Effects of talker's dialect labeling and listener's language experience on the perception of nasal codas in Shanghai Mandarin

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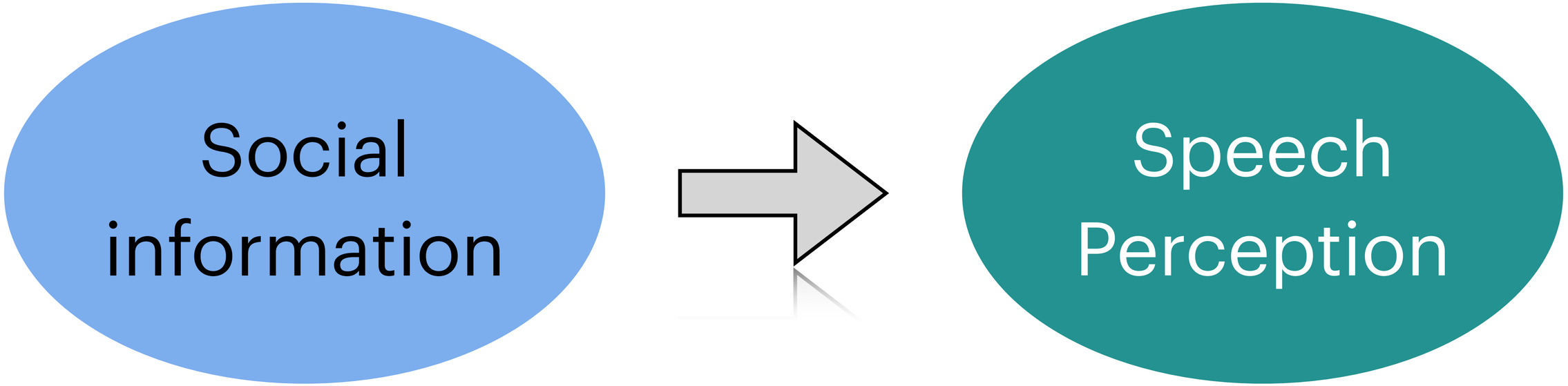
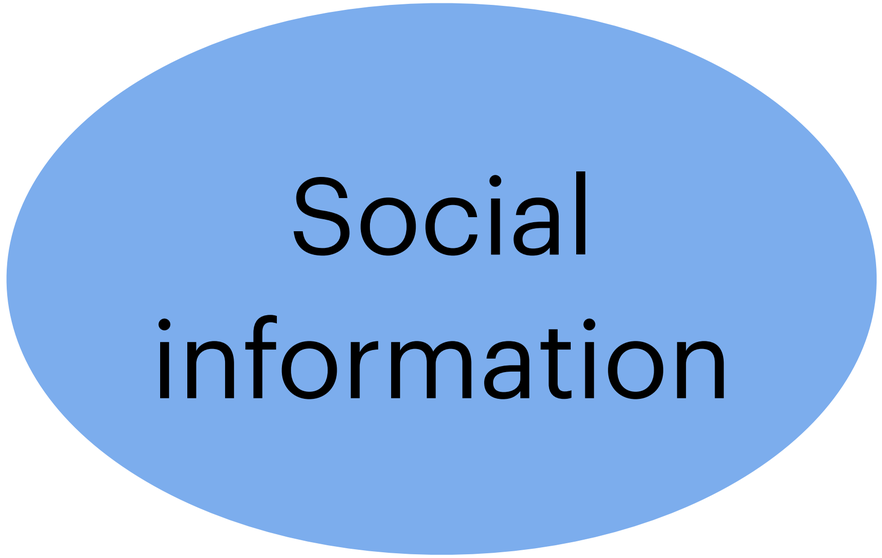
PLC47 Talk

Research question



Talker dimension

Listener dimension



Talker dimension

- Perceived socio-demographic information of the talker:
  - Gender (Eklund and Traunmüller, 1997; Strand, 1999; Johnson, Strand and D'Imperio, 1999; Strand and Johnson, 2016; Lai, 2021)
  - Age (Drager, 2011; Koops, Gentry and Pantos, 2008)
  - Race/ethnicity (Staum Casasanto, 2010)

