

Speakers converge toward variants they haven't heard: The case of Southern monophthongal /ay/

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Linguistic Convergence

Speakers shift their speech to sound more similar to their addressees.

Linguistic Convergence

Speakers converge toward the linguistic input they observe

- ▶ **Lexical Items** (Garrod & Doherty, 1994)
- ▶ **Syntactic Constructions** (Bock, 1986; Pickering & Ferreira, 2008)
- ▶ **Lengthened VOT** (Shockley et al., 2004; Nielsen, 2011)
- ▶ **Vowel Quality** (Babel 2009, 2012; Pardo 2012)

Linguistic Convergence

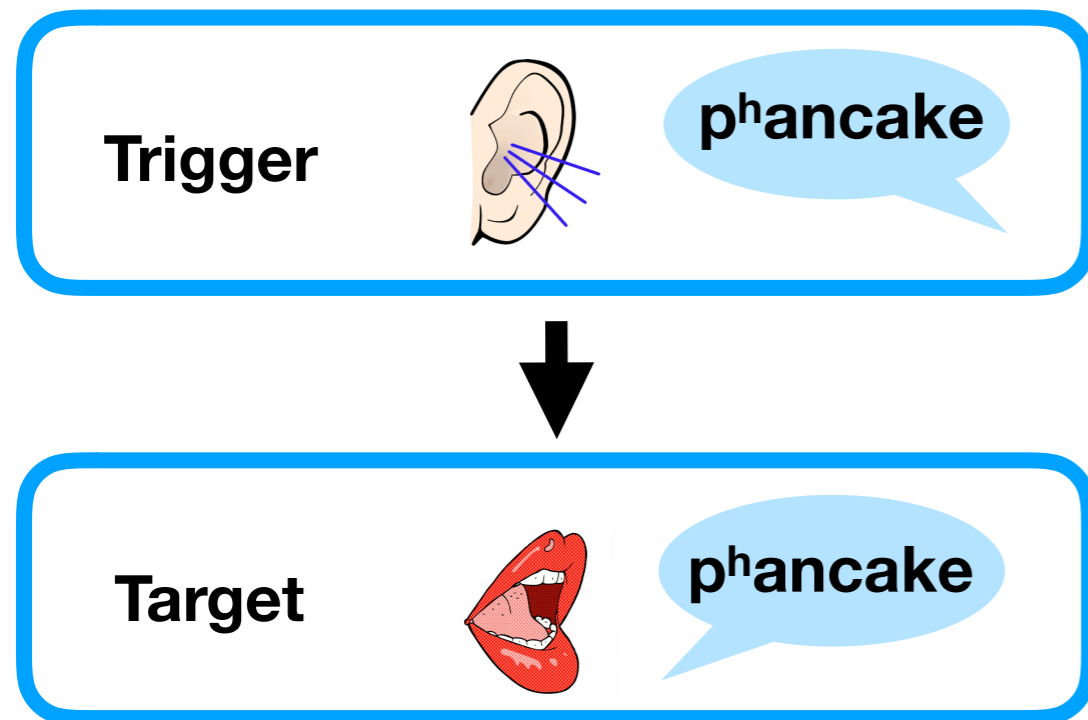
Speakers converge toward linguistic variants they **expect**, triggered by social cues

- ▶ Identity Projection Model: Instead of converging toward “observable behaviour of the recipient ... speakers converge to a stereotype of the ‘model’ receiver, not the actual partner in direct communication” (Auer & Hinskens, 2005)
- ▶ In New Zealand, an Anglo interviewer produced the “eh” tag when conversing with a Maori interviewee who never used this tag (Bell, 2001)

Linguistic Convergence

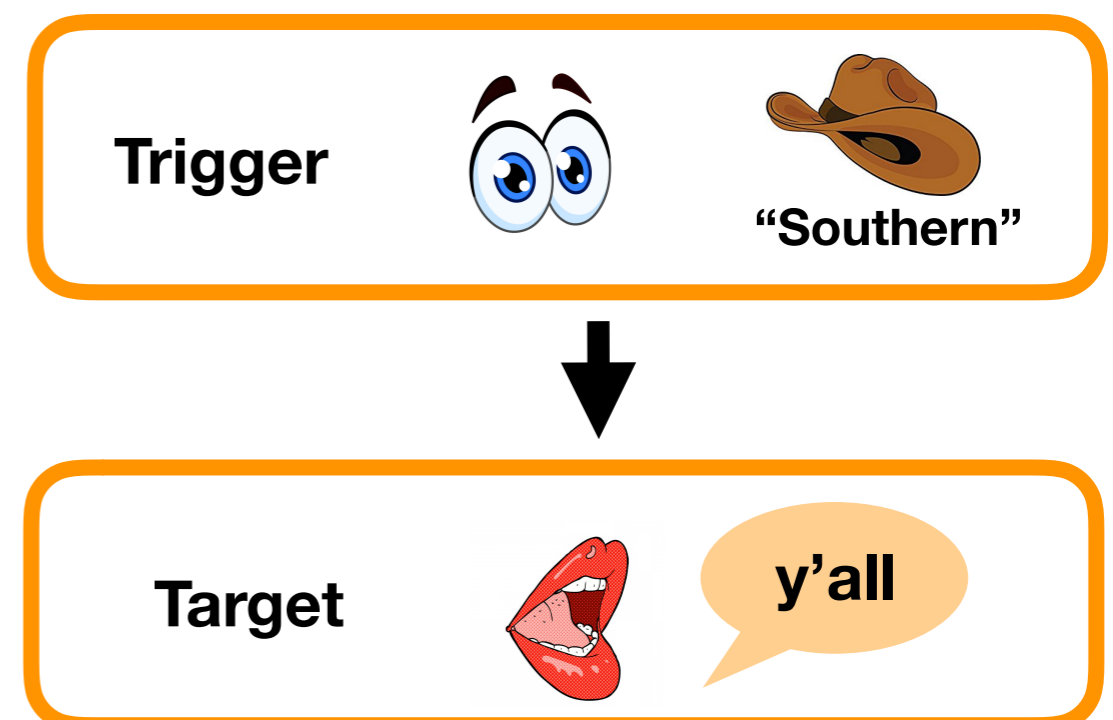
Observation-Driven

- ▶ Trigger and target are the same
- ▶ Target directly derived from the input in real time



Expectation-Driven

- ▶ Trigger may (but need not) be linguistic
- ▶ Target is derived from pre-existing knowledge



Linguistic Convergence

Automatic mechanistic processes

- ▶ Episodic Memory Storage: Perception-production feedback loops (Goldinger, 1998)
- ▶ Interactive Alignment Model: Structural priming mechanisms (Pickering & Garrod, 2004)

Socio-psychological motivations

- ▶ Audience Design Model: Convergence as a form of style-shifting triggered by addressee (Bell, 1984)
- ▶ Communication Accommodation Theory: Goal is to manage social distance (Giles, 1980)

Overview

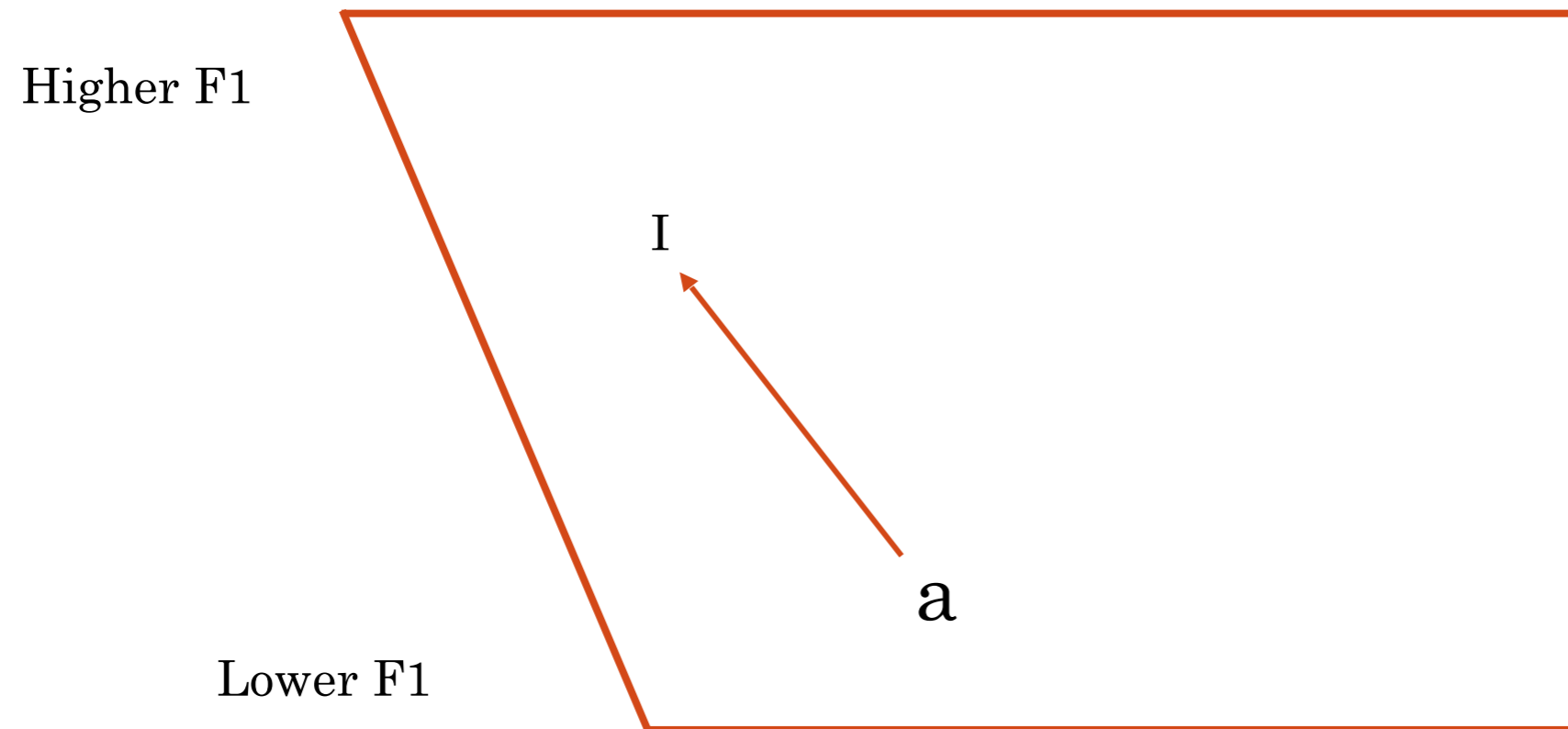
Experiment 1: Production

- ▶ Do participants shift their speech **production** toward a variant they **expect**—but don't observe—from a talker?

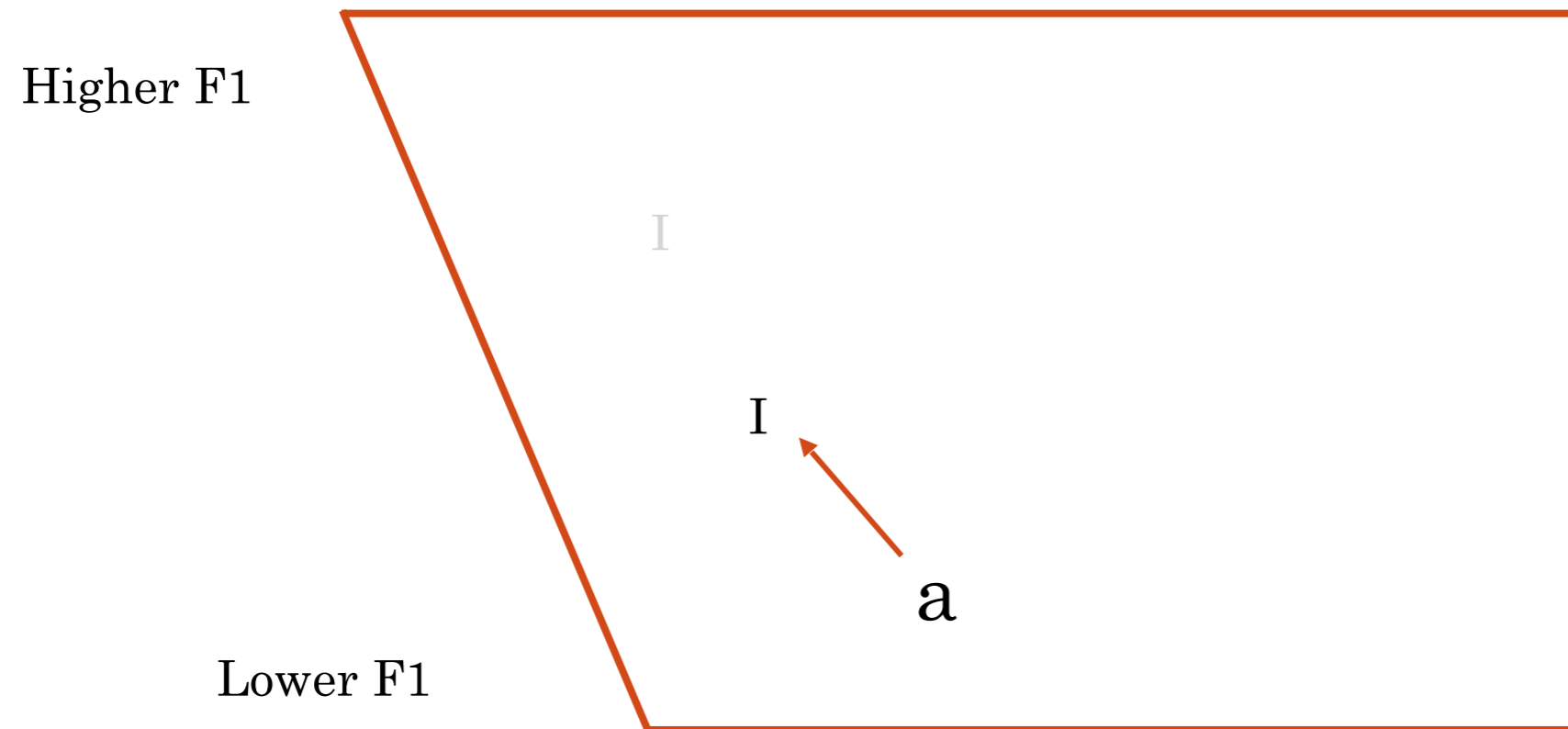
Experiment 2: Perception

- ▶ Do participants shift their **perceptual** category boundaries to encompass variants they **expect**—but don't observe—from a talker?

/aɪ/ Monophthongization



/aɪ/ Monophthongization



Experiment 1

Do participants produce more monophthongal /aɪ/ after hearing a clearly Southern speaker who **never produces** the /aɪ/ vowel?

