

Throughout the lifespan, we acquire knowledge about speakers, their identities and their ideas and that can lead to expectations and stereotypes. Previous research has shown that such expectations can positively or negatively influence language processing. In this talk I examine how such expectations affect speech intelligibility and speech evaluation. I will focus on expectations driven by perceived ethnicity.



# EFFECTS OF TALKER IDENTITY ON SPEECH PROCESSING: A LIFESPAN PERSPECTIVE

Adriana Hanulíková  
University of Freiburg

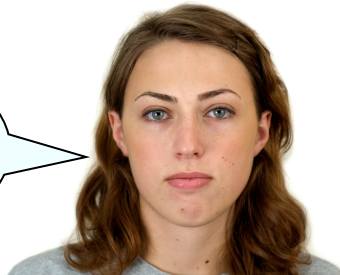
London 30.3.2020

Previous studies report conflicting results. In contrast to non-native speech, when presenting English spoken by a native speaker, intelligibility, comprehension scores, and accent ratings drop for an Asian compared to a White Caucasian/European guise. This paradox is explained in terms of matching expectations: When the expected and observed speech match, intelligibility is enhanced. However, different studies use different measures and one speech context only. Here I compare three contexts and two measures across non-university populations.



## Social attributions & linguistic expectations

Senk you for  
organizing zis  
vorkshop.



Thank you for  
organizing this  
workshop.



e.g. McGowan, 2015; Fiedler, Keller,  
Hanulíková 2019; Hanulíková, in prep.)

e.g. Rubin, 1992; Kang & Rubin, 2009, Babel & Russel,  
2015; Zheng & Samuel, 2017; Hanulíková, 2018)

1. How does perceived ethnicity affect accent ratings and speech intelligibility in different speech contexts?
2. Do talker effects change over the lifespan and across different tasks and speech contexts?

There are two main competing theoretical accounts that make different predictions.



## Theoretical accounts and predictions

- **Expectation/socially indexed exemplar-based accounts:** anticipating a talker's accent can enhance intelligibility
  - Intelligibility of foreign-accented speech, but not regional and native speech, enhanced for Asian relative to white European primes
  - Accent ratings change as a result of varying expectations
- **Bias-based accounts/reverse-linguistic stereotyping:** conscious misunderstanding of the speech signal or decrease in perceptual effort in the case of a speaker classification as nonnative (stereotypical attributions)
  - Intelligibility and accent ratings drop for the Asian compared to the white European primes in all accent conditions

While abundant research exists that deals with declines in speech processing skills, less is known about talker effects across the lifespan.