Talker dimension

- Perceived dialectal background:
  - Top-down dialect labels (Niedzielski, 1999; Lev-Ari and Peperkamp, 2016; Schertz, Kang and Han, 2019; McGowan and Babel, 2020)
- Counter-example: Lawrence (2015)
  - Investigate the impact of dialectal labels by replicating Niedzielski's 1999 paradigm
  - Different variable and language context
  - No significant effect of dialect labeling was found
  - The author's interpretation suggests that the impact of dialect labeling on speech perception may be influenced by linguistic context

Listener dimension

- Listeners' socio-demographic status:
  - Age (D'Onofrio, 2021; Hay, Warren and Drager, 2006; Drager, 2011; Hay and Drager, 2010)
  - Gender (Hay, Warren and Drager, 2006; Drager, 2011; Hay and Drager, 2010)
  - Social class (Hay and Drager, 2010)
- Language experience (Sumner and Samuel, 2009; Lev-Ari and Peperkamp, 2016; Lev-Ari, 2018; Schertz, Kang and Han, 2019; Voeten, 2021)
- Language attitude (Walker et al.; 2018)

- In this experiment, I focus on the following two effects:

  Talker dimension — Social (regional) labeling

  Listener dimension — Language experience

- I explore how these social factors affect Shanghai Mandarin speakers' discrimination of -*in* and -*iŋ*

Predictions

- **Talker's dialect label** and **listener's language experience** both play a role on the perception of ambiguous /in~iŋ/ stimuli

Social labeling influences speech perception	Talker's Standard Mandarin Speaker label facilitates **higher** *iŋ*-selection rate
Language experience influences speech perception	Listeners with **more** language experience with Standard Mandarin have **higher** *iŋ*-selection rate

- Beijing Mandarin
  - Well-accepted as a standard variety of Standard Mandarin
- Shanghai Mandarin
  - To a large extent similar to Standard Mandarin
  - Shows Wu dialect influence, differing from Standard Mandarin in some features

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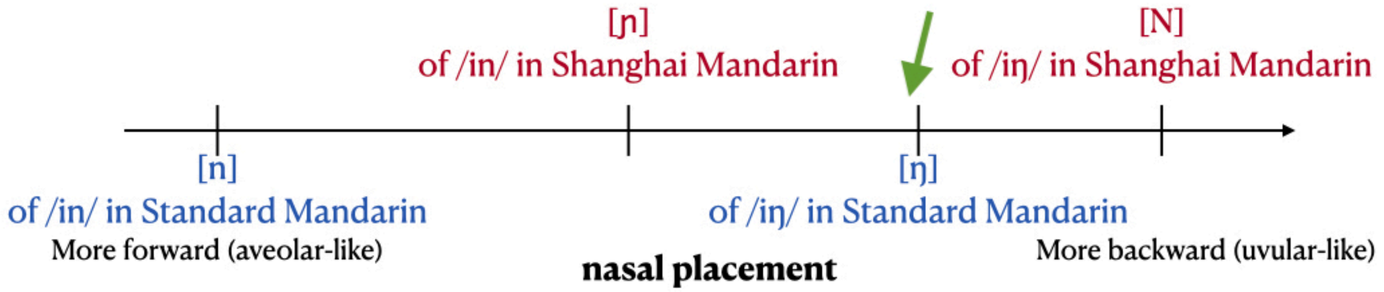
The *in~iŋ* contrast in Mandarin

- Standard Mandarin: /in/ as [in] v. /iŋ/ as [iŋ]
- Shanghai Mandarin: /in/ as [iɳ] and /iŋ/ as [iɴ] in formal speech
- Low social awareness of the phonetic variation for Shanghai Mandarin speakers



Recap: What is **ambiguous** in formal Shanghai Mandarin is closer to *-iŋ* in Standard Mandarin

Methods

- Within-subject design matched-guise study
    - Two conditions (Shanghai Label vs. Beijing Label) in separate blocks
    - Make up by personal stories of the talker in **text** - young women in their twenties, similar SEs
- Stimuli that are phonetically ambiguous to Shanghai Mandarin speakers
- Forced choice between 2 characters (an *in*-word vs. an *iŋ*-word) on screen

progress

请判断你听到的是哪个字。

Please determine which character you heard.

如果你认为听到的是屏幕左边的字，按电脑键盘上的左键（←）。

If you think the character you heard is on the left side of the screen, press the left arrow key.

如果你认为听到的是屏幕右边的字，按电脑键盘上的右键（→）。

If you think the character you heard is on the right side of the screen, press the right arrow key.

