

On the robustness of high variability phonetic training effects

A study on the perception of non-native dutch contrasts by french-speaking learners

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Overall aim

The aim of the study is to examine the **robustness** of phonetic training effects on the perception of non-native speech.

Background

TRAINING NON-NATIVE SPEECH PERCEPTION

Training non-native speech perception

Listening to a non-native language is **difficult**,
esp. for **L2 contrasts** which **do not occur in the L1**.



Productive research line on the impact of **phonetic training**.
Generally: positive results



Frequently used framework:
High Variability Phonetic Training

- See Williams and Escudero 2014 for an overview.
- See Lee et al. 2015 and Sakai and Moorman 2018 for overviews
- See Thomson 2018 for an overview

High Variability Phonetic Training (HVPT)

- Developed by **Logan, Lively & Pisoni (1991)**

- TRAINING:

- Exposure to auditory stimuli
 - **Multiple talkers**
 - **Multiple contexts**

Auditory exposure can be combined with:

- **metalinguistic information**
 - **articulatory-based instruction**

- IDEA BEHIND HVPT: Variability in the realization of a particular phoneme will help the learner to **build a more robust phonological category**.

Robustness of training effects

- Most studies using HVPT report positive effects (see Thomson, 2018).

BUT: How robust are these effects?

- **Dimensions of robustness**
 - 1) **Generalizability** of training effects to novel tokens and novel talkers
 - 2) **Retention** : duration of the impact of training
 - 3) **Effect of training in non-optimal listening conditions** (e.g. background noise)

Generalizability and long-term benefits of training

Results from previous studies:

HVPT can lead to changes in listeners' perception, which can be **generalized** to novel tokens and talkers and which are **long-lasting**.

Examples:

- **Bradlow et al. (1997):** **gains** in identification of L2 English /r/-/l/ by L1 Japanese listeners in the post-test and **generalization test**.
- **Pisoni, Lively & Logan (1994):** **gains** in identification of L2 English /r/-/l/ by L1 Japanese listeners in the post-test and a decrease of only 2% in **delayed posttest after three months**.
- **Rato (2014):** **gains** in identification of L2 English vowels by L1 European Portuguese listeners in the post-test and **generalization test** as well as **delayed posttest after two months**.

Perception in non-optimal conditions

Results from previous studies:

Non-native listeners have difficulty with speech recognition when **noise** has been added to the signal (see the special issue edited by **Garcia-Lecumberri, Cook and Cutler 2010**).

- **Lengeris & Nicolaidis (2015):**

- Training L1 Greek listeners on L2 English consonants
- Stimuli presented in quiet or in noise during pretest and posttest
- Results:
 - **Training effect in noise and in quiet.**
 - Performance was **lower** in noise than in quiet.

Moderating variables in instruction

Language learning difficulty

= a series of **moderating variables influencing the effectiveness of any instructional treatment**
(Housen & Simoens, 2016)

- **Learner-related difficulty:** instruction will have more impact on some learners than on others.
 - Determined by the language learner's capacities and abilities, related to a.o. age of learning, **motivation** and **learning style**.
- **Feature-related difficulty:** instruction will have more impact for some language features than for others
 - Determined by markedness, frequency in the input, but also by **L1-L2 correspondences**.

The present study

TRAINING FRENCH-SPEAKING LEARNERS ON DUTCH VOWELS

Setting

- Set in **Belgium**
 - French is the official language in Wallonia.
 - Dutch is the official language in Flanders.
- Most Walloons do not speak or hear Dutch on a daily basis.



Dutch is taught as a **foreign language in secondary and tertiary education** in Wallonia.

Research questions

RQ1: How **robust** are HVPT effects on the perception of Dutch contrasts for French-speaking learners of Dutch in Belgium?

- **RQ1a:** Do HVPT training effects extend to **novel stimuli and novel talkers**?
- **RQ1b:** Is there **long-term retention** of HVPT training on perceptual identification?
- **RQ1c:** Do training effects of HVPT in quiet extend to **non-optimal listening conditions**?

