The relationship between listener attitudes and the comprehension of nonnative-accented speech

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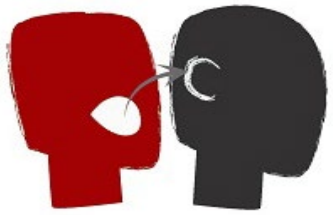

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Background

- Nonnative-accented speech is typically less intelligible to native listeners than is native speech (Munro 1998)
  - Intelligibility: “the extent to which a speaker’s message is actually understood by a listener” (Munro & Derwing 1995)
- The intelligibility of nonnative speech for native listeners is traditionally viewed as the responsibility of the nonnative speaker, and not of the listener

Listener Factors

- However, **listener factors** have been shown to relate to the comprehension of nonnative speech, including:
  - Native language background of the listener (Hayes-Harb *et al.* 2008)
  - Brief exposure to nonnative-accented speech (Clarke & Garrett 2004)
  - Experience with nonnative-accented speech (Kennedy & Trofimovich 2008)

Listener Factors

- The listener's **attitude** towards a particular nonnative talker or accent is another factor of interest
  - Negative attitudes toward nonnative speakers are prevalent (Gluszek & Dovidio 2010)

Ingvalson *et al.* 2017

- Ingvalson, Lansford, Federova, and Fernandez (2017) investigated the relationship between **listener attitude towards specific nonnative talkers** and **the intelligibility of those talkers' speech**
  - Listeners rated nonnative-accented talkers and their speech on several characteristics and transcribed speech produced by those talkers
  - Listeners' cognitive performance and hearing acuity was also assessed

Ingvalson *et al.* 2017

- Listener attitudes accounted for an additional 5% of variance in transcription accuracy
  - After listener age, hearing acuity, and a variety of cognitive factors were accounted for
- However, only **one** talker for each of **five** native languages
  - Talker and native language conflated

Present Study

- Follows up on Ingvalson *et al*. (2017) by including **eight** talkers for each of **three** native languages
- Different materials

Research Question

- Is there a relationship between listeners' attitudes towards nonnative talkers and their speech and how well they comprehend speech produced by those talkers?
  - Does the native language of the **talker** affect this relationship?
  - Do the following **listener** characteristics affect this relationship?
    - Whether or not the listener is bilingual
    - Whether or not the listener speaks second languages (L2s)
    - Listener gender

Speech Materials

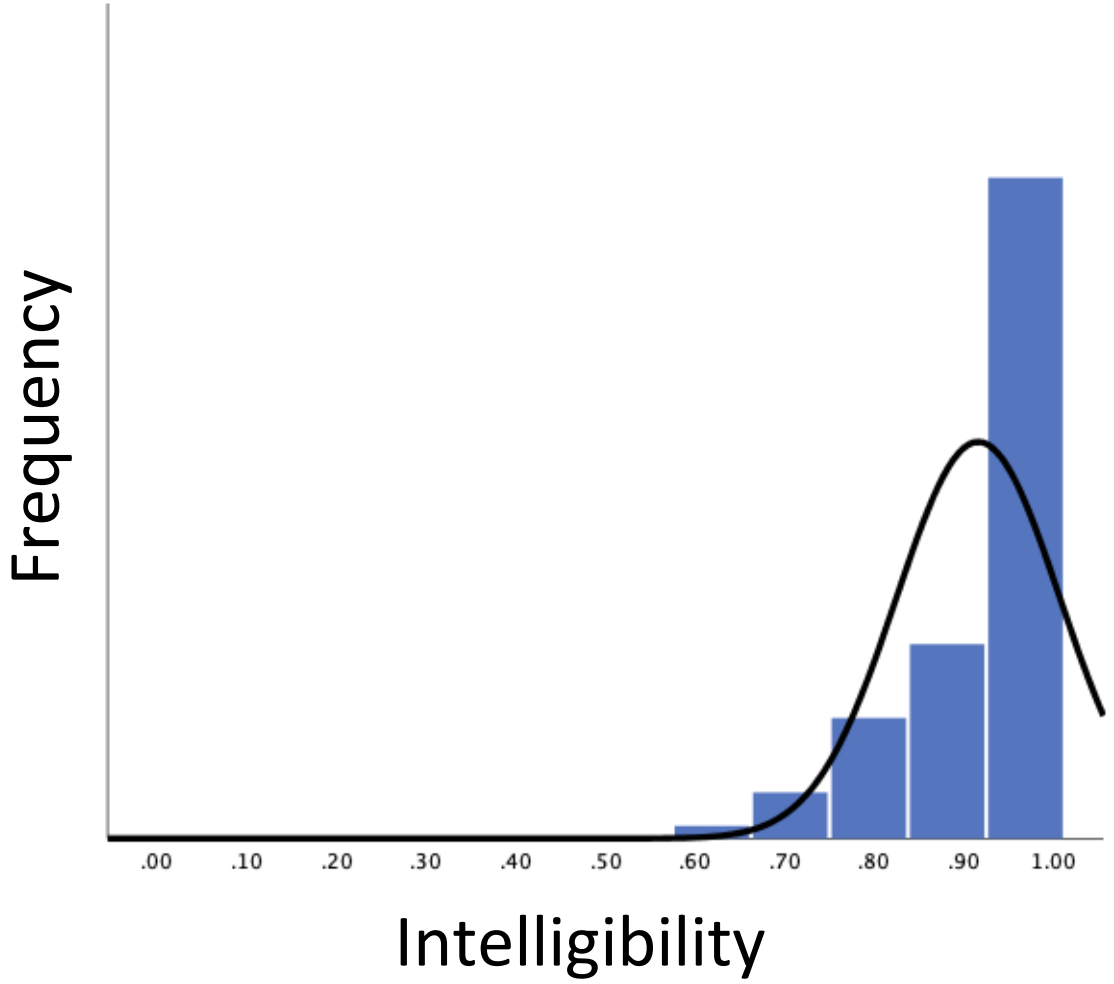
- 24 talkers (ages 20-43, mean age 26.4) selected from existing speech database at the University of Utah
  - 8 native Korean, 8 native Mandarin, 8 native Spanish
  - 16 female, 8 male
- 19 talkers reported having lived in an English-speaking country
  - Length of stay: 2 months-23 years, mean 5.6 years
- No attempt to control for proficiency

Speech Materials

- 24 recordings of the “Please call Stella” passage (Weinberger & Kunath 2011), one from each talker
- 240 recordings of short sentences with 3-4 keywords (BKB sentences; Bench *et al.* 1979), ten from each talker
  - *The children are walking home.*
  - *Mother picked some flowers.*
  - *She is calling her daughter.*
  - *He wore his yellow shirt.*
  - *The mailman brought a letter.*
  - *The scissors are very sharp.*

Speech Materials

- Pilot data collected from 109 native English participants showed ceiling effect on transcription accuracy for BKB sentences
- BKB sentences embedded in 6-talker babble; SNR 0 (Van Engen & Bradlow 2007)



Listeners

- 60 native English speakers (ages 18-62, mean age 23.1) recruited from University of Utah linguistics courses
  - 31 female, 29 male
  - 5 identified a native language in addition to English (bilingual)
  - 44 identified at least one L2

Listeners

- 16 participants excluded for childhood experience with one or more of the target languages
- A listener's responses to particular talker excluded if listener had L2 experience with the talker's first language (L1)
  - Excluded data: Korean (1 listener), Mandarin (5), Spanish (25)

Procedure

- Qualtrics online survey platform
- Participants asked to use headphones and complete the study in a quiet environment
  - Soundcheck questions: identify four English words at 100% accuracy
- Informed consent
- Two tasks: an attitude rating task and a transcription task
  - 12 talkers (4 per language) randomly assigned to each listener
- Participant questionnaire

Procedure – Attitude Rating Task

- Listeners heard “Please Call Stella” passage from each of their randomly-assigned 12 talkers
- Rated both the **speech** and the **talker** on 10 different characteristics on a 5-pt Likert scale (following Ingvalson *et al.* 2017; originally from Pantos & Perkins 2013)

Procedure – Attitude Rating Task

- 5 speech characteristics
- MOST/HIGHEST rating = 1, LEAST/LOWEST rating = 5
- The ratings for these five characteristics were averaged to produce a **speech attitude score**

On the basis of the recording you hear, please rate the speaker's speech as follows:

	MOST/HIGHEST rating				LEAST/LOWEST rating
Pleasantness	○	○	○	○	○
Romantic qualities	○	○	○	○	○
Warmth	○	○	○	○	○
Refinement	○	○	○	○	○
Ease of understanding	○	○	○	○	○