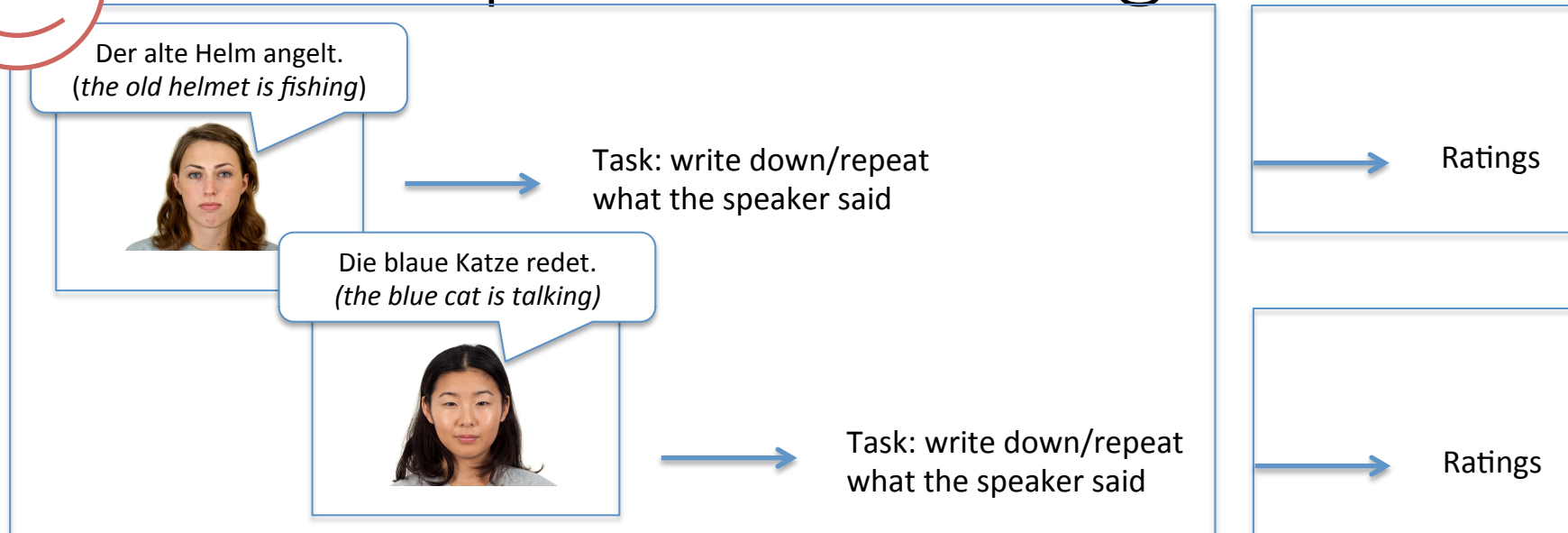
## Talker effects across the lifespan

- Intelligibility of speech declines with age
  - overall drop in performance for elderly
- World knowledge increases with age (e.g., Park et al. 2002)
- Stereotypical inferences increase with age (e.g. Radvansky et al., 2010)
  - more pronounced talker effects on intelligibility and accent ratings with increasing age

Similar design to previous studies: Subjects saw a picture of the speaker and heard a German utterance. They