RQ2: To what extent is the robustness of HVPT moderated by **learner-related factors** (learner profile)?

RQ3: To what extent is the robustness of HVPT moderated by the **type of language feature**?

Methodology

Participants

48 participants - French speakers, no Dutch as L1, no hearing problems

27 secondary school pupils

- **French-speaking school** in the French-speaking part of Belgium, general education
- 4th, 5th, 6th year of secondary education
- Follow a class of **Dutch language**
- **A2** entry requirement
- **4h** Dutch classes/ week

21 university students

- UCLouvain, **French-speaking university** in the French-speaking part of Belgium
- 1st or 2nd year students
- enrolled in a **Dutch proficiency course**
- **B1** entry requirement
- Compulsory class (Linguistics and Literature) or optional (e.g. in law)
- Minimum of **9h** of Dutch-spoken classes / week,

Participants

A contrasted Dutch learning experience

Secondary pupils

University students

Dialang-level
(listening comprehension)

Between A1 and B1 (C1 for one pupil)

Between B2 and C2

Exposure to Dutch

- 4h Dutch/ week
- A2 entry requirement
- Not frequently extracurricular activities in Dutch

- 9 hours of Dutch / week
- B1 entry requirement
- Watch Dutch films or television more often (at least once a week).

Motivation

Motivation is often low (Mettewie 2015)

Have chosen to study Dutch as a major or minor at university

Materials

Five target contrasts including

- 5 vowels /i/ vs /ɪ/ /ɑ/ vs /a:/ /ə/ vs ø
- 3 consonants /x/ vs /k/ /h/ vs ø

Difficult for French speakers because

- the contrast does not exist /i/ vs /ɪ/ - /ɑ/ vs /a:/ - /x/ vs /k/ *Vis/vies – man/maan – lag/lak*
- no direct counterpart in French /h/ *Hals/ als*
- often not produced in French /ə/ vs ø *hij werkt-hij werkte*

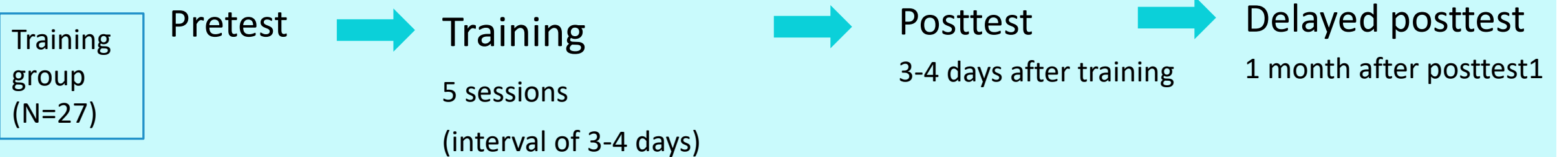
Monosyllabic Dutch minimal pairs for each contrast

- pretest & training: 8 minimal pairs
 - posttest: 4 minimal pairs of the pretest + 4 new minimal pairs
-
- Recorded by 6 native speakers of Dutch, living in Flanders, linguists at the Ghent University (Age: 30-62)
 2 speakers: stimuli online for the posttest
 - Read the list of stimuli in the phrase “I have X gezegd” (“I said X”)

Procedure

General information & selection

Consent form, background questionnaire, dialang (listening comprehension)



Procedure

Pretest

Auditory forced choice identification task

320 stimuli

- Short training phase (/y/ vs /u/)
- Part 1: 160 stim. without noise
- Part 2: 160 stim. with noise (SNR0, SNR8)
- Each target feature 16x, produced by 4 native speakers

Training

Posttest 1

Delayed posttest

Procedure

Pretest

5 Sessions (interval of 3-4 days)

Training

1. Vowels /ɪ/-/i/ & /ɑ/-/a/
2. Consonants /x/-/k/ - /h/- ø
3. /ə/- ø
 Repetition vowels
4. Repetition consonants & repetition /ə/- ø
5. Repetition of all five target contrasts