Procedure – Attitude Rating Task

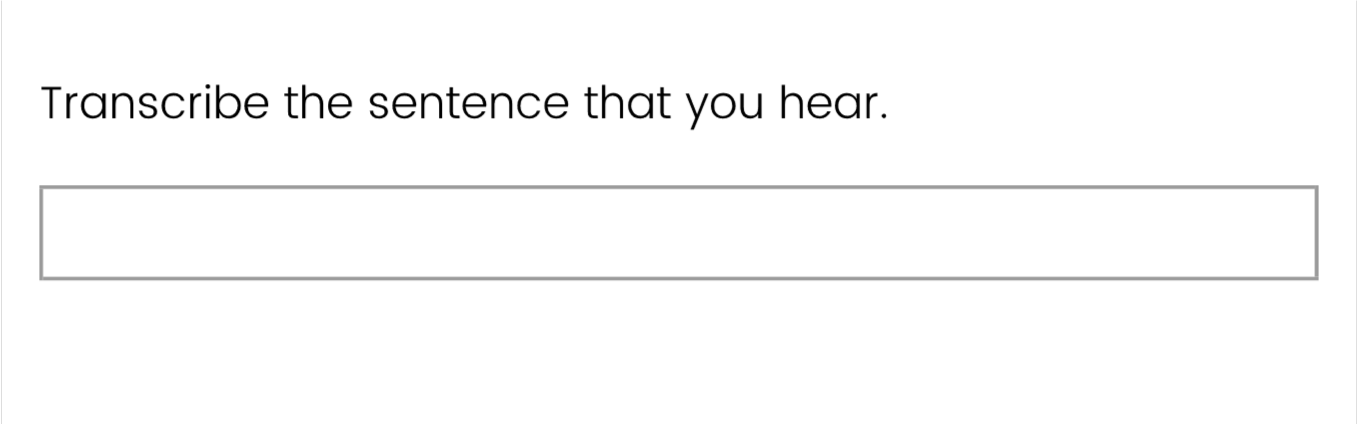
- 5 talker characteristics
- MOST/HIGHEST rating = 1, LEAST/LOWEST rating = 5
- These five characteristics were averaged to produce a **talker attitude score**

On the basis of the recording you hear, please rate the speaker as follows:

	MOST/HIGHEST rating				LEAST/LOWEST rating
Education	○	○	○	○	○
Class status	○	○	○	○	○
Pleasantness	○	○	○	○	○
Friendliness	○	○	○	○	○
Confidence	○	○	○	○	○

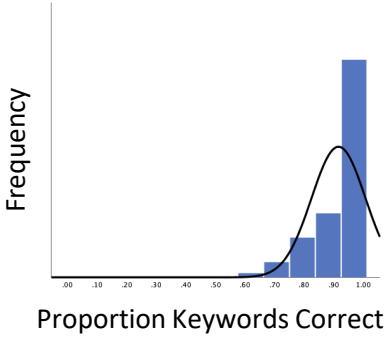
Procedure – Transcription Task

- Listeners randomly assigned to one of two sentence orderings
- Transcribed five sentences from each of their 12 talkers (60 sentences total), blocked by talker and in random order

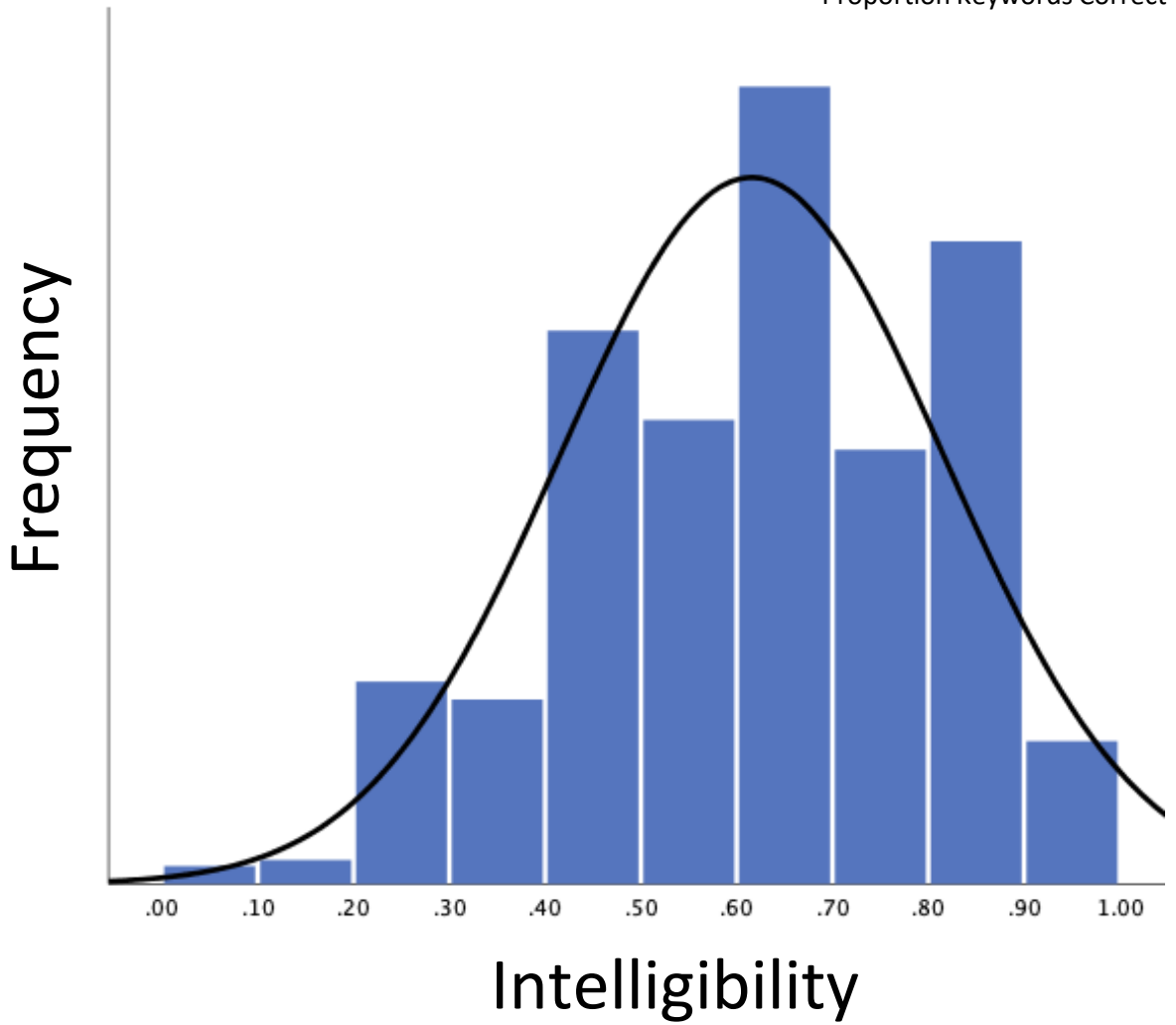


Transcribe the sentence that you hear.

