

Design, structure, and preliminary analyses of a speech corpus of Infant Directed Speech (IDS) & Adult Directed Speech (ADS)



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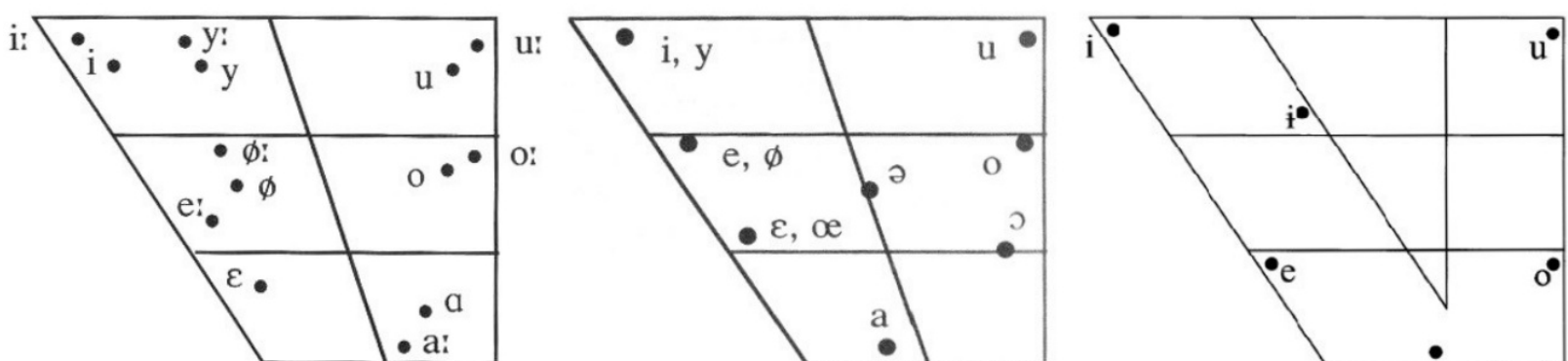
Background

Infant-directed speech (IDS) is reported to differ significantly from **adult-directed speech (ADS)** in its acoustic-phonetic and prosodic properties. In IDS, phonetic features of individual speech sounds tend to be intensified. For example, vowel hyperarticulation was documented for IDS in several languages. Consequently, the formant frequency values (F1, F2) as well as timing and intensity patterns vary in the two speaking registers. Other modifications can be observed in pitch levels. Due to infants' preference towards IDS, laboratory-elicited IDS recordings are often used as stimuli for the needs of infant speech perception studies, aiming e.g., at the investigation of the effects of short-term exposure to foreign-language stimuli in early infancy and their role in the development of language learning skills. The latter often involves using speech samples from languages differing in phoneme inventories from the infant's native language. In this paper, we present a corpus of IDS and ADS for the needs of phonemic training in infants. We also discuss the results of preliminary analyses by means of perception-based and phonetic-acoustic experiments.

Laboratory IDS & ADS

Languages & stimuli selection

- The corpus is expected to provide **stimuli for training phonemic hearing in Polish infants**, thus the choice of contrasts is primarily motivated by the presence / absence of specific phonemic contrasts in Polish.
- Illustrations of the IPA as a starting point + native speaker consultants,
- 5 languages, 2-5 speakers per language.



Illustrations of the IPA: Hungarian (Szende, 1999), French (Fougeron, Smith, 1999), Polish (Jassem, 2003).

French	vowel or approximant contrasts, e.g. vowel quality /e/, /e/, /ø/
Hungarian	vowel contrasts, e.g. quantity /u/, /u:/ or /a/, /a:/
Korean	stop contrasts, e.g. /p ^h / vs. /p/ or /k ^h / vs. /k/
Spanish	fricative contrasts, e.g. /θ/ - /s/ - /f/
Chinese	forthcoming: tones?
Polish	parallel material to compare with all above recordings of authentic spontaneous IDS

Recording scenarios

Each recording session consisted of two stages differing by stimuli elicitation manner:

- ADS mode** (stage 1)
- IDS mode** (stage 2)

In each mode speakers produced:

- isolated syllables,
- nonsense-words.

Stimuli presentation

Target sounds for each contrast located in the same preceding & following contexts. In the nonsense-words, targets located in word-initial syllables but preferably not as the word initial sounds. Random order of presentation, 3 repetitions of each stimulus.

IDS mode

Speakers requested to speak in a manner as when addressing an infant.

