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Faculty of English

Natural Growth Theory of Acquisition:
New data support for a revised theory of multilingual acquisition of speech

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Aim

- to provide new evidence for our revised version of the earlier proposed Natural Growth Theory of Acquisition (**NGTA**)

NGTA: A big-picture theory of acquisition

- It is **holistic** – in the sense that it incorporates each and every aspect of the acquisition process

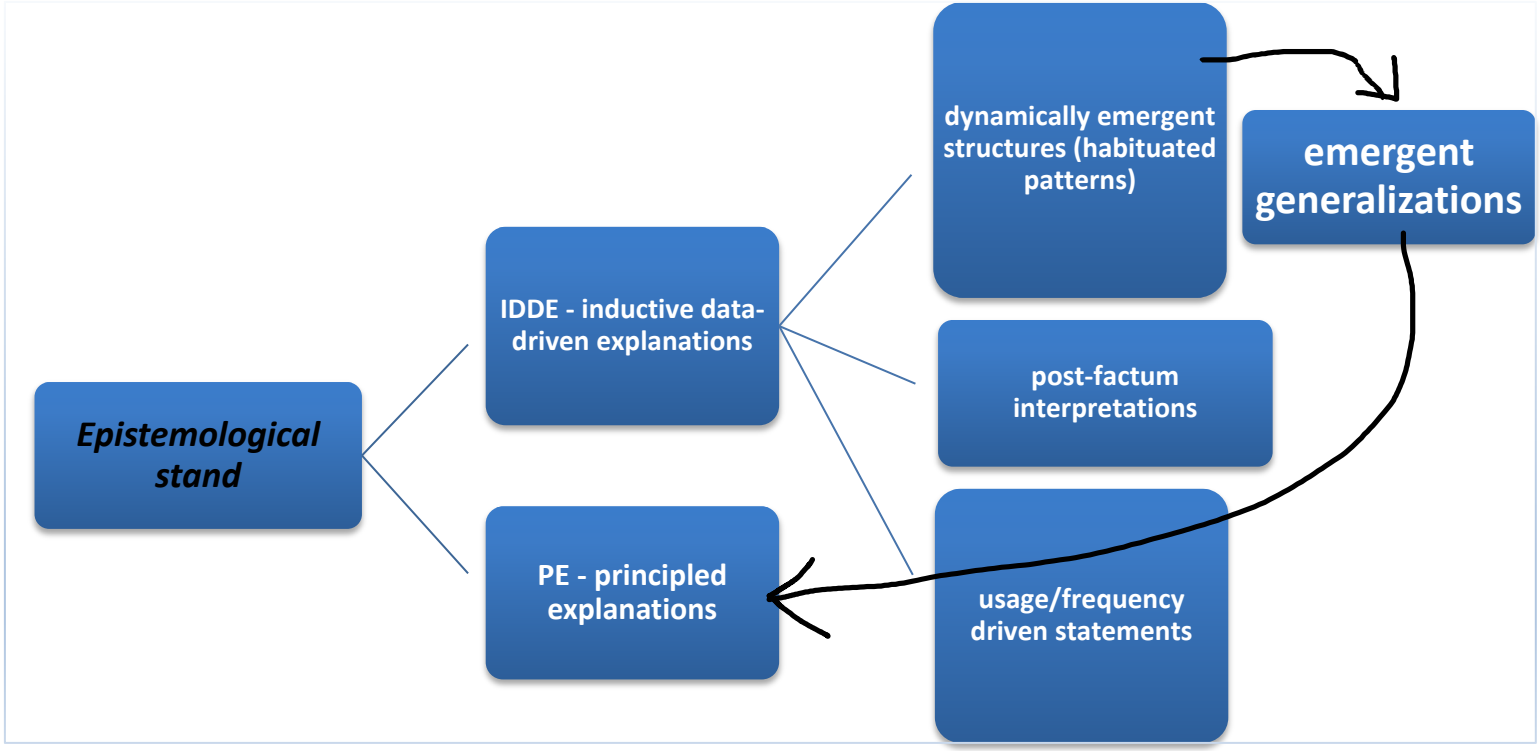
- It assumes **a gradual dynamic emergence** of Ln phonology, shaped by the **input** from L1 and other L's, and influenced by **typology**, **universals**, and **context**