Posttest 1

Delayed
posttest

Procedure

Pretest

7 parts in each training session

Training

Posttest 1

Delayed posttest

1. **Introduction:**
one minimal pair (auditory input)
2. **Auditory exposure:**
five minimal pairs by different speakers with w
3. **Metalinguistic explanation**
explanation on phonological nature of the Dutch.
4. **Contrastive information:**
comparison with French and brief exp
difficulty of the contrast.
5. **Audiovisual input:**
videos showing the lower part of the fa
(mouth/lip movements)
6. **Articulatory information:**
information on the articulatory setting
7. **HVPT:**
forced-choice identification task with feedl

De consonanten 'g' en 'k' komen ook voor in deze woordparen.
Luister goed naar het verschil.

In deze tweede sessie

De eerste twee
De 'g' komt v
De 'k' komt v

In het Nederlands is dit ve
Vergelijk:

Voor Franstalige
heeft in plaats v
Het Frans heeft

In het woord 'vlak' zie je op he

zacht zakt

Volgende

Klik op de afbeeldingen om de woorden te horen.

Daarom spreken

Procedure

Pretest

Training

Posttest 1

Similar to pretest but with **new stimuli and speakers**

2 speakers used only for the posttests

For each contrast: 4 new minimal pairs of words + 4 minimal pairs of the pretest

Delayed
posttest

Procedure

Pretest

Training

Posttest 1

Delayed
posttest

Similar to posttest 1

Research questions

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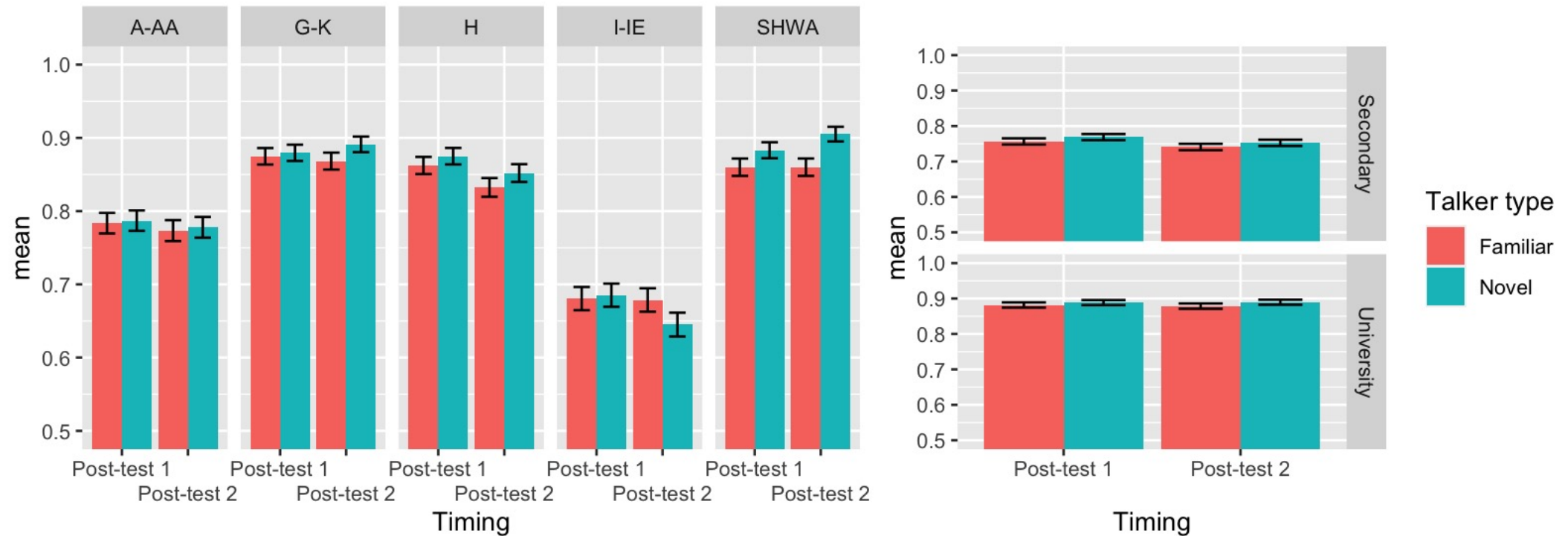
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RQ3: To what extent is the robustness of HVPT moderated by the **type of language feature**?

