Dynamic information for Polish and English vowels in syllable onsets and offsets

Mateusz Jekiel
mjekiel@wa.amu.edu.pl
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The generic theory of vowel perception

- **the simple target model**
  - vowel targets (Strange 1989)
    - a unifying concept among articulatory, acoustic and perceptual characterizations of vowels
    - canonical forms of vowels
    - can be analysed in terms of articulation and acoustics

Target undershoot and the dynamic specification model

- **target undershoot** (Lindblom & Studdert-Kennedy 1967)
  - the variation of vowel targets observed in speech of a single speaker
  - in casual speech, the canonical acoustic targets are often not reached
- **the dynamic specification model**
  - perception of coarticulated vowels
  - listeners compensate for the production undershoot by a **perceptual overshoot**

Dynamic specification of coarticulated vowels

- Strange et al. (1976)
  - coarticulated vowels can be easily identified by untrained listeners, even when examples are highly ambiguous
  - vowels in CVC context identified more accurately than their isolated counterparts, even despite speaker variation

Dynamic information for vowels in syllable onsets and offsets

- Strange, Jenkins and Johnson (1983)
  - **syllable onsets and offsets** carry useful information for vowel identification
  - listeners are able to employ them, even when the static vowel targets are not present in the recording

Dynamic information for vowels in syllable onsets and offsets

- Jenkins and Strange (1999)
  - neither syllable onsets or offsets are as informative as taken together in the **silent-centre (SC)** paradigm
  - a combination of two imperfect sources of dynamic information can produce a complex dynamic signal that is highly informative as to the identification of the vowel

L1 and L2 speech perception

- Iverson and Evans (2007)
  - learning L2 vowel system can be different for learners with a simple vowel system than for those with a more complex one
  - learners with a complex vowel system can apply the cues that they use in their L1 to the process of learning L2 vowel system

The study

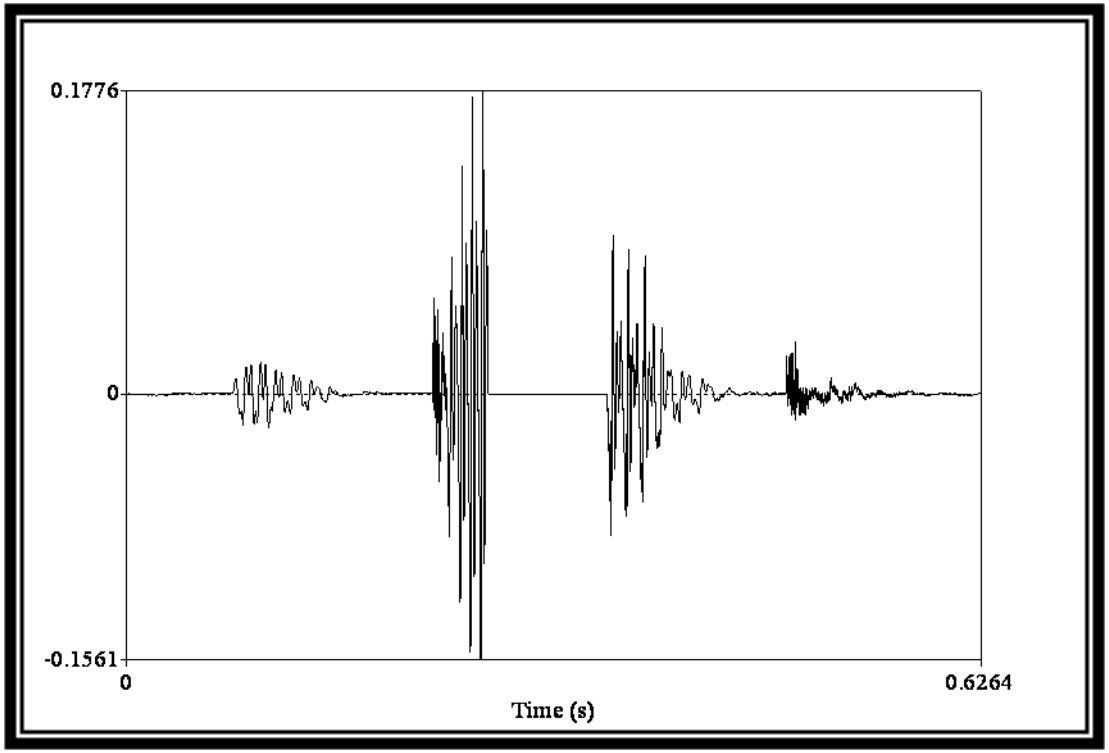
	Jenkins and Strange (1999)	Jekiel (2010)
participants	128 native speakers of AmE	10 Polish learners of English: 5 advanced, 5 intermediate
speakers	AmE, Ohio	BrE, Yorkshire Polish
recorded vowels	AmE /ɪ ɛ ʌ ʊ iː uː eː æ aː oː/	BrE /ɪ iː e eə ʌ aː ɒ ɔː ʊ uː/ Polish /a e i ɔ u ɨ/
conditions	SC, I-1PP, I-3PP, I-5PP, I-7PP, F-4PP, F-6PP, F-8PP	SC, I-1PP, I-5PP, F-4PP, F-8PP