  – Dziubalska-Kołaczyk & Wrembel (2016, 2017, 2022)

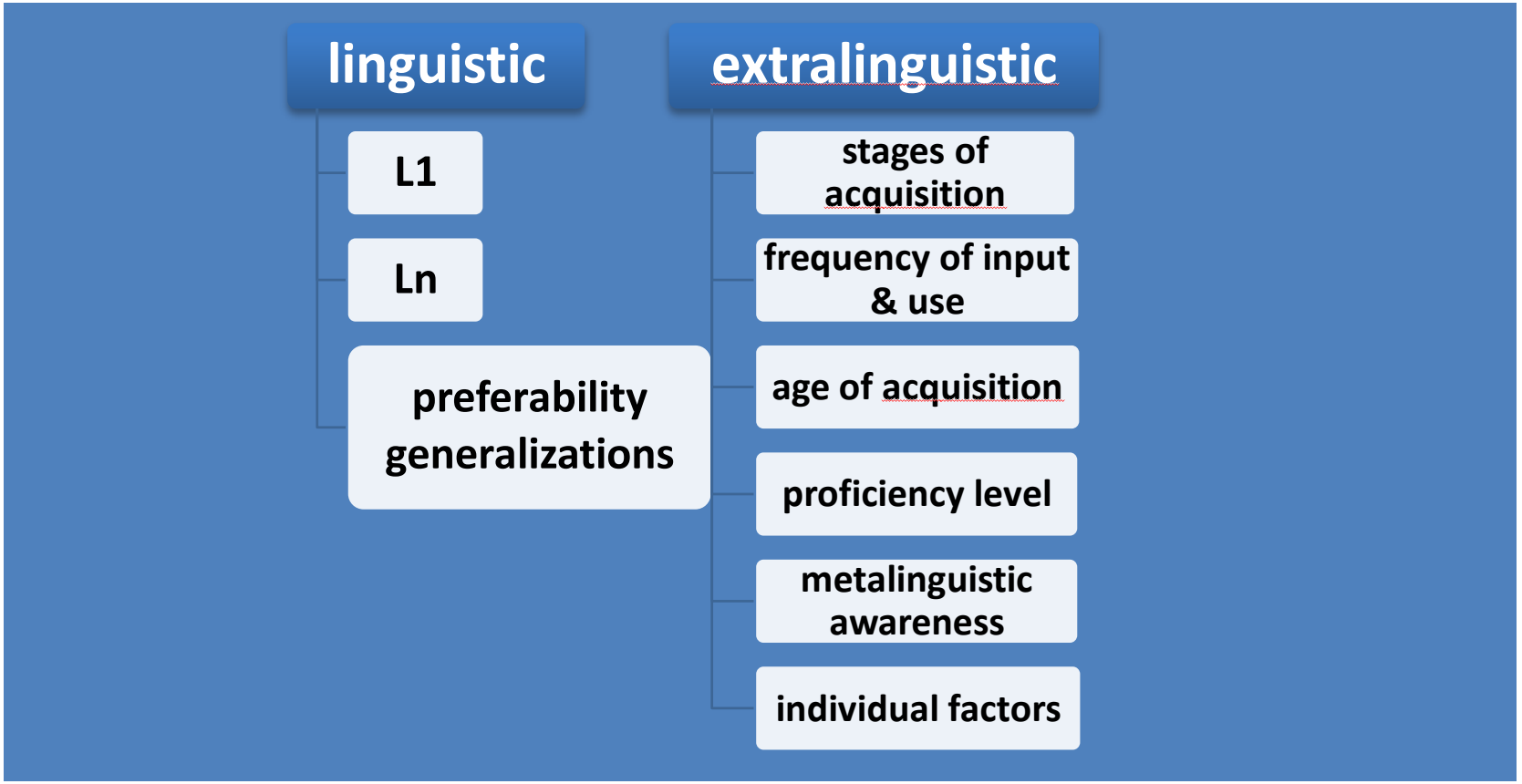
NGTA: Explanatory background

- Stems from the framework of **Natural Phonology**
  - Stampe 1979, Donegan & Stampe 2009, Dressler 1984, 1996, Dziubalska-Kołaczyk 2002, 2009, 2012
- Enhanced by **Complexity Theory**
  - Kretzschmar 2015