Procedure – Transcription Task

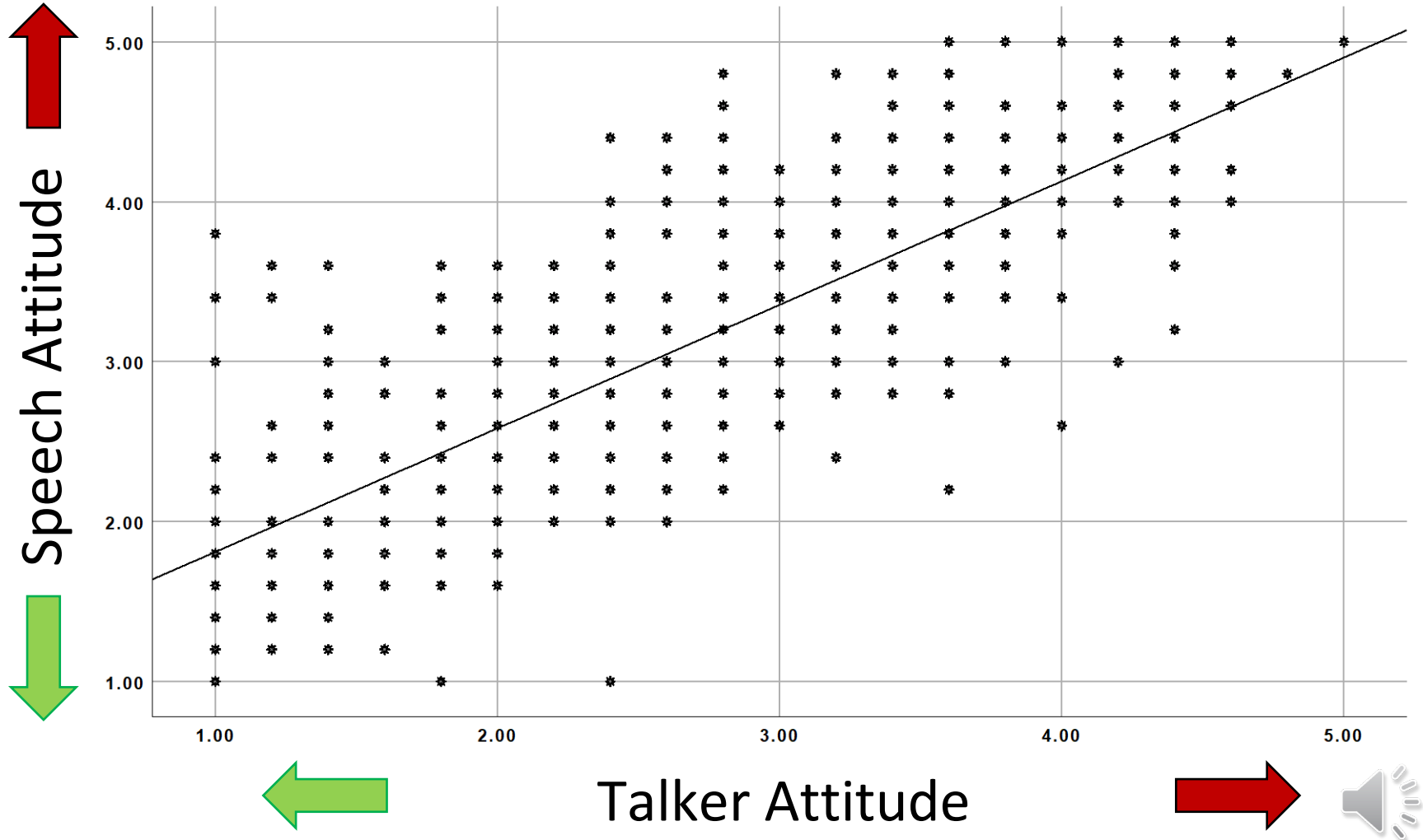


- Transcriptions coded for proportion keywords correct
- Embedding the sound files in 6-talker babble produced a normal distribution



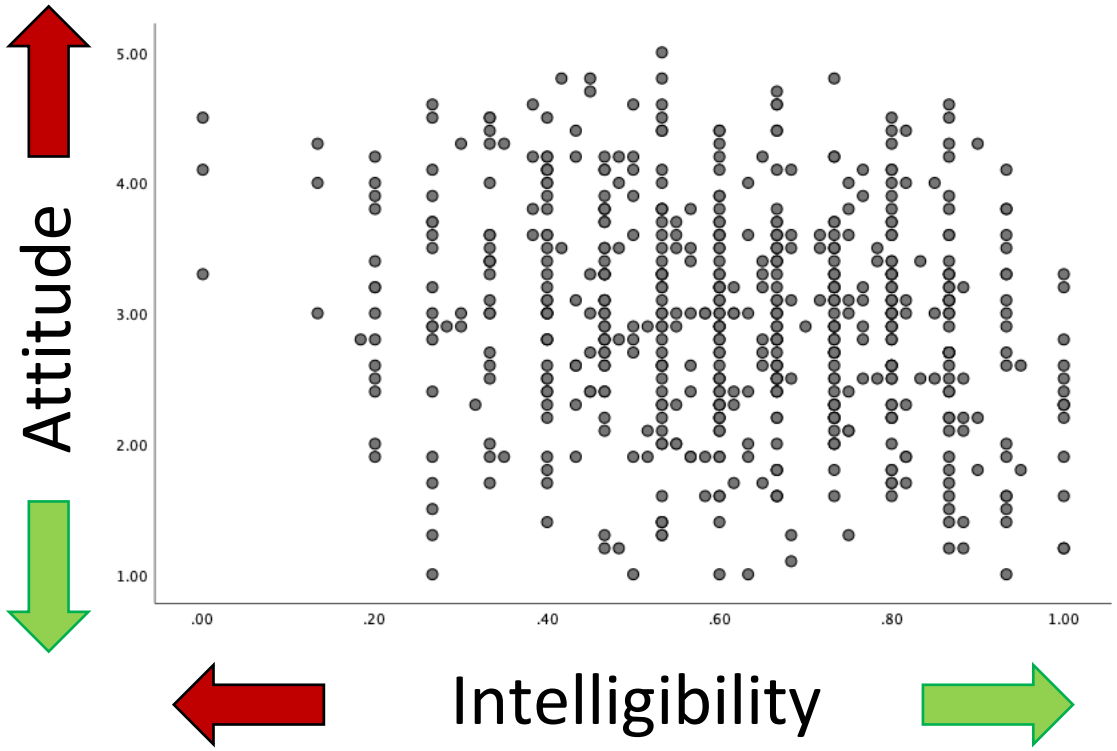
Speech & Talker Attitude Scores

- Pearson r=.777, p<.0005, n=596
- **Collapsed into a single composite Attitude score** (following Ingvalson *et al*. 2017)



Results - General

- After listener age, listener L2s, listener bilingual, and listener gender accounted for, attitude accounts 3.7% of the variance in intelligibility (p<.0005)

