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Can phonological variant choices be primed in perception and production?

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Variant Persistence

Persistence:

When language users produce sociolinguistic variation in everyday conversation, they tend to reuse the same linguistic variant that they have recently used or been exposed to (Szmrecsanyi, 2006; Clark, 2014; Tamminga, 2016; Li & Tamminga 2021)

Variant Persistence

- Persistence has been observed at different levels of grammar
(Sankoff, 1978; Abramowicz, 2007; Tamminga, 2016; Clark, 2018; Villarreal, 2022)

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- A common interpretation:

Persistence may be driven by priming, in the psycholinguistic sense of repetition being facilitated in processing (Clark, 2018; Tamminga, 2016, 2019; Pickering & Garrod, 2017)

Priming

- Priming: the phenomenon whereby processing a particular form facilitates the subsequent processing of similar forms
- Robustly attested cross-linguistically
- **Syntactic priming**

Prime sentence

One of the fans punched the referee.

VS.

The referee was punched by one of the fans.



Target picture



Lightning is striking the church vs. The church is being struck by lightning (Bock, 1986) 6

Persistence and priming



Similarities empirical properties (decay & lexical boost) (Bock, 1986; Pickering, 1999; Pickering, 2008)

Persistence and priming



Phonological persistence

e.g., /t/-flapping (Clark, 2018)
DH-stopping (Tamminga, 2014)
[f]-[θ] (Clark, 2014)