A Word Naming Game

Run online in Ibex using PennController (Zehr & Schwarz 2018)

Baseline

Clues presented
on-screen

Participants
respond out loud

Exposure

Clues presented
over headphones by
either a Southern or
Midland talker

Participants respond
out loud

Post-Exposure

Clues presented
on-screen

Participants
respond out loud

A Word Naming Game

Baseline

Clues presented
on-screen

Participants
respond out loud



A Word Naming Game

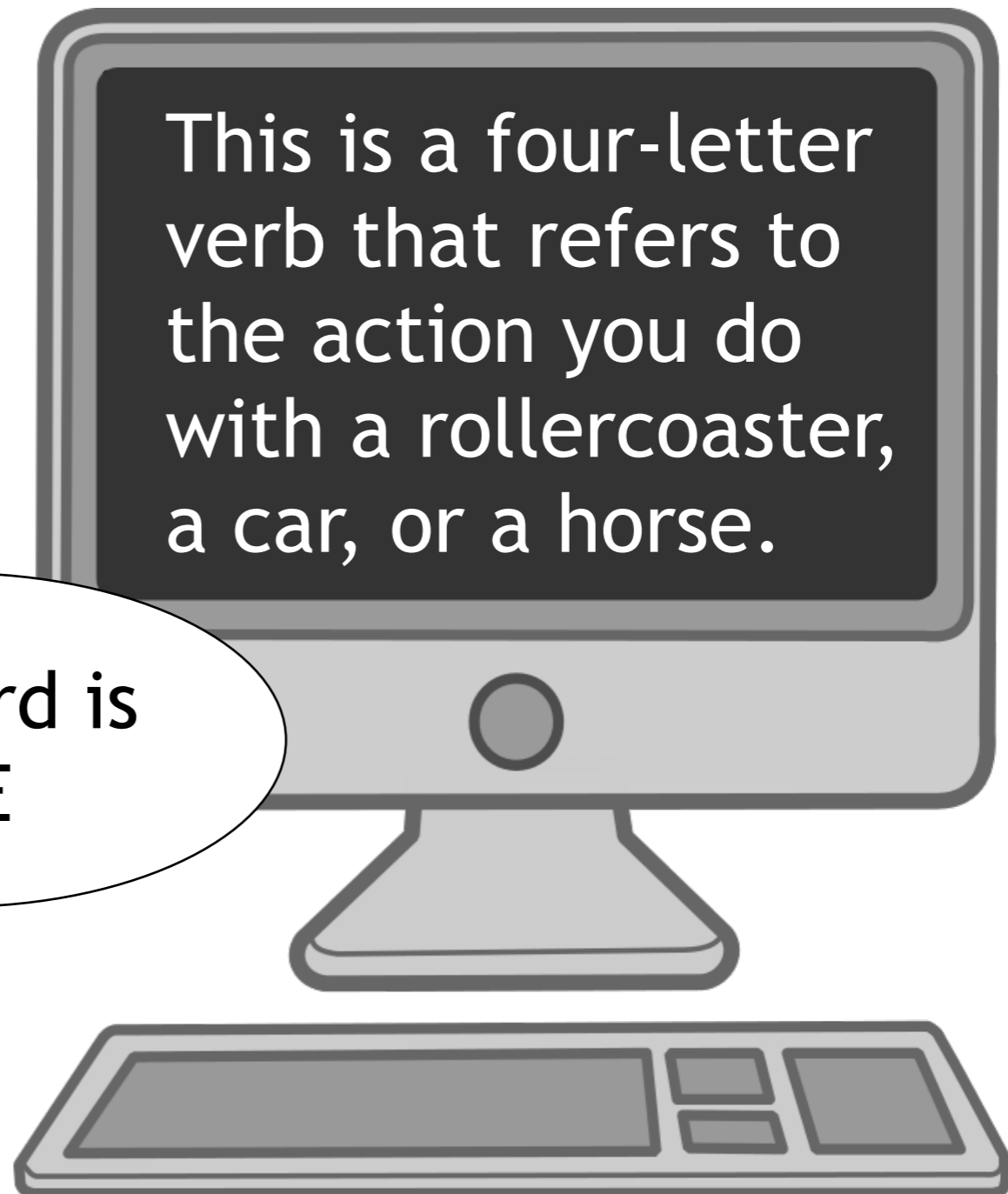
Baseline

Clues presented
on-screen

Participants
respond out loud



The word is
RIDE



This is a four-letter
verb that refers to
the action you do
with a rollercoaster,
a car, or a horse.

A Word Naming Game

Exposure

Clues presented
over headphones by
either a Southern or
Midland talker

Participants respond
out loud

A Word Naming Game

Southern Talker:

- From southern Mississippi
- Reversal of front tense & lax vowel nuclei
- Fronting of back vowels
- Pin/Pen merger

Exposure

Clues presented over headphones by either a Southern or Midland talker

Participants respond out loud



A Word Naming Game

Southern Talker:

- From southern Mississippi
- Reversal of front tense & lax vowel nuclei
- Fronting of back vowels
- Pin/Pen merger



Exposure

Clues presented over headphones by either a Southern or Midland talker

Participants respond out loud

Midland Talker:

- From North East Ohio
- Participants described talker as “normal” or “neutral” sounding



A Word Naming Game

Southern Talker:

- From southern Mississippi
- Reversal of front tense & lax vowel nuclei
- Fronting of back vowels
- Pin/Pen merger



Exposure

Clues presented over headphones by either a Southern or Midland talker

Part
out

The word is
SPIDER



Midland Talker:

- From North East Ohio
- Participants described talker as “normal” or “neutral” sounding



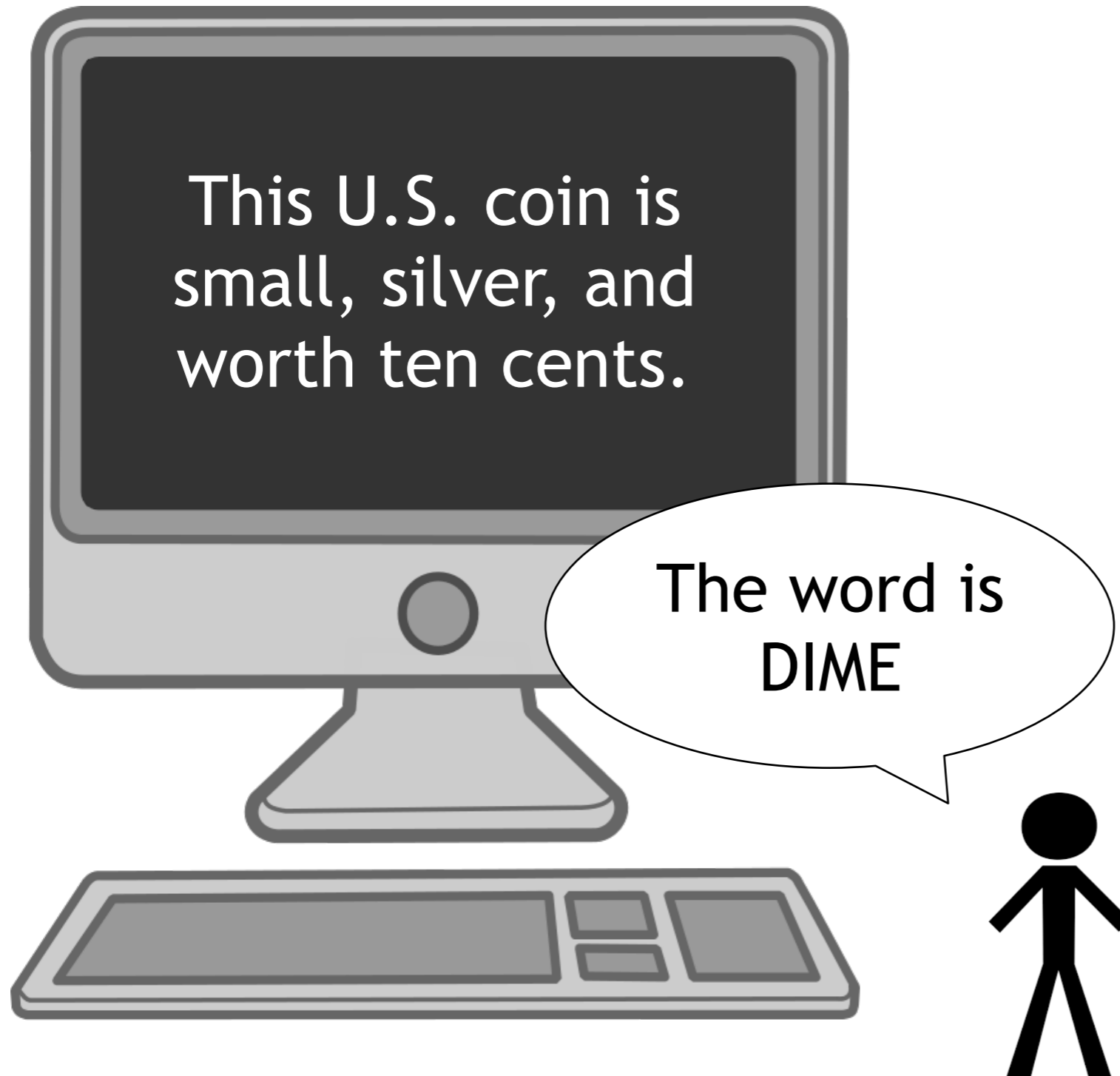
A Word Naming Game

Post-Exposure

Clues presented
on-screen

Participants
respond out loud

A Word Naming Game



Post-Exposure

Clues presented on-screen

Participants respond out loud

A Word Naming Game

List 1

Cry

Wine

Pie

List 2

Dry

Vine

Buy

List 3

Try

Fine

Spy

30 /aɪ/ words and 30 fillers elicited per list

A Word Naming Game

List 1

Cry

Wine

Pie

Freq = 2.97

List 2

Dry

Vine

Buy

Freq = 2.97

List 3

Try

Fine

Spy

Freq = 2.97

30 /aɪ/ words and 30 fillers elicited per list

A Word Naming Game

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30 /aɪ/ words and 30 fillers elicited per list

A Word Naming Game

Baseline

List 3

Try

Fine

Spy

Freq = 2.97

Exposure

List 1

Cry

Wine

Pie

Freq = 2.97

Post-Exposure

List 2

Dry

Vine

Buy

Freq = 2.97

30 /aɪ/ words and 30 fillers elicited per list

Participants

120 Participants recruited from Prolific (N=105) or Penn Subject Pool (N=15)

10 excluded due to recording issues or excessive (>20) mistakes

110 included here

51 Southern participants

- 25 in Midland Condition
- 26 in Southern Condition

59 Non-Southern participants

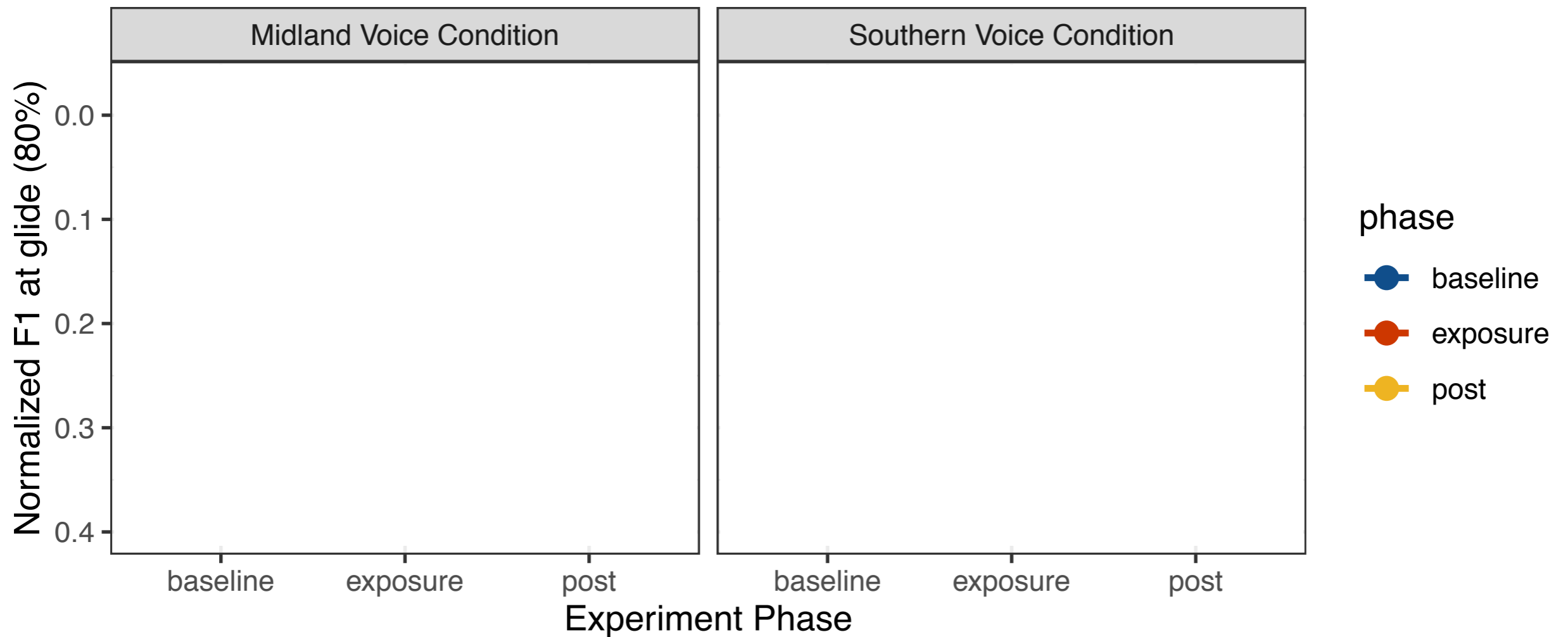
- 28 in Midland Condition
- 31 in Southern Condition



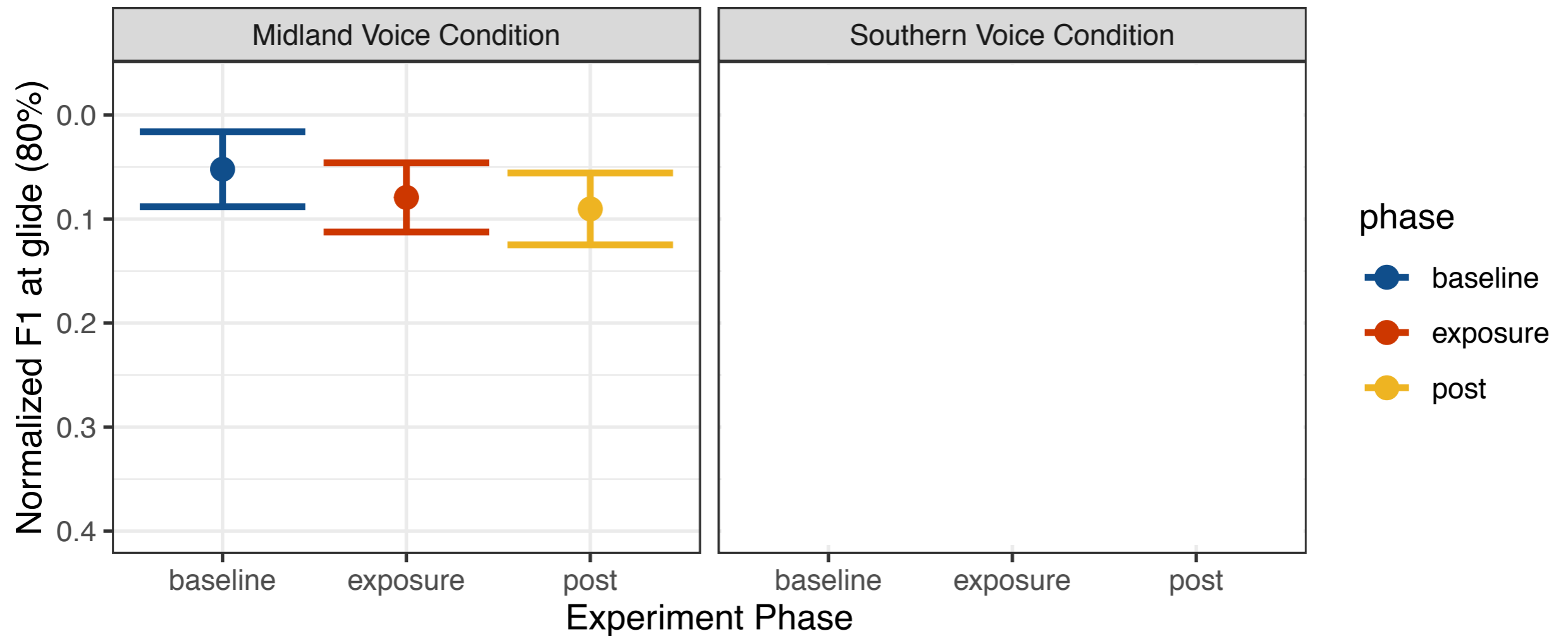
Analysis

- ▶ Sound files and transcripts forced-aligned & (blindly) hand corrected
- ▶ F1 and F2 measurements extracted at nucleus (20%), midpoint (50%), and glide (80%) then Lobanov normalized
- ▶ Linear mixed effects regression for /aɪ/ tokens with F1 at glide as dependent variable
- ▶ Model fit based on likelihood ratio tests
 - Fixed predictors:
 - Phase*Condition*Dialect
 - Duration
 - Frequency
 - Participant Age
 - By-item random intercepts & random slopes for Dialect
 - By-participant random intercepts & random slopes for Phase