NGTA: Epistemology



NGTA: variables



The ‘acquisition situation’

- An umbrella term for extralinguistic variables
- Embracing all aspects of a given acquisition case:
  - acquisition of L1 or Ln,
  - by an individual or a population,
  - in a formal or natural context,
  - at a given age,
  - with a given proficiency level, etc.

- Phonology grows in a learner along his or her individual natural path of acquisition
  - how much individual paths converge or diverge?

NGTA: General assumptions

- we formulate general assumptions of NGTA on the basis of the analysis of the network of interdependencies formed by the linguistic and extralinguistic variables

NGTA: General assumptions

- **GA I:**
  - **A**: All three linguistic variables (L1, Ln, preferability generalizations) have influence on the process
  - **B**: Their influence is moderated by the configuration of extralinguistic factors in a given acquisition situation

- **GA II:**
  - Acquisition process is dynamic and proceeds as the function of time and language learning experience
  - The older the multilingual learners, the more complex the interdependencies among variables

NGTA: General assumptions

- **GA III:**
  - We distinguish two levels in language acquisition process, motivated by Kahneman (2011)
  - Level 1 is automatic (involuntary and instinctive) e.g., articulatory routines and phonetic perceptual constraints; grounded in implicit, procedural knowledge
  - Level 2 is conscious (mindful, cognitively-based) as manifested by any aspect of meta-awareness; relates to explicit, declarative knowledge

Scenarios
for multilingual acquisition of phonology

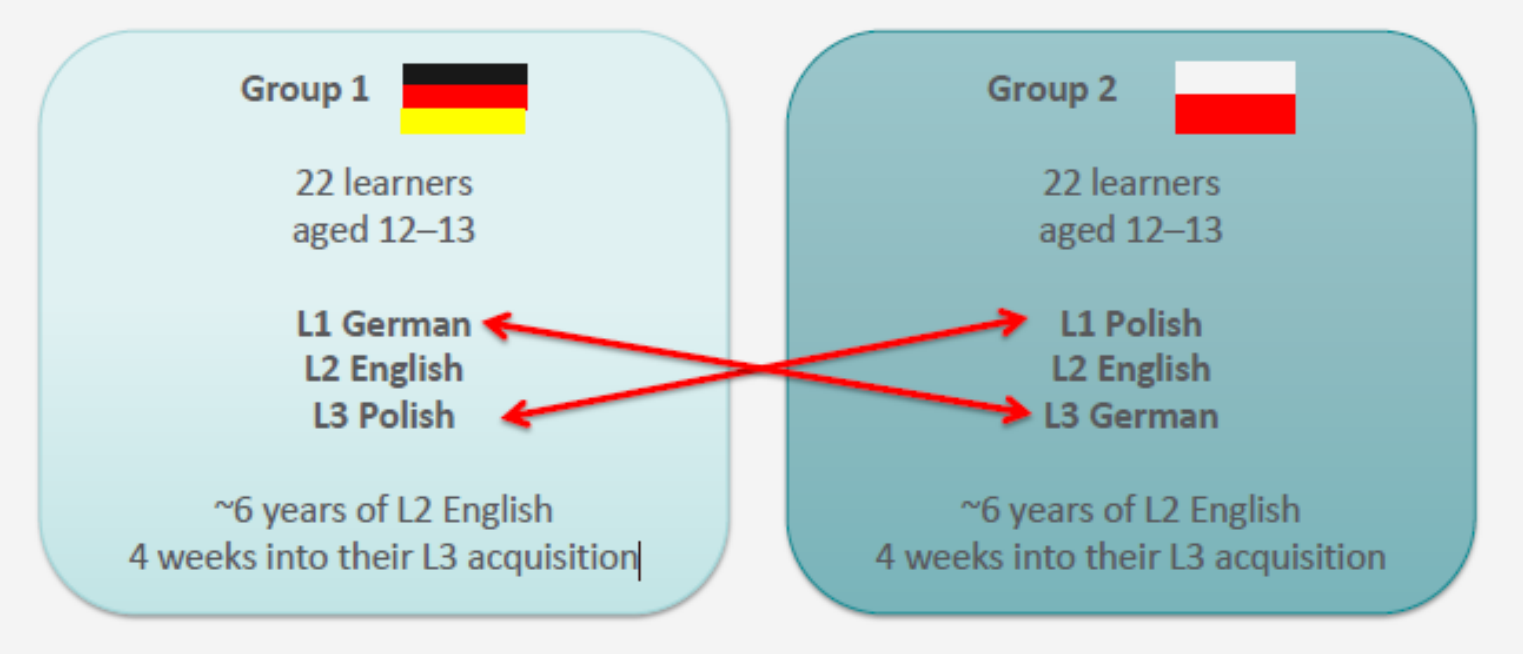
- **Scenario 1.** Low proficiency triggers hybrid values based on L1 and L2/Ln; with the advancement of proficiency target values emerge. Universal phonetic grounding is present throughout the process of acquisition.
- **Scenario 2.** At the initial stages of acquisition of a new/additional language, the most recent routines, including but not limited to primary (L1) routines prevail as the source of CLI; at a later stage the metalinguistic learning of Ln takes place.
- **Scenario 3.** Attainment in the target language is modulated by input, amount of training, individual factors and metalinguistic awareness.
- **Scenario 4.** A high degree of metalinguistic awareness (cf. Level 2) does not guarantee that learners overcome universal phonetic difficulties (cf. Level 1).
- **Scenario 5.** L2 plays an important role as a source of CLI and it is intricately connected with such variables as metalinguistic awareness, recency of use and the language status (L2 vs. L3/Ln).

