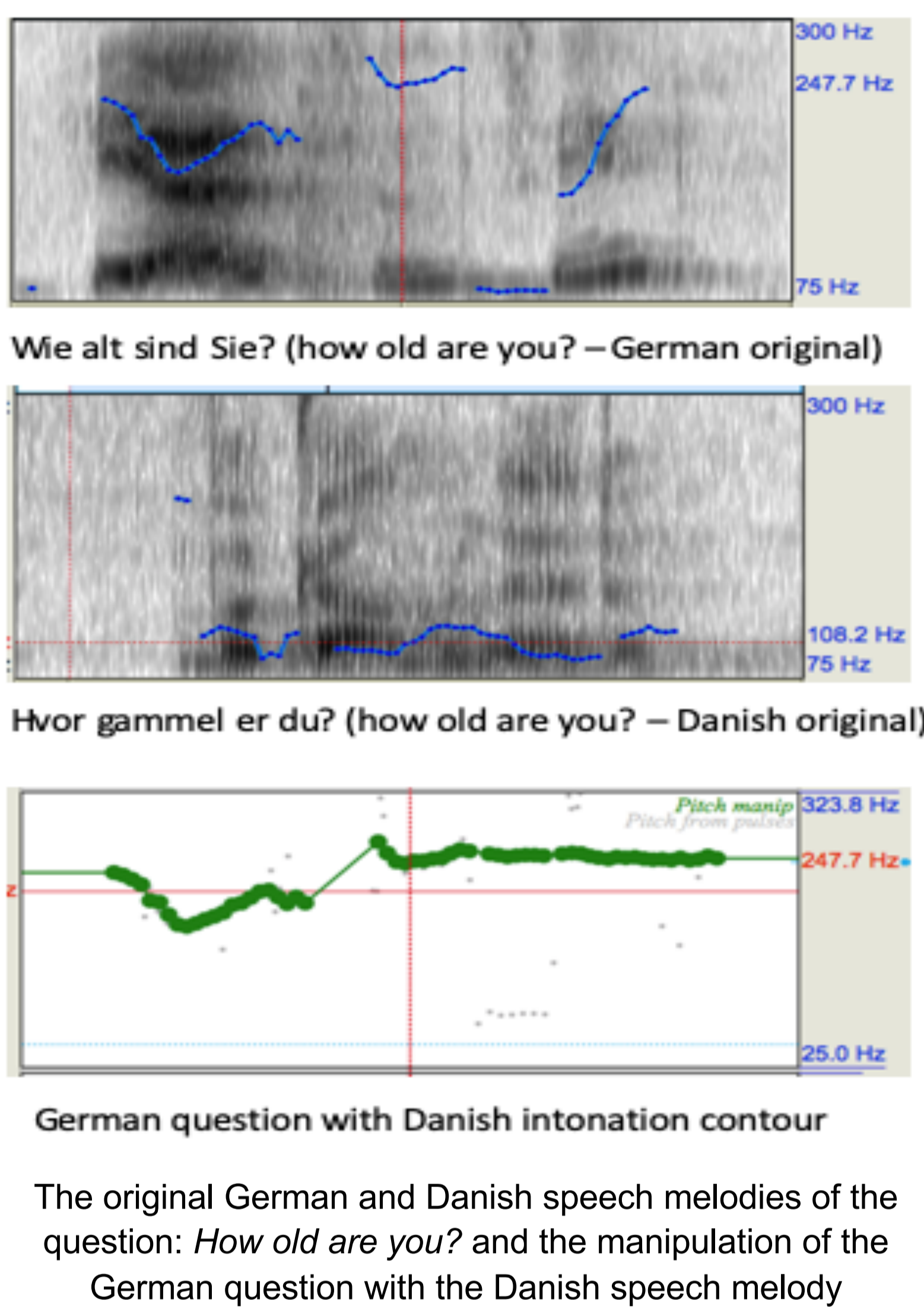# Studying Language Attitudes Using Robots