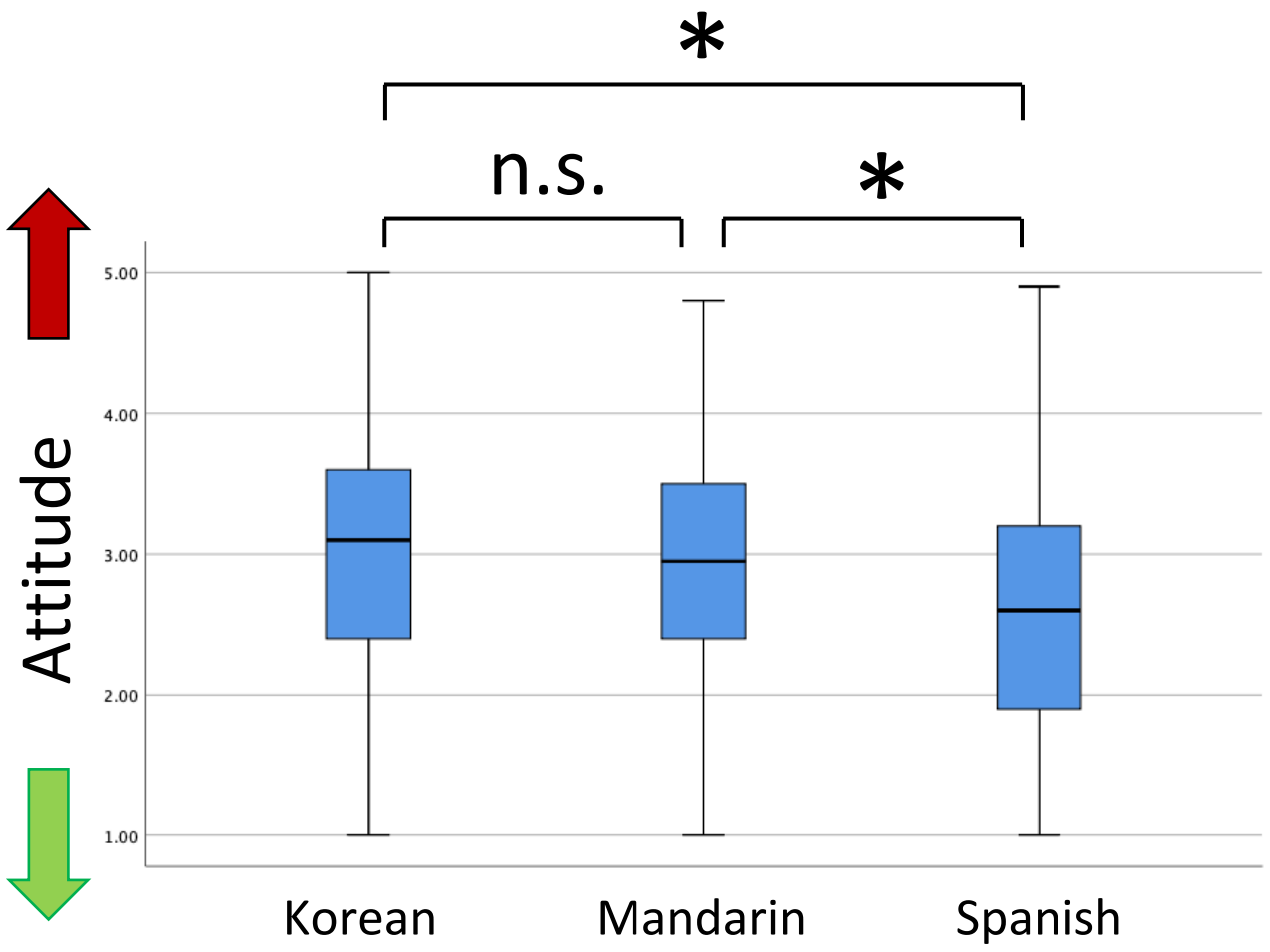


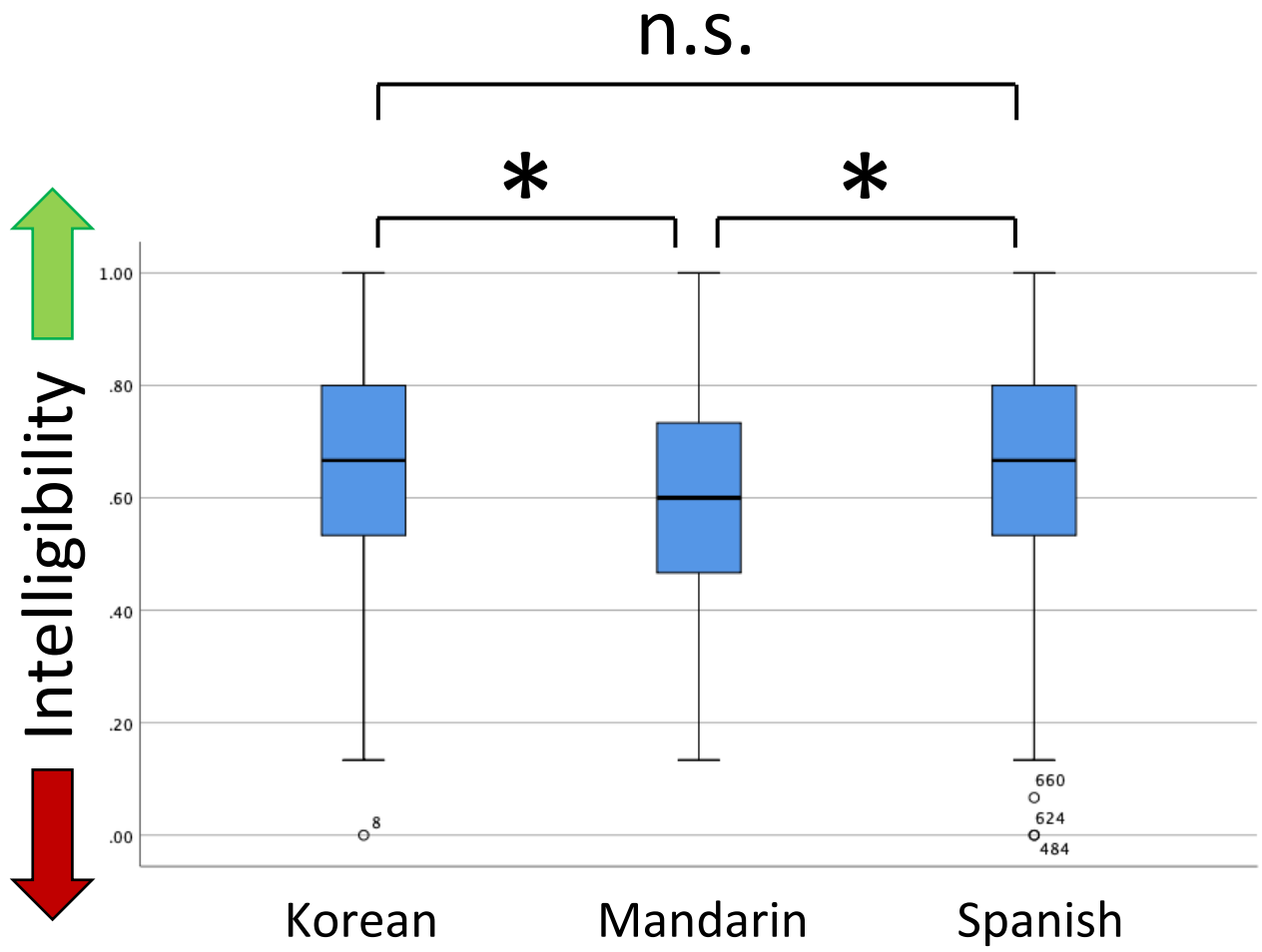
Research Question

- Is there a relationship between listeners' attitudes towards nonnative talkers and their speech and how well they comprehend speech produced by those talkers? ✔ **YES**
  - Does the native language of the **talker** affect this relationship?
  - Do the following **listener** characteristics affect this relationship?
    - Whether or not the listener is bilingual
    - Whether or not the listener speaks second languages (L2s)
    - Listener gender

Results – Talker Language

Korean: n=59
Mandarin: n=55
Spanish: n=35

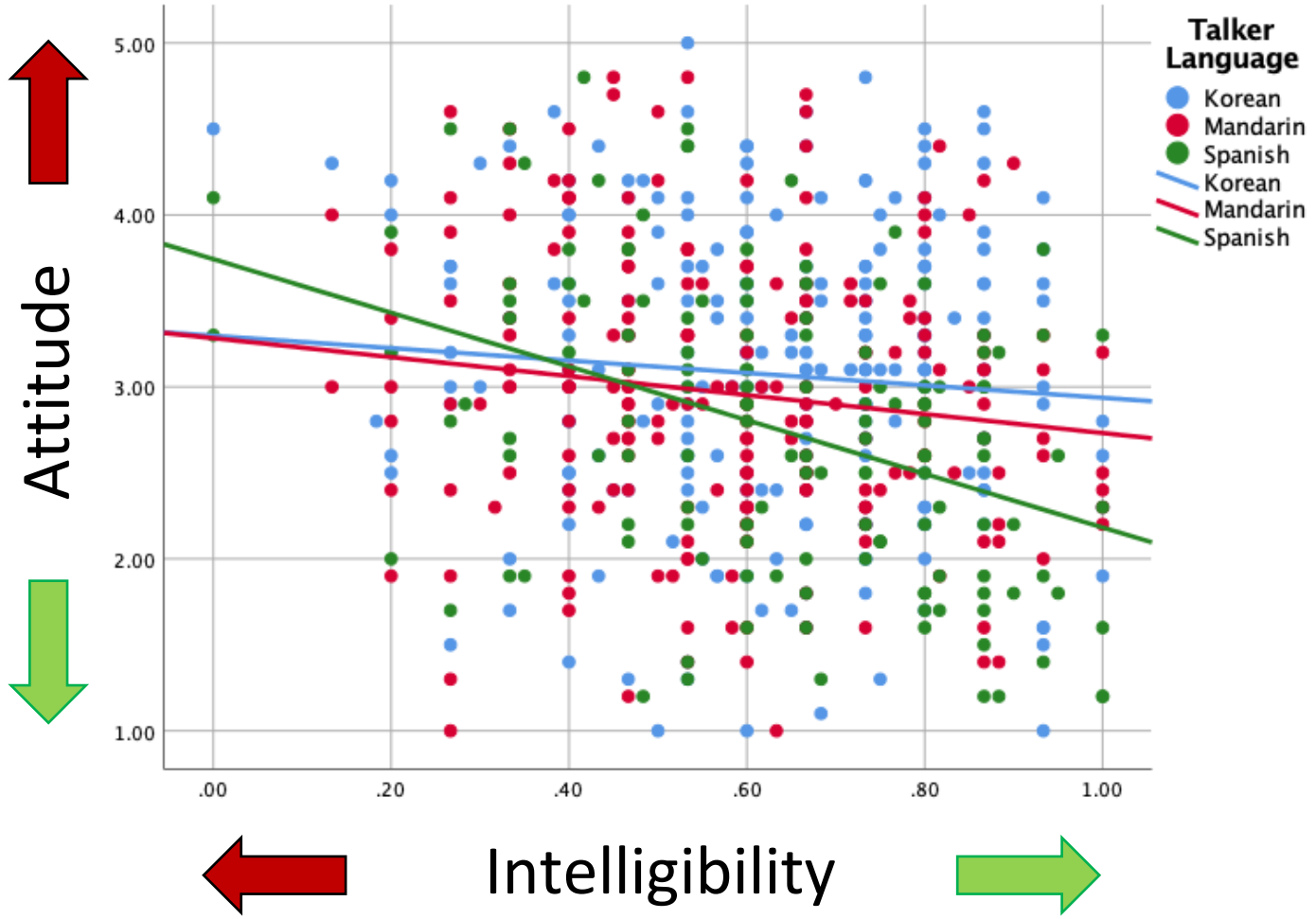




Results – Talker Language

Additional variance accounted for by listener attitude for each talker native language separately (after accounting for all other variables)