NGTA DATA SUPPORT

Multi-Phon project

- Large-scale international project (2017-2019)
- Longitudinal design – 3 data collections (T1, T2, T3)
- Pool of 40 young sequential multilinguals
- Parallel studies in Polish and German schools
- Tested in L1, L2 and L3
- Battery of production and perception tests
- Aim: to explore phonological CLI in multilingual adolescent learners

Project scope



4 weeks into L3 instruction → **4 months into L3 instruction** → **9 months into L3 instruction**

Research designs

Study 1: Phonological awareness

Kopečková, Wrembel, Gut & Balas 2021

- Accent mimicry task (picture story in L2 and L3)
- Auditory analysis of recordings
- Foreign accentedness ratings (FAR)

Study 2: Rhotics production

Wrembel, Gut, Krzysik, Lewandowska & Balas 2019

- Delayed repetition in all 3 languages
- Target words embedded in carrier sentences
- Tested longitudinally

Study 3: Multi-feature speech perception

Wrembel, Gut, Kopečková, Balas 2020

- Forced-choice goodness task in L2 and L3
- Perception of rhotics and final obstruent (de)voicing
- Response accuracy and reaction times

Study 4: Perception & production interface

Wrembel, Gut, Kopečková, Balas 2022

- Delayed repetition (rhotics)
- Forced-choice goodness task
- Randomised and counterbalanced in E-prime