英

This is an -*iŋ* word

音

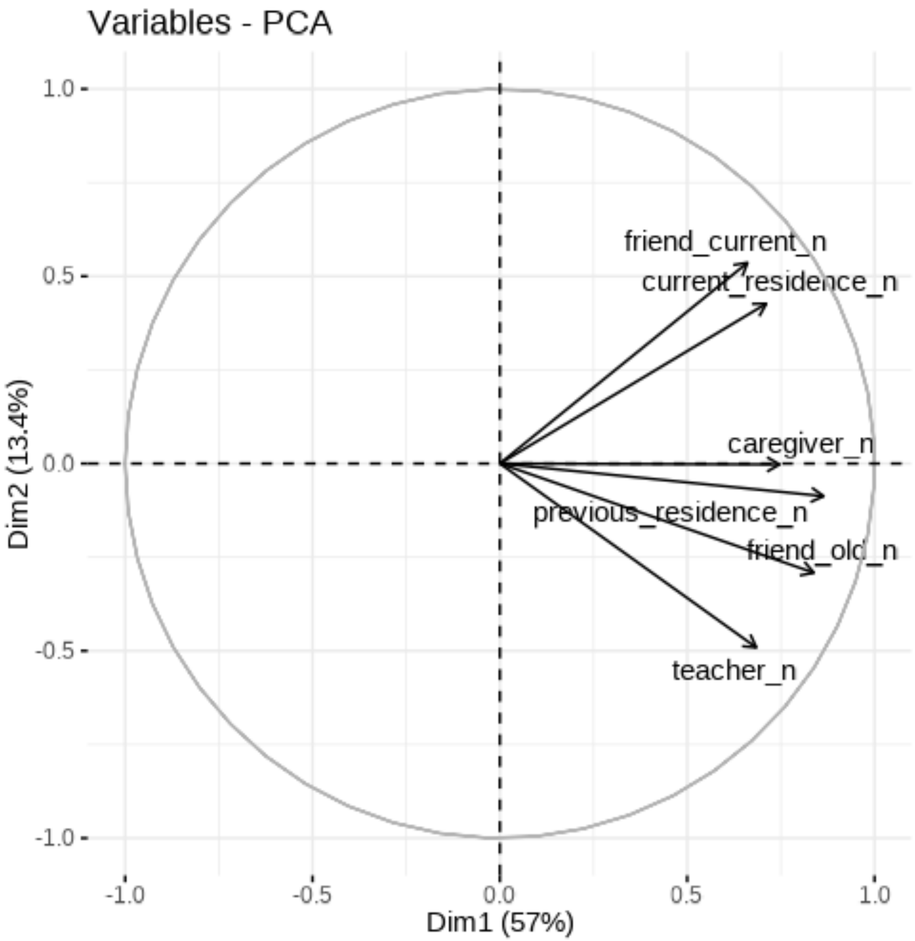
This is an -*in* word

Language experience

6 questions from an end-of-experiment questionnaire

- Approximately how many teachers do you have from elementary to high school from North China? (previous teacher)
- About how many of your childhood friends (before the age of 18) were from North China? (previous friends)
- About how many of your friends from North China have you interacted with in the last year? (current friends)
- How much time did you live in North China before you turned 18? (previous residence)
- Approximately how much of the last year have you lived in North China? (current residence)
- When you were a child, were your primary caregivers from North China? (caregiver)

- In order to condense language experience responses into a single parameter
- Performing principal component (PCA) analysis on the six dimensions
  - Responses to all 6 questions are positively correlated with PC1 (57.0% of the variance)
  - I'll use **PC1** to represent a participant's **language experience** to Standard Mandarin in the following models



Principal component analysis (PCA) loadings of the responses to questions about language experience.