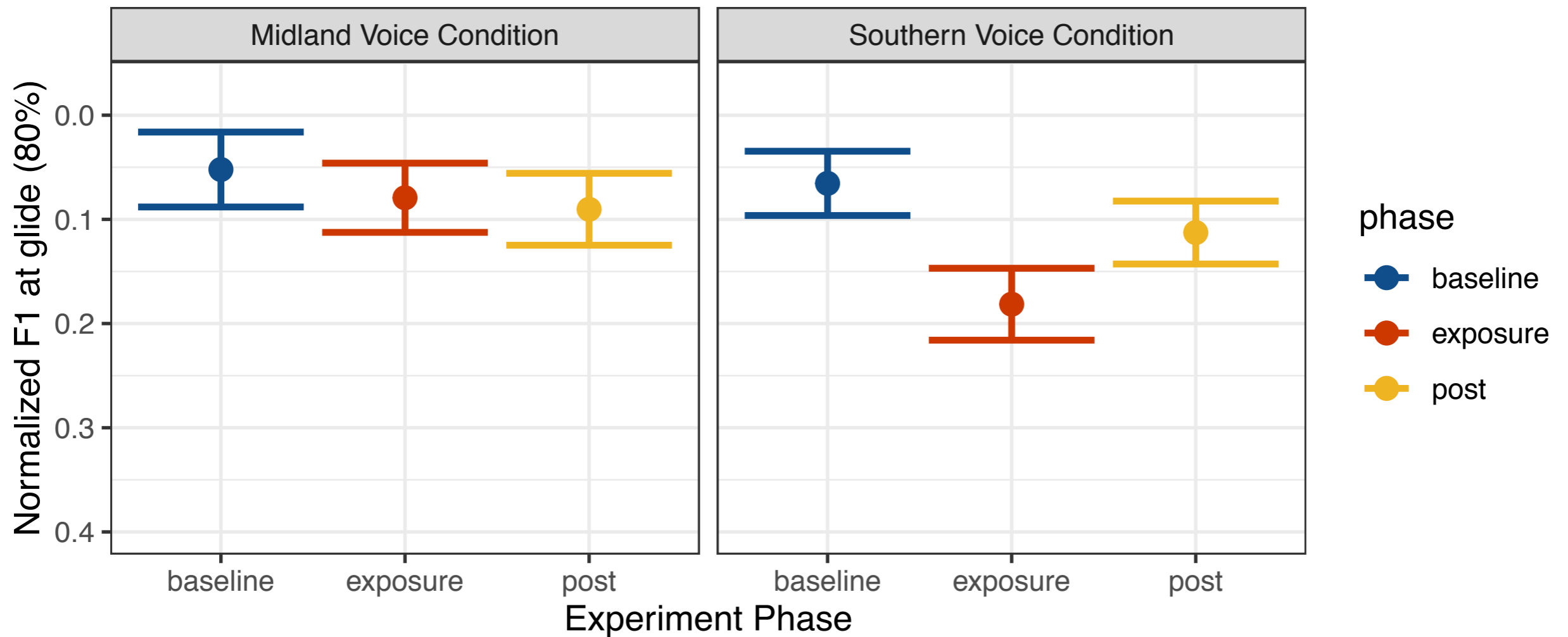
Results



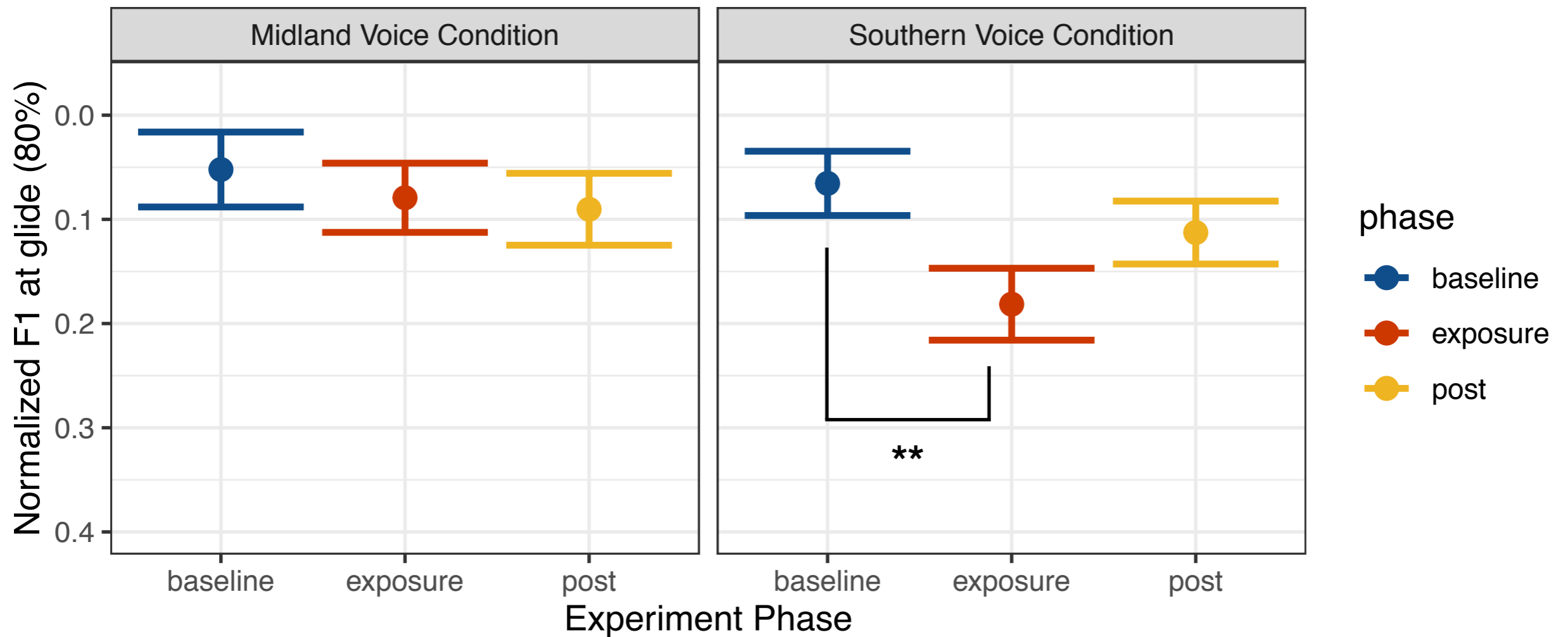
Results



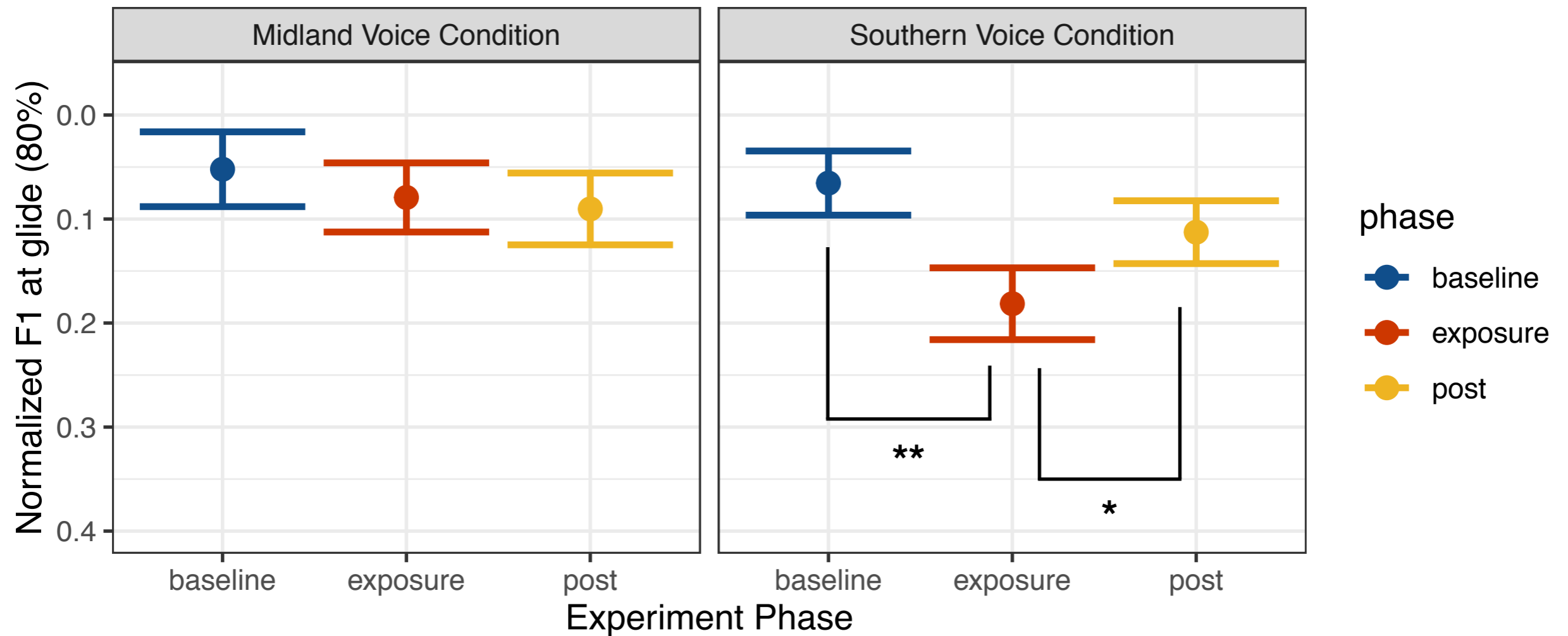
Results



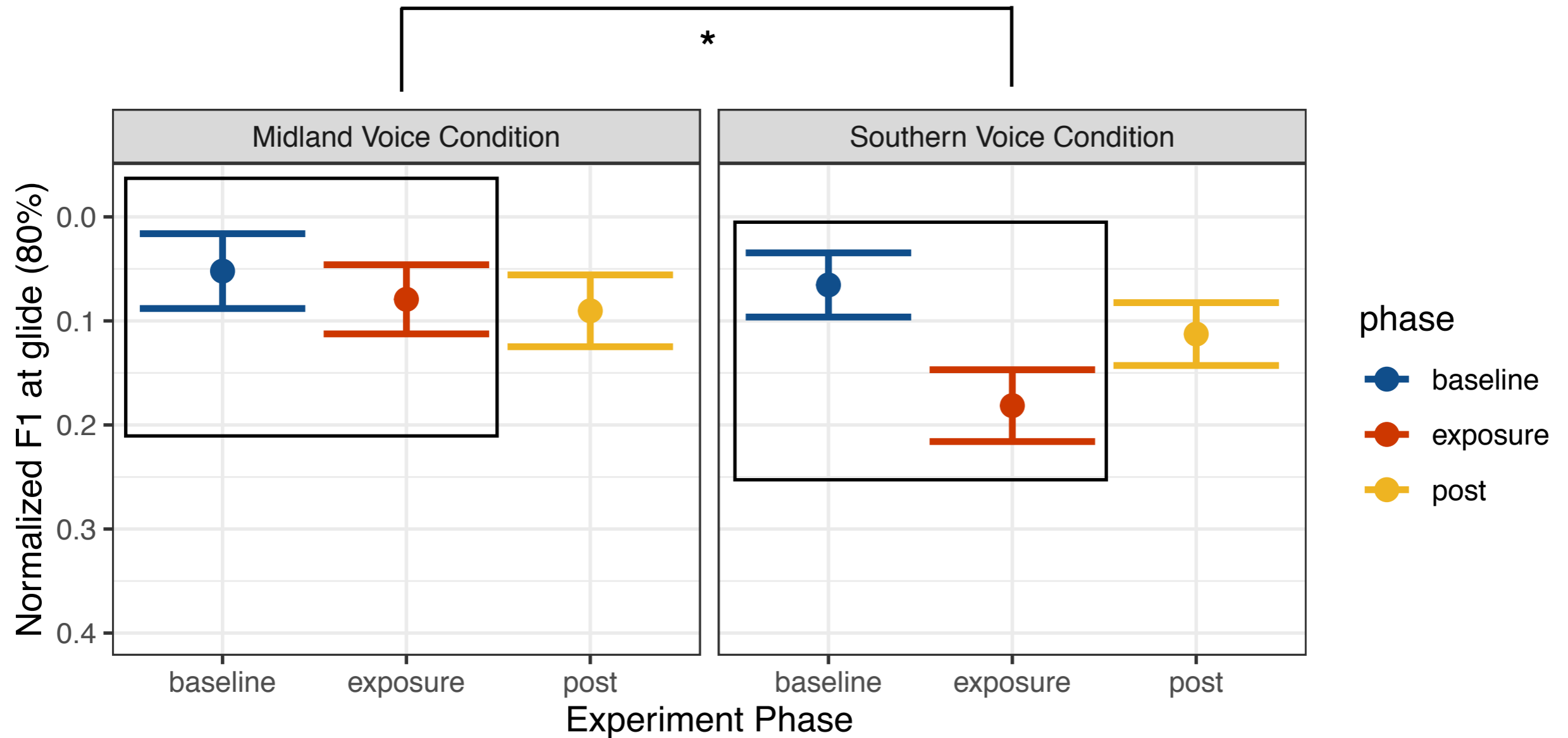
Results



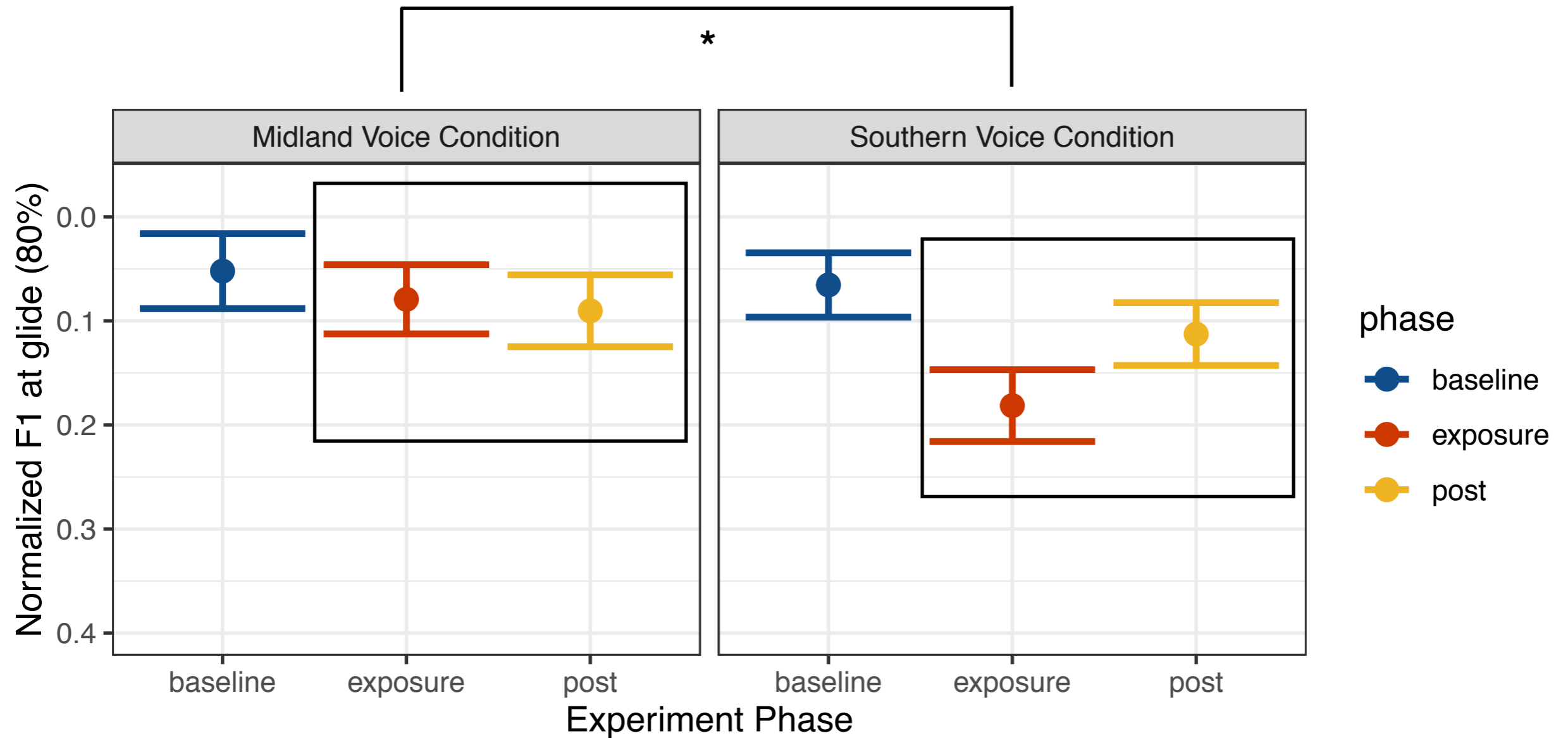
Results



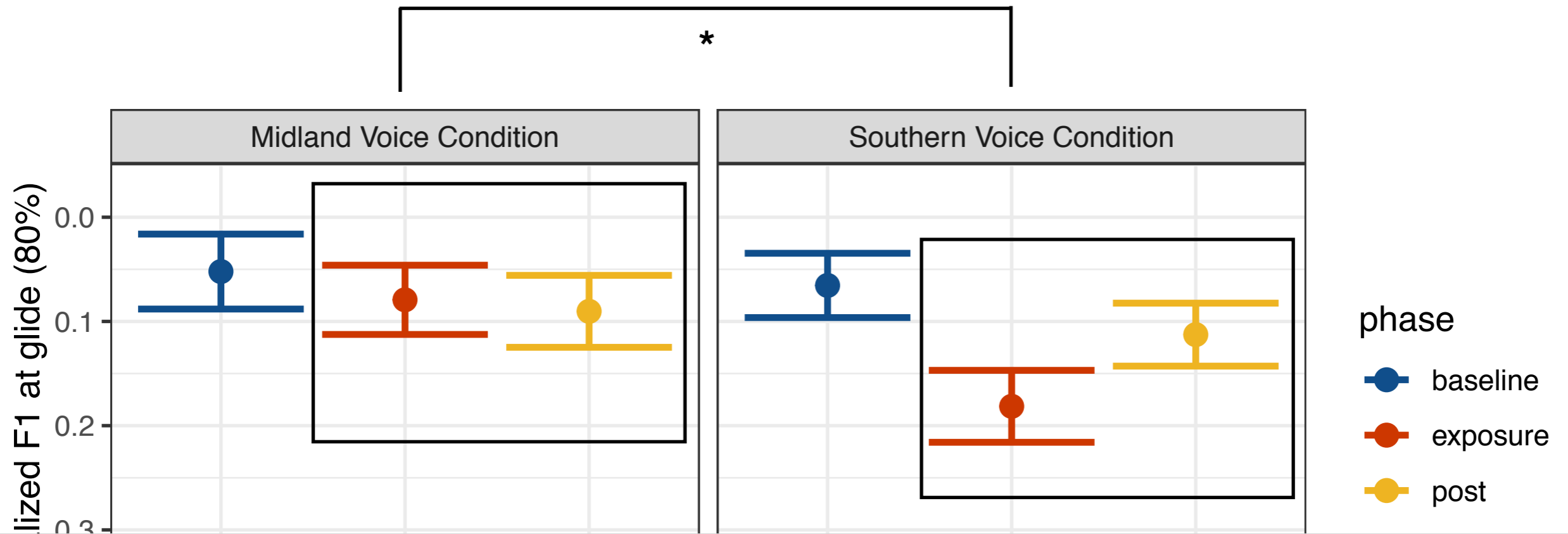
Results



Results

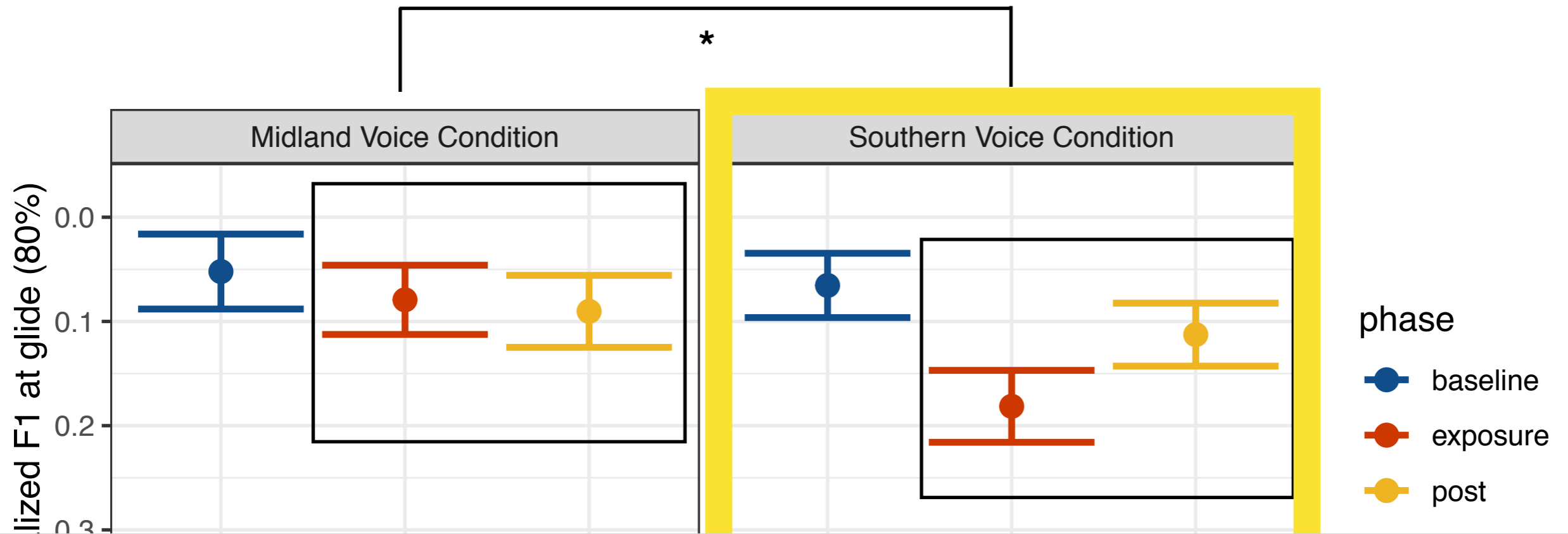


Results



Participants produce lower glides for the /aɪ/ vowel after hearing a Southern talker who never produces the /aɪ/ vowel.

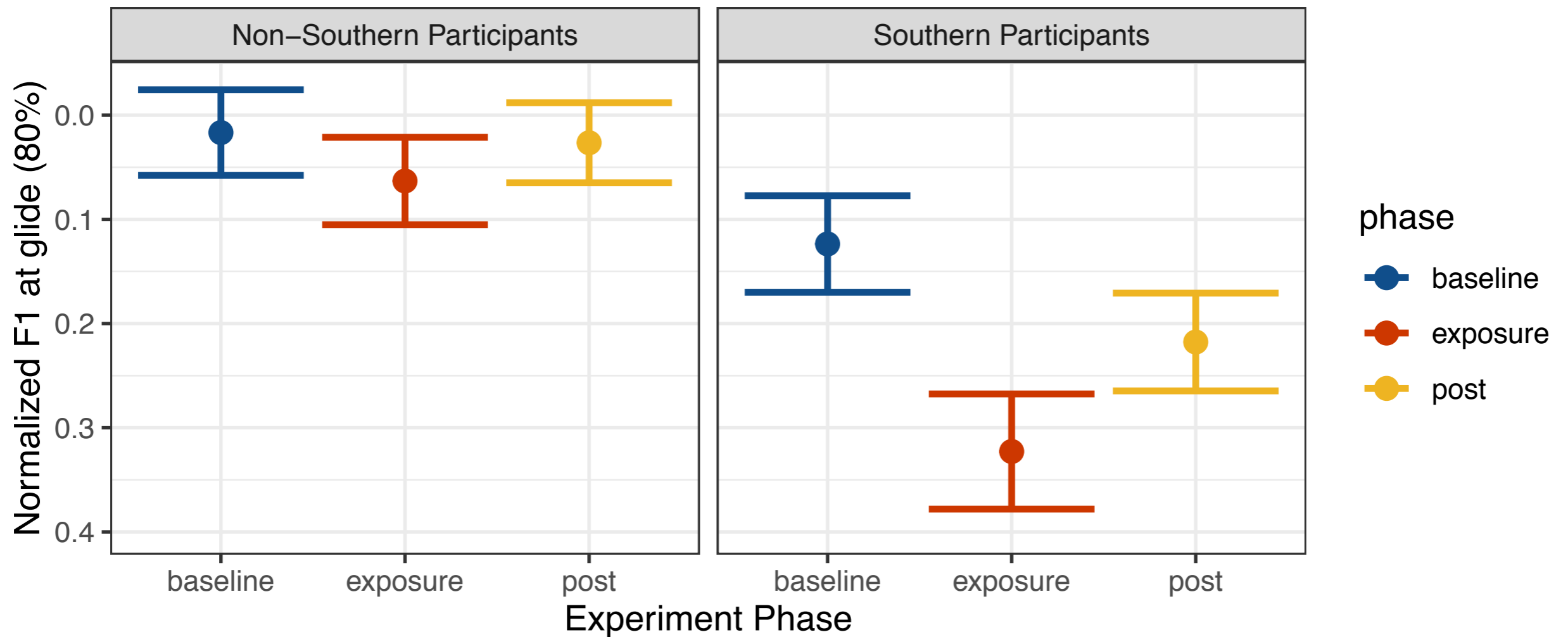
