



LUND  
UNIVERSITY

# Native language sounds in new, foreign words boost grammar processing: ERP evidence of transfer in initial acquisition

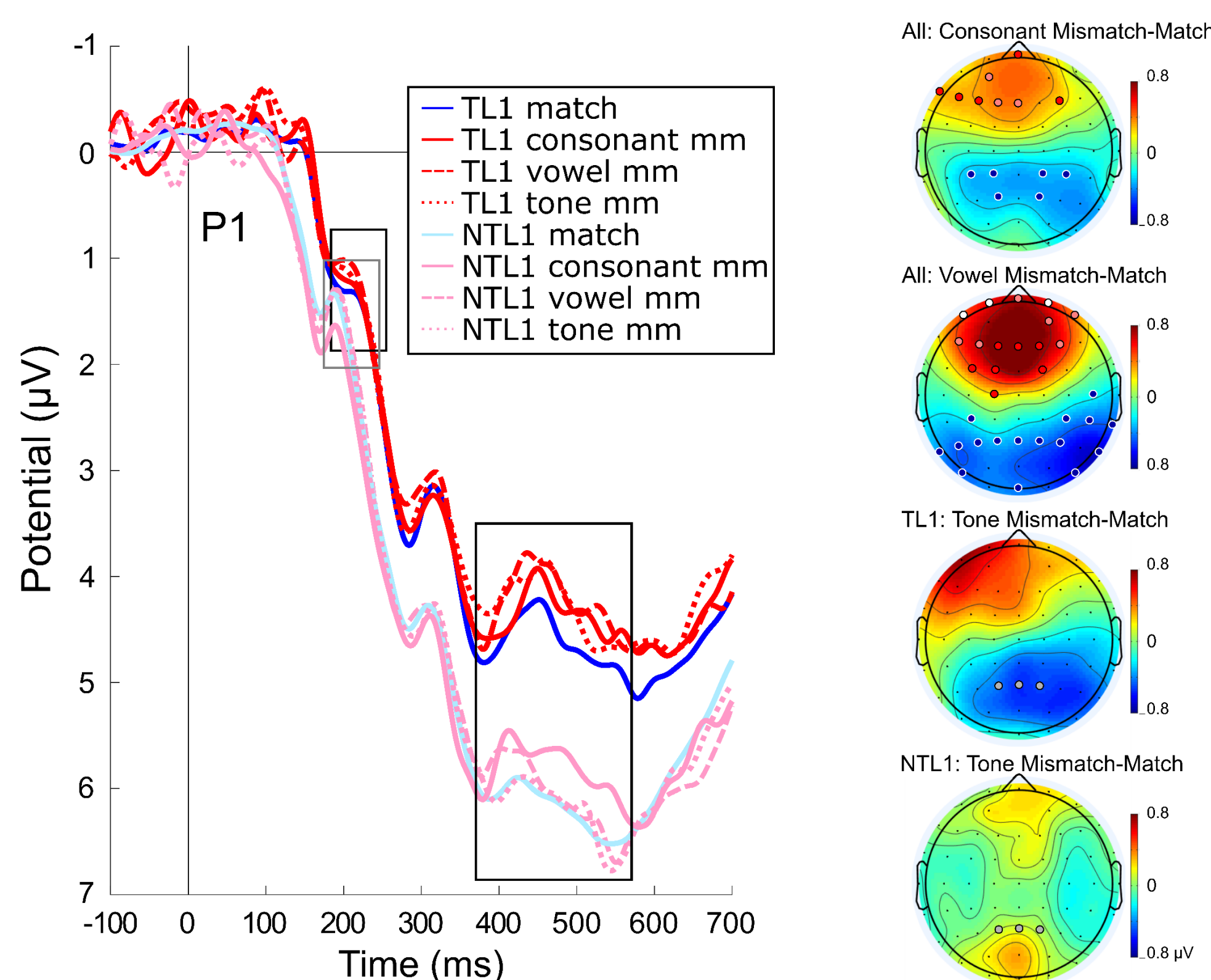
Sabine Gosselke Berthelsen<sup>1a</sup>, Merle Horne<sup>1</sup>, Yury Shtyrov<sup>2,3</sup>, Mikael Roll<sup>1</sup>

## Introduction

- initial SLA\* → fast processing of novel words and grammar  
→ dependent on **transfer** (\*2nd language acquisition)
- does transfer (here: native vs. non-native phonology) facilitate the processing of **grammar errors** while language rules are forming?

