



# Vowel perception and production in Turkish children acquiring L2 German

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SECOND LANGUAGE  
PSYCHO LINGUISTICS

## Our goal

is to gain better understanding of the **development of phonetic categories in children** who learn a second language (L2) very early in life (successively)

## Previous studies

**Influence of L1 categories is said to be less strong in early learners as compared to late learners:**

Less foreign accent, better production, better perception (1, 2); they are just like monolinguals (8) in some tasks. The influence of L1 might be more variable in early learners (3, 4) because in children, phonetic categories are still in formation (9).

**But it is sometimes still strong enough to make them different from monolinguals:**

Early and intensive exposure to a second language is not enough to build native-like phonemic categories (5), to perform like monolinguals in discrimination (3,4,6,7) or production (1).

**Incomplete picture: early bilingual children?**

- Very little is known about the development of categories in children who learn an L2 early (we know only the „end-state“ as adult early learners)
- If early bilinguals are different from (or just like?) monolinguals and from late bilinguals, when does it start to be so?

## Participants & background

### 2 groups of 10-year-old children

- German monolinguals (N=14)
- Turkish bilinguals acquiring German (N=14)

Early successive bilinguals exposed to L2 since Kindergarten (age 3). Schooled in a bilingual elementary school, speak only Turkish at home

### German and Turkish vowels

German differentiates between long tense vowels and short lax vowels – Turkish does not.

Turkish [i], [e] and [a] acoustically closer to the German lax vowels but do not have a tense counterpart - the duration feature is rare/absent

German vowels	categorized as	Turkish vowel
[i: I e:]	--->	[i]
[E]	--->	[e]
[a: a]	--->	[a]

Table 1: categorization data from Turkish adult monolinguals with no knowledge of German (8)

## 1. Perception

### Method

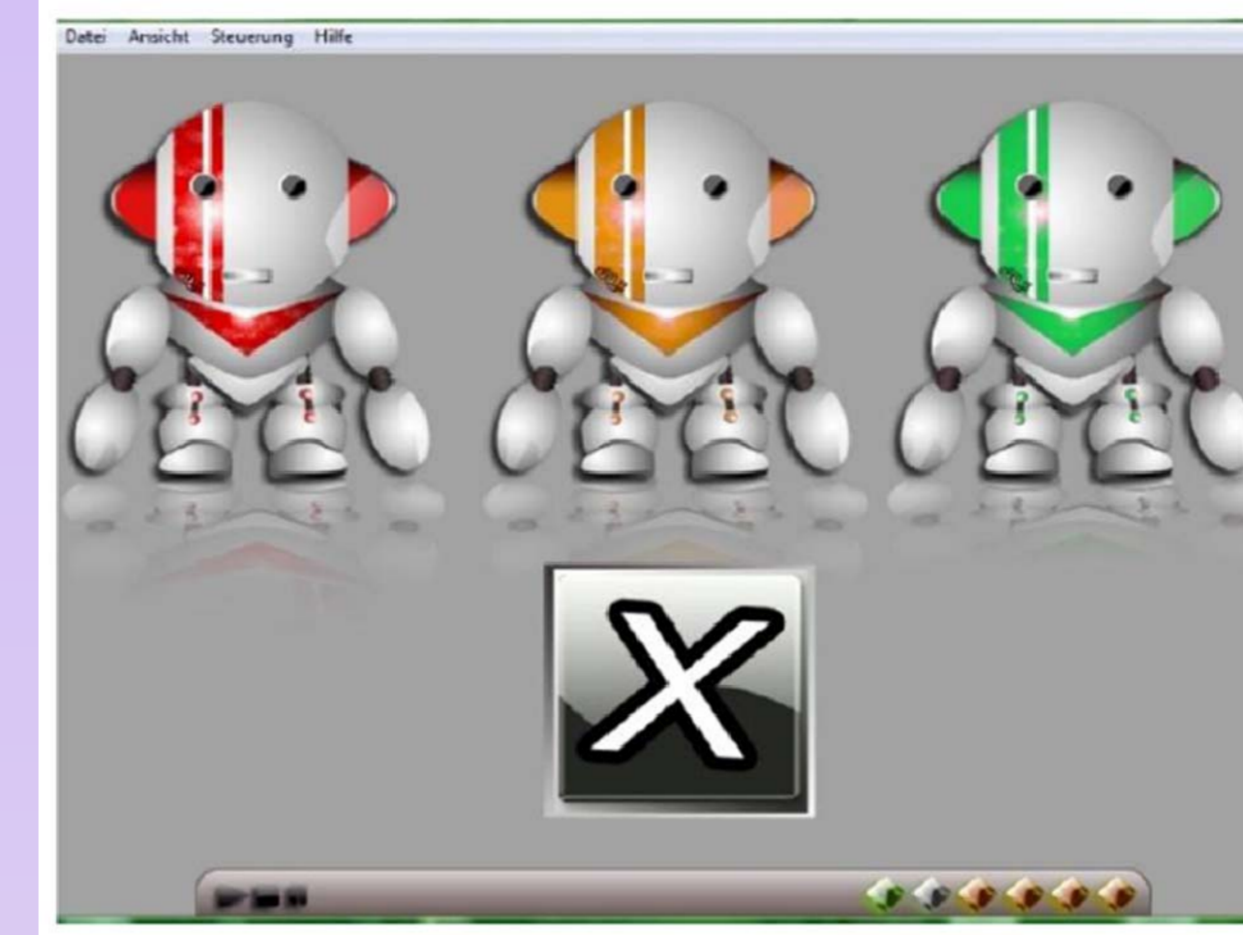
- oddball auditory categorization
- nonwords presented in triads (48 „same“, 48 „change“)