Persistence and priming

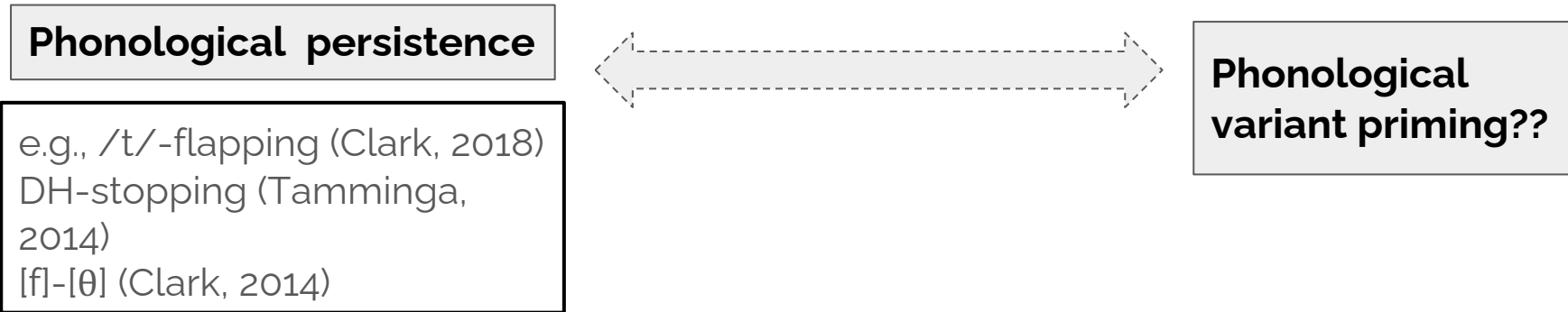


Phonological persistence

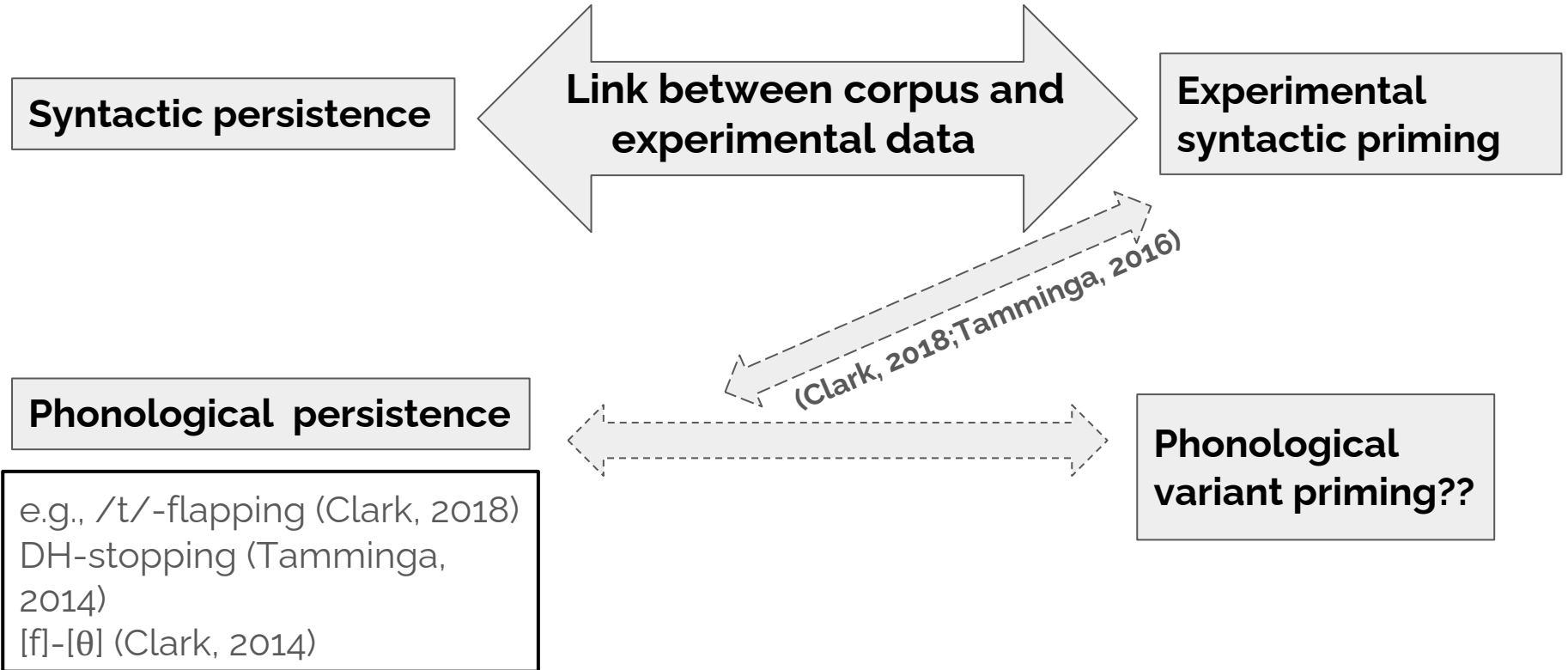
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**Phonological
variant priming??**

Persistence and priming



Persistence and priming



Syntactic persistence

Link between corpus and experimental data

Experimental syntactic priming

Phonological persistence

e.g., /t/-flapping (Clark, 2018)
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Phonological variant priming??

The current study

Research question: can discrete phonological variant choices (-in' vs. -ing) be experimentally primed in speech perception and production?

Variant priming: categorization task

Variant priming in categorization: Hypothesis

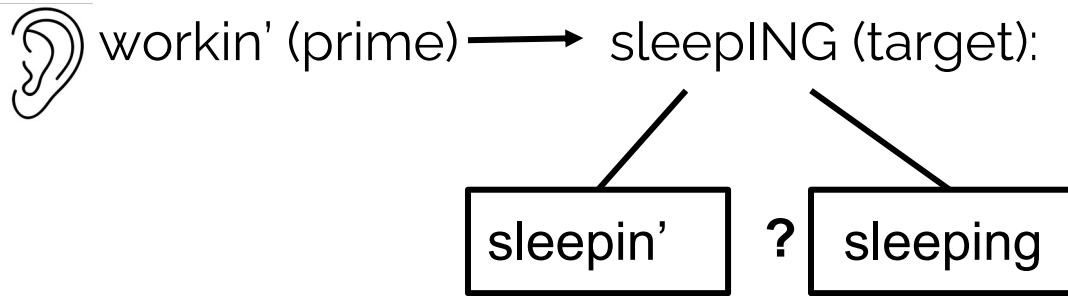
Hearing one variant of (ING) will make listeners more likely to perceive the same variant given an ambiguous target for **categorization**.



workin' (prime) → sleepING (target):