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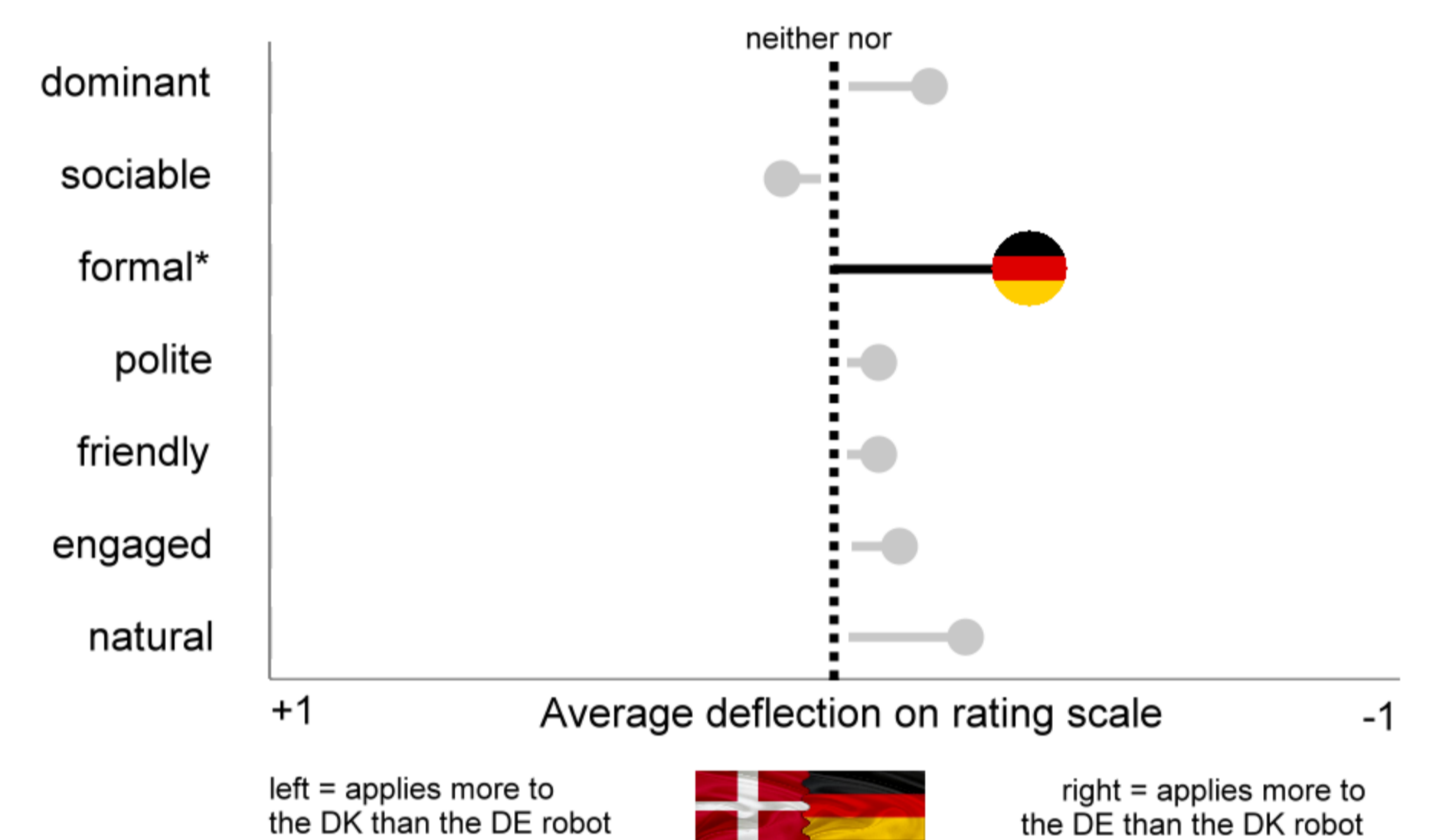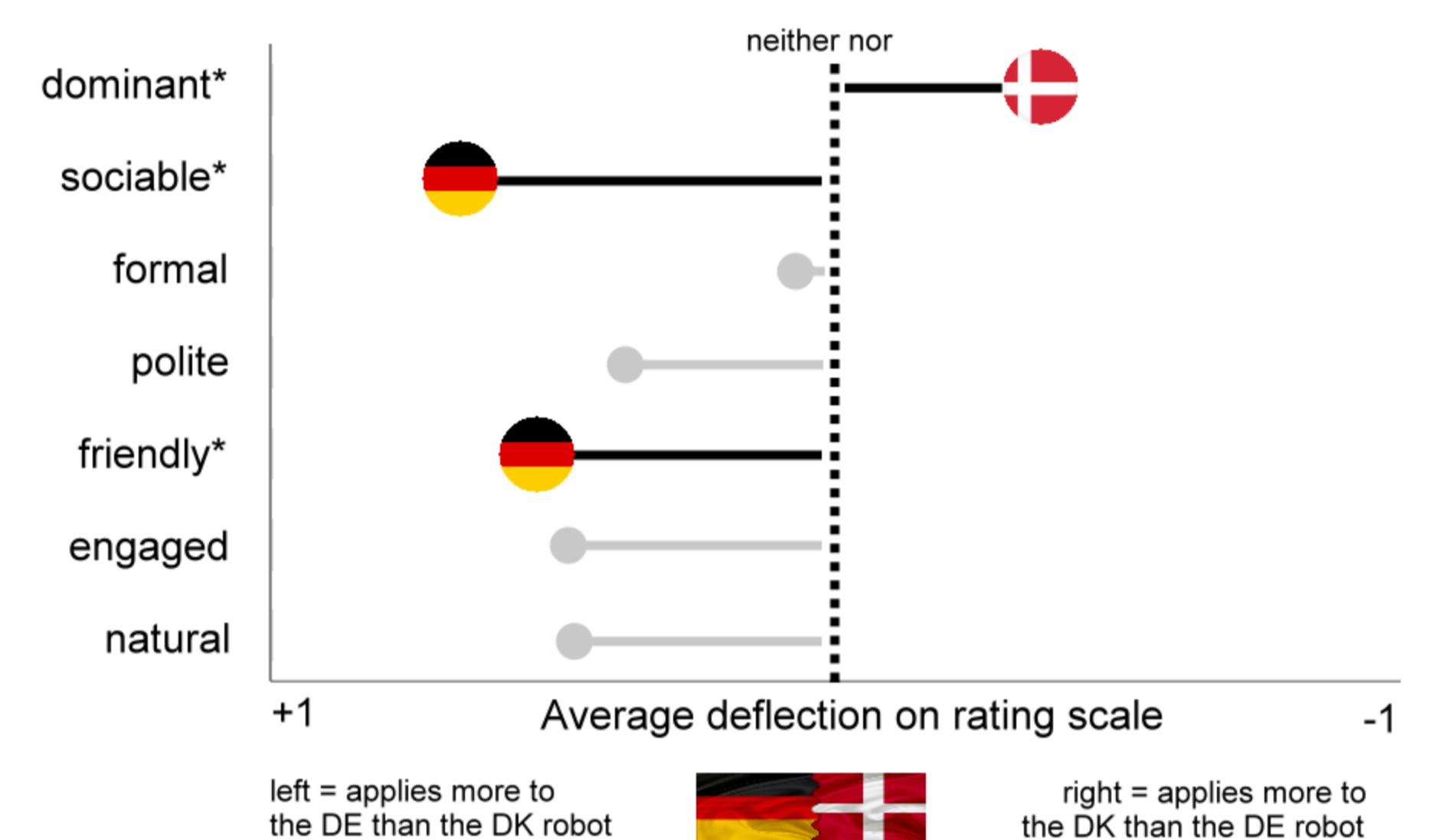Sonderborg, Denmark
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Language attitudes concern the beliefs people hold towards speakers of a particular variety (for instance, a dialect or a foreign accent). **Robots provide an excellent methodological tool to study language attitudes**. We illustrate this methodology on the perception of transfer of the speech melody from one's mother tongue to a foreign language.