- Korean: n.s. (n=59)
- Mandarin: 1.8% (n=55)
- Spanish: 14.8% (n=35)



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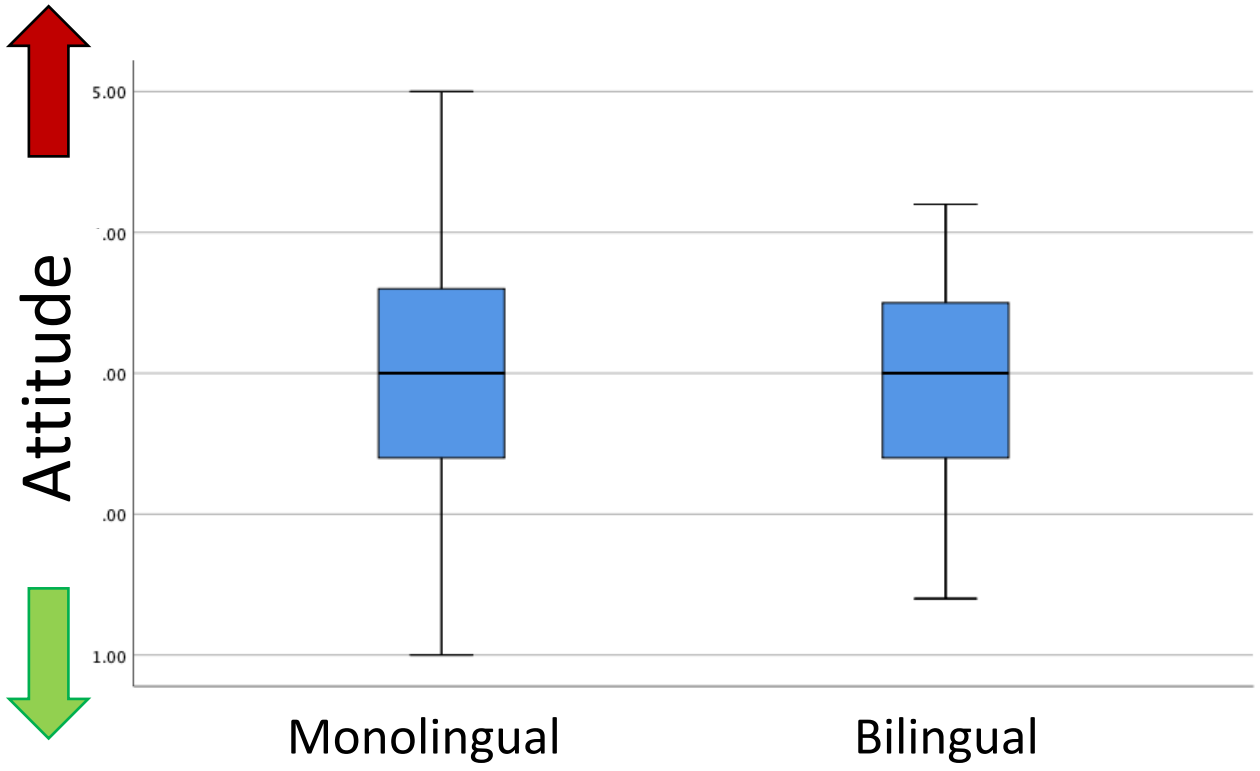
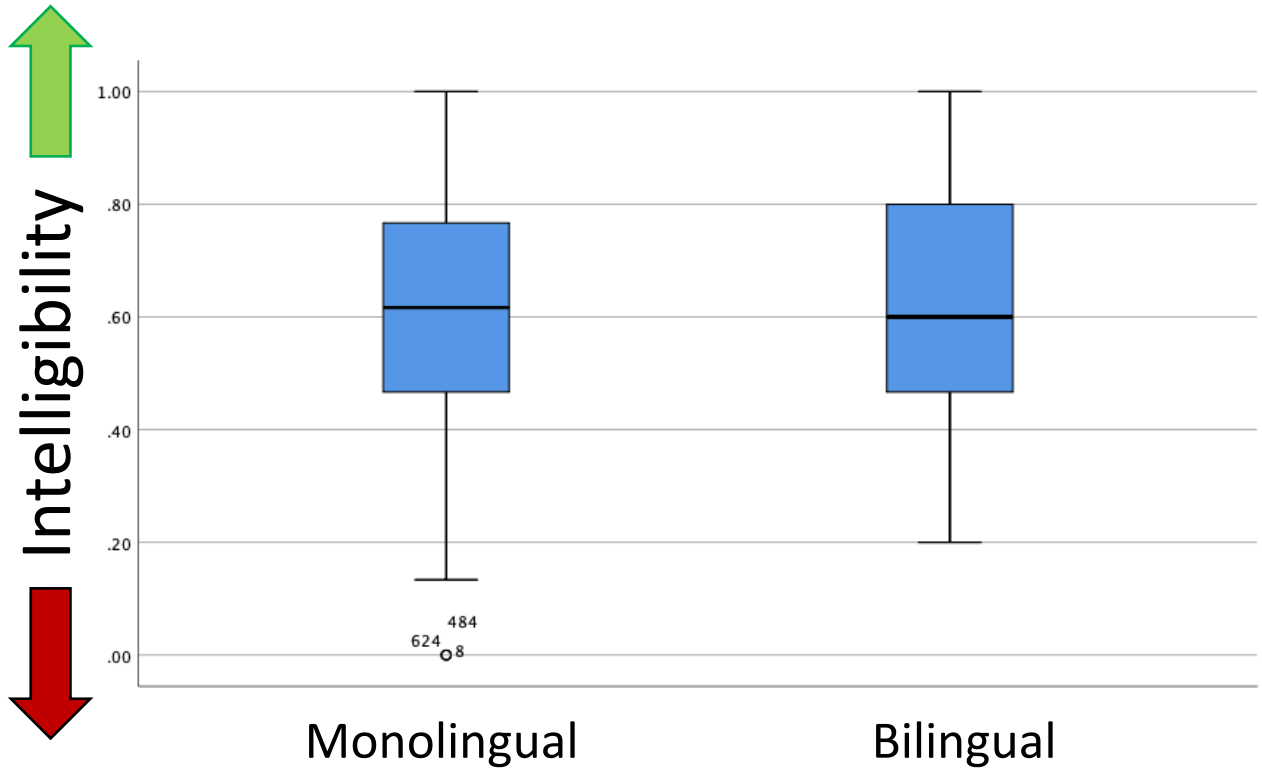
    - Listener gender