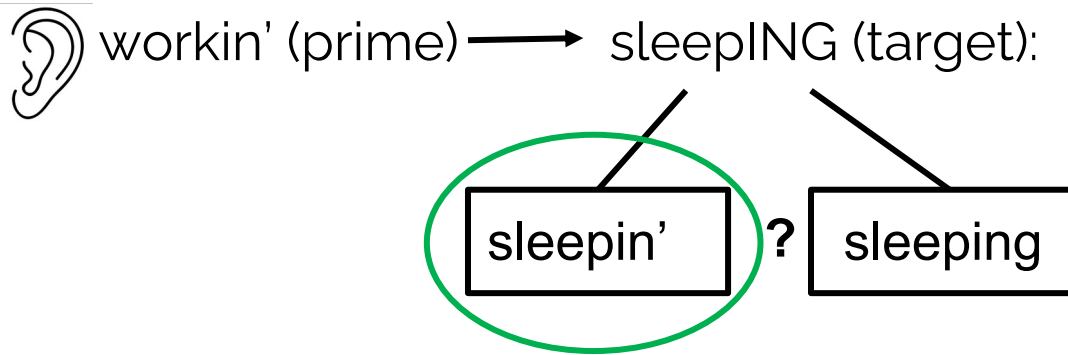
Variant priming in categorization: Hypothesis

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Variant priming in categorization: Hypothesis

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Variant priming in categorization: Design

- Compare two critical conditions

-in'-primed condition: *-in'* (prime) → Target

-ing-primed condition: *-ing* (prime) → Target

Variant priming in categorization: Design

- To prime the perception: **Lexical decision task**

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- To perceive variant choices: **forced-choice categorization task**

Variant priming in categorization: Design

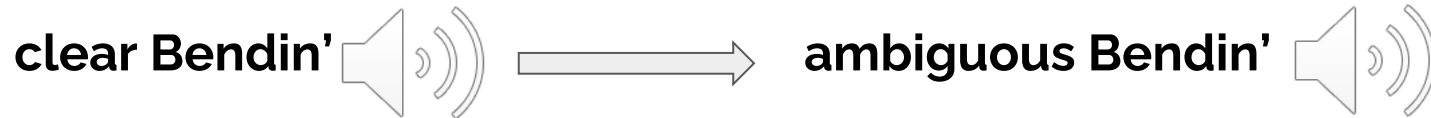
- To prime the perception: **Lexical decision task**
- To perceive variant choices: **forced-choice categorization task**

Categorization of **ambiguous tokens** to force people to make a choice in variable perception: if people don't know for sure which variant they heard, they will have to make a choice in perception.

Variant priming in categorization: Design

- **Ambiguous tokens**

- ideally, people can tell it's ING but not the exact variant
- source-extraction manipulation: vowel identifying information is masked while the intonational contour remains unchanged

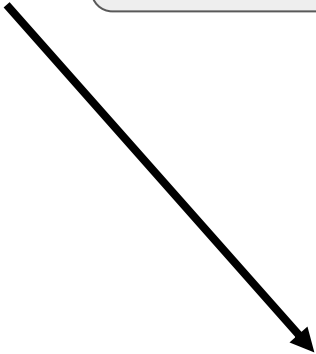


Variant priming in categorization: Design

Key
pressing

Prime

Is this a word?
F: Nonword J: Word



Button
clicking

Target

Which word have you heard?



beggin'

begging

Variant priming in categorization: Stimuli

- **critical sequences**

- 38 critical sequences
 - 38 clear primes
 - 38 ambiguous targets

- **filler trials**

- 200 filler trials of various types including distractor sequences (e.g. sequences where targets after *-ing* or *-in'* were not ING)