Hypotheses

- difficulties in identifying English vowels
- students of English advantage over students of non-linguistic studies
- good results in identifying Polish vowels

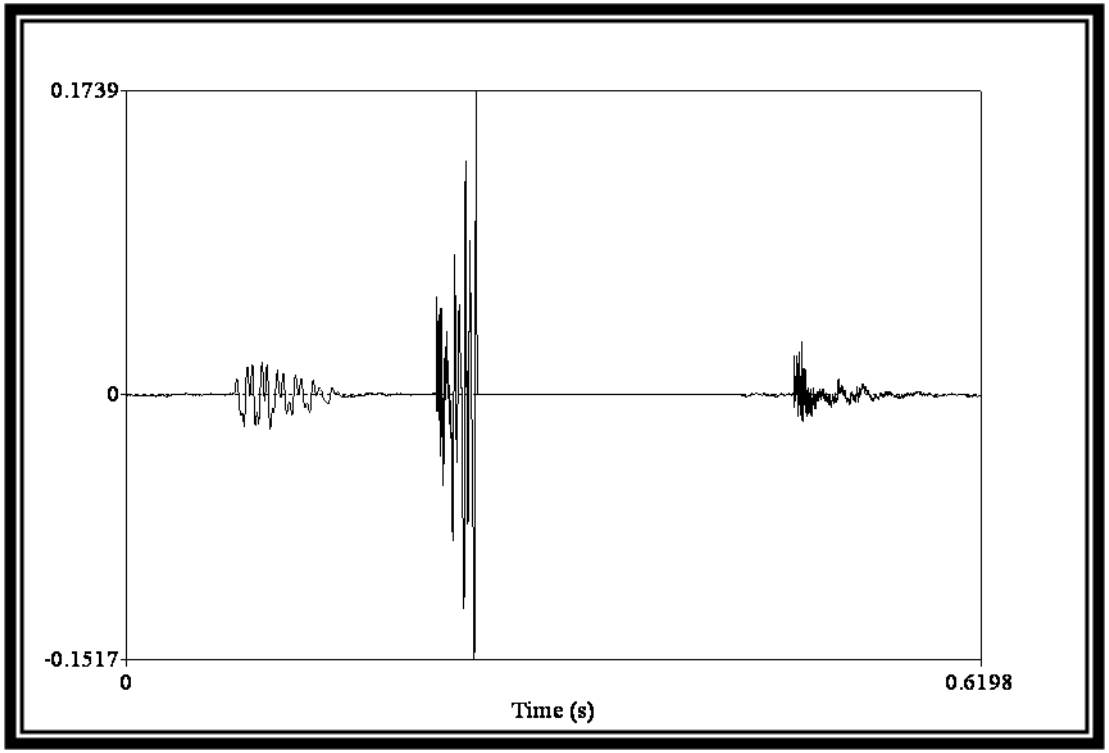
Recordings

- figure 1. /dɪd/ – silent-centre condition



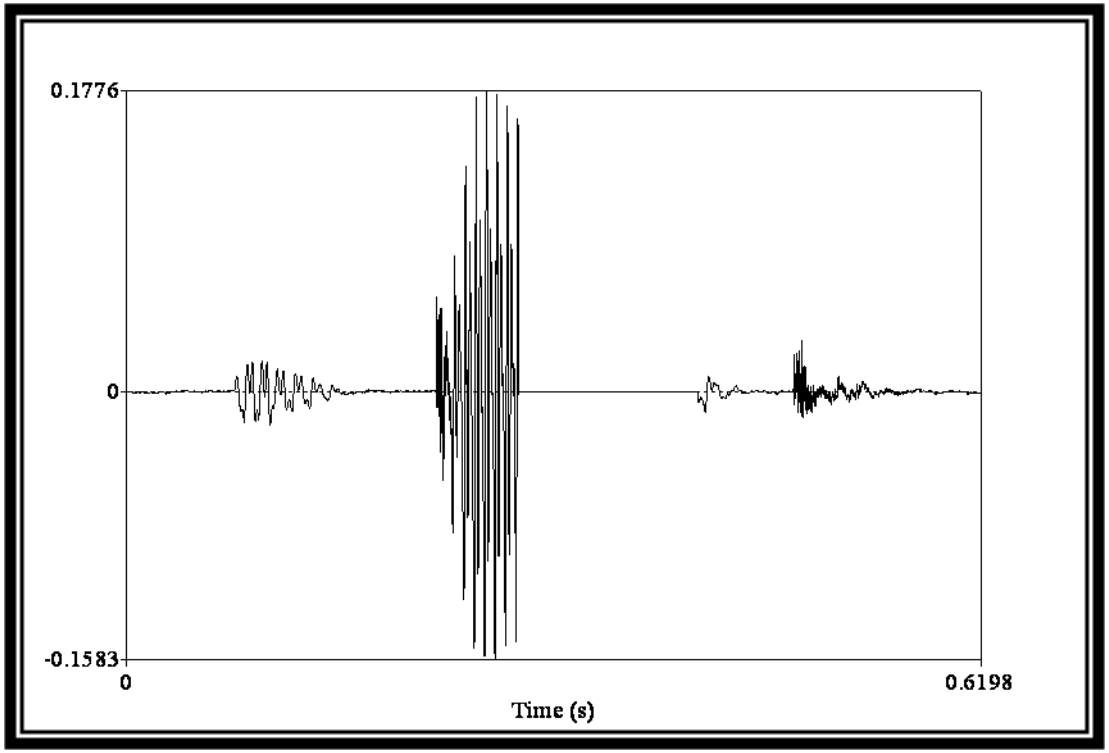
Recordings

- figure 2. /dɪd/ – initial one pitch period condition



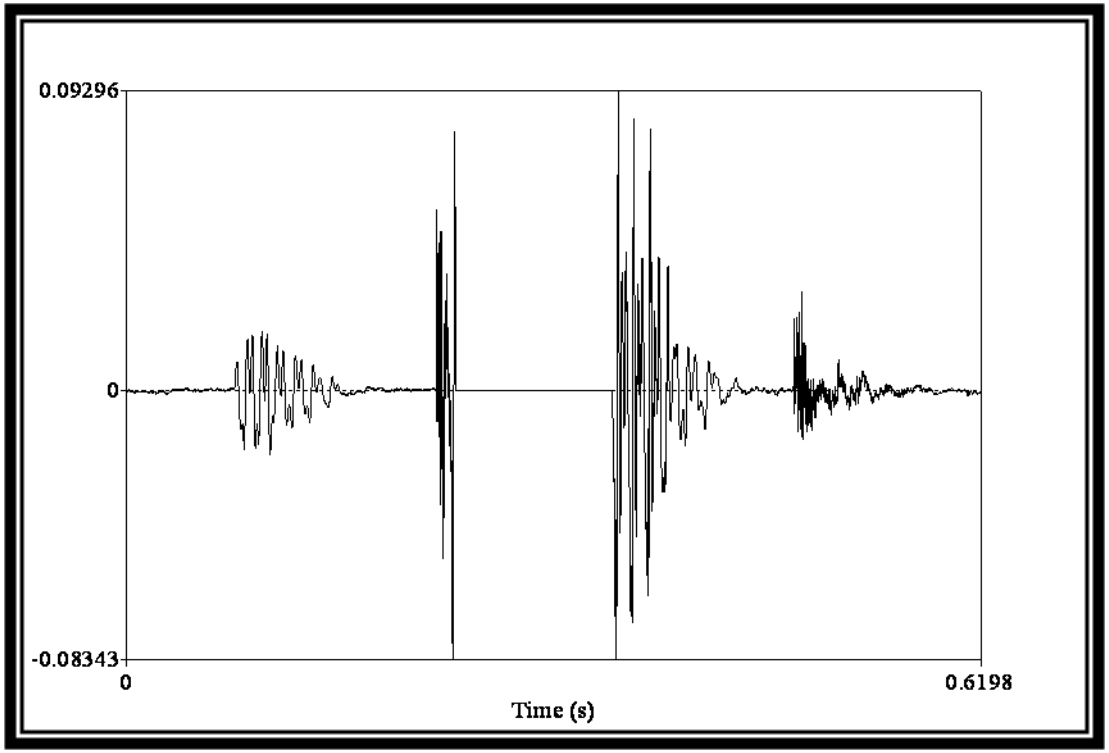
Recordings

- figure 3. /dɪd/ – initial five pitch period condition



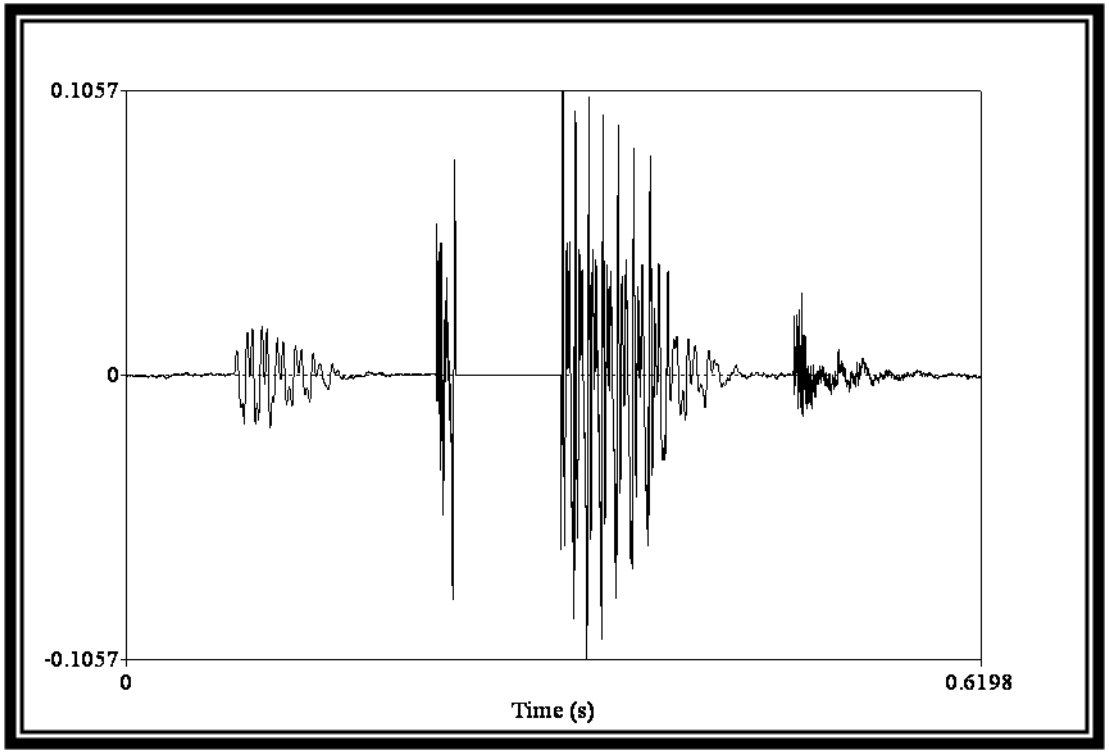
Recordings

- figure 4. /dɪd/ – final four pitch period condition



Recordings

- figure 5. /dɪd/ – final eight pitch period condition



Recordings

- 96 wave files