Results



Participants produce lower glides for the /aɪ/ vowel after hearing a Southern talker who never produces the /aɪ/ vowel.

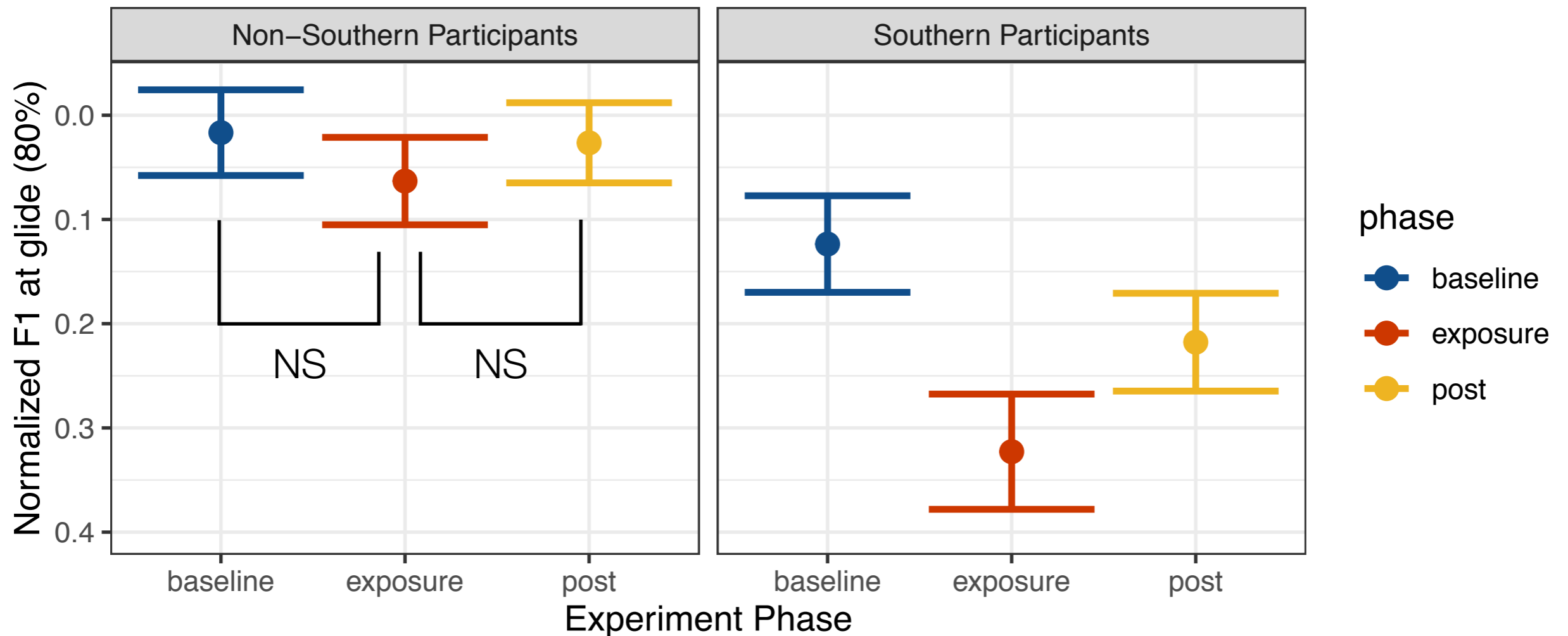
Results

Southern Voice Condition



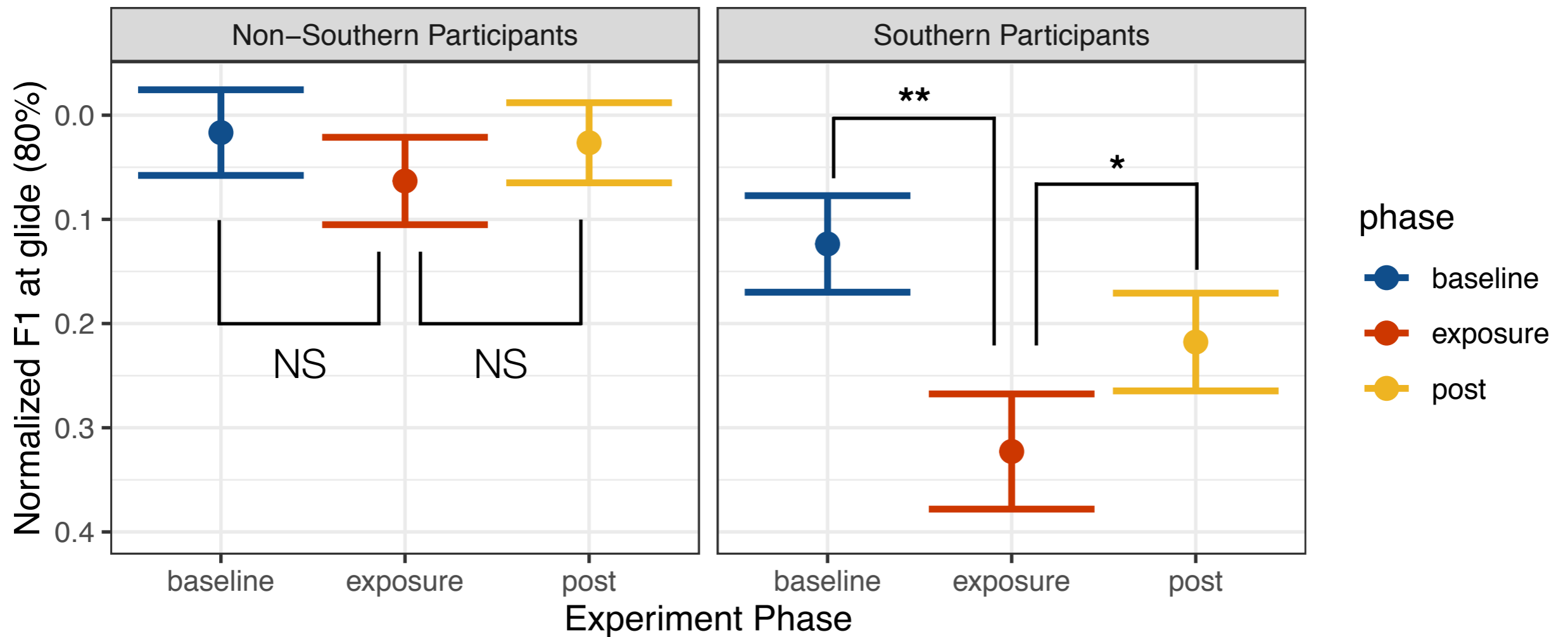
Results

Southern Voice Condition



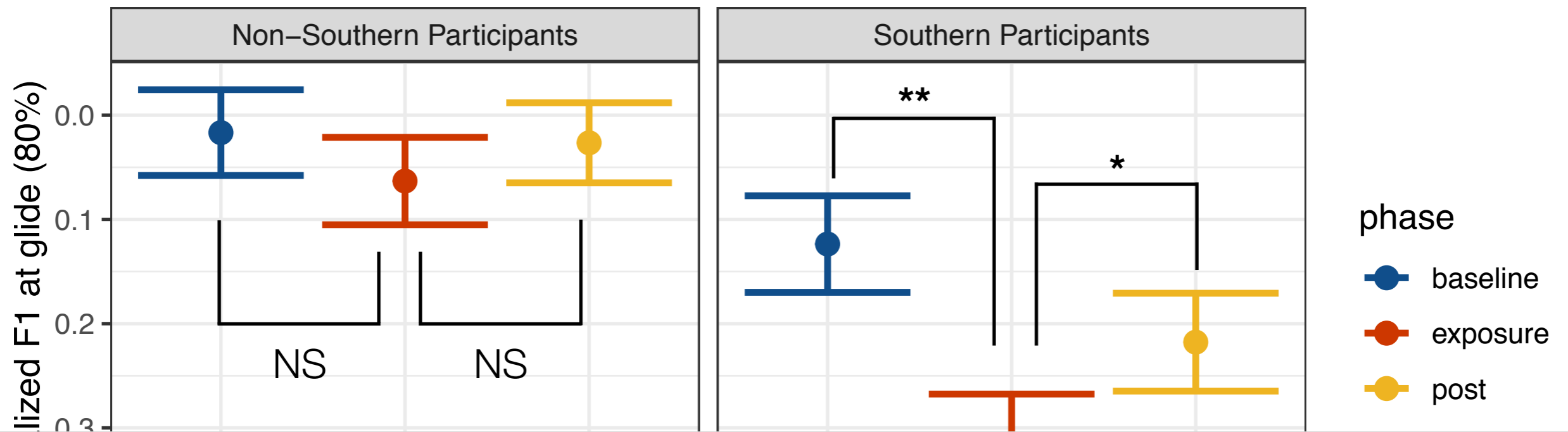
Results

Southern Voice Condition



Results

Southern Voice Condition



Only Southerners produce more monophthongal /aɪ/ after hearing a Southern talker who never produces /aɪ/.