## Methods

- spoken word-picture association learning
  - tones and vowels: morphosyntactic content (gender & number)
  - consonants: lexicosemantic content (profession)
- 23 learners with tonal L1\*\* (Swedish), 23 learners with non-tonal L1 (German)
- 2 days of learning (i.e., 2 x 30 repetitions of 24 words)
- occasional word-picture mismatches (~11%) = errors (\*\*native language)



## Analysis

- global gRMS peaks for each group
- t-tests for peaks between groups in case of different latencies
- cluster-based permutations on gRMS-based time windows for each error type vs. non-error trials
  1. both groups together
  2. if no cluster, groups separately

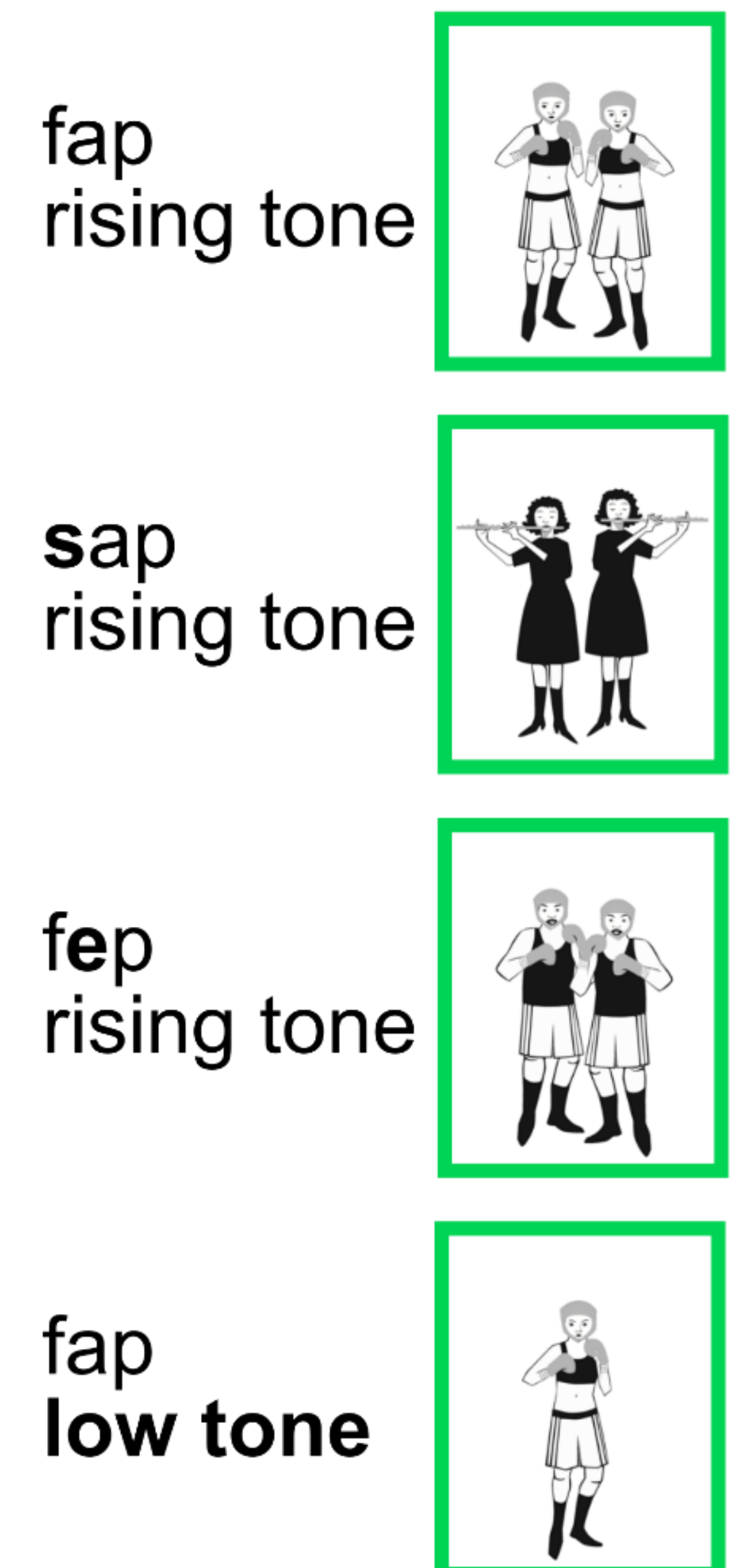
## Results

- two gRMS peaks: ~180 ms & 370 ms
- 180 ms = **posterior N1**: timing differences between groups
  - tonal L1 group: overall delayed posterior N1 response (+10 ms)
- 370 ms = **N400**: amplitude differences within & between groups
  - tonal L1 group: larger N400 for consonant, vowel & tone errors
  - non-tonal L1 group: larger N400 for consonant & vowel errors *NOT* tone
- **negative correlation**: the larger the **N400** for vowel & tone errors, the faster the **response times**
- no grammar-related ERP effects (E/LAN, P600)