Data support for NGTA

GA I supported

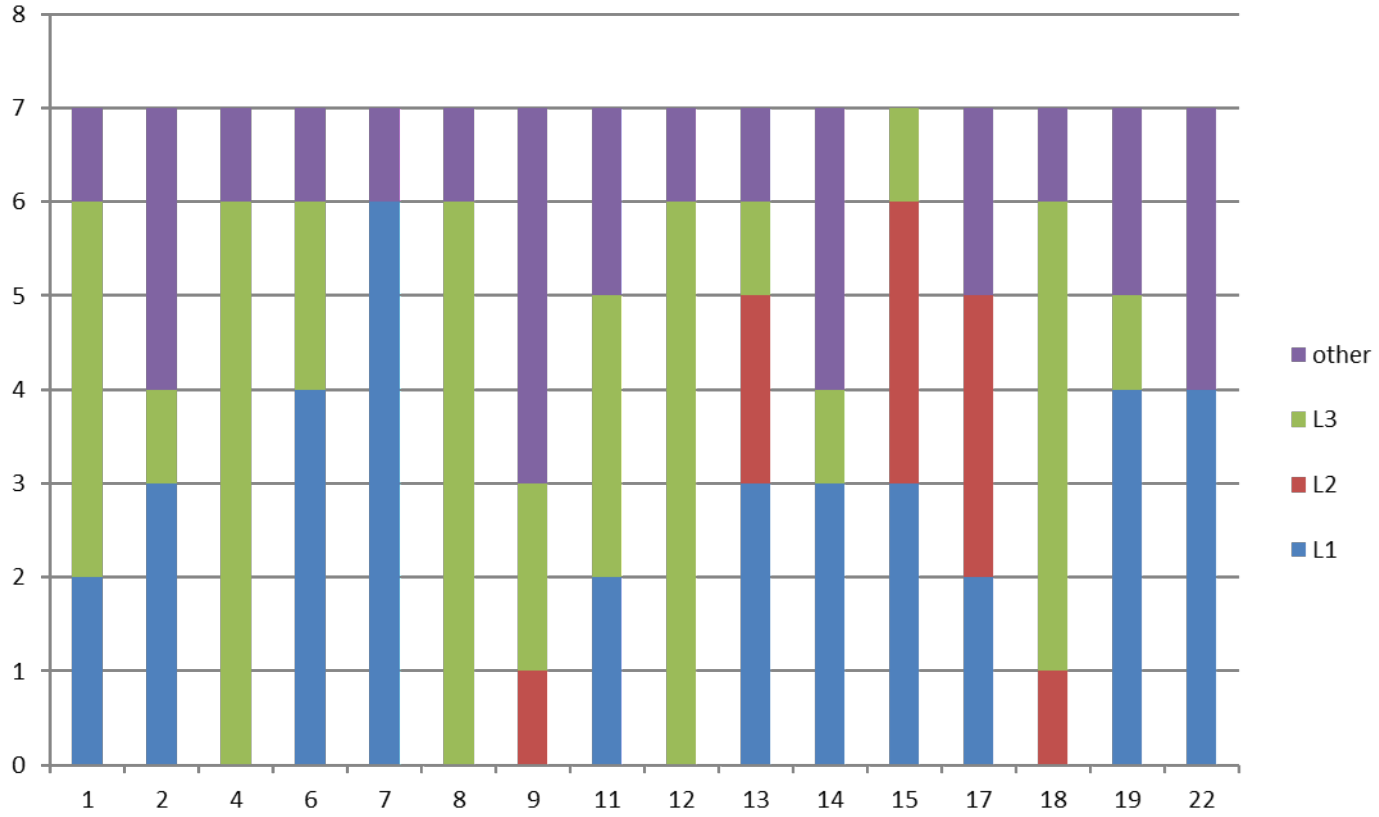
- *A: All three linguistic variables* (**L1, Ln**, preferability generalizations) h*ave influence on the process.[…]*

-> Sources of phonological CLI in rhotics production (Study 2)

- In L3 – mainly L1-based, some from L2, hybrid forms
- In L2 – target-like productions

Sources of phonological CLI (Study 2)

- L1 Polish group in L3 German rhotics production (at T1)



Data support for NGTA

GA I supported

- *B: Linguistic influence is modulated by the configuration of **extralinguistic factors** in a given acquisition situation.*

-> Both phonological feature and language proficiency determine perception accuracy and RT (Study 3)

- perception accuracy is higher in L2 English > L3 German
- processing speed (RT) is faster in L2 > L3
- perception accuracy higher for rhotics > final obstruent in L2 & L3 (linguistic factor)