Experiment 1 Summary

- ▶ Participants exhibit expectation-driven convergence
- ▶ Convergence lasts throughout the exposure phase then quickly decays
- ▶ Southern participants converge somewhat more

Experiment 2

Experiment 2

Do participants shift their perceptual /aɪ/ category to encompass more monophthongal tokens after exposure to a Southern talker (who does not produce /aɪ/)?

Lexical Adaptation Task

Run online in Ibex using PennController (Zehr & Schwarz 2018)

Baseline

Clues presented
on-screen

Participants
respond out loud

Exposure

Clues presented
over headphones by
either a Southern or
Midland talker

Participants respond
out loud

Post-Exposure

Clues presented
on-screen

Participants
respond out loud

Lexical Adaptation Task

Baseline

Clues presented
on-screen

Participants
respond out loud

Exposure

Clues presented
over headphones by
either a Southern or
Midland talker

Participants respond
out loud

Post-Exposure

Clues presented
on-screen

Participants
respond out loud

Lexical Adaptation Task

Baseline

Clues presented on-screen

Participants respond out loud

Exposure

Clues presented over headphones by either a Southern or Midland talker

Participants respond out loud

Lexical Decision

Participants judge Southern audio clips as WORDs or NON-WORDs

Post-Exposure

Clues presented on-screen

Participants respond out loud

Lexical Adaptation Task

Baseline

Clues presented on-screen

Participants respond out loud

Exposure

Clues presented over headphones by either a Southern or Midland talker

Participants respond out loud

Lexical Decision

Participants judge Southern audio clips as WORDs or NON-WORDs

Post-Exposure

Clues presented on-screen

Participants respond out loud

Are word endorsement rates for monophthongal /aɪ/ words greater after exposure to a Southern talker?

Lexical Adaptation Task

Baseline

Clues presented on-screen

Participants respond out loud

Exposure

Clues presented over headphones by either a Southern or Midland talker

Participants respond out loud

Lexical Decision

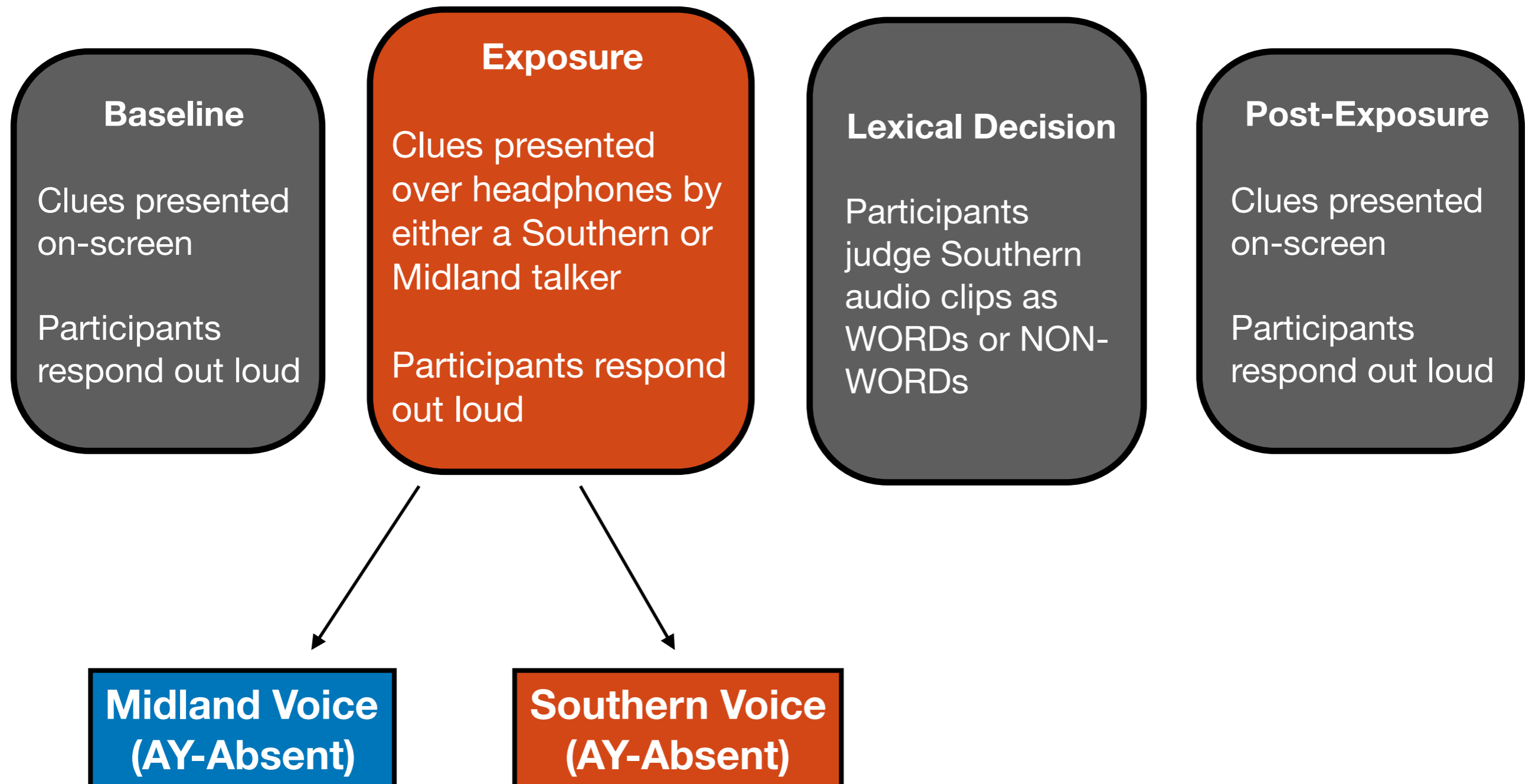
Participants judge Southern audio clips as WORDs or NON-WORDs

Post-Exposure

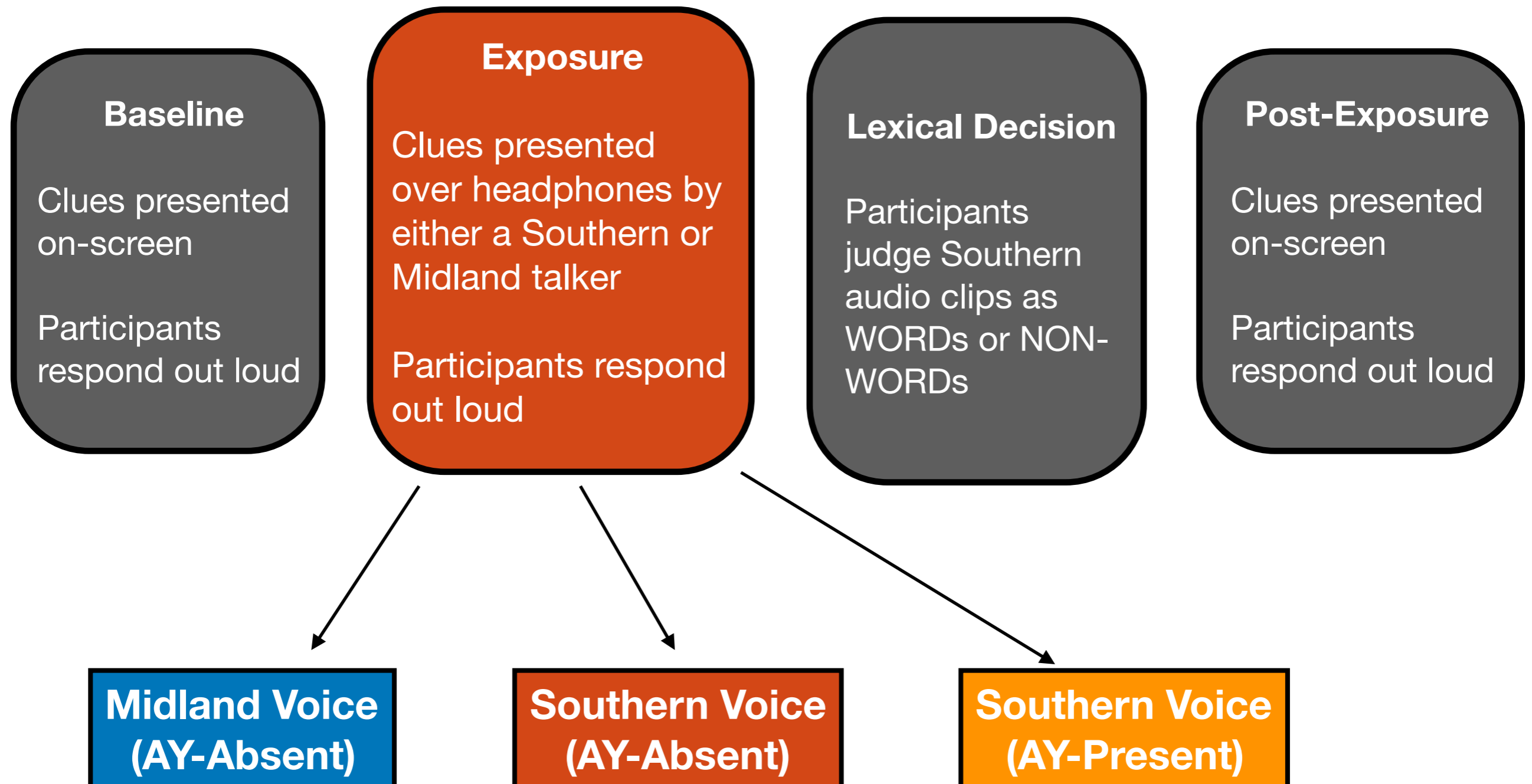
Clues presented on-screen

Participants respond out loud

Lexical Adaptation Task



Lexical Adaptation Task



Lexical Adaptation Task

Baseline

Clues presented on-screen

Participants respond out loud

Exposure

Clues presented over headphones by either a Southern or Midland talker

Participants respond out loud

Lexical Decision

Participants judge Southern audio clips as WORDs or NON-WORDs

Post-Exposure

Clues presented on-screen

Participants respond out loud

Adapted from Maye, Tannenhaus & Aslin (2008); Weatherholtz (2015)

Lexical Adaptation Task

Baseline

Clues presented on-screen
Participants respond out loud

Exposure

Clues presented over headphones by either a Southern or Midland talker
Participants respond out loud

Lexical Decision

Participants judge Southern audio clips as WORDs or NON-WORDs

Post-Exposure

Clues presented on-screen
Participants respond out loud

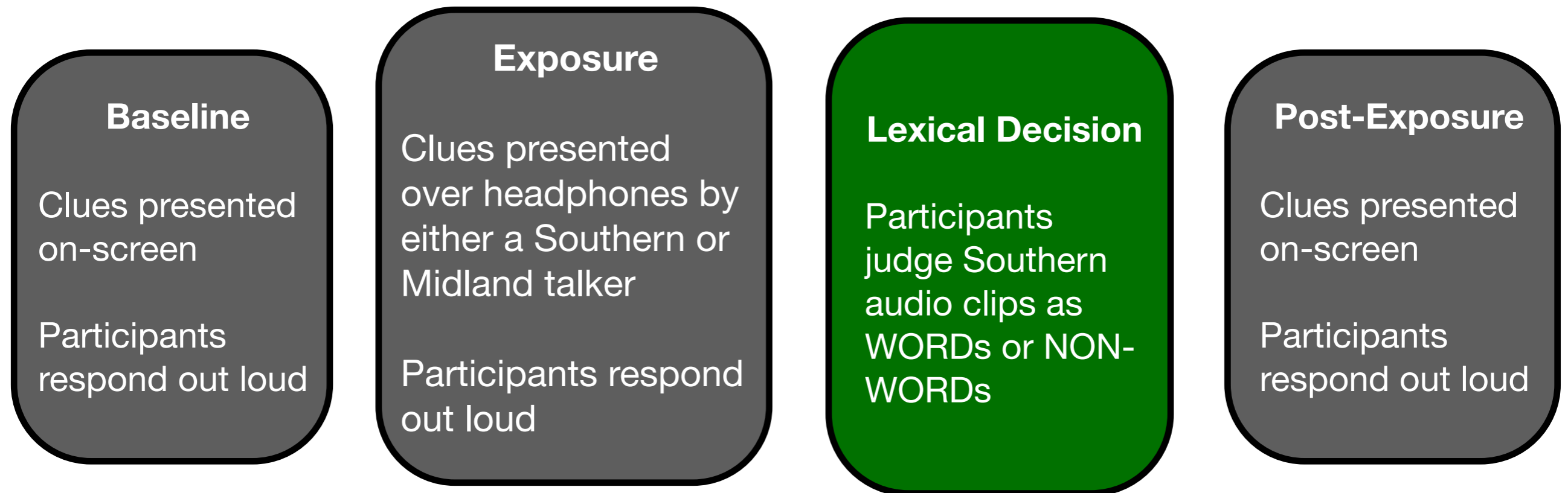
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[bra:b]