### Stimuli

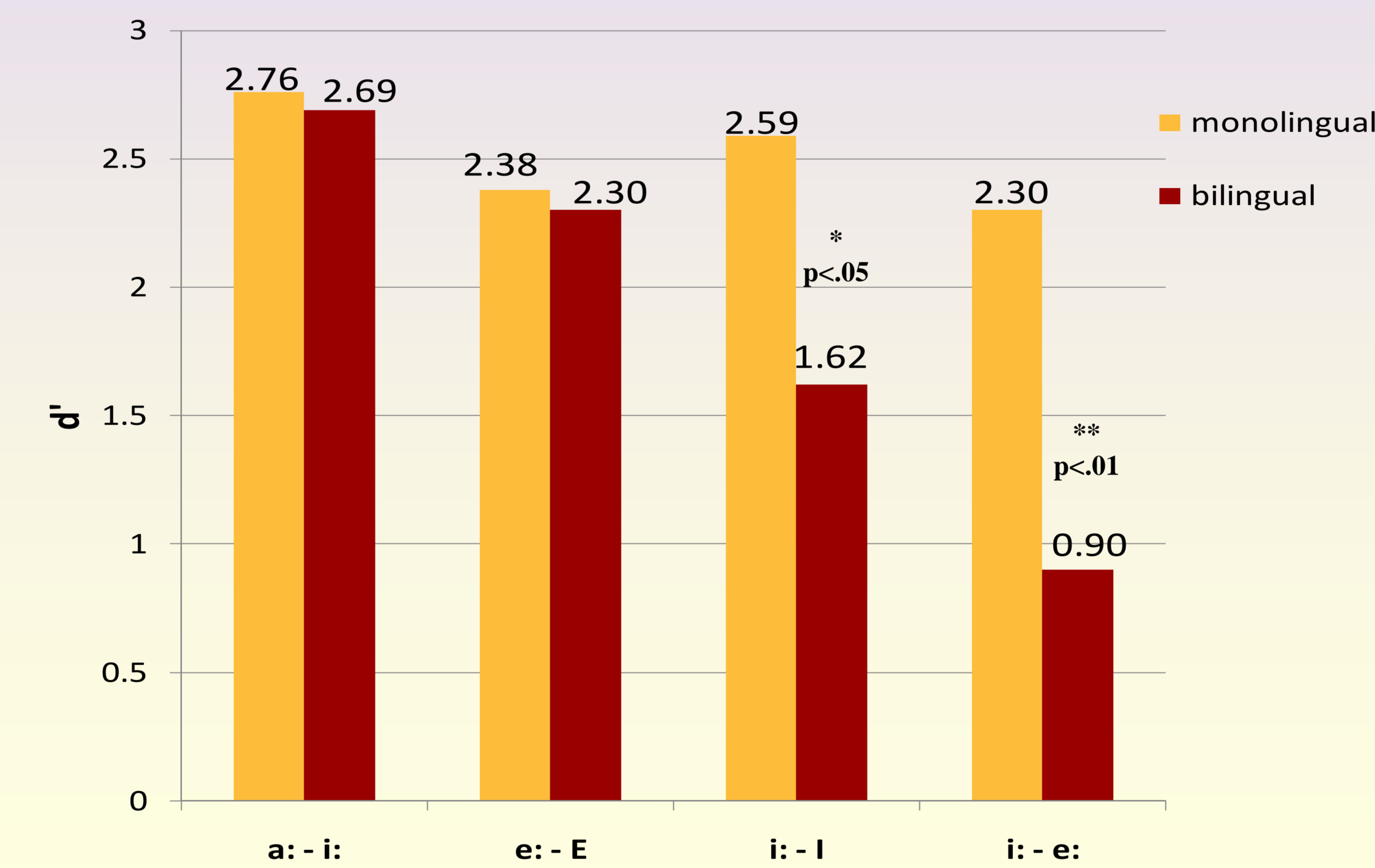
- four contrasts
- Control: [a:]~[i:] Test: [e:]~[E], [i:]~[I] and [e:]~[i:]
- recorded from 3 different speakers
- all contrasts embedded in non-word syllables (k\_k, p\_p)