Results – Bilingual/Monolingual

Monolingual: n=55
Bilingual: n=5

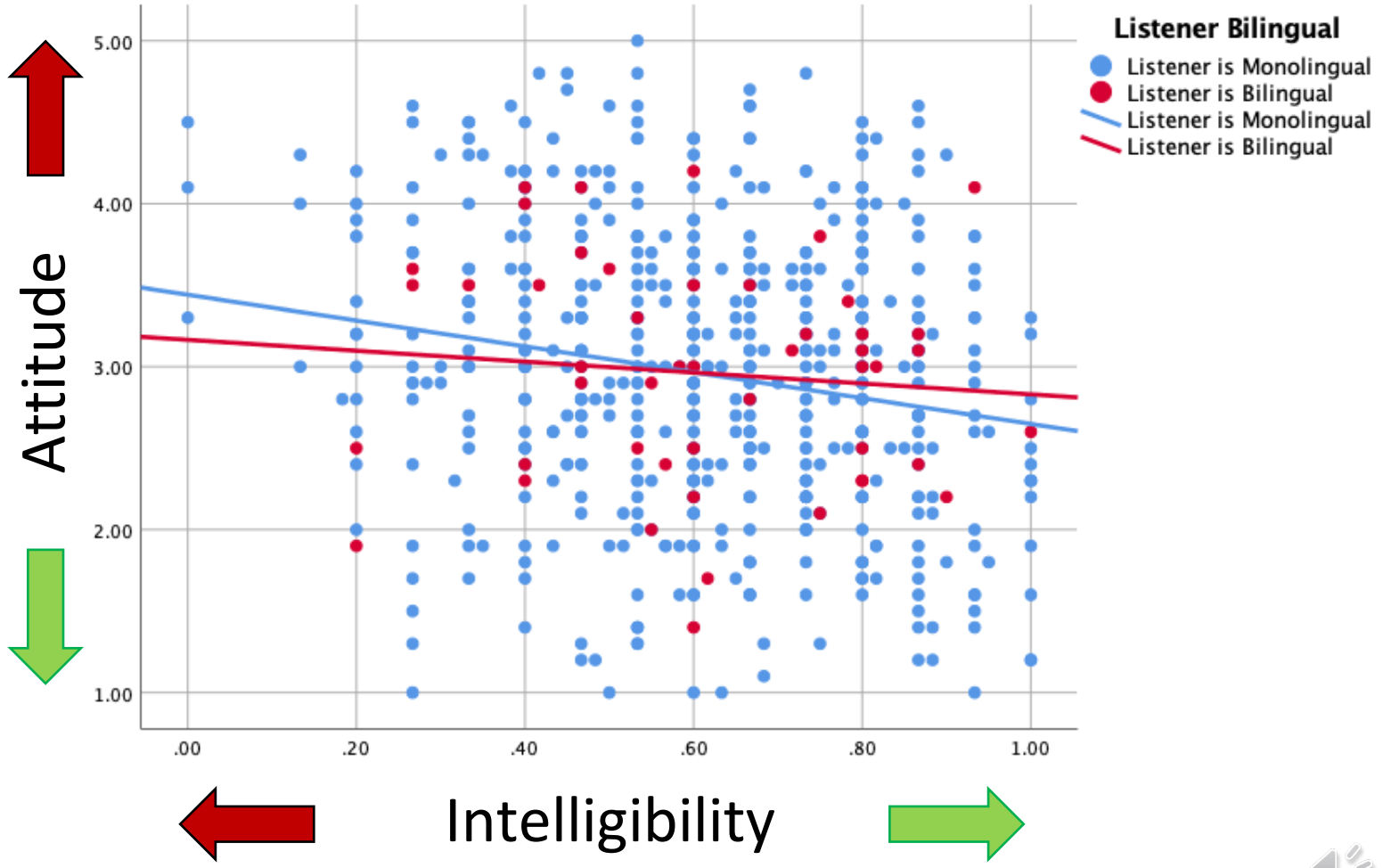




Results – Bilingual/Monolingual

Additional variance accounted for by listener attitude for monolingual and bilingual listeners separately (after accounting for all other variables)

- Monolingual listeners: 3.5% (n=55)
- Bilingual listeners: n.s. (but n=5!)



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  - Does the native language of the **talker** affect this relationship? ✔ **YES**
  - Do the following **listener** characteristics affect this relationship?
    - Whether or not the listener is bilingual **MAYBE; bilingual N is small**
    - Whether or not the listener speaks second languages (L2s)
    - Listener gender

Results – L2s/No L2s

No L2s: n=16
L2s: n=44

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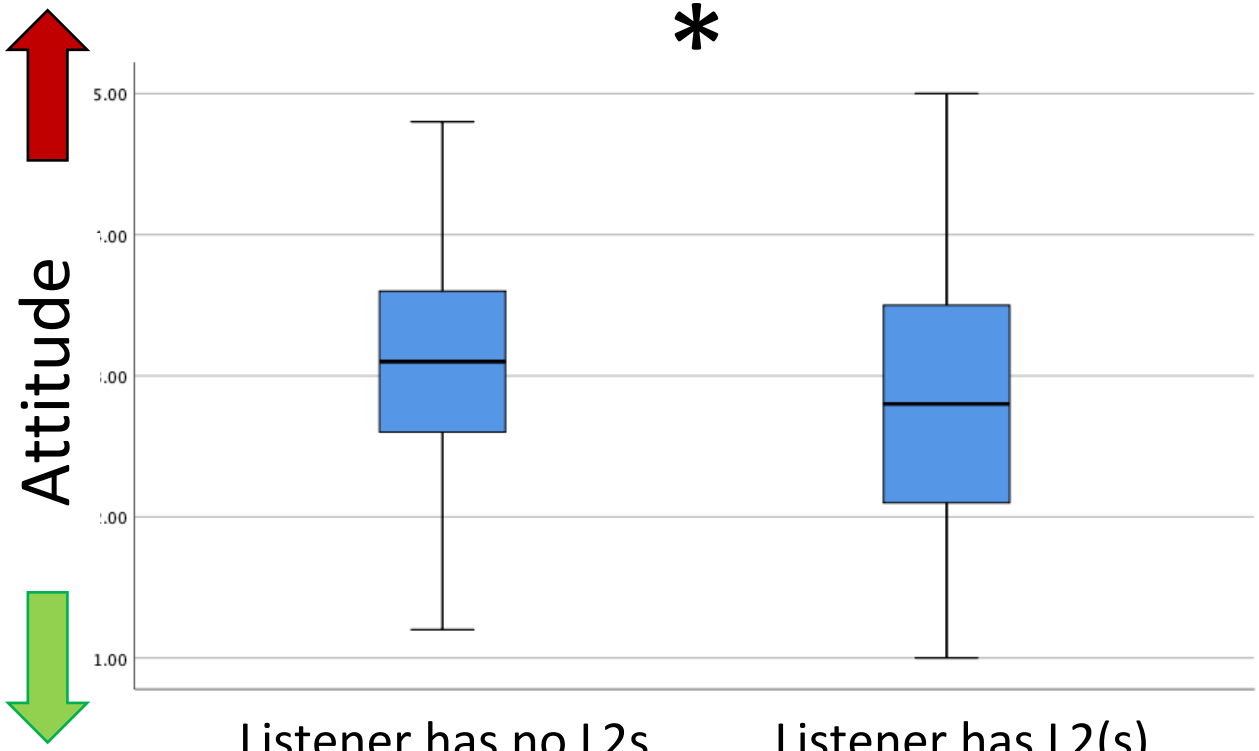
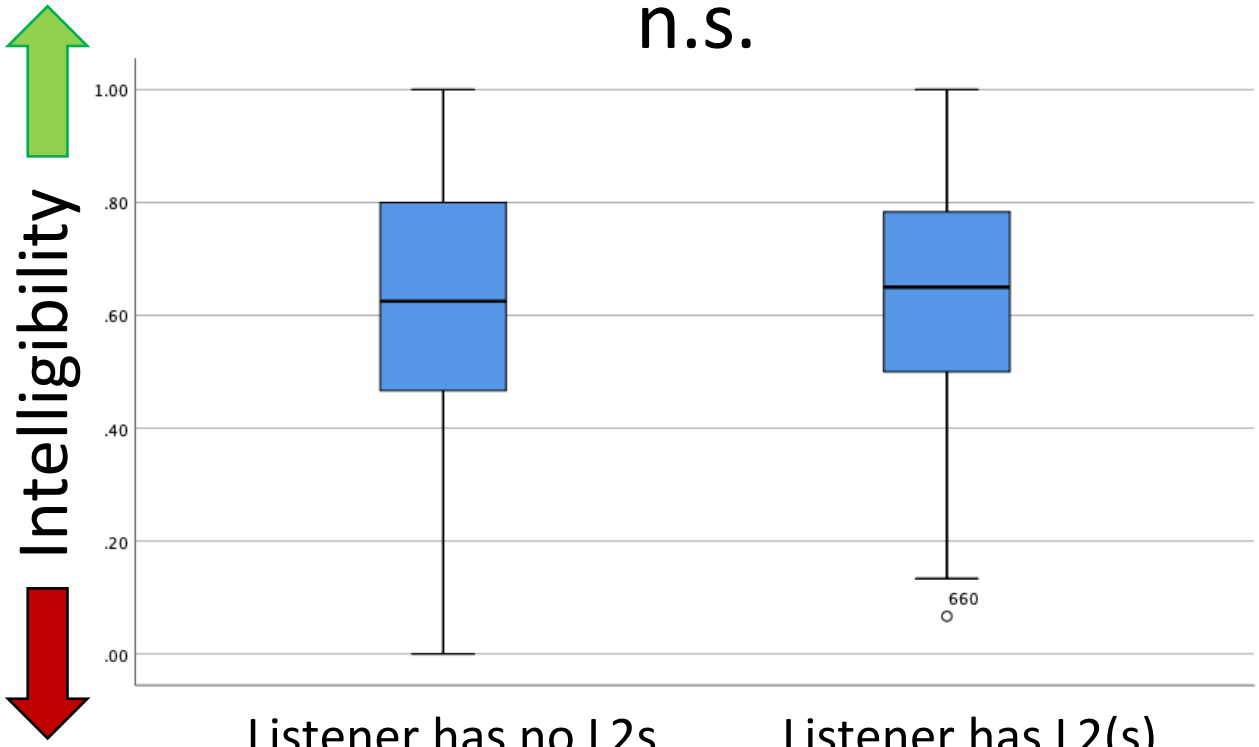


