.

#### How can this apply to teaching

- High variability phonetic training (HVPT): exposing learners to a wide range of phonetic variations (multiple voices in the input) (Zhang et al., 2021; Mora et al., 2022)
- Shadowing: improved perceptual adaptation to unfamiliar accents more than listening alone (Hamada 2019, 2022)
- Hand gestures: Hand gestures can be a valuable tool in L2 phonetics training, particularly when they appropriately mimic the target phonetic features and are actively performed by learners (Xi et al., 2020; Li et al., 2021, 2022; Hoetjes & Maastricht, 2022; Gluhareva & Prieto, 2017)
- Visualization of area of difficulty: Ultrasound visual biofeedback for L2
   English (Yamane et al., to appear), Explicit attention to visualization cues in spectrogram improved intonation in scripted speech (Liu & Tseng, 2019)

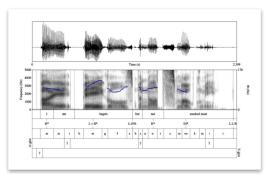
#### INTEGRATING TECHNOLOGIE

#### => a holistic view of speech production



#### **Ultrasound**

Movements of the tongue, offering insights into the internal articulatory processes



#### **Praat**

Acoustic properties of speech sounds, providing detailed information about pitch, intensity, and duration



#### Face mesh

Movements of the lips, giving a clear picture of the external articulatory gestures

#### Summary

- **Interlanguage** can be observed at every level of phonetics and phonology.
- Human babies around 10-12 months perceptually narrow their ability to discriminate sounds that are not distinctive in their L1.
- Contrastive analysis predicts challenging sounds to L2 speakers, but has limitations.
- Markedness differential hypothesis, SLM, PAM can complement may make predictions about the degree of difficulty.
- **Segmental** and **prosodic** levels should be properly taught through explicit instructions such as HVPT, shadowing, hand gestures, and visual aid such as ultrasound, Praat, etc.