### Analysis

- d' sensitivity and Mann-Whitney U-test



## Results



### Context effects : Sensitivity to the contrast differs

pVp low d' for both [i: - I] and [i: - e:]  
kVv low d' for [i: - e:] only

## 2. Production

### Method

- picture naming task („memory“ game)
- subjects asked to name every picture they turn around (no time pressure)

### Stimuli

- three common German near-minimal pairs for each vowel contrast [i:-I], [e:-E] and [a:-a] (real words)

### Analysis

- acoustic measurements (spectral and duration)
- N=1008; Bark difference: F0-F1 / F2-F1; t-tests



## Results

### Duration data

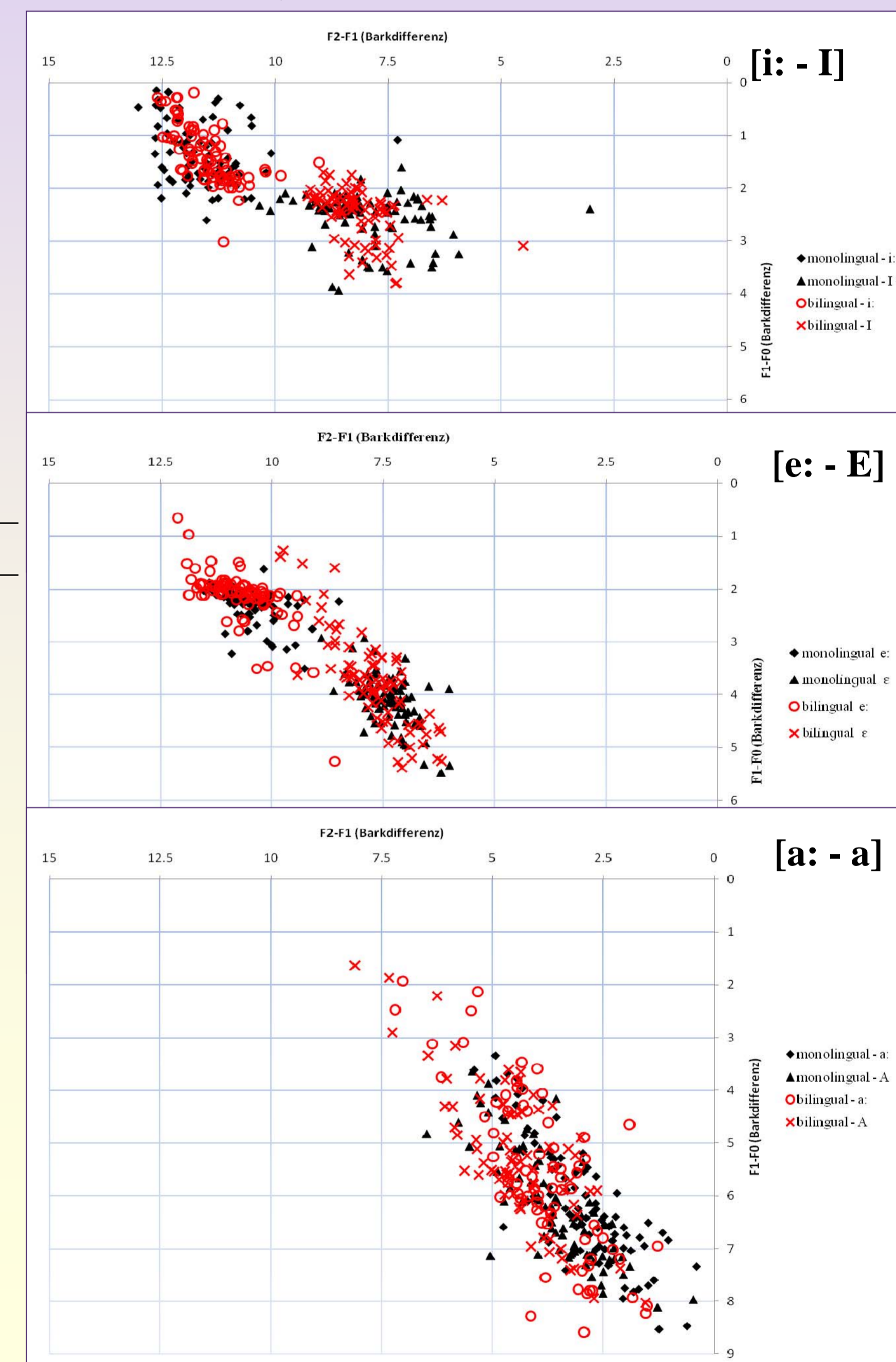
Significant differences for all vowel pairs  
Bilinguals's ratio shorter (p<.05)

Ratios	[E-e:]	[I-i:]	[A-a:]
bilingual	1: 1.68	1: 1.48	1: 1.97
monolingual	1: 1.74	1: 1.50	1: 2.16

### Spectral data

No significant effects of group, but in bilinguals:

- [e:] is slightly higher (p<.006)
- [a:] is more front but not higher (p<.001; p=.2)
- [a] is more front, and higher (p<.005; p<.003)



## Summary and Discussion

**Perception:** category “merger” despite early exposure (< age 3). Very similar to late adult learners, supports previous studies that show a strong influence of L1 even at an early age (3, 4).

**Production:** adequate acquisition of German-specific articulatory patterns (tense-lax; duration), but not exactly “native-like” (subtle differences in the context-separated analysis suggest that L2 learners lack the flexibility to adapt to coarticulatory influences).

Perception difficulties not reflected in production; Do not seem to impede the establishment of lexical contrast.

### Open questions:

- Are children early learners different from adult early learners?
- Will categories be refined and stabilized with prolonged exposure?

## SELECTED REFERENCES

[1] Baker, & Trofimovich (2005) [2] Flege, Yeni-Komshian, & Liu (1999) [3] Pallier, Bosch, & Sebastián-Gallés (1997) [4] Højen & Flege (2006) [5] Bosch et al. (2000) [6] Sebastián-Gallés & Soto-Faraco (1999) [7] Navarra et al. (2005) [8] Oturan (2002) [9] Flege (1992)

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