Priming: a picture of a baby shown instantly before each stimulus.



Photo: Piotr Ciuchta, freemages.com

Mothers' speech

Authentic IDS: home environment

Polish **authentic motherese** produced by 4 mothers in interaction with their babies.

Features:

- babies below 1 year,
- home environment,
- everyday activities,
- min. 1-2 month period for recordings,
- a portable recorder used (Roland R-26).



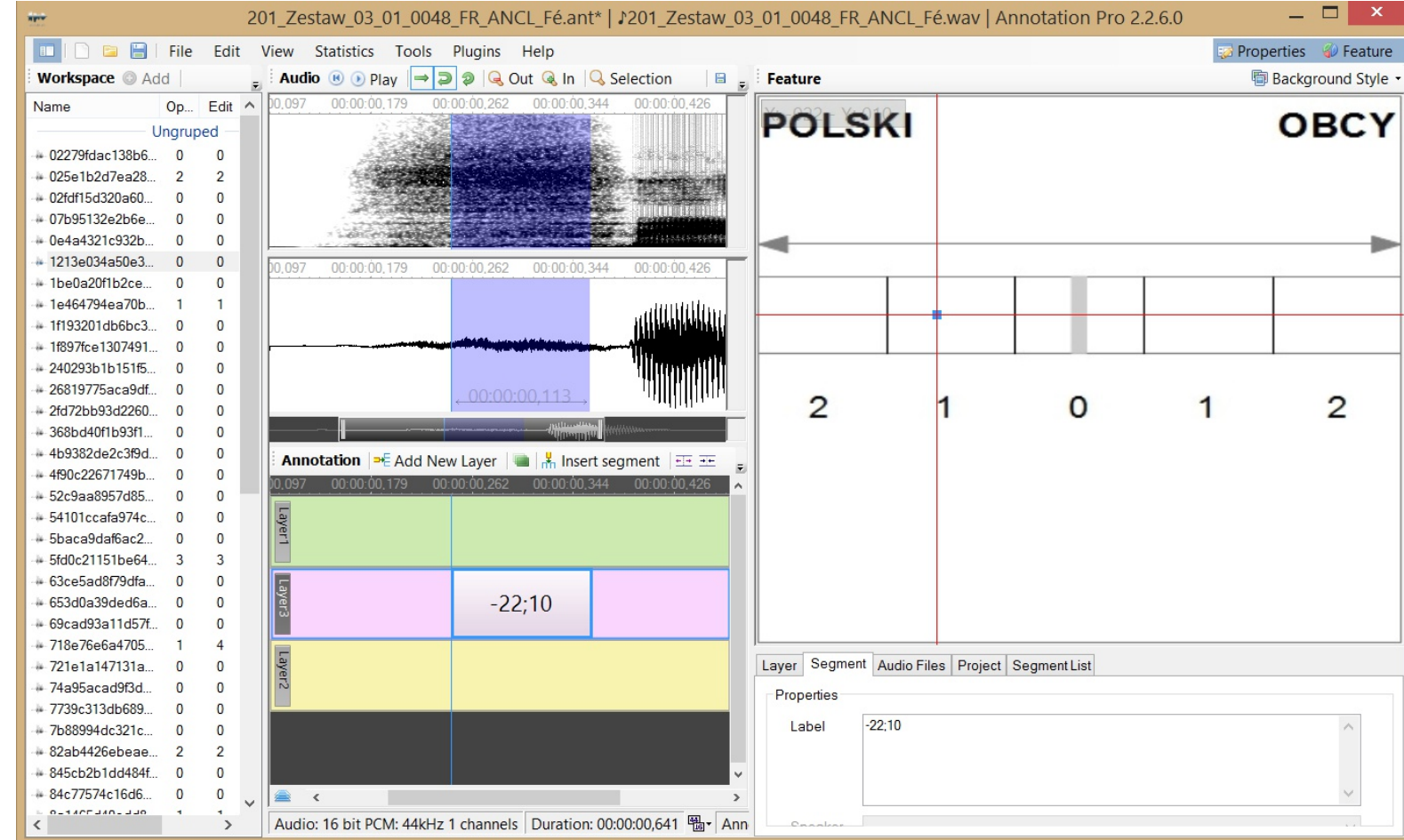
Photo: courtesy of Magdalena Oleksiewicz-Popiel

Controlled speech

After the recordings at home the same mothers have been invited to participate in a recording session (first in ADS then in IDS) including:

- elicited** speech: isolated & nonsense-words,
- read** speech: reading a passage from Trurl's Machines by St. Lem,
- quasi-spontaneous** speech: answers to 2 questions related to typical activities and observations regarding baby care.