Southern Voice

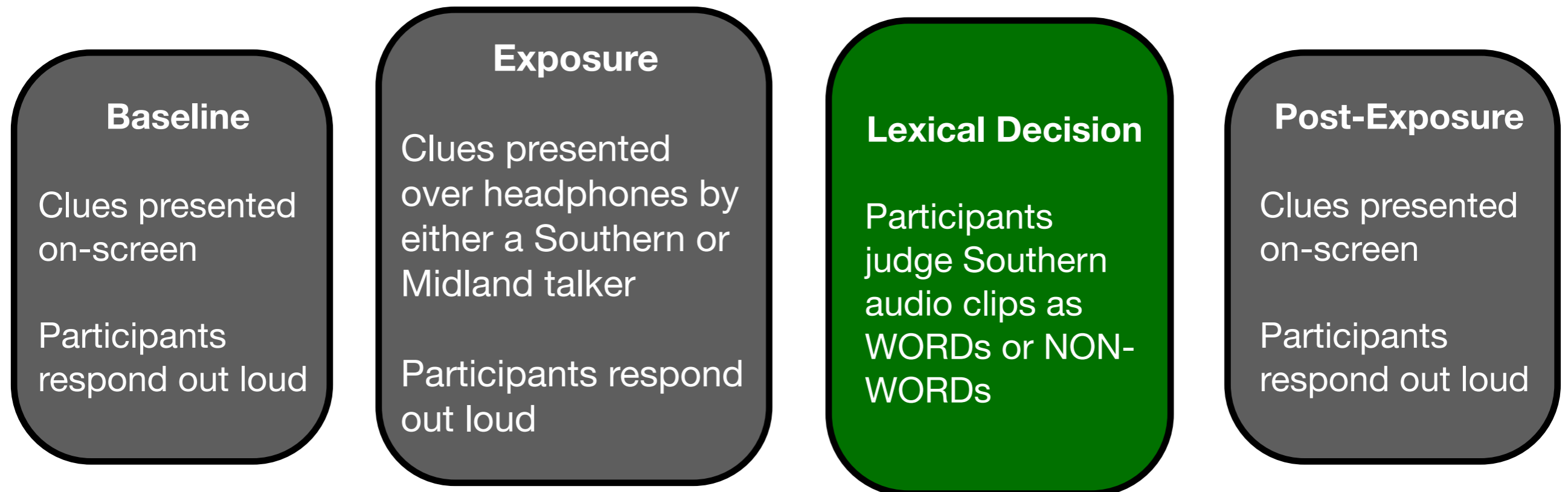
Lexical Adaptation Task



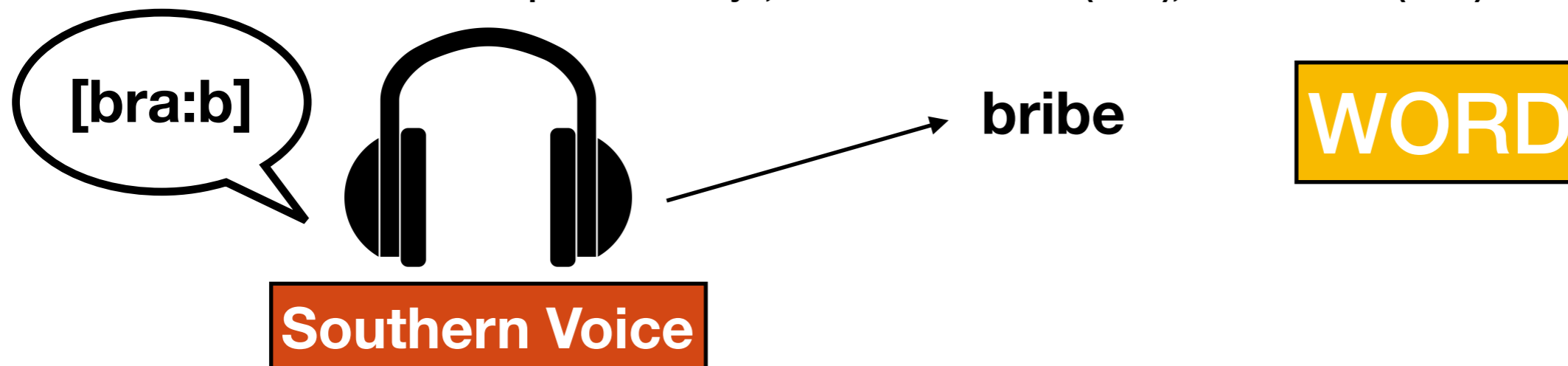
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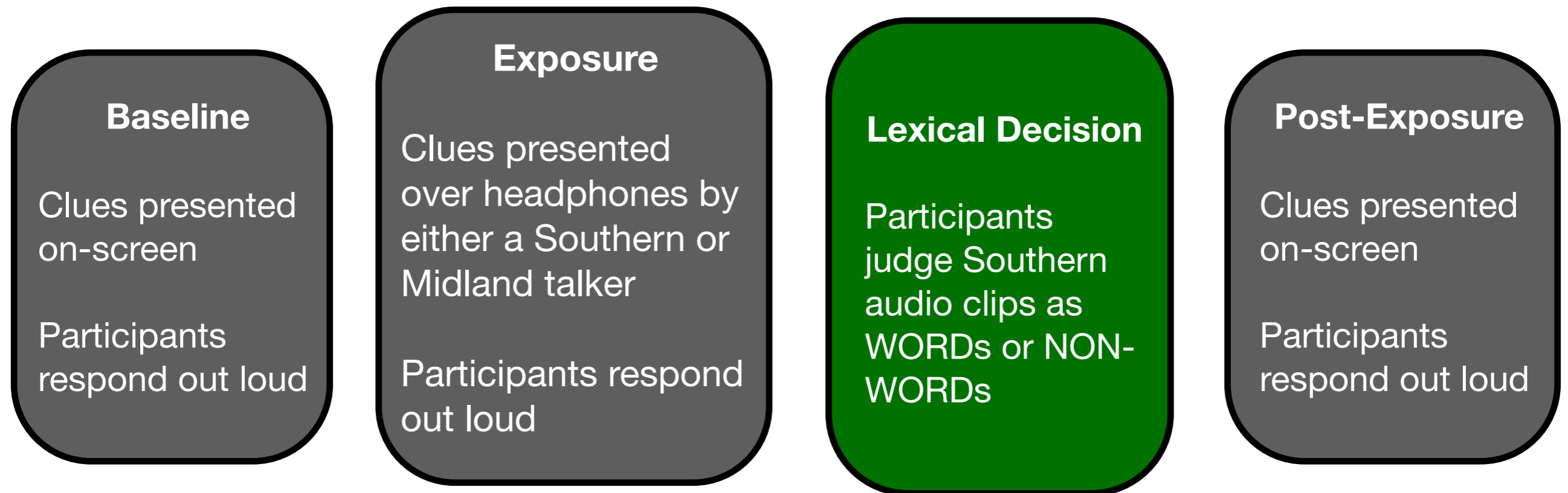
Lexical Adaptation Task



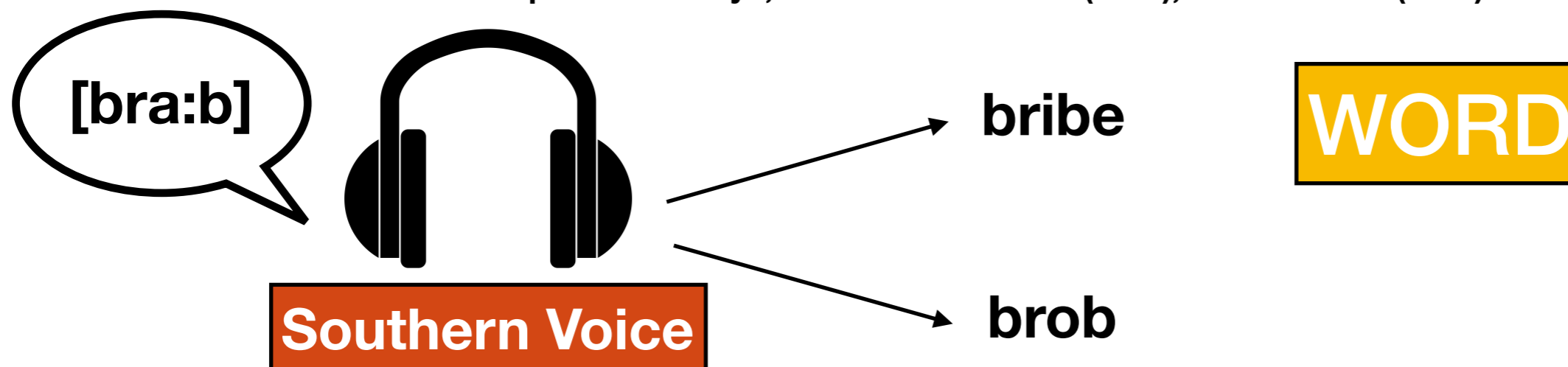
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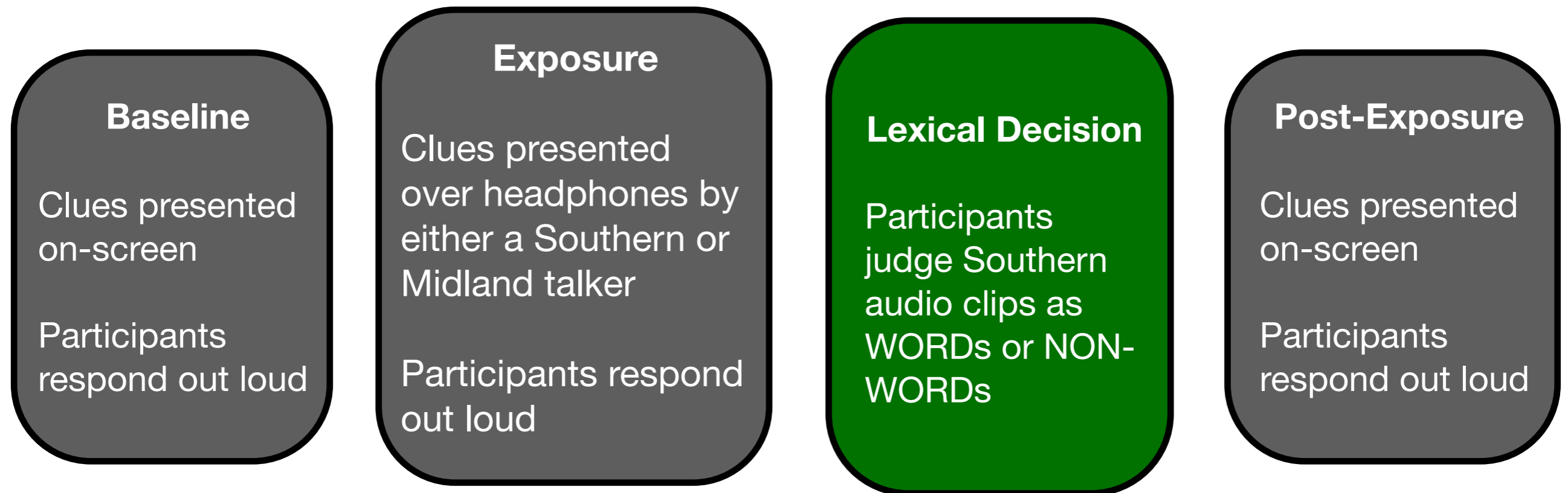
Lexical Adaptation Task



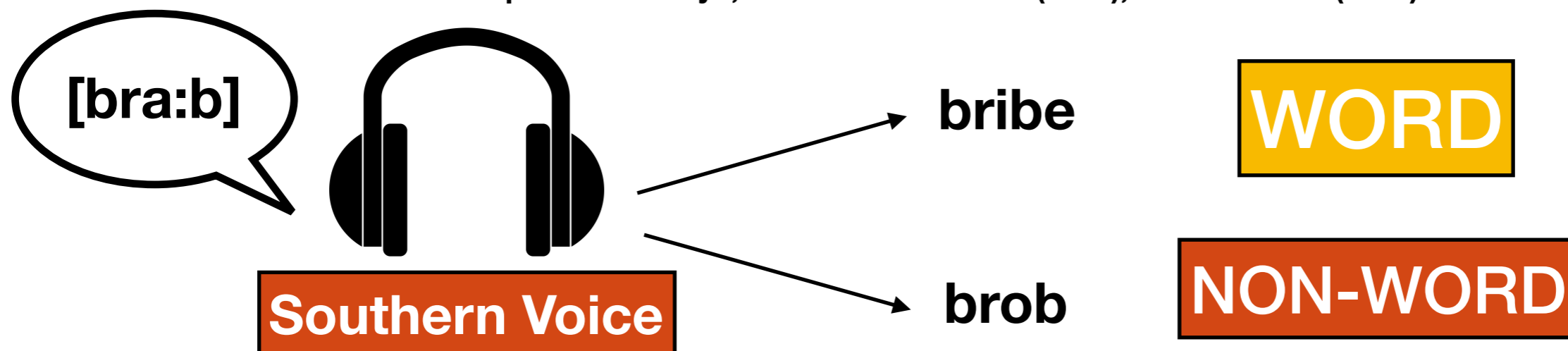
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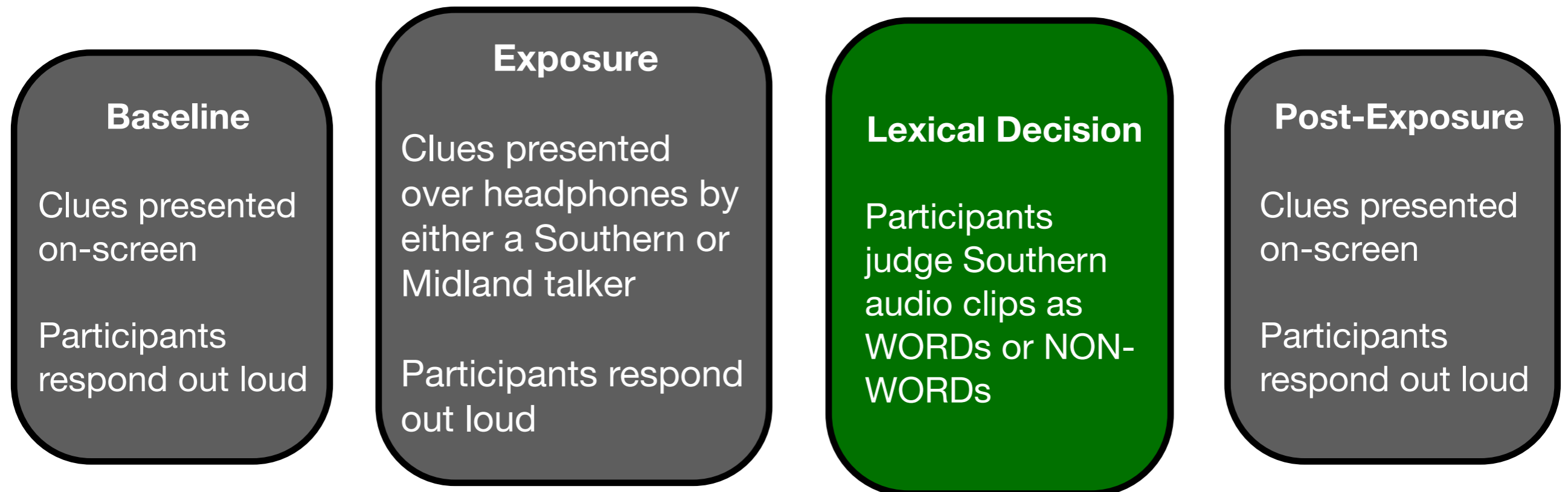
Lexical Adaptation Task



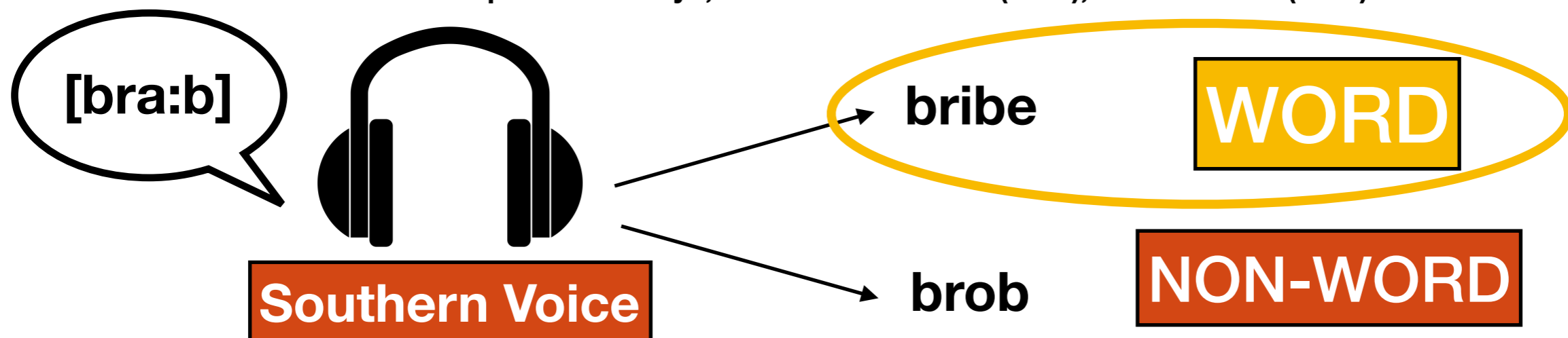
Adapted from Maye, Tannenhaus & Aslin (2008); Weatherholtz (2015)



Lexical Adaptation Task



Adapted from Maye, Tannenhaus & Aslin (2008); Weatherholtz (2015)