Data support for NGTA

GA I supported

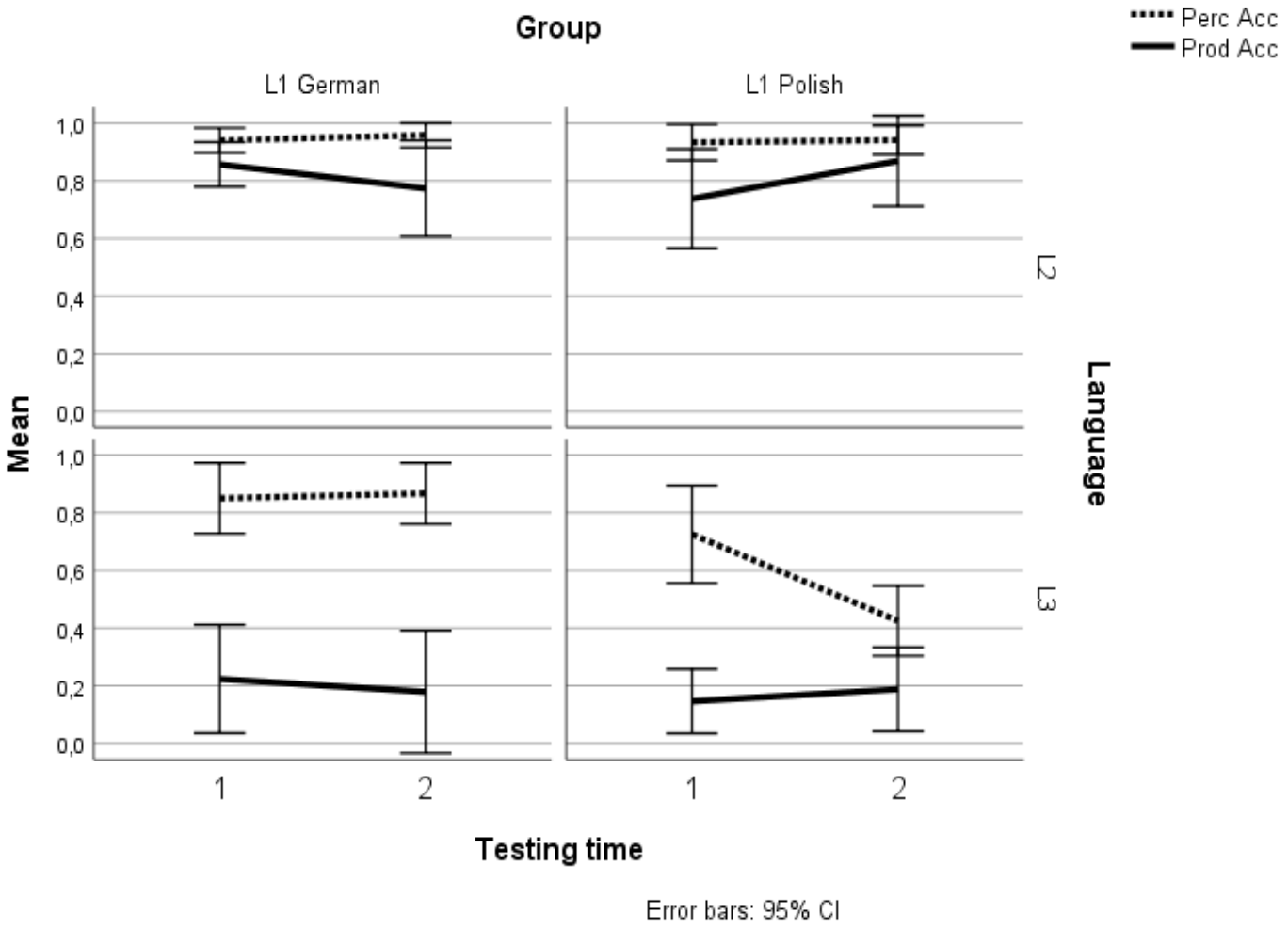
- *A: All three linguistic variables* (L1, Ln, **preferability generalizations**) h*ave influence on the process.*