then wrote down/repeated the utterance, ratings were collected at the end.



# Experimental design



**Stimuli:** 36 unpredictable utterances (from Levy et al. 2019) in speech-shaped noise, three speech contexts: standard, regional accent, foreign accent (Korean), and 6 visual primes (from the Chicago Database)

**Participants:** **Teens** → 72, mean age 14.1; range 12-15

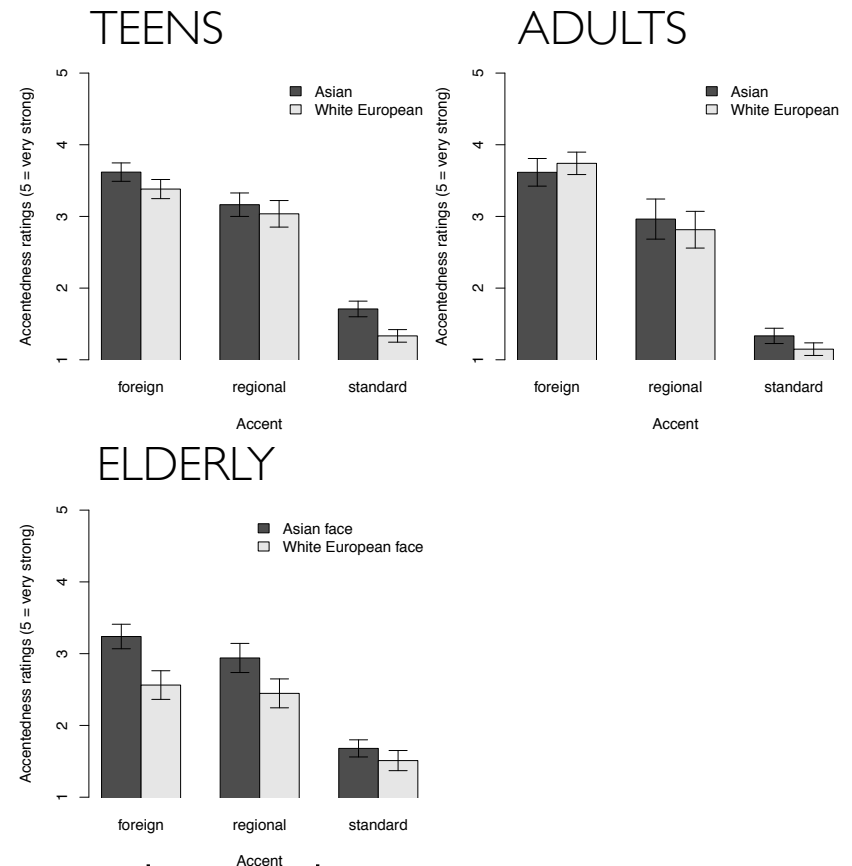
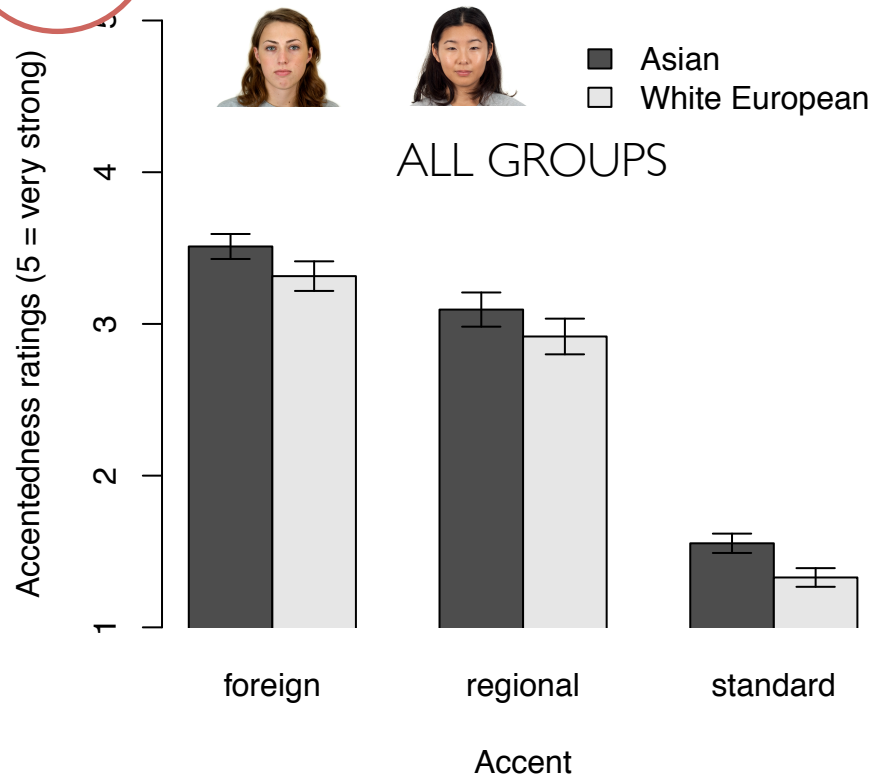
**Adults** → 50, mean age 36; range 30-45