Annotation mining & perception tests tool



annotationpro.org

Perception-based experiments

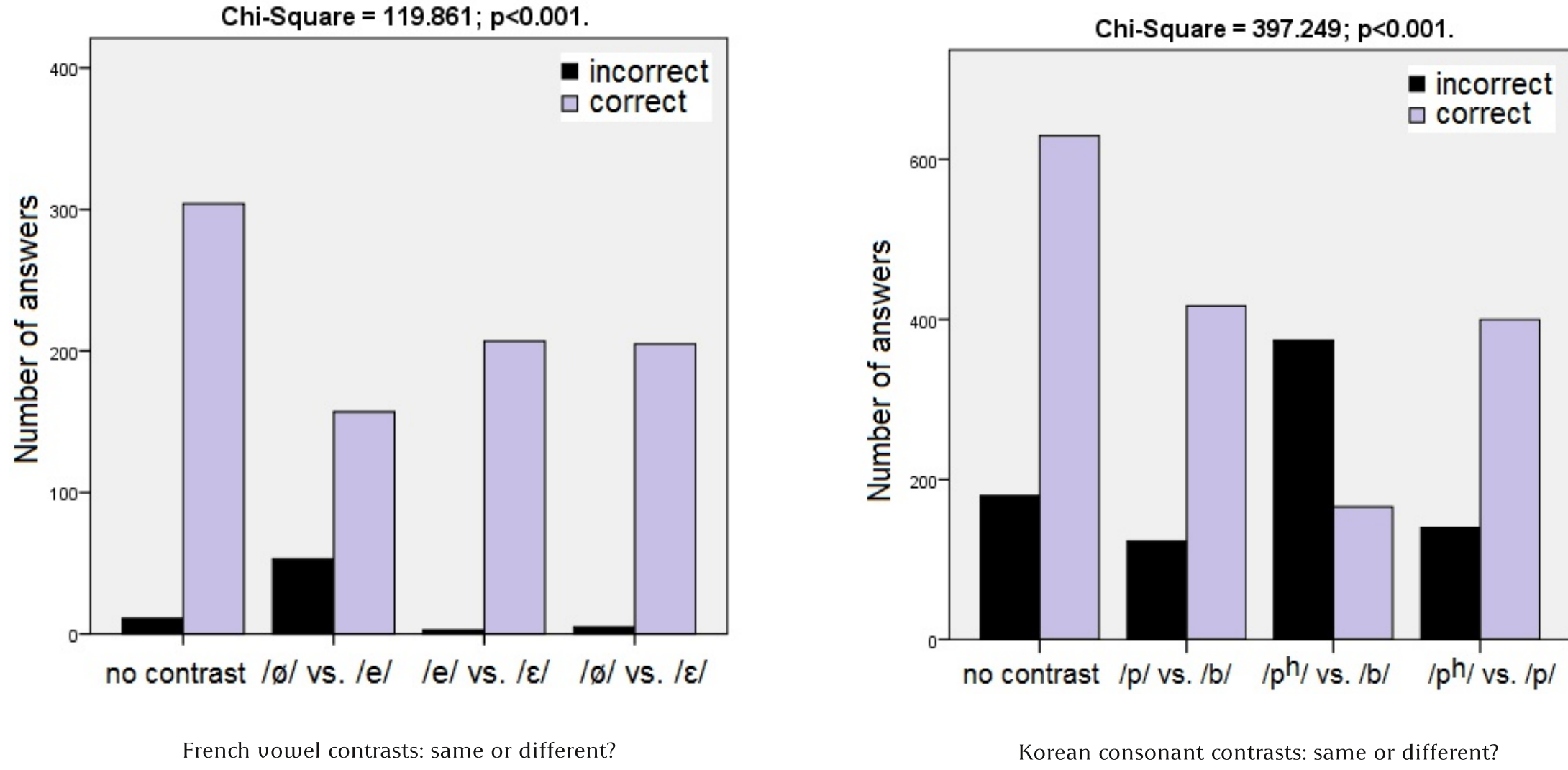
Question: same or different?