Variant priming in categorization: Implementation

- **Participants**

80 native speakers recruited from both Prolific and Penn undergrad subject pool

- **Procedure**

implemented online using PCIBex

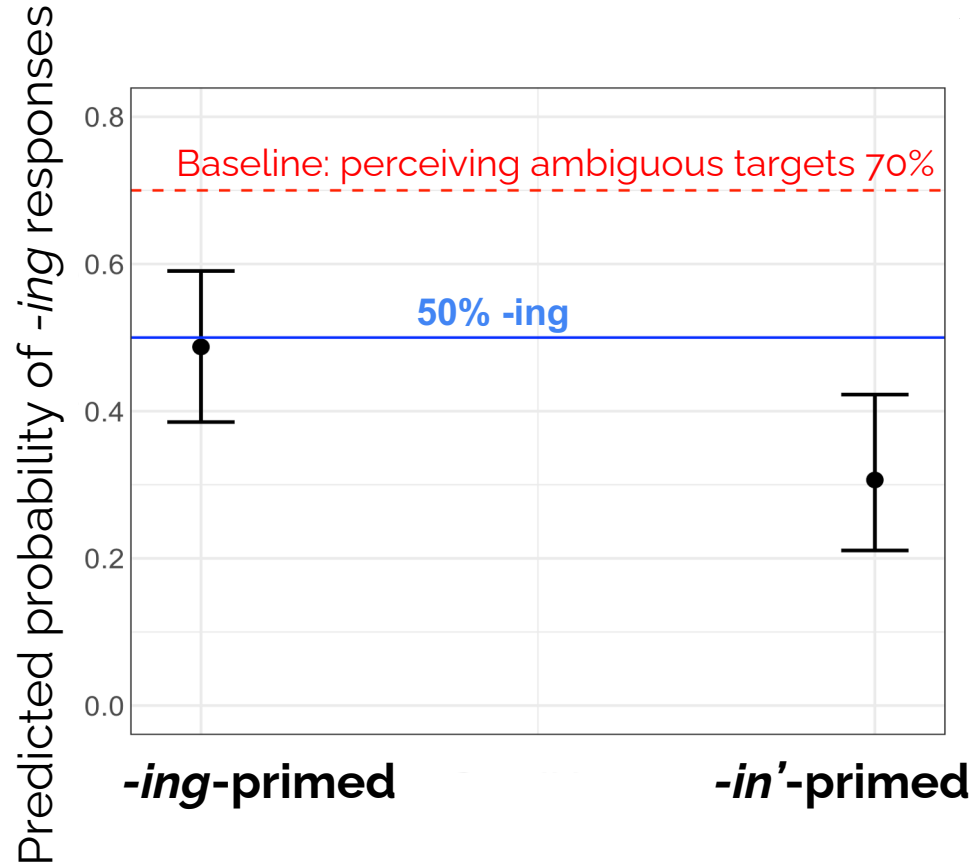
- **Analysis**

Listeners' *-ing* responses ~

Condition (-in'-primed vs. -ing-primed) * Target frequency + Trial number + Source (Prolific vs. Sona) + (Condition | Speaker) + (Target Frequency | Speaker)

Variant priming in categorization: Results

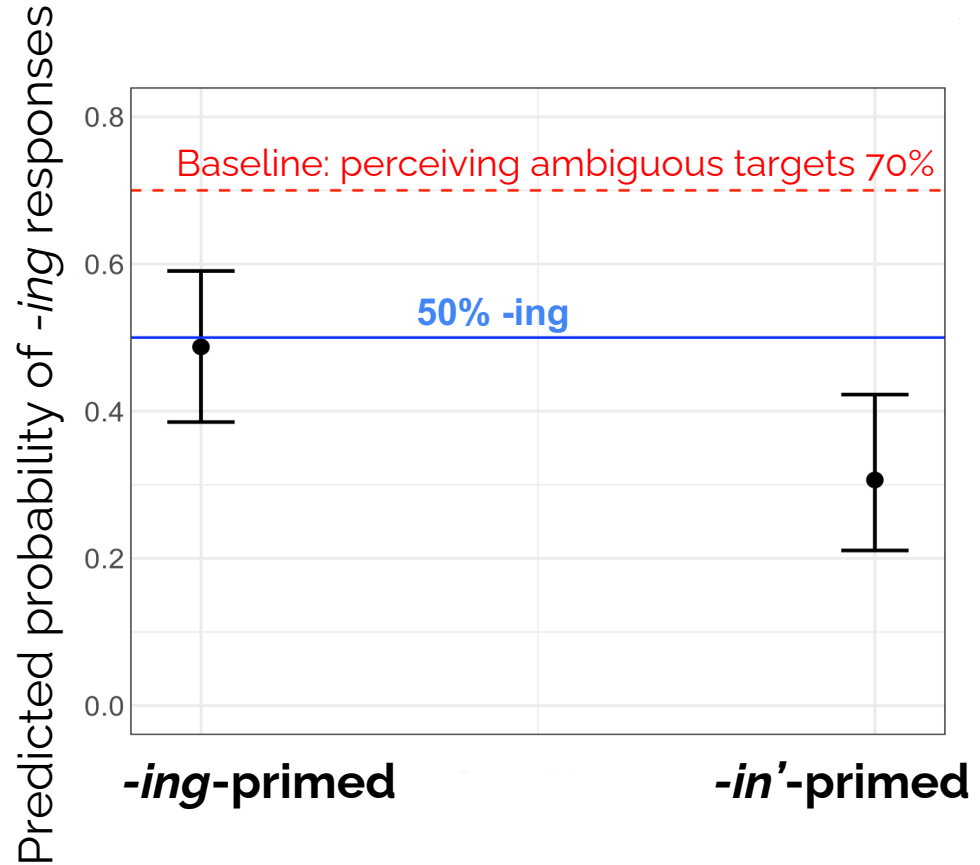
- Significant main effect of Condition ($\beta = 0.77$, $p < 0.001$)
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Variant priming in categorization: Results

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Participants were significantly more likely to categorize an ambiguous target as containing *-ing* when they had just heard an *-ing* variant on the previous trial.