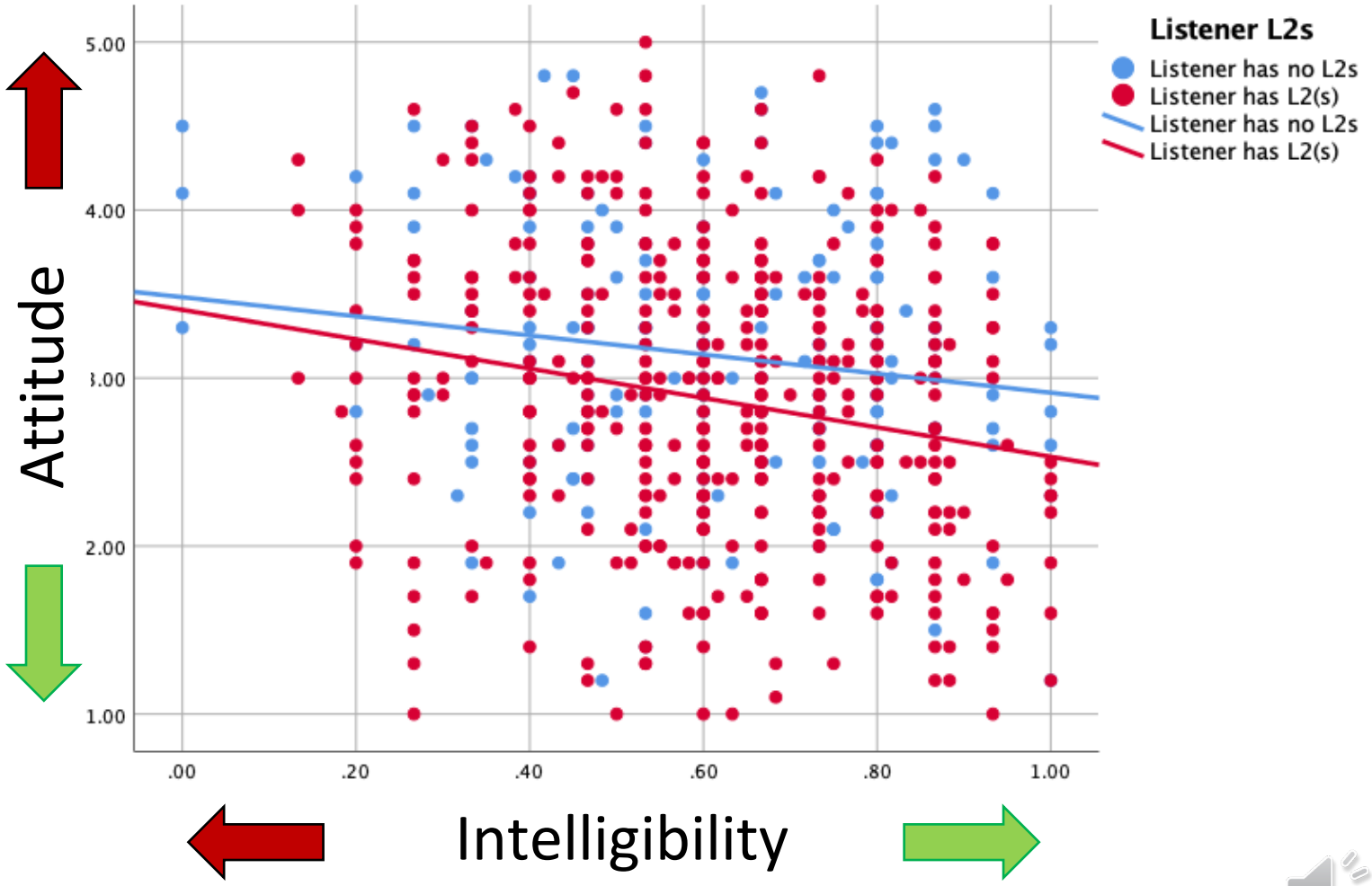
n.s.



Results – L2s/No L2s

Additional variance accounted for by listener attitude for listeners with and without L2s separately (after accounting for all other variables)

- Listener has no L2s: n.s. (n=16)
- Listener has L2(s): 4.2% (n=44)



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  - Do the following **listener** characteristics affect this relationship?
    - Whether or not the listener is bilingual **MAYBE; bilingual N is small**
    - Whether or not the listener speaks second languages (L2s) ✔ **YES**
    - Listener gender

Results – Listener Gender

Female: n=31
Male: n=29

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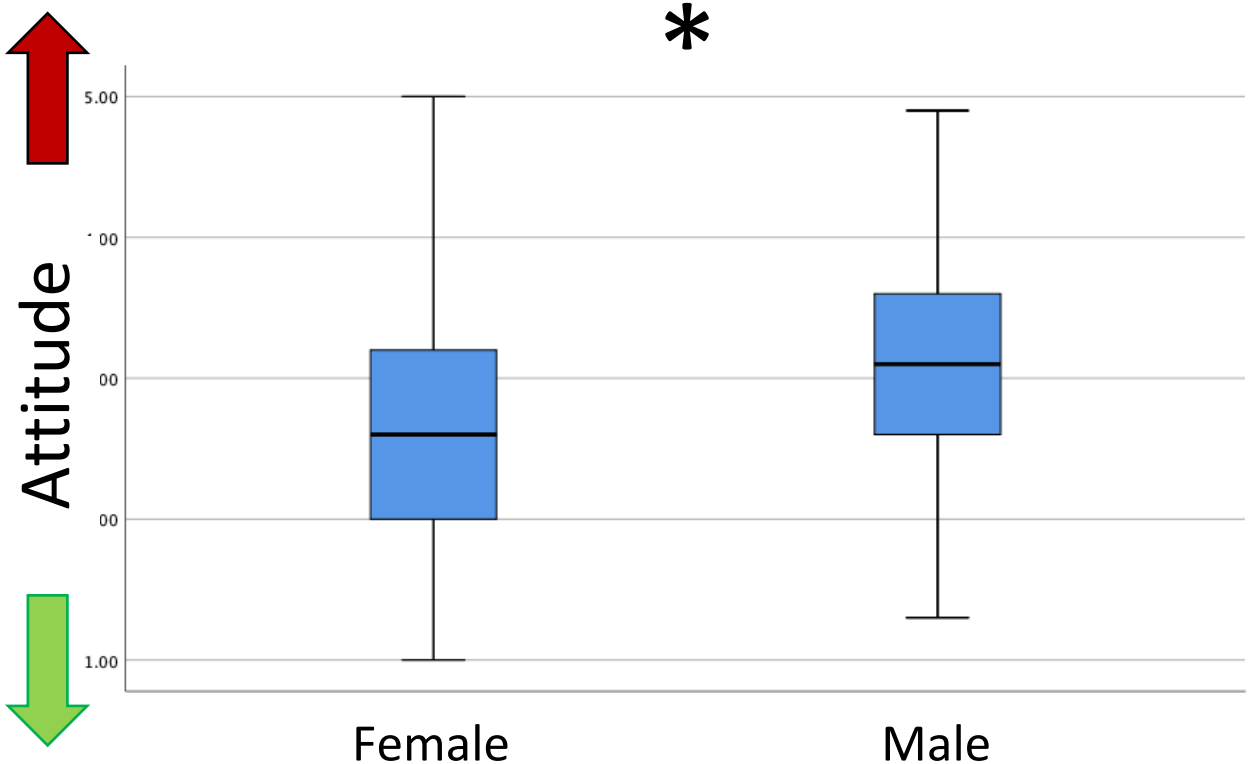
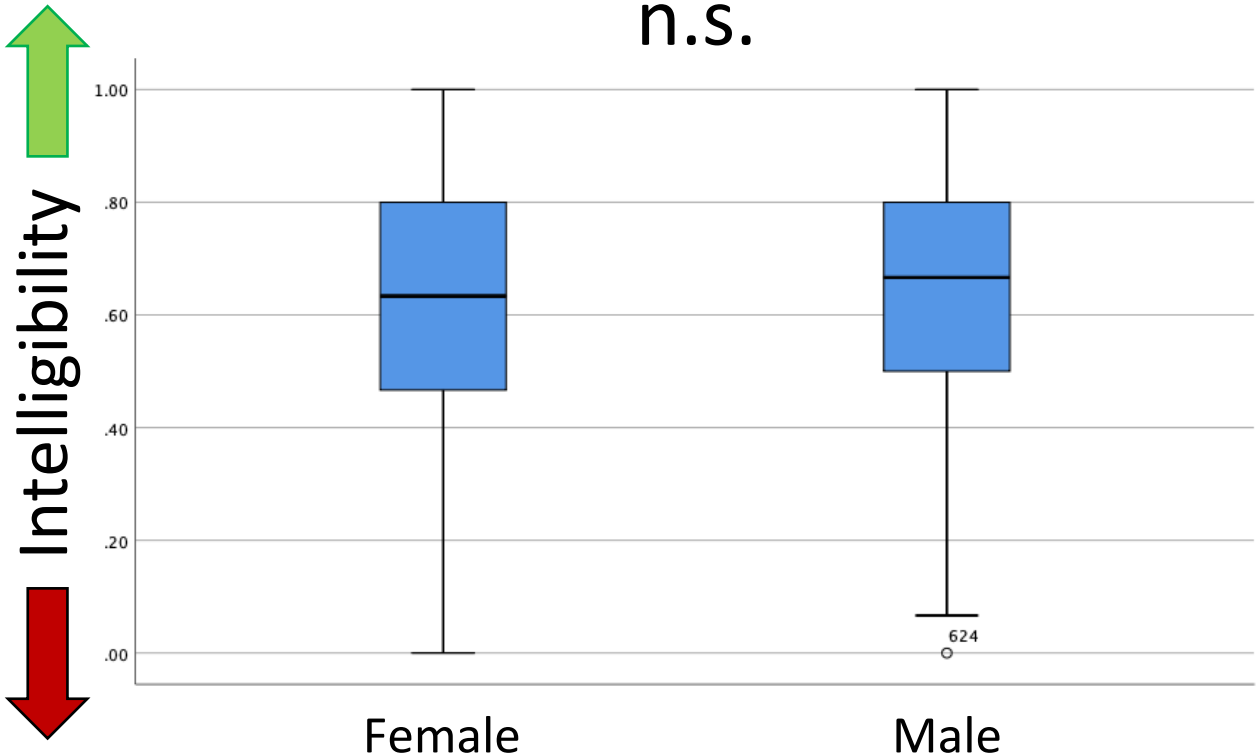