-> Universal and L1-specific learnability of sounds (Study 4)

- Both L1 groups did equally well at acquiring L2 English alveolar approximant, which may pose less articulatory difficulty than trills (less complex)

- L3 Polish / German: high perception, low production accuracy because of high perceptual salience of L3 rhotics vs. their motor-articulatory difficulty

Universal and L1-specific learnability of sounds (Study 4)



Data support for NGTA

GA II not supported / partially supported

- *Acquisition process is dynamic and grows as the function of time and language learning experience*

-> No significant development over time attested in phonological awareness (Study 1)

-> Rhotics production - trajectories of development (Study 2)

- Increase in production accuracy for L2 English
- No change for L3 rhotics over time

-> Developmental changes found only for perception of rhotics not final devoicing (Study 3)

Data support for NGTA

GA III supported / partially supported

- *We distinguish two levels (automatic & conscious) in acquisition process. Articulatory routines and phonetic perceptual constraints; grounded in implicit, procedural knowledge.*

-> **Implicit grounding** in perception (based on articulatory features) (Study 3)

- established stable perceptual categories L2 > L3
- lower perceptual salience of final obstruent devoicing compared to rhotics

-> **Explicit metalinguistic knowledge** / phonological awareness (Study 1)

- Noticing specific L2 and L3 phonetic properties
- Evidenced in foreign accent mimicry ability

Data support for NGTA

- **Scenario 1.** *Low proficiency triggers hybrid values based on L1 and L2/Ln; with the advancement of proficiency target values develop. Universal phonetic grounding is present throughout the process.*

-> Rhotics production in L3 – hybrid/intermediate forms; rhotics in L2 – target-like (Study 2)

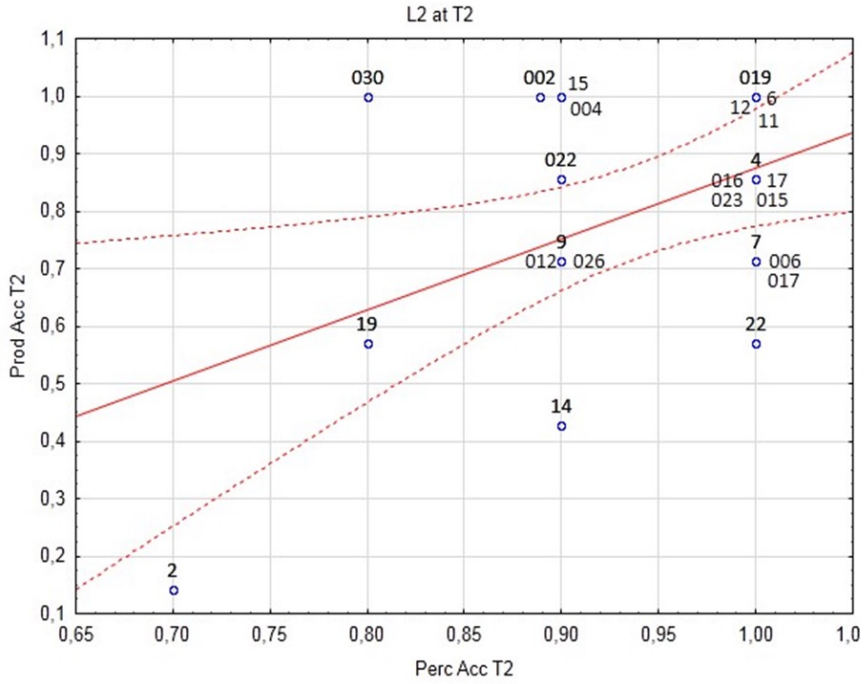
-> Perception accuracy higher for L2 > L3 (Study 3)

-> Perception & production co-evolve with higher proficiency level;