  - 50 English (10 vowels x 5 conditions)
  - 30 Polish (6 vowels x 5 conditions)
  - 16 (10 English + 6 Polish) unmodified recordings used in the task familiarization procedure

Answer sheet A – English

	/ɪ/	/iː/	/e/	/eə/	/ʌ/	/ɑː/	/ɒ/	/ɔː/	/ʊ/	/uː/
1	if	eek	heck	hair	up	ah	hot	horde	hook	ooze
2	if	eek	heck	hair	up	ah	hot	horde	hook	ooze
3	if	eek	heck	hair	up	ah	hot	horde	hook	ooze
4	if	eek	heck	hair	up	ah	hot	horde	hook	ooze
5	if	eek	heck	hair	up	ah	hot	horde	hook	ooze

- originally this answer sheet was full-page and consisted of 50 entries

Answer sheet B – Polish

	/i/	/ɛ/	/a/	/ɔ/	/u/	/ɨ/
1	ich	hej	hak	och	huk	hyc
2	ich	hej	hak	och	huk	hyc
3	ich	hej	hak	och	huk	hyc
4	ich	hej	hak	och	huk	hyc
5	ich	hej	hak	och	huk	hyc

- originally this answer sheet was full-page and consisted of 30 entries

Results – English vowels

Condition	Polish learners of English (advanced)	Polish learners of English (intermediate)	Jenkins and Strange (1999)
SC	**80%**	**48%**	**92.7%**
I-1PP	18%	8%	38.3%
I-5PP	44%	40%	70.2%
F-4PP	28%	28%	44.3%
F-8PP	50%	48%	54.3%

Results – Polish vowels

Condition	Polish learners of English (advanced)	Polish learners of English (intermediate)
SC	100%	100%
I-1PP	92%	90%
I-5PP	96%	94%
F-4PP	100%	100%
F-8PP	100%	100%

Discussion

- simple L1 vowel system versus complex L2 vowel system
- dynamic specification acquisition
- simple vowel system means simple vowel identification