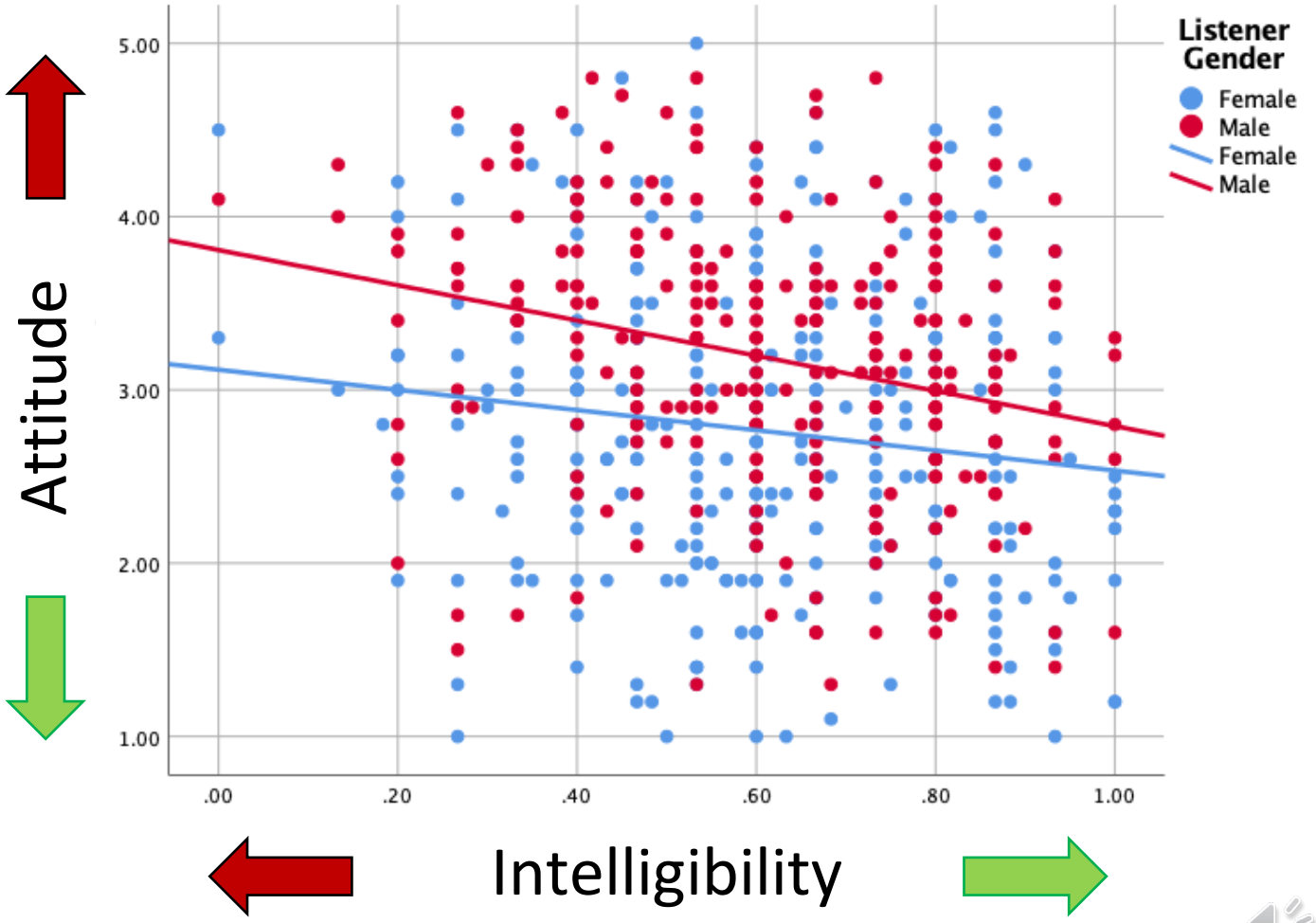
n.s.



Results – Listener Gender

Additional variance accounted for by listener attitude for female and male listeners (after accounting for all other variables)

- Females: 1.7% (n=31)
- Males: 7.8% (n=29)



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  - Do the following **listener** characteristics affect this relationship?
    - Whether or not the listener is bilingual **MAYBE; bilingual N is small**
    - Whether or not the listener speaks second languages (L2s) ✔ **YES**
    - Listener gender ✔ **YES**

Discussion

- More positive attitudes towards nonnative talkers and their speech correlate with increased intelligibility of speech produced by those talkers
  - Affected by the talker's native language
  - Affected by whether listener has L2s
  - Affected by listener gender
  - Maybe affected by whether listener is bilingual

Next steps

- Additional experiment with same method, except listeners assigned to four talkers per language in attitude task, hear different four talkers per language in intelligibility task
  - Attempt to tease apart talker & accent/native language background
- Fuller replication of Ingvalson *et al*. (2017) – include measures of cognitive performance and hearing acuity

Intriguing Findings

- Relationship between attitude and intelligibility may be stronger for males than for females
  - Males and females respond differently to the same language stimuli in various settings (Podberesky *et al*. 1990; Brown & Cichocki 1995; O'Loughlin 2002; Grondelaers *et al*. 2010)
- Attitude accounted for much more variance in transcription accuracy for Spanish than for the other languages
  - Follow-ups?

Final thoughts

- Further evidence that the listener also contributes to intelligibility
  - Responsibility of the speaker AND the listener
- Multiple loci/opportunities to enhance the intelligibility of nonnative speech

Thank you!

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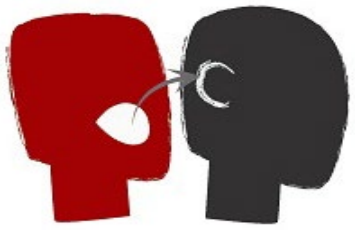

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