Test 1: French

135 pairs of syllables; vowel contrasts /e/, /e/, /ø/. Always preceded by /f/. Only one speaker. 7 Polish native listeners advised to answer immediately after hearing the signal.

Test 2: Korean

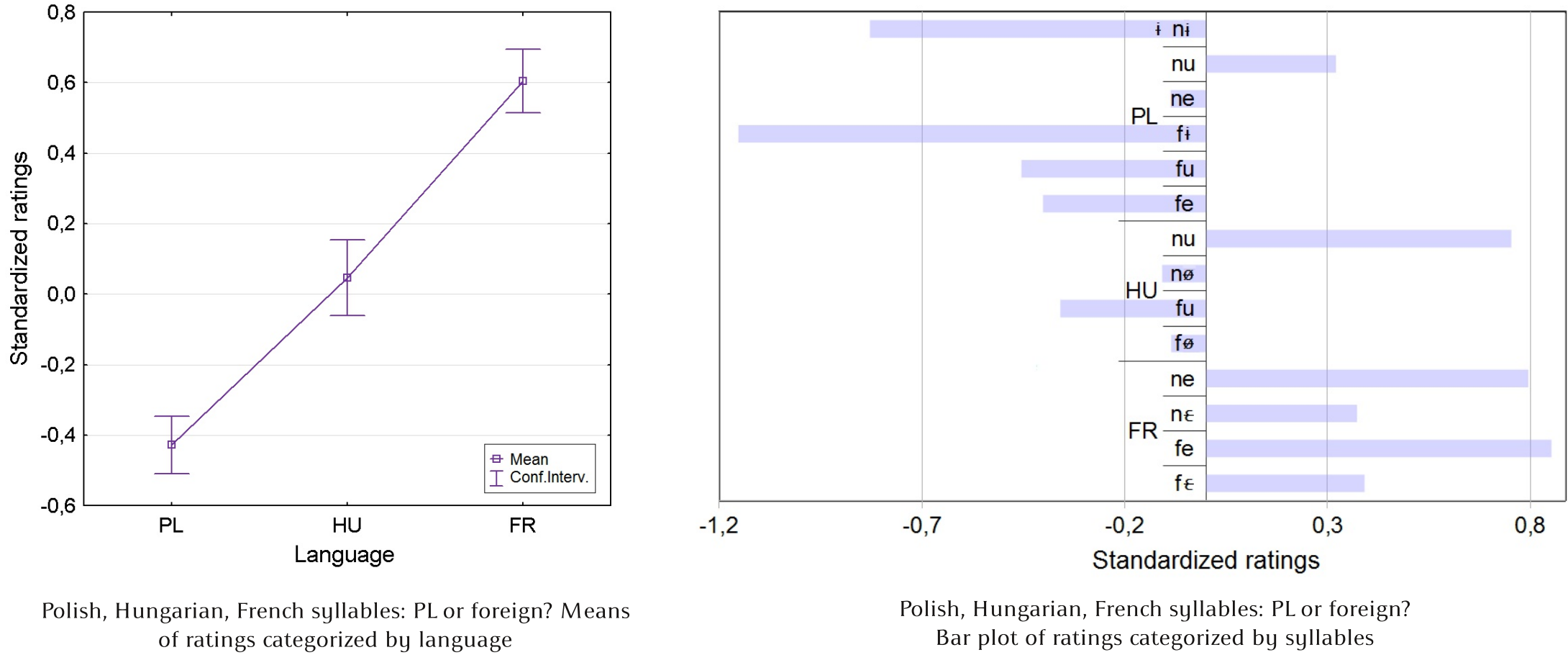
135 pairs of syllables; consonant contrasts /p, b, p^h/ (fortis unaspirated, lenis (un)aspirated, strongly aspirated). Always followed by /a/. Five speakers. 20 Polish native listeners advised to answer immediately.



Question: native or foreign?

Test 3: French, Hungarian, Polish

56 syllables, 2 repetitions, random order. 6 speakers (2 per language) 16 Polish native listeners. Continuous rating scale: Polish-foreign as shown in the Annotation Pro screenshot (right column of the poster). The middle of the scale = lack of any certainty. Listeners could re-play sound signals.



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Software tools used for corpus development: E-Prime (stimuli presentation during the recording sessions and discrimination perception tests), **Sony Sound Forge** (studio recordings), **Annotation Pro** (segmentation, tagging, annotation mining, native vs. foreign perception test, download at: annotationpro.org).