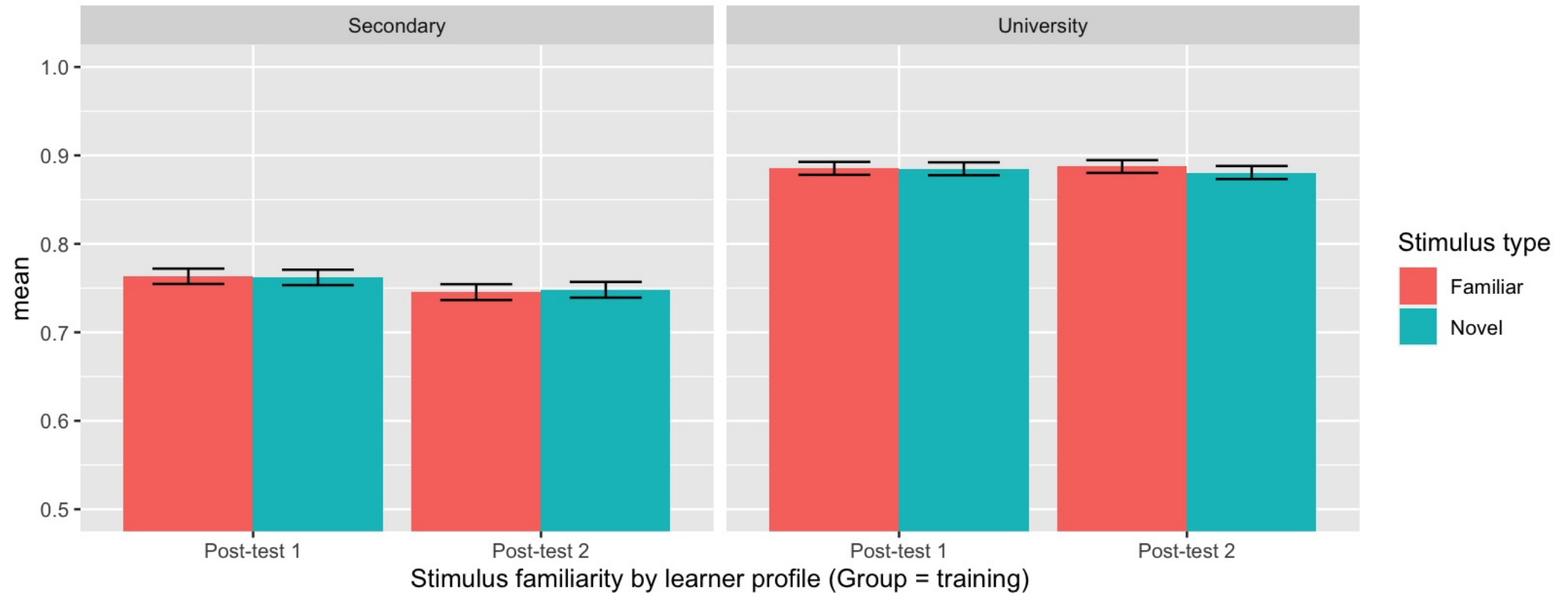
Results

Talker familiarity

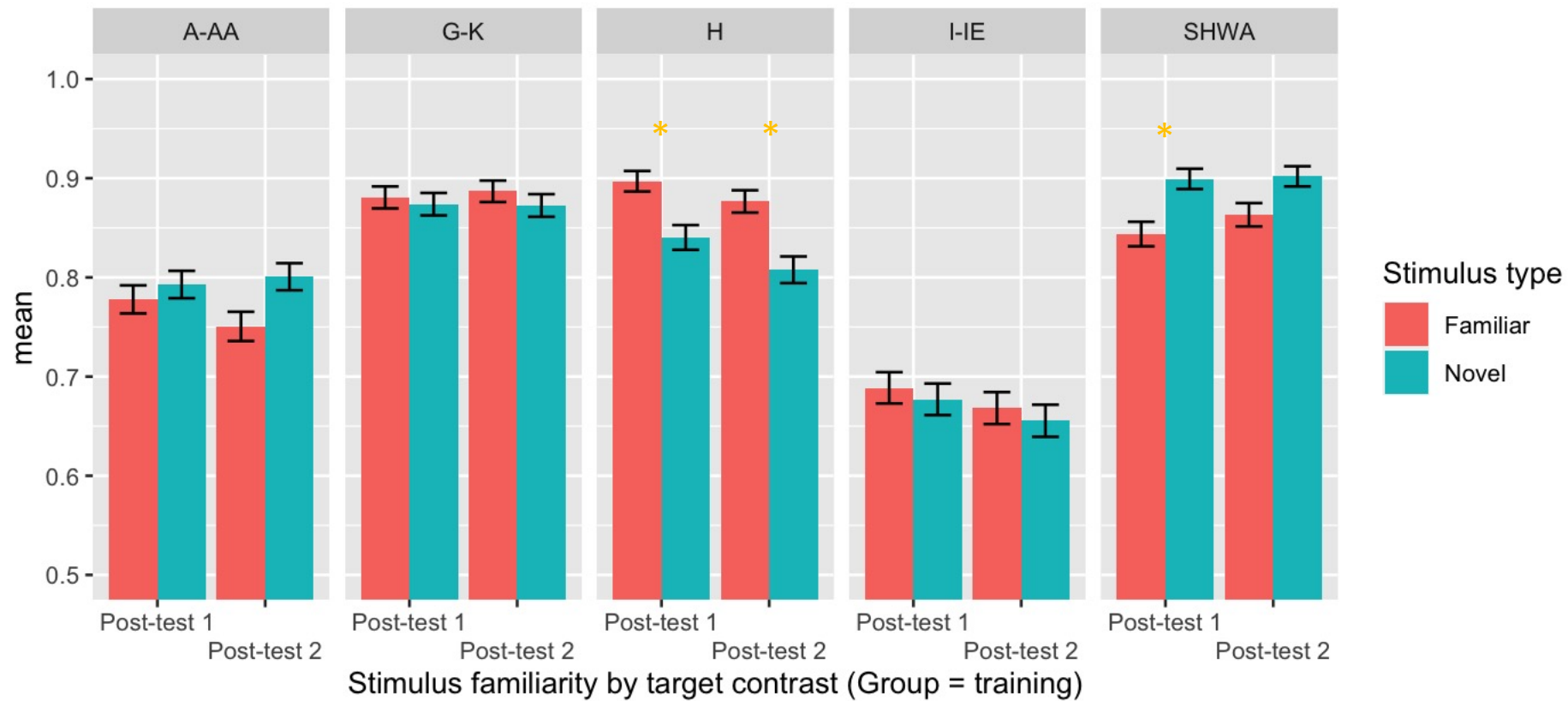
Talker familiarity by target contrast (left) and learner profile (right) (Group = training)