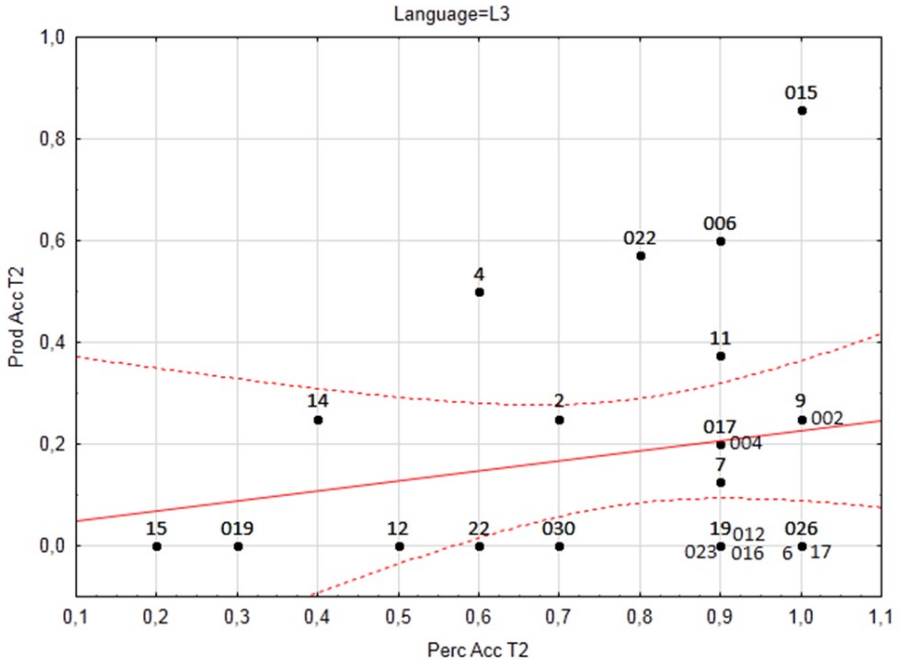
- Modalities aligned in L2, but dissociated in L3 (Study 4)

Perception / production correlations

- For L2
  - Both modalities aligned, co-evolving



- For L3
  - Performance on two modalities unrelated -> dissociation



Individual perceptuo-productive patterns and change trajectories

Participant	L2 English		L3 German / L3 Polish	
	Relationship type at T1	Relationship type at T2	Relationship type at T1	Relationship type at T2
L1 Polish				
2	dissociation	dissociation	dissociation	dissociation
4	perc = prod	prod = perc	dissociation	perc = prod
6	perc = prod	perc = prod	dissociation	dissociation
7	perc > prod	perc = prod	dissociation	dissociation
9	perc = prod	perc = prod	dissociation	dissociation
11	perc = prod	perc = prod	dissociation	dissociation
12	perc = prod	perc = prod	dissociation	dissociation
14	dissociation	perc = prod	dissociation	dissociation
15	perc = prod	perc = prod	dissociation	dissociation
17	perc = prod	perc = prod	dissociation	dissociation
19	perc = prod	perc = prod	dissociation	dissociation
22	perc > prod	perc > prod	dissociation	dissociation
L1 German				
002	perc = prod	perc = prod	dissociation	dissociation
004	perc = prod	perc = prod	dissociation	dissociation
006	perc > prod	dissociation	perc > prod	dissociation
012	perc = prod	perc = prod	dissociation	dissociation
015	perc = prod	perc = prod	perc = prod	perc = prod
016	perc = prod	perc = prod	dissociation	dissociation
017	perc > prod	perc > prod	dissociation	dissociation
019	perc= prod	perc = prod	dissociation	dissociation
022	perc = prod	perc = prod	perc = prod	dissociation
023	perc = prod	perc > prod	dissociation	dissociation
026	perc = prod	perc > prod	dissociation	dissociation
030	perc = prod	perc = prod	dissociation	Dissociation

Conclusions

- We aimed to juxtapose the general assumptions and scenarios of the NGTA against selected research data
- We hope to have shown a more holistic perspective on the proces of multilingual acquistion of speech

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"MULTI-PHON - Phonological cross-linguistic influence in young multilinguals"

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Co-authors: Ulrike Gut, Romana Kopečková, Anna Balas

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