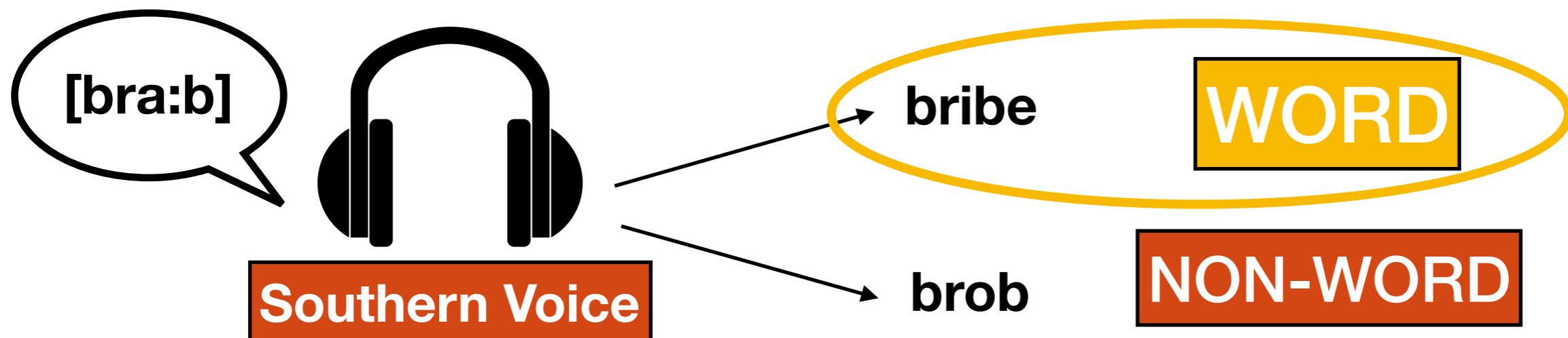


Lexical Adaptation Task

40 target words

60 filler words

40 filler non-words



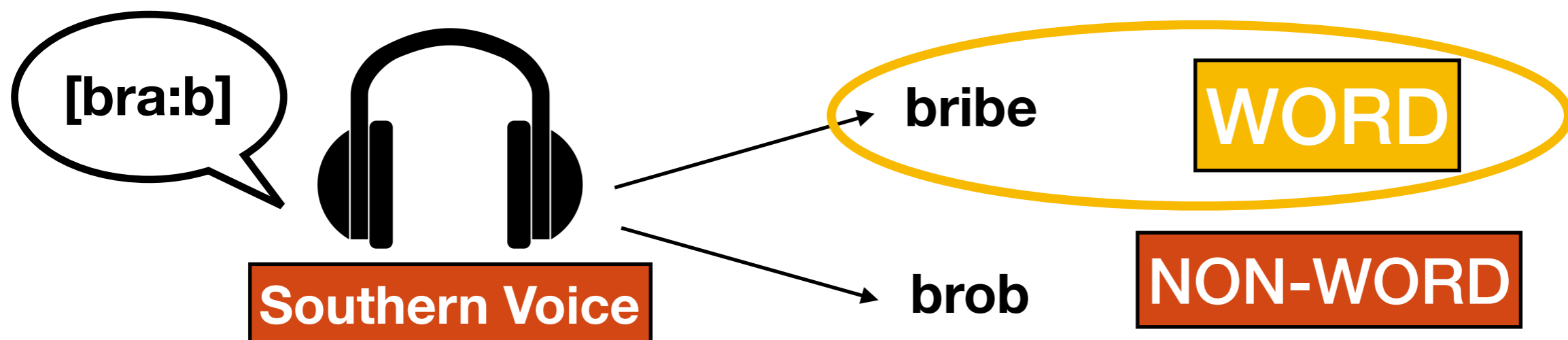
Lexical Adaptation Task

40 target words

BRIBE

60 filler words

40 filler non-words



Lexical Adaptation Task

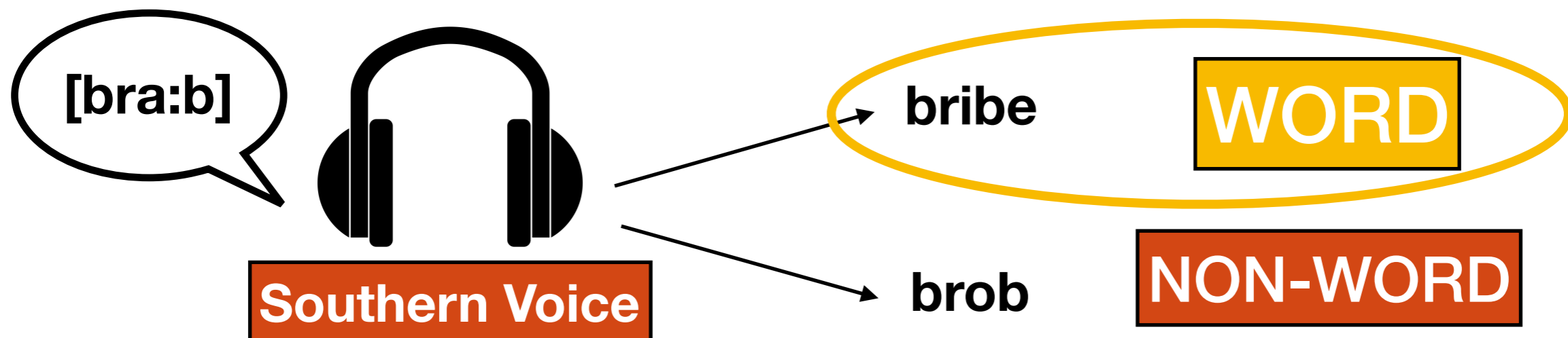
40 target words

60 filler words

40 filler non-words

BRIBE

SMASH



Lexical Adaptation Task

40 target words

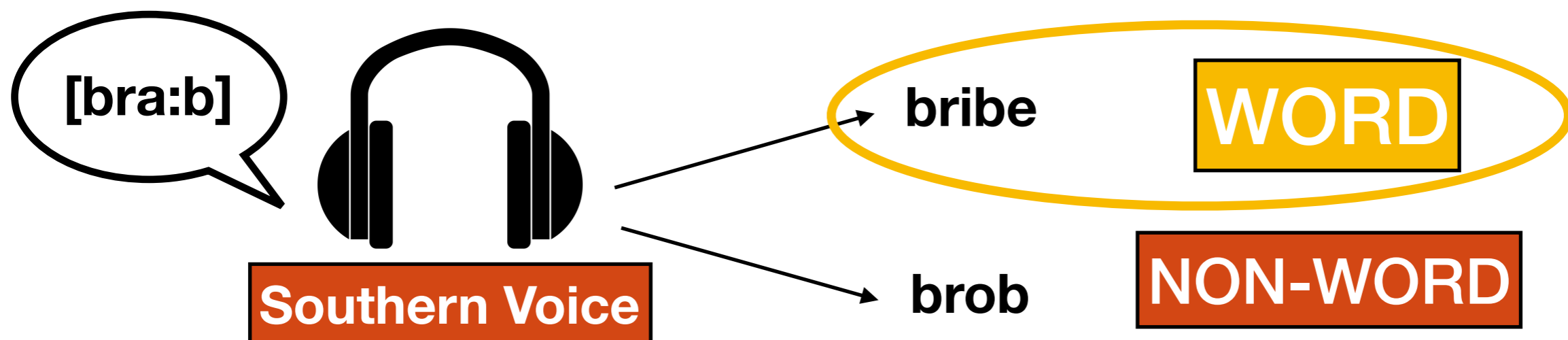
60 filler words

40 filler non-words

BRIBE

SMASH

YORCH



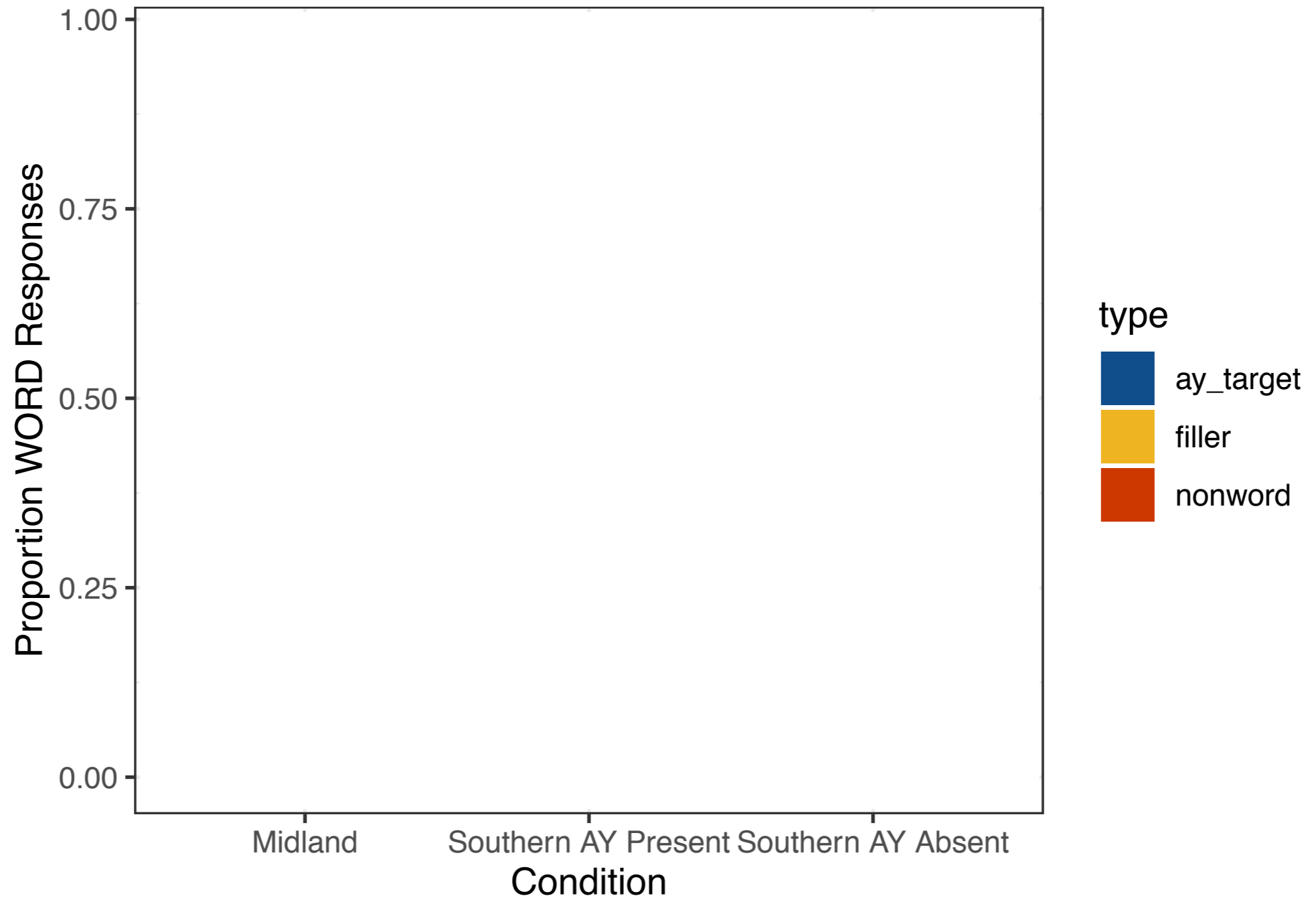
Participants

- ▶ 60 Participants recruited from Prolific (N=45) or Penn Subject Pool (N=15)
- ▶ One excluded for <75% accuracy on non-target items
- ▶ Data collection is ongoing

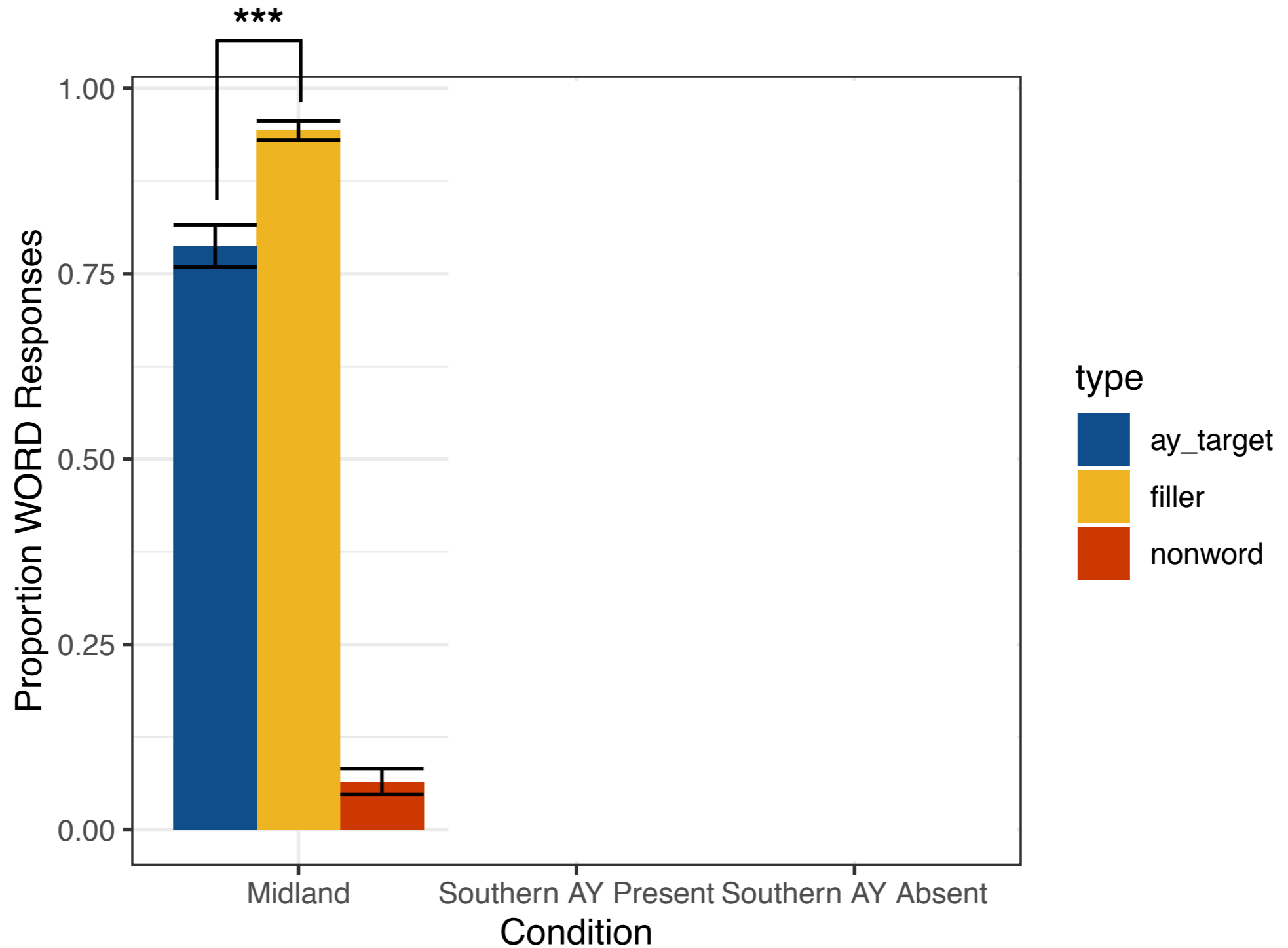
Analysis

- Logistic mixed effects regression with lexical decision task responses as dependent variable (Word=1, Non-word=0)
- Predictors included based on likelihood ratio tests
 - Fixed predictors:
 - StimType
 - Condition
 - Dialect
 - StimType*Condition*Dialect
 - By-item random intercepts
 - By-participant random intercepts & random slopes for StimType