**Elderly** → 50, mean age 77.6; range 70-92

Cumulative link mixed model across all groups: main effect of Face, no effect of Group and no interactions. Within each group: main effect of Face for teens and elderly only.



# Results: accentedness ratings

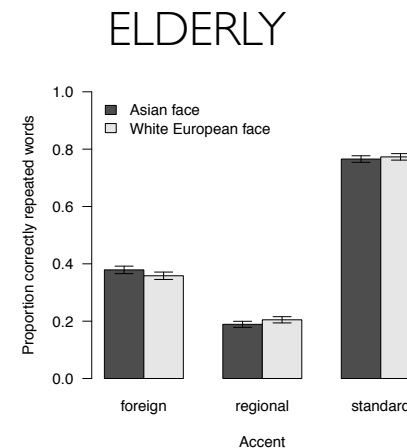
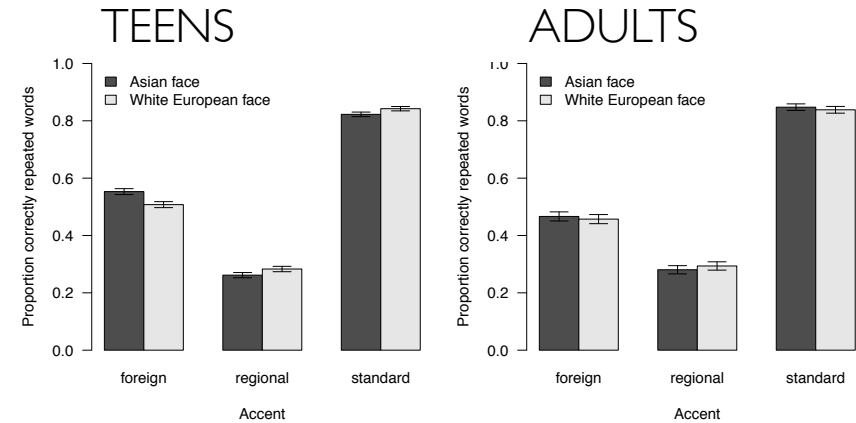
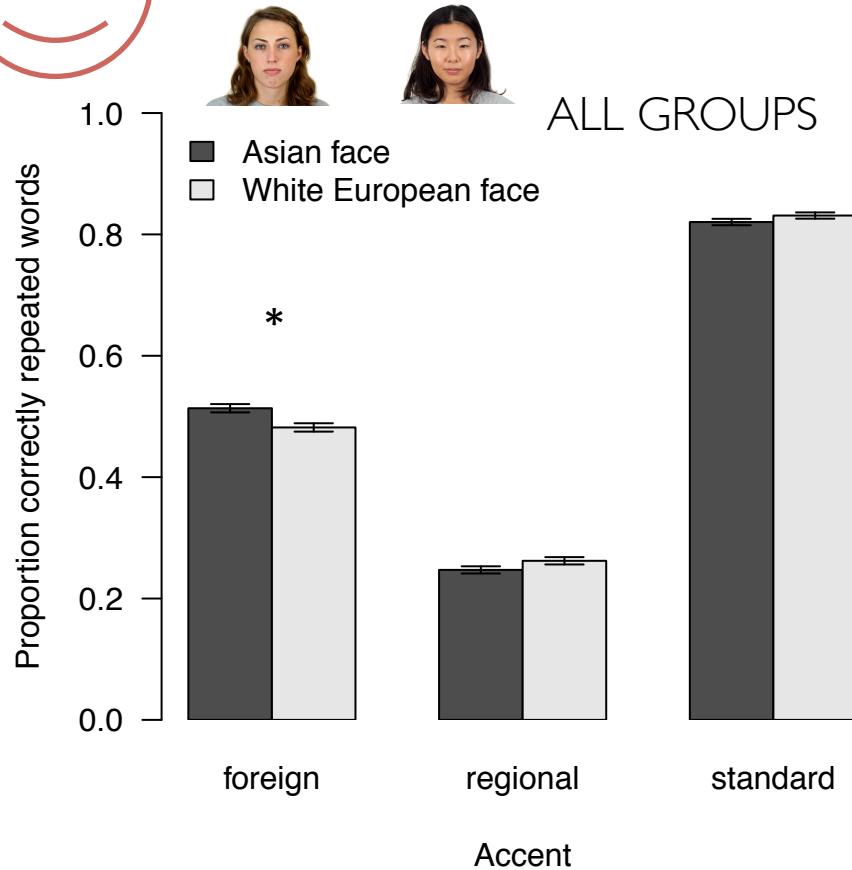


- Stereotypical attributions lead to negative ratings
- Differences in ratings across the lifespan: greater for the elderly

Across all groups: main effect of Group, interactions bw Face and Accent and Accent and group, but no 3-way interaction with Group.