Logistic mixed-effect regression model

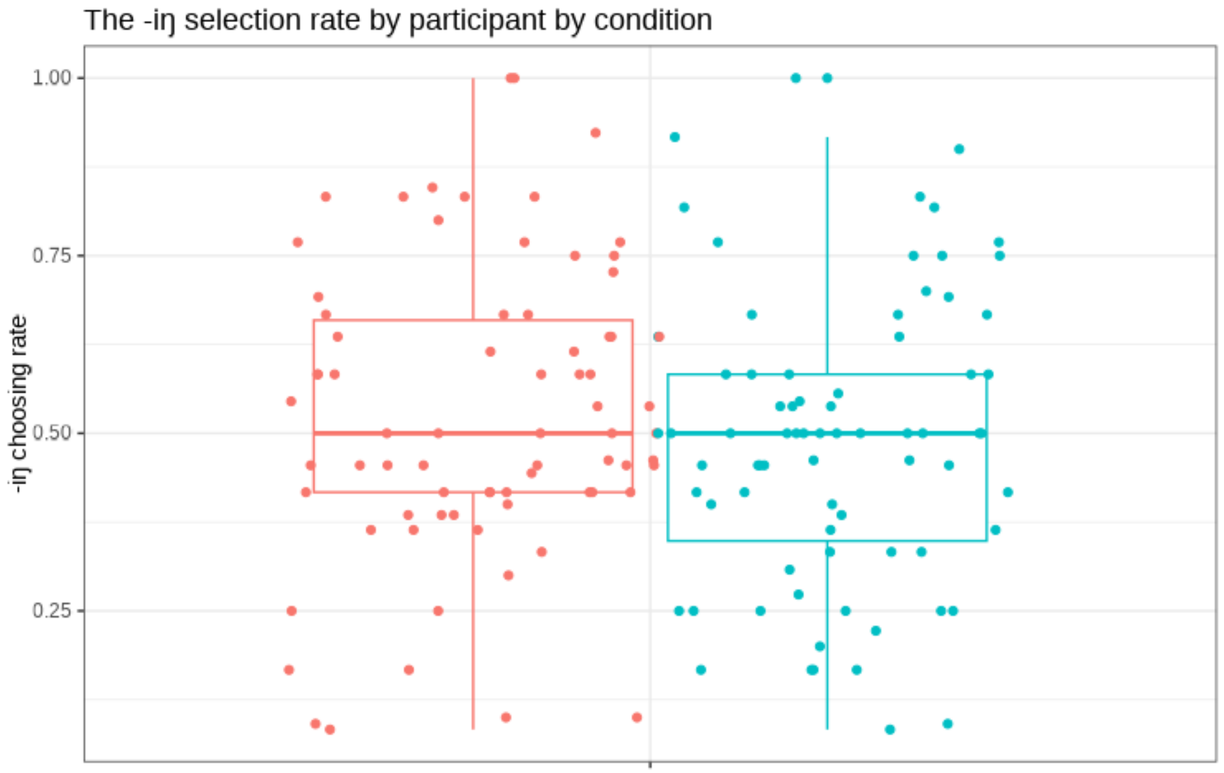
- A total of 1788 valid responses from 76 participants
- Fixed factors:
  - **Key factors**: talker's social label * participant's language experience (PC1)
  - Experimental setting: block * within-block item order (rescaled to 0-1)
  - Stimuli: tone, initial, word frequency (in vs. iŋ)
- Random effects:
  - by-participant random intercept
  - *Models with random slopes have no significant improvement over models with only random intercepts (p=0.313) and have similar outputs*