Wie alt sind Sie? (how old are you? – German original)

Hvor gammel er du? (how old are you? – Danish original)

German question with Danish intonation contour

The original German and Danish speech melodies of the question: *How old are you?* and the manipulation of the German question with the Danish speech melody

The two Keepon robots took turns in asking demographic questions and questions about robots

Top right: German participants rate the robot asking questions with German speech melody as significantly more sociable and more friendly than the robot asking questions with the Danish speech melody, while they rate the robot with the Danish speech melody as significantly more dominant.

Right: The Danish participants rate the robot asking questions with German speech melody as near-significantly more formal than the robot with the original speech melody.

left = applies more to the DE than the DK robot
right = applies more to the DK than the DE robot

left = applies more to the DK than the DE robot
right = applies more to the DE than the DK robot

Starting Point

Many features of our linguistic productions may have direct interpersonal effects, i.e. they may have an impact on how we are perceived as a person. In language attitude research, sociolinguists determine

a) what linguistic features are relevant for how speakers are perceived, and

b) what attitudes are connected to those linguistic features.

Robots as Methodological Tools

Robots are great for language attitude research because

- they can be completely controlled
- they deliver identical behaviors to all participants alike and as often as necessary
- they are embodied and thus serious interaction partners
- they can assume many social roles
- two robots of the same kind look identical; thus, efforts to disguise the speaker and distractor items are not necessary
- linguistic variables and their interactional and even behavioral effects can be studied in naturalistic interactional contexts.

Aim

We illustrate the methodology using the transfer of speech melody from one's native language into a foreign language.

Procedure

We recorded native speakers of Danish, German and English asking the demographic questions of a questionnaire. Then we manipulated the speech melody of one question by imposing the speech melody of the same question from another language using PRAAT.

In an online questionnaire, distributed via social media, two Keepon robots took turns in asking 6 questions, which the participants had to respond to. One Keepon used the original speech melody, the other used the melody from another language.

A total of 115 listeners rated their two Keepon interlocutors with respect to several interaction and personality features as well as with respect to the naturalness of their speech.

Results

Test for (non-)equal rating distribution shows:

- overall significantly different evaluations of the two robots for the German participants (N=45; χ^2=15.5; p=.017),
- near-significant differences for the native speakers of English (N=18; χ^2=10.75; p=.096),
- no significant differences for the Danish participants (N=52; χ^2=3.24; p=.777).
- Additional binominal tests show:
  - the German participants find the robot with Danish intonation dominant (z[14,19]=1.85, p=.03) and the original robot more sociable (z[17,20]=2.91, p=.001) and more friendly (z[13,18]=1.65, p=.04).
  - The English participants agree with the Germans in perceiving the original robot as more sociable (z[12,16]=1.75, p=.04).
  - the Danish participants tend to perceive the robot with German intonation as formal (z[17,26]=1.37, p=.08).
  - Note that none of the listener groups found the original robot more natural than that with the manipulated speech melody → good resynthesis!

Conclusion

The experiment illustrates the use of robots for the controlled investigation of the effects of linguistic features on the perception of the respective speaker and thus on language attitudes.