Variant priming: shadowing task

Variant priming in shadowing: Design

- repeated previous set-up except that the categorization task was replaced by a shadowing task
- participants repeated out loud what they heard the model talker say:
 - in'*-primed condition: *-in'* (LD) → Target (shadowing)
 - ing*-primed condition: *-ing* (LD) → Target (shadowing)
- Same stimuli

Variant priming in shadowing: Implementation

- **Participants:** 160 native speakers recruited from both Prolific and Penn undergraduate subject pool
- **Procedure:** implemented online through PClbex
- **Coding:** responses coded independently by two different coders and disagreed cases were resolved by a third coder
 - NAs excluded
 - Tokens with wrong stems excluded
 - Tokens with ambiguous variants
 - Tokens with wrong words excluded
 - Tokens with tense vowels and final strengthening were excluded

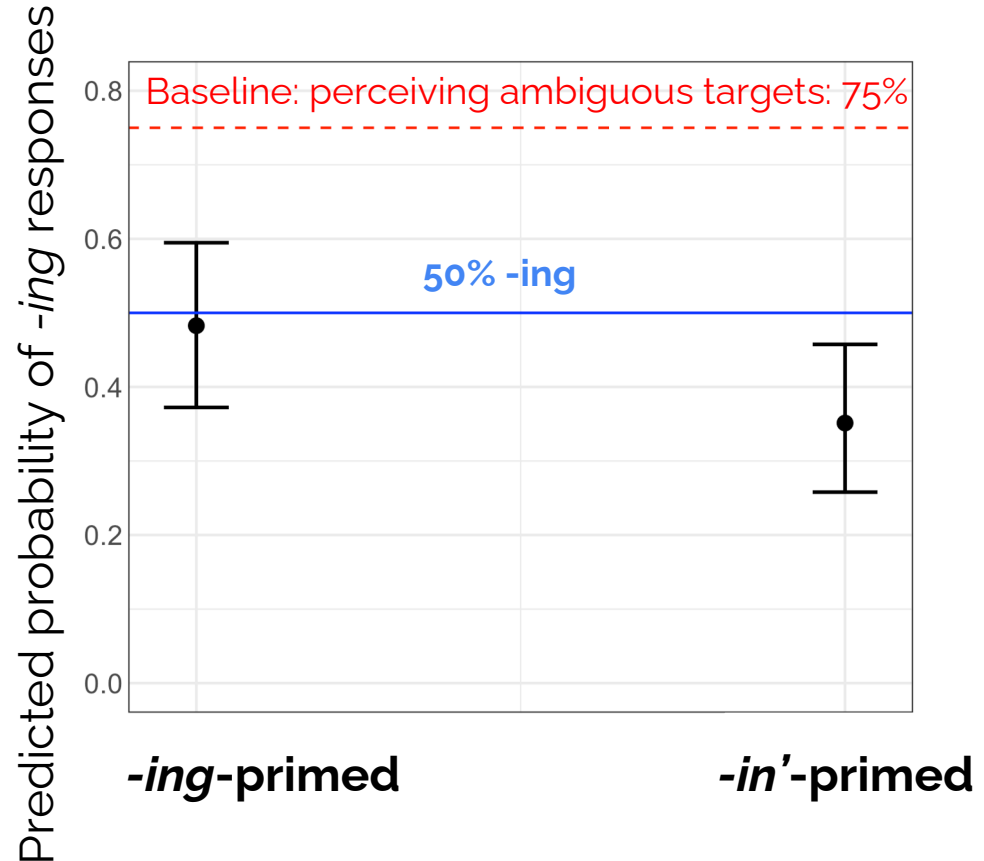
Variant priming in shadowing: Implementation