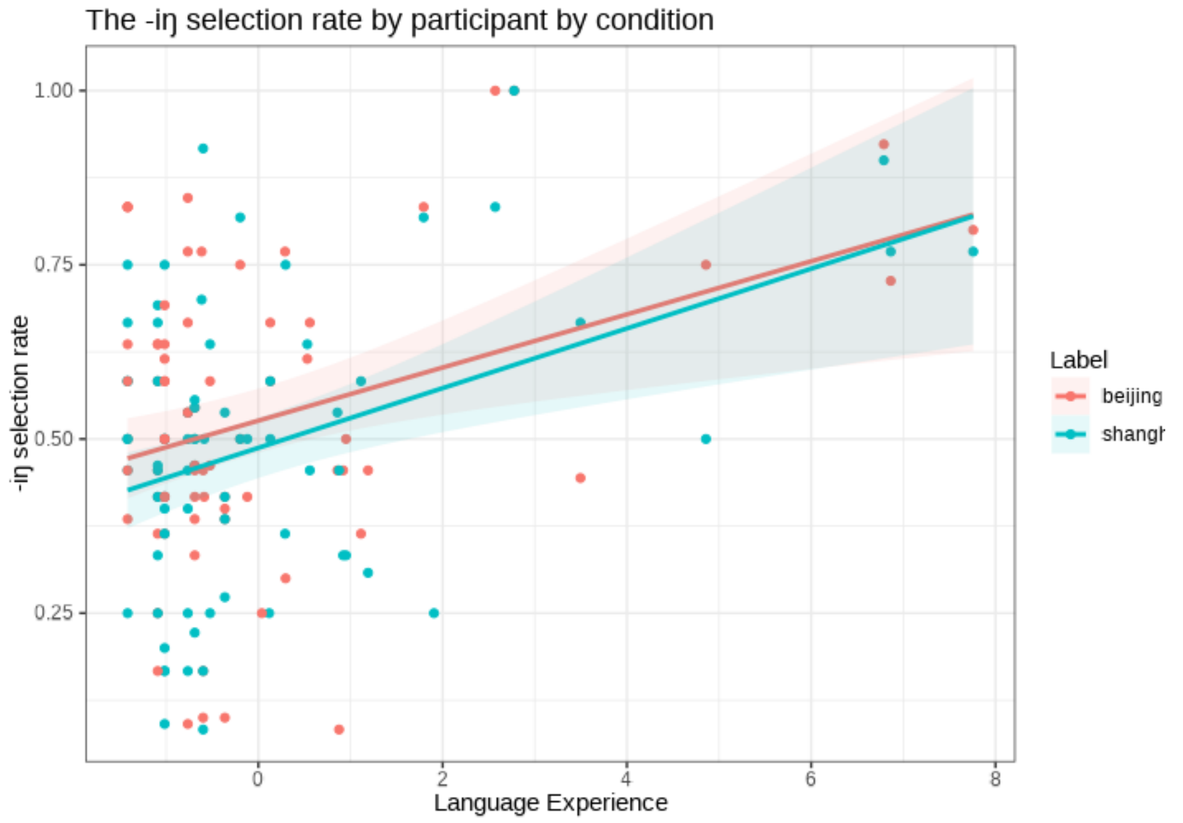
Within-subject results

	Estimate	Std. Error	z value	p value
Label (Beijing v. grand mean)	-0.037	0.246	-0.152	0.879
language experience	0.186	0.051	3.616	**0.000**
block (block 1 v. grand mean)	-0.099	0.098	-1.005	0.315
within-block order	-0.621	0.235	-2.646	**0.008**
word frequency (in v. iŋ)	-1.124	0.811	-1.386	0.166
initial (consonant v. grand mean)	-0.414	0.088	-4.717	**0.000**
tone (tone 1 v. grand mean)	-0.315	0.083	-3.786	**0.000**
tone (tone 2 v. grand mean)	-0.074	0.094	-0.788	0.431
tone (tone 3 v. grand mean)	0.340	0.119	2.865	**0.004**
Label : language experience	-0.014	0.030	-0.476	0.634
block : within-block order	0.067	0.168	0.401	0.689