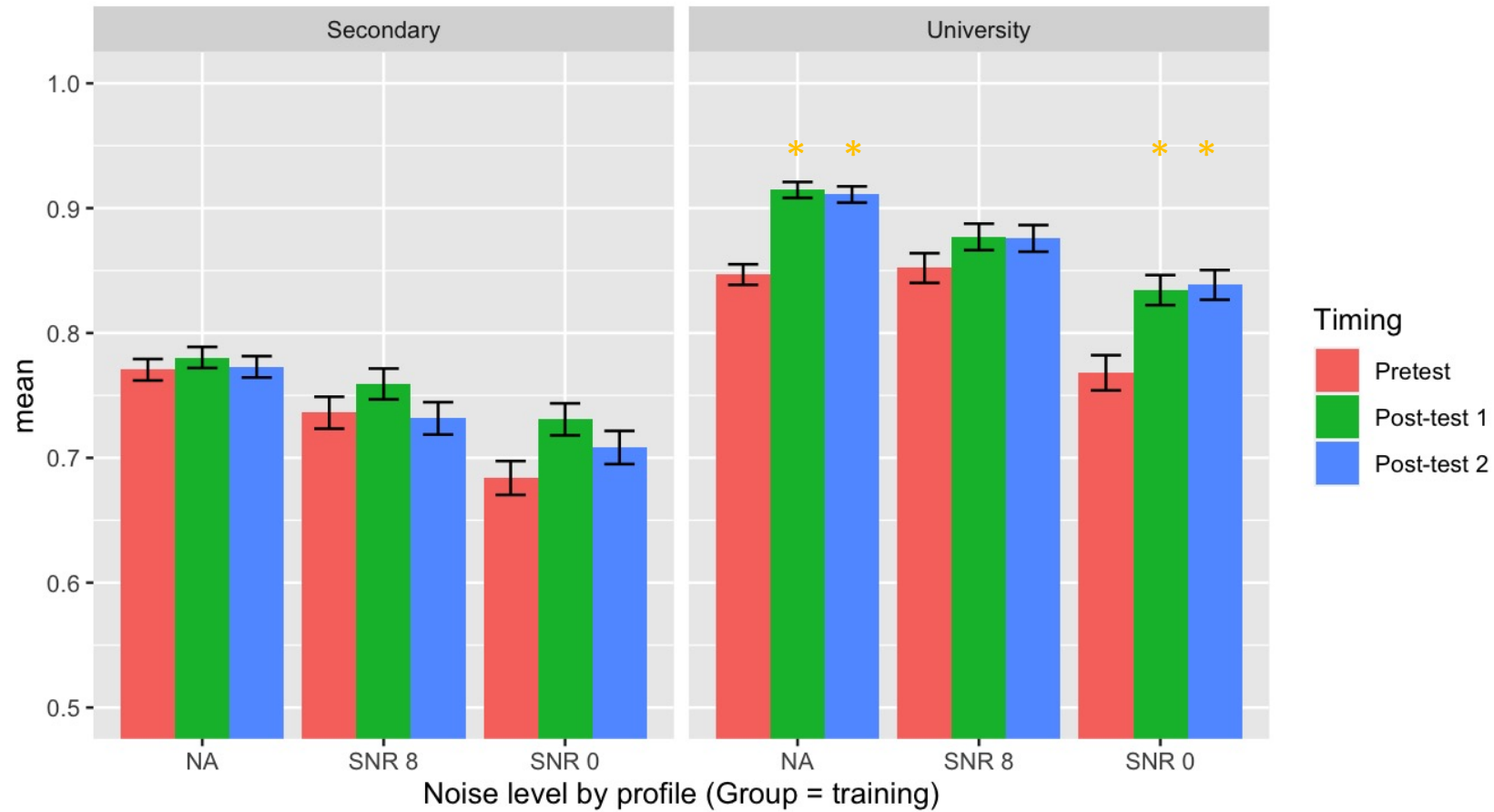
Stimulus familiarity by learner profile



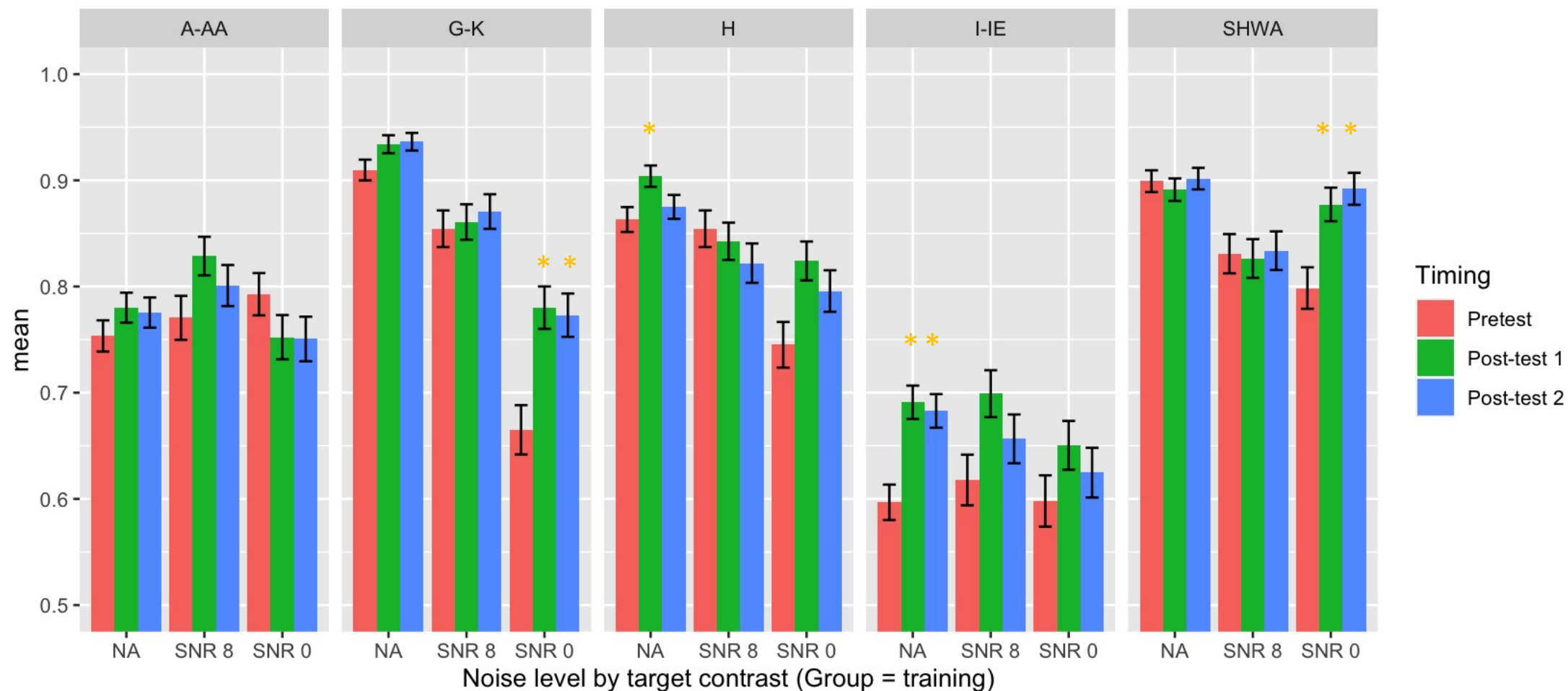
Stimulus familiarity by target contrast



Noise level by profile



Noise level by target contrast



Discussion & conclusion

Main findings

Varied effects of training along measures of robustness

- Few differences between **familiar and novel stimuli/talkers** **RQ1a**
- Significant effects often appear in **both post-tests** **RQ1b**
- Great **variability** in terms of
 - Noise level **RQ1c**
 - Learner profile **RQ2**
 - Target contrast (cf. Rato, 2014) **RQ3**

Overall effects = **limited**

Limitations & suggestions

Data collection in times of **Covid**

- **Less control** over data-collection environment
- **Technical issues**

Target audience, **meta-linguistic knowledge** and **motivation**

- Favouring **university students?** (cf. other HVPT studies)

Conclusion

Nuanced representation of the effects of HVPT

- Three **robustness indicators**
- Two **moderating variables**

Development of **pedagogical resources**

- Research-based and tailored to local educational context

hartelæk bəðankt voor
uw aːndaxt

(THANK YOU FOR YOUR ATTENTION!)

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