- **Analysis**

Listeners' *-ing* responses ~ Condition (-in'-primed vs. -ing-primed) *
Target frequency + Trial number + Source (Prolific vs. Sona) +
Headphone (yes vs. no) + (Condition + Target Frequency | Speaker) + (1|
Target)

Variant priming in shadowing: Results

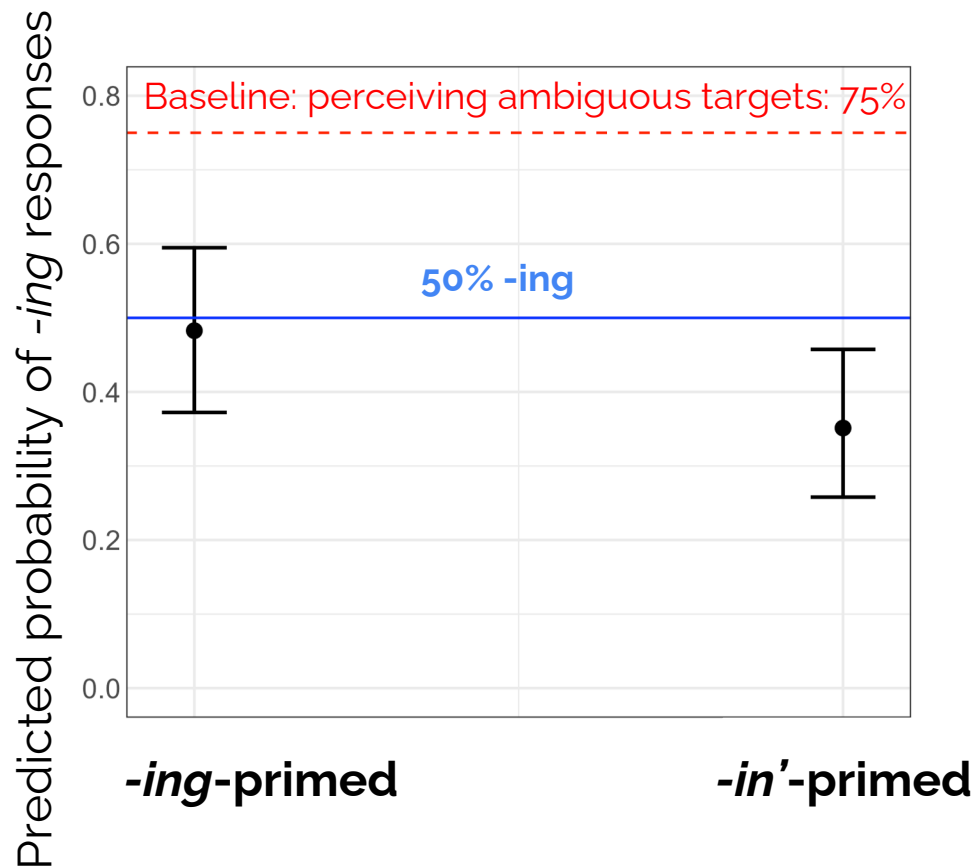
- **Main effect of Condition:**
($\beta=0.55$, $p < 0.001$)
- No significant effect found for Target frequency:
($\beta=-1.42$, $p = 0.15$)



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Similar to categorization task: participants were primed when they were asked to shadow ambiguous targets.



Discussion & Conclusion

- The variant participants are recently exposed to can influence which variant they perceive subsequently: **phonological variant choices can be primed!**

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- The variant participants are recently exposed to can influence which variant they perceive subsequently: **phonological variant choices can be primed!**
- The difference between the two conditions cannot be attributed to convergence towards the talker's overall (ING) rate because the conditions do not differ in that rate.

Discussion & Conclusion

- People also appear to be moving toward the overall statistics of the model talker's global *-ing* rate.

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- This might reflect more holistic convergence toward their global expectations about the model talker.

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Discussion & Conclusion

- The use of a shadowing task was originally intended to get at whether variant choices in *production* can be primed.
- But the priming effect already shows up in people's perception of the ambiguous targets→ the shadowing task might just be functioning as a different way for participants to report what they think they heard.
- The similar results from two tasks support the idea that even the shadowing task might just reflect perception-to-perception priming.

Discussion & Conclusion

Overall, our results suggest that phonological variant choices **can be primed**, which makes it plausible that phonological persistence in conversation speech could arise due to priming.

Thank you for your attention!

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