Table 4: Model output of /in∼iŋ/ selection with the within-participant data

Within-subject results



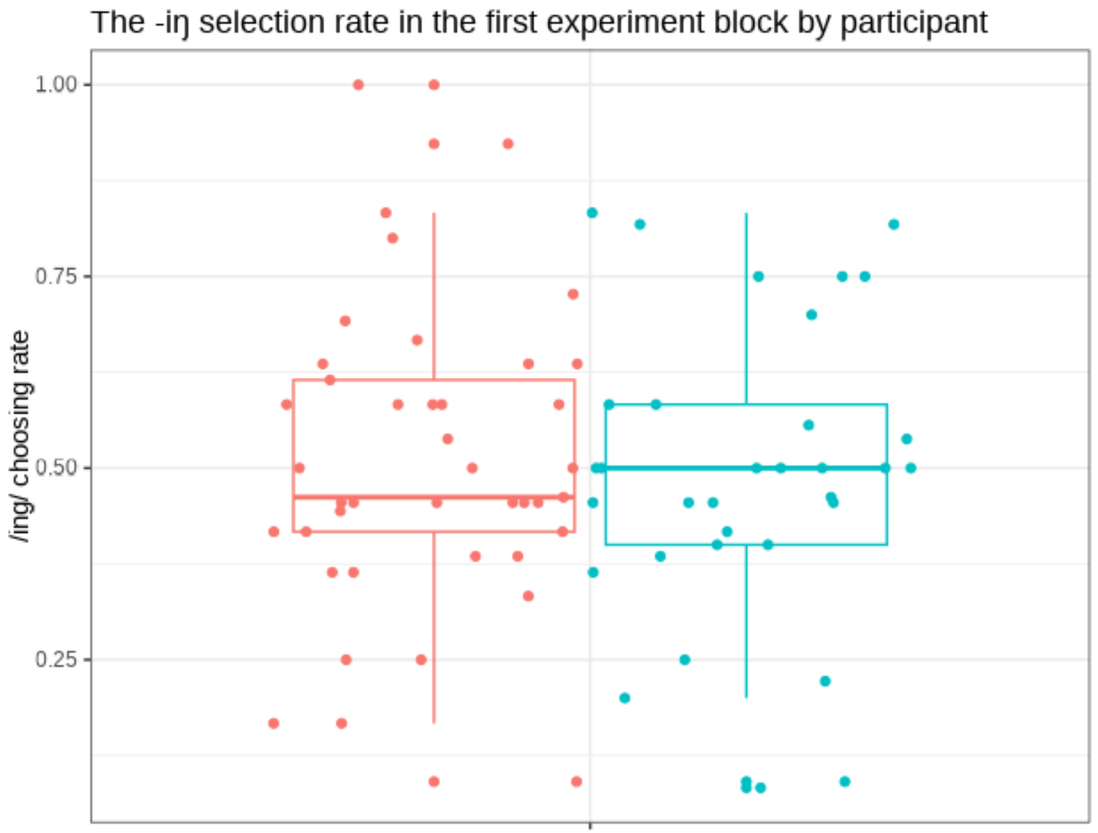


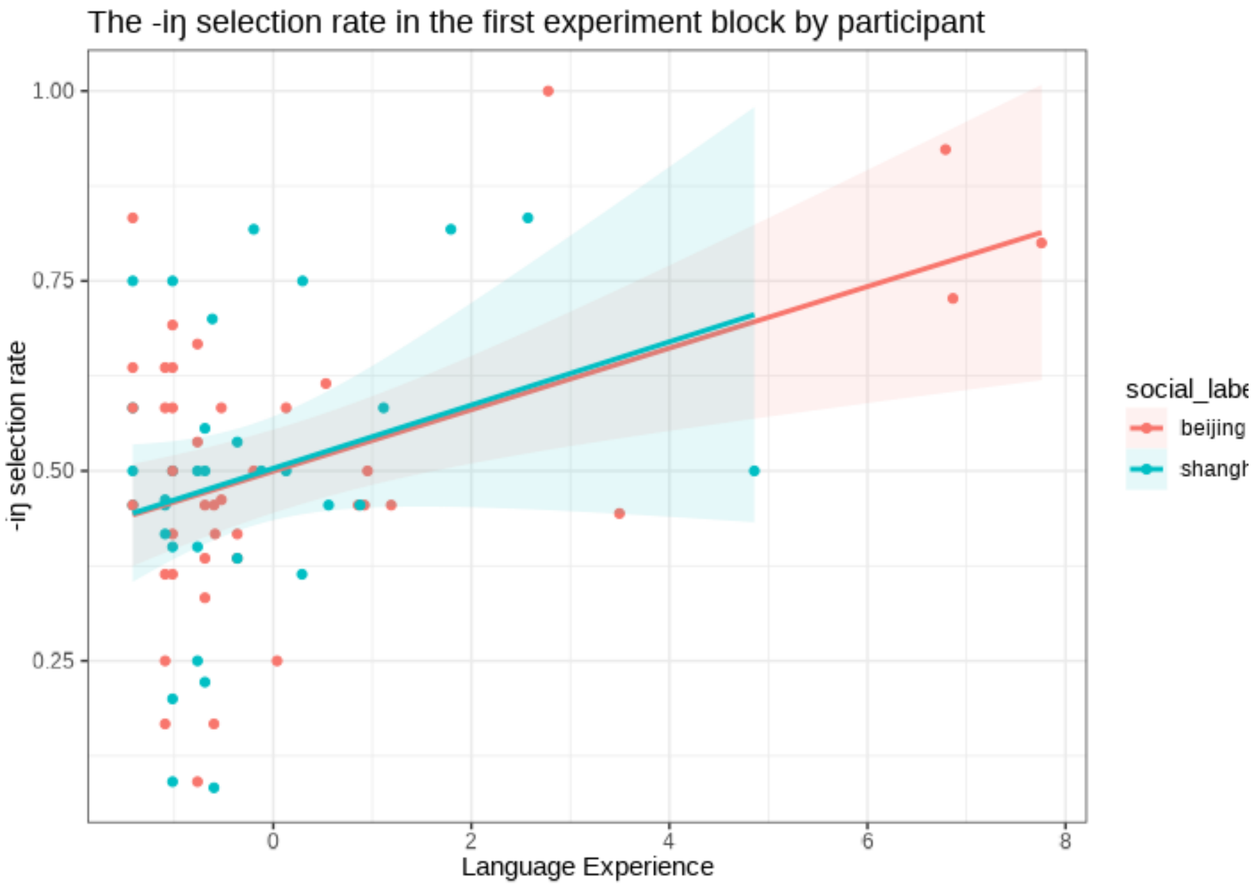
Between-subject results

	Est.	S. E.	Z value	P value
label (Beijing v. grand mean)	-0.080	0.547	-0.146	0.884
language experience	0.176	0.068	2.593	**0.010**
within-block order	-0.755	0.337	-2.241	**0.025**
word frequency (in v. iŋ)	-2.882	1.172	-2.460	**0.014**
initial (consonant v. grand mean)	-0.448	0.125	-3.578	**0.000**
tone (tone 1 v. grand mean)	-0.331	0.119	-2.783	**0.005**
tone (tone 2 v. grand mean)	-0.148	0.134	-1.108	0.268
tone (tone 3 v. grand mean)	0.427	0.167	2.548	**0.011**
Label : language experience	-0.002	0.068	-0.029	0.977

Table 5: Output of the model for between-participant data collected from the first experimental block

Results from Block 1 only





Summary

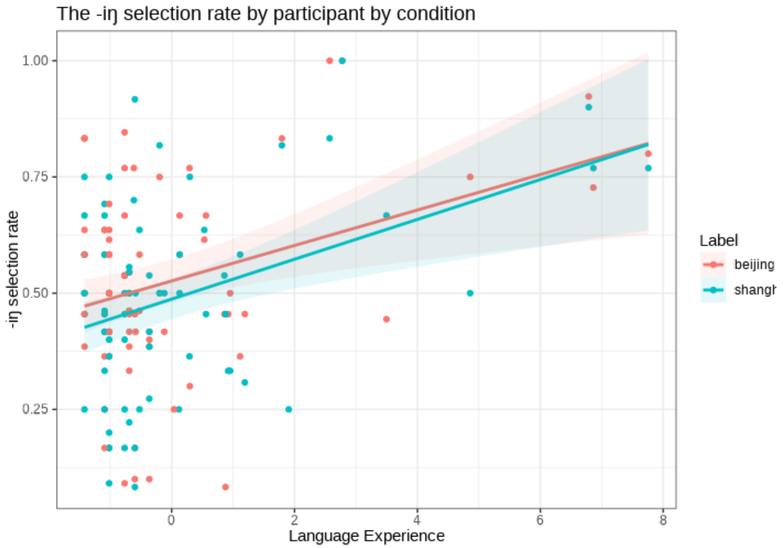
- Social labeling effect not found
  - No significant difference of /iŋ/ selection between the two conditions, either between-subject or within-subject
- Language experience has effect on speech perception
  - Consistent with our expectation: participants with **more** language experience with Standard Mandarin have **higher** *iŋ*-rate
- No interaction effect between the talker's dialect label and the listener's language experience.

Summary

Has **Social labeling** effect on speech perception	(Talker's) **Beijing** condition has **higher** *iŋ*-rate	✗
Has **Language experience** effect on speech perception	Participants with **more** language experience with Standard Mandarin have **higher** *iŋ*-rate	✓
Interaction between talker's social labeling and listener's language has effect on speech perception	*iŋ*-rates between -condition differ more for participants more experienced with Standard Mandarin	✗

Discussion questions

- Does the uneven distribution of participants' Standard Mandarin experience have an influence?
  - Vast majority of participants have relatively limited experience with Standard Mandarin
- Label construction: How to balance between control variables and sufficient credibility?
  - The social-labeling construction may not be convincing enough
  - Identity of talkers established with plain text
  - No voice or photo clues provided
- How does formality influence it?
- How does the social awareness of this variable play a role in this context?