# Results: intelligibility



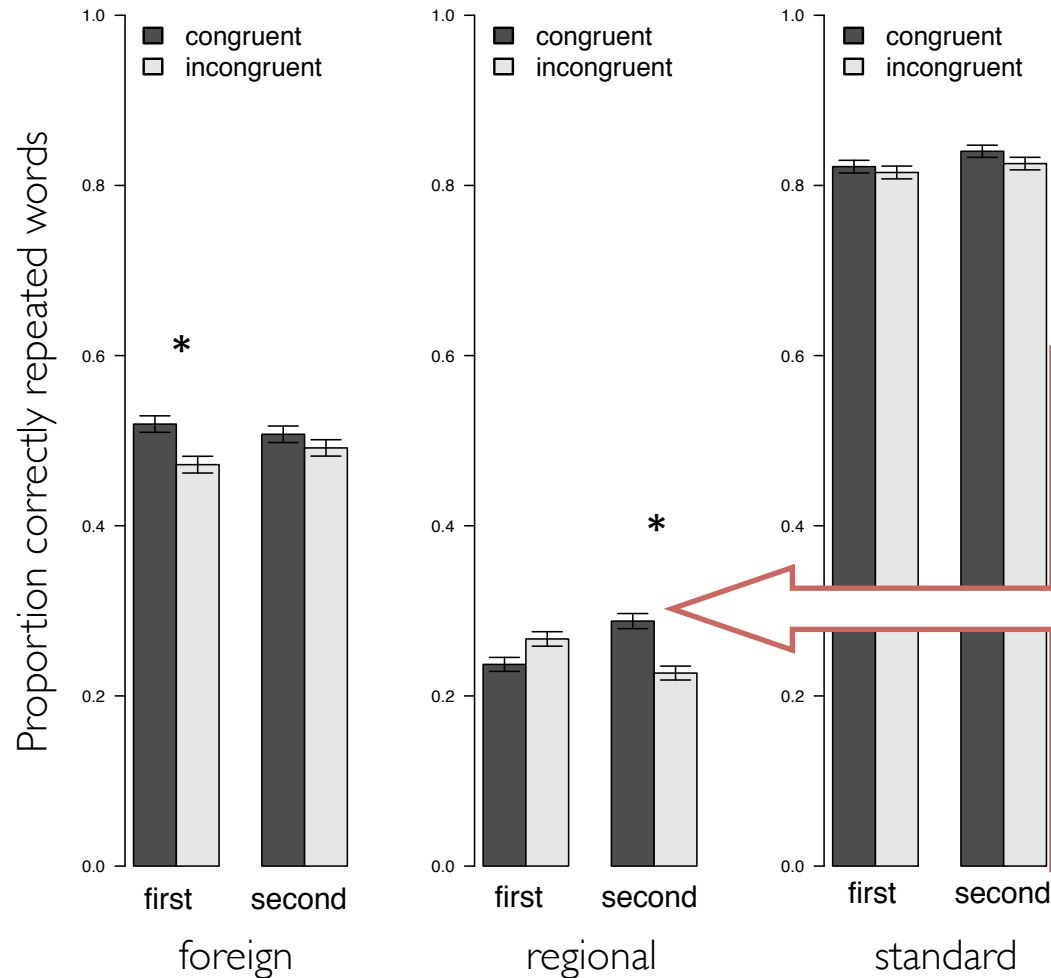
- Effect of talker identity on intelligibility in non-native speech only, and greater for teens

Plots now show how congruency effect changes in the first and second half of the experiment. In the foreign condition, congruence refers to the Asian guise, in the regional and standard condition, congruence refers to the White European guise.



ALL GROUPS

# Adjustement?



The regional accent was hard to understand. Participants initially thought that it is non-native speech, the congruence effect is therefore delayed and emerges in the second half only.

- Listeners adjust their expectations; talker effects short-lived



# Summary

1: Talker effects in different accents and tasks?

- Intelligibility: perceived ethnicity can enhance speech intelligibility, but effects vary for different speech contexts
- Talker effects most pronounced in the foreign and partly regional accents
- Accentedness ratings: more negative for Asian primes irrespective of the speech context

2: Changes in talker effects across the lifespan?

- Greater difficulties with distorted speech for elderly relative to teens and adults
- Intelligibility: talker effects less pronounced with age
- Accentedness ratings: talker effects more pronounced for elderly







The intelligibility results are best accounted for by expectation accounts, but postperceptual offline task such as ratings are more prone to biases. Both theories can account for some of the findings. Such a disconnect between linguistic measures is not novel, but we need to be aware of these differences, because they obscure comparisons of different theories.



## Discussion

### Expectations/socially indexed exemplars vs. Biases/reverse-linguistic stereotyping

#### – Intelligibility

- of the foreign accent enhanced for the Asian primes  
- of the regional accent reduced for the Asian primes (second half only)  
- of the native speech not affected by talker ethnicity  

#### – Accentedness ratings

- Overall more negative for the Asian primes compared to the white European primes  



# Feel free to send a question related to this research.

([adriana.hanulikova@germanistik.uni-freiburg.de](mailto:adriana.hanulikova@germanistik.uni-freiburg.de))

- Thanks to:
- Personal project grant of the Ministry of Science, Research and Art, Baden-Württemberg
- Psycholinguistics Lab, University of Freiburg:  
Dr. Daniel Müller-Feldmeth, Dina Osime, Saskia Leymann, Lisa Hübner
- Frias project group grant: *Language Dynamics across the Life Span*, with Prof. Evelyn Ferstl, Dr. Alice Blumenthal-Dramé