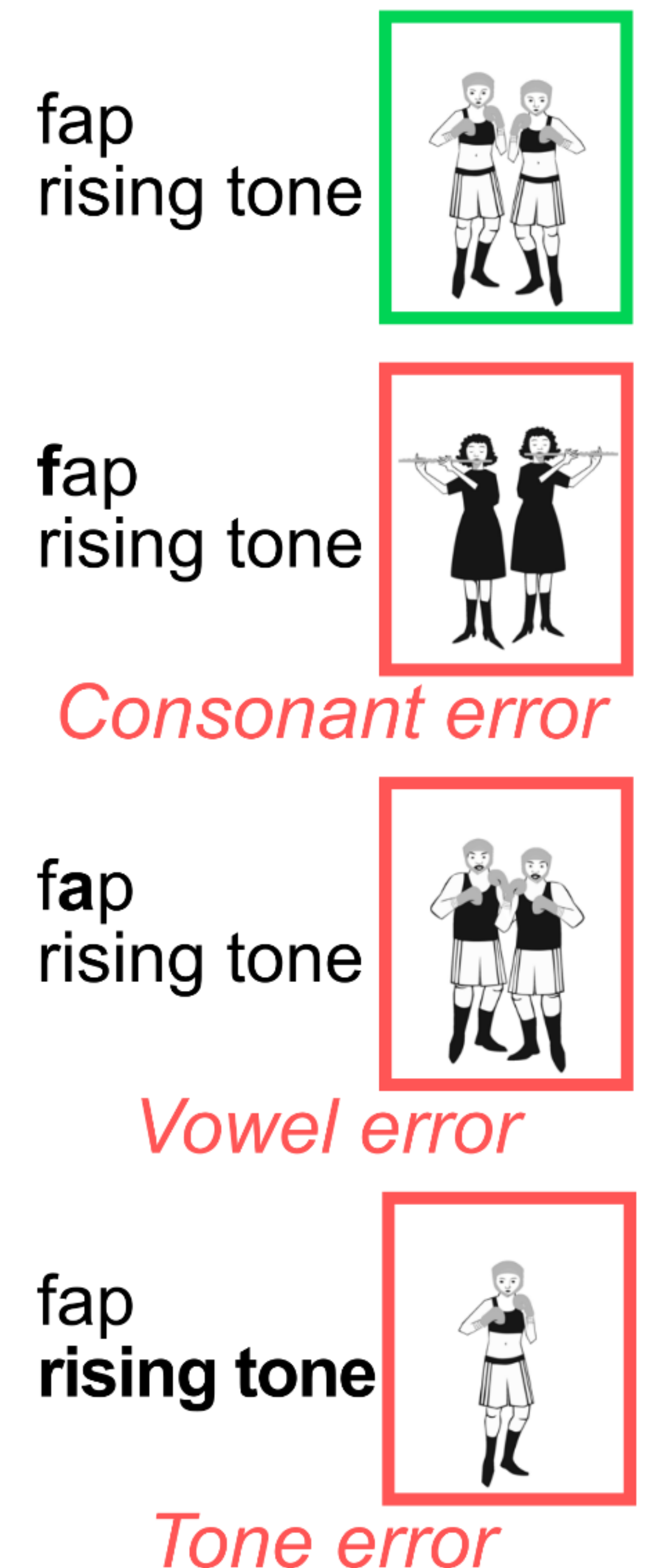
## Conclusion

- N400 – processing of grammar errors facilitated **only** when based on phonological cues present in the learners' native language  
→ better grammar sequence processing for familiar sounds ← **transfer!!**
- N400 rather than E/LAN or P600 because pictures (inherently more semantic)
- N1 - visual processing delayed by attentional demands (3 vs. 2 internalised categories)

## Word-picture pair examples



## Error types



<sup>1</sup> Centre for Languages and Literature, Lund University, Sweden; <sup>a</sup> sabine.gosselke\_berthelsen@ling.lu.se,

<sup>2</sup> Center for Functionally Integrative Neuroscience, Aarhus University, Denmark;

<sup>3</sup> Laboratory of Behavioural Neurodynamics, St. Petersburg State University, Russia