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- My gratitude also extends to all the participants in the experiment and to the fantastic PLC 47 committee for making this event possible!

Thank you!

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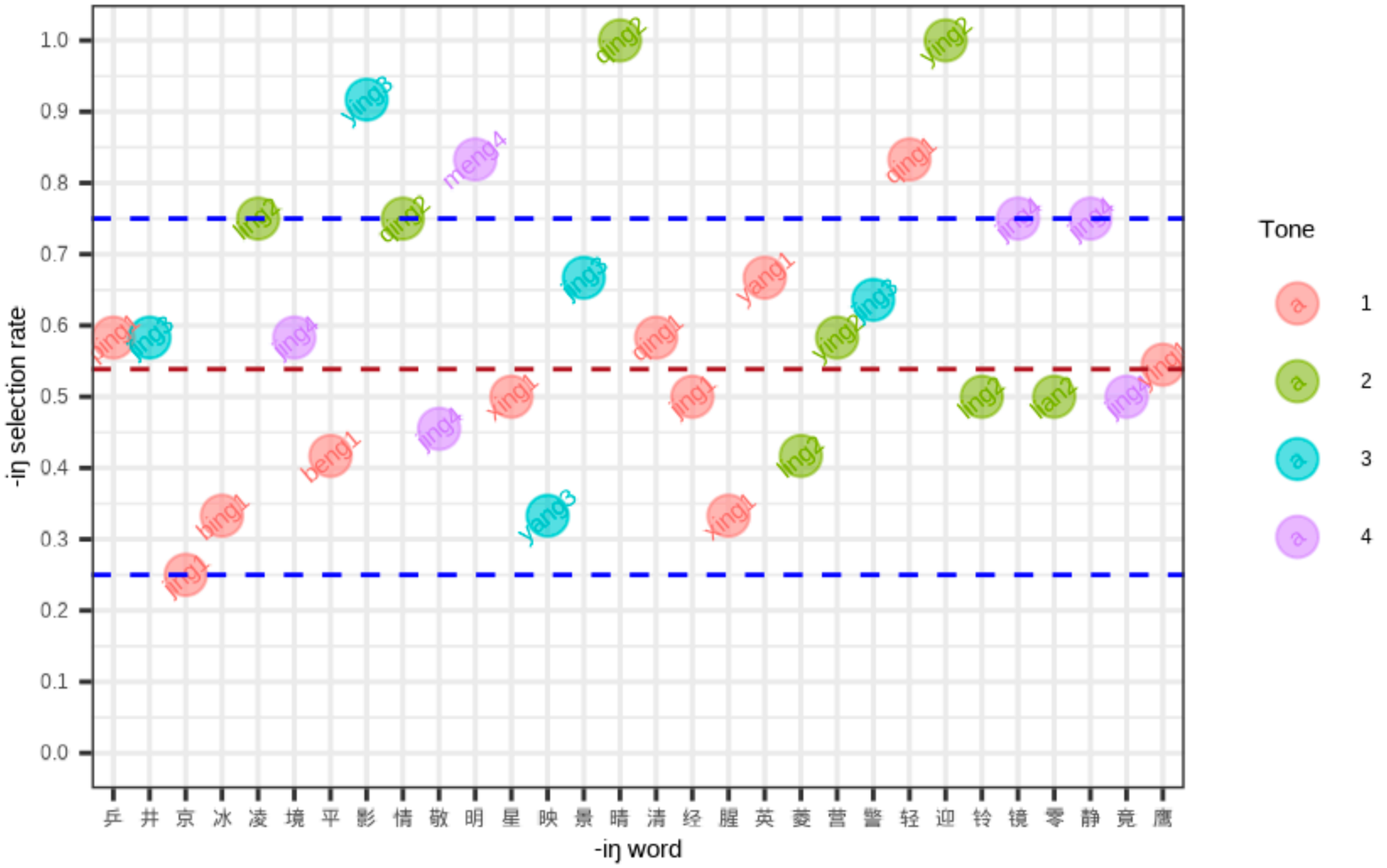
From the norming test



The average selection rate of /iŋ/ by item. The initial consonant and tone of the stimulus item are labeled on the data points. Blue dashed lines indicate the range of 0.25-0.75. The red dashed line indicates the mean /iŋ/ selection rate within the new subset.

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