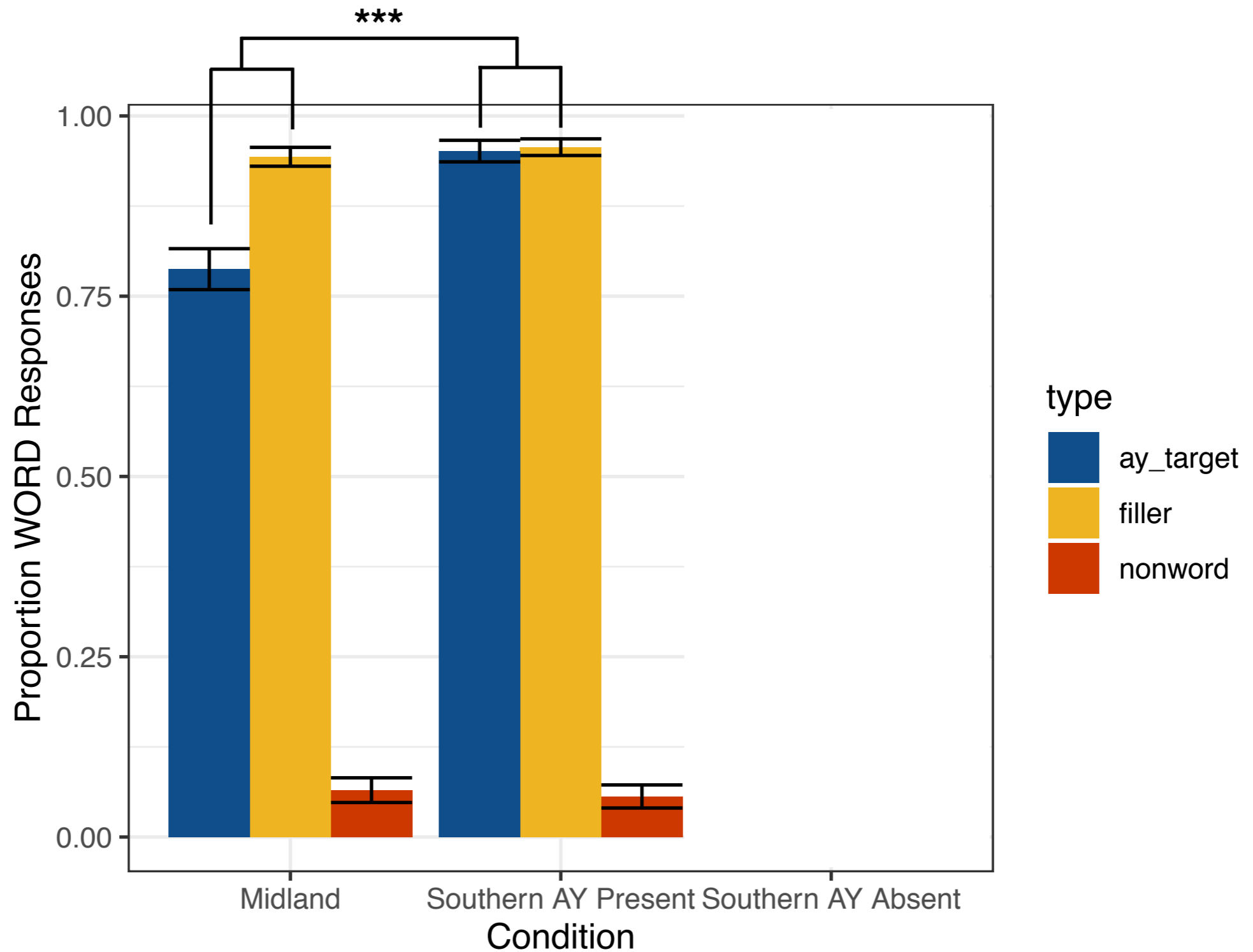
Results



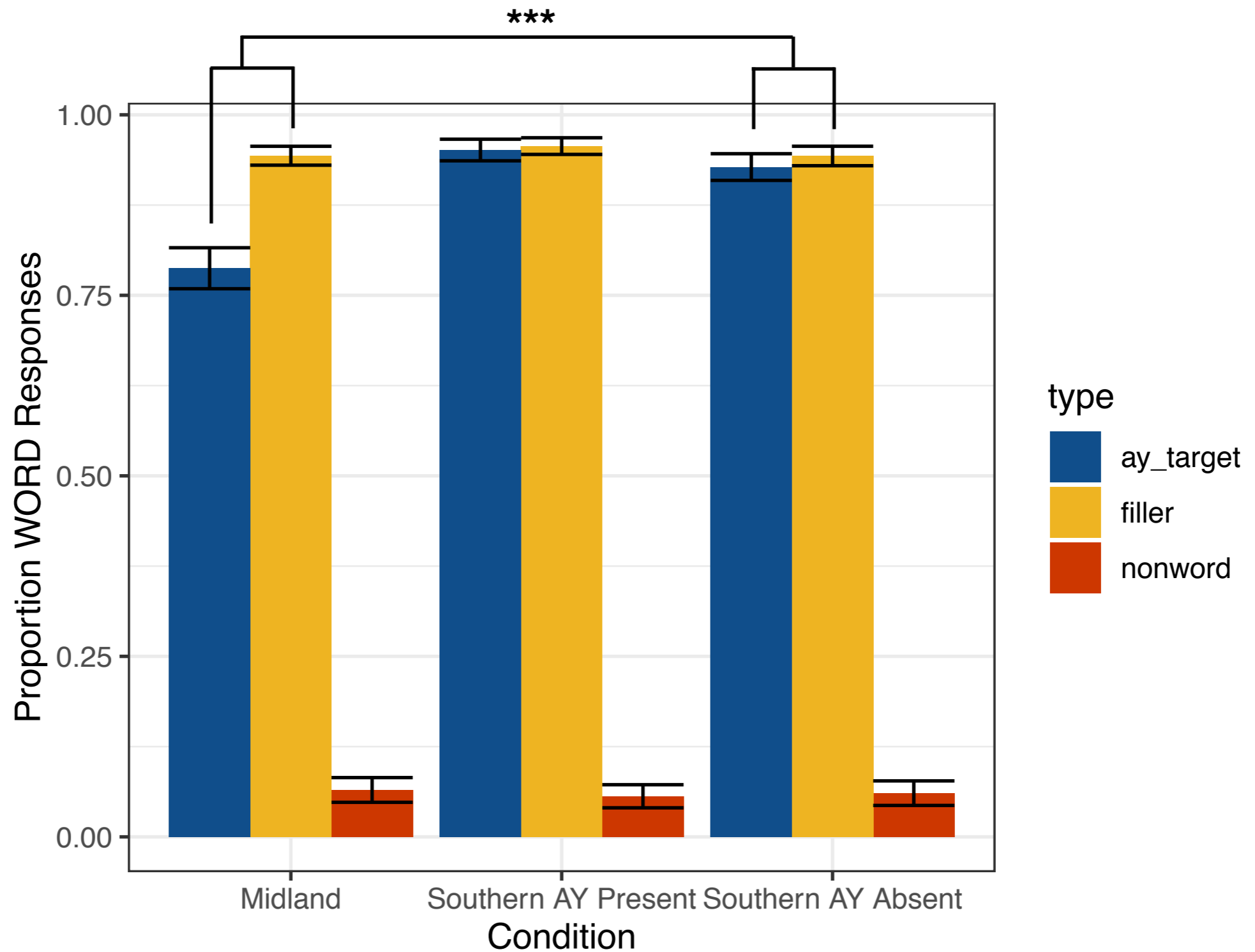
Results



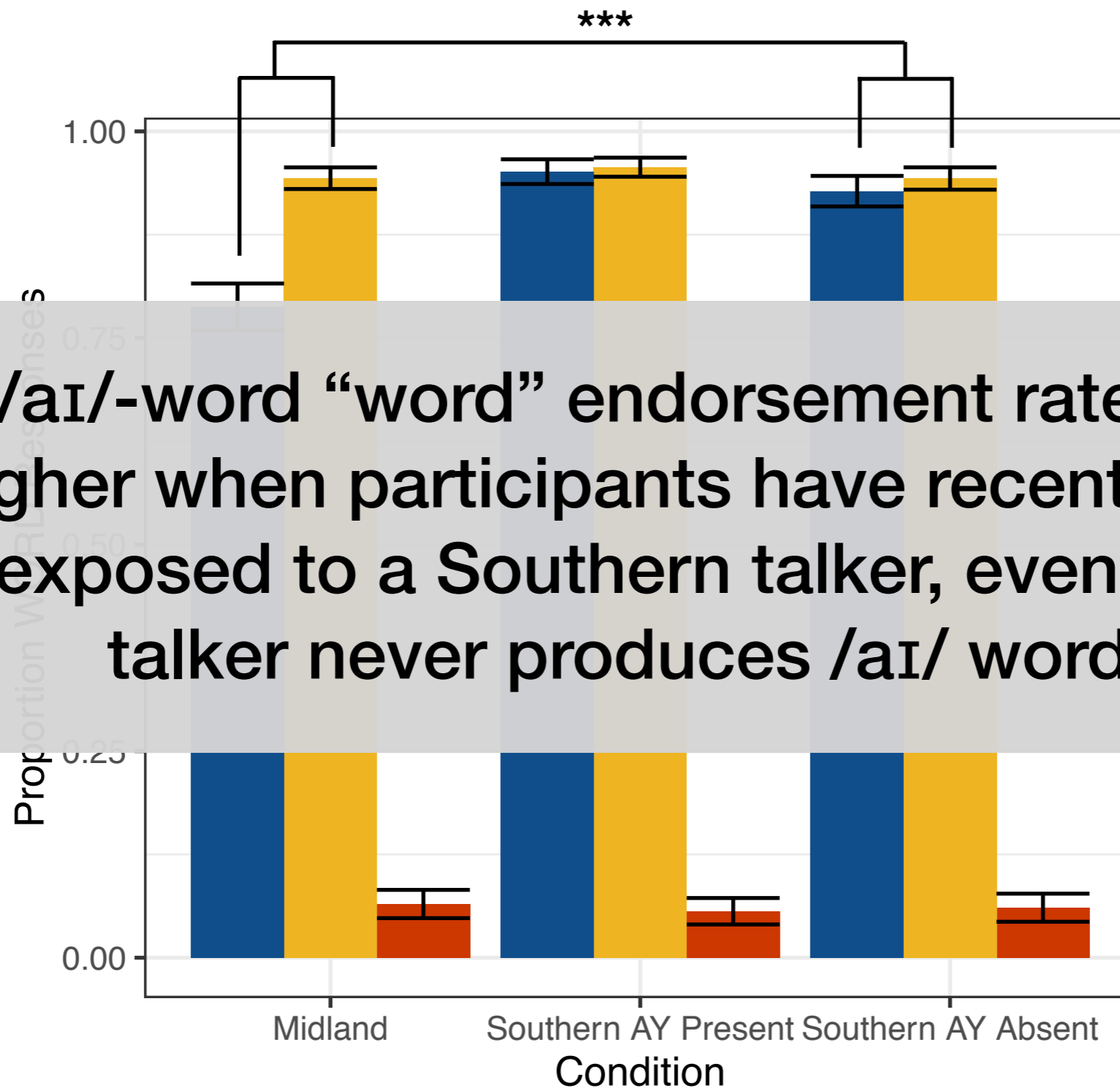
Results



Results

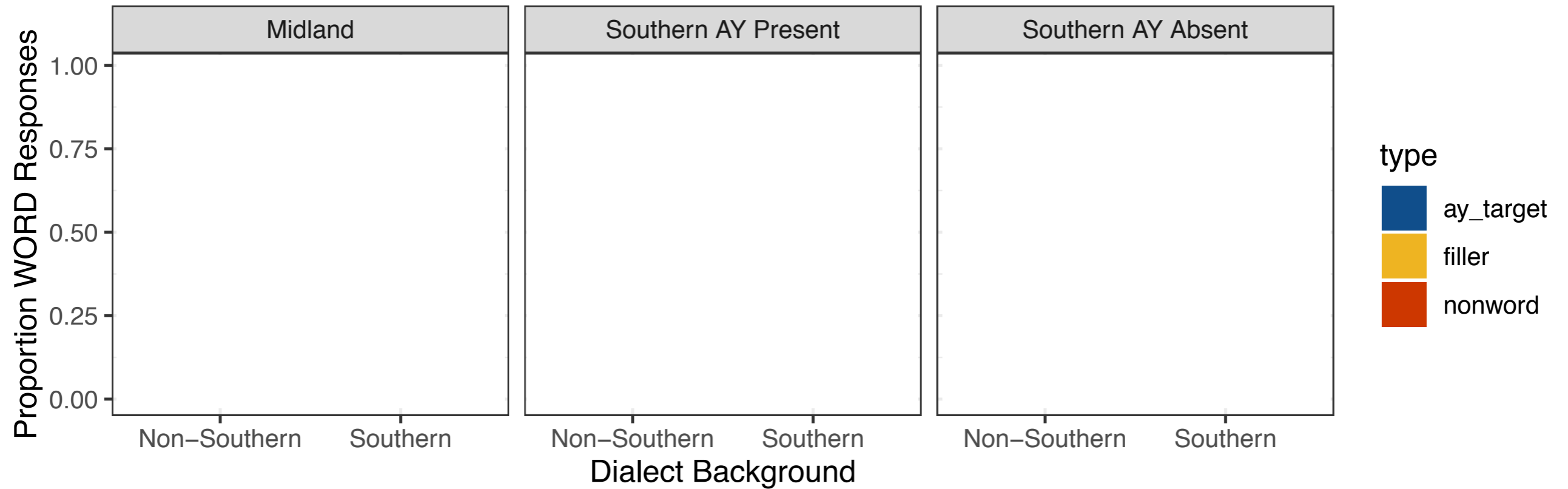


Results

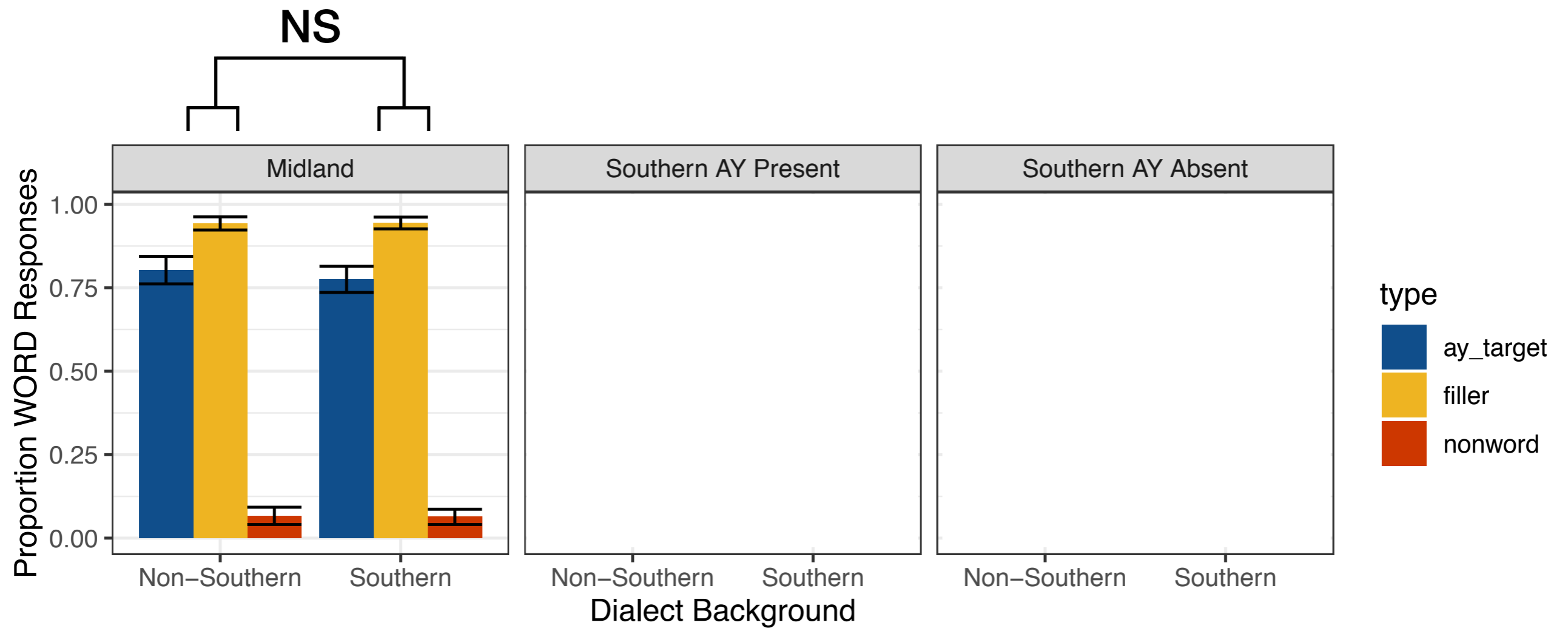


/aɪ/-word “word” endorsement rates are higher when participants have recently been exposed to a Southern talker, even if the talker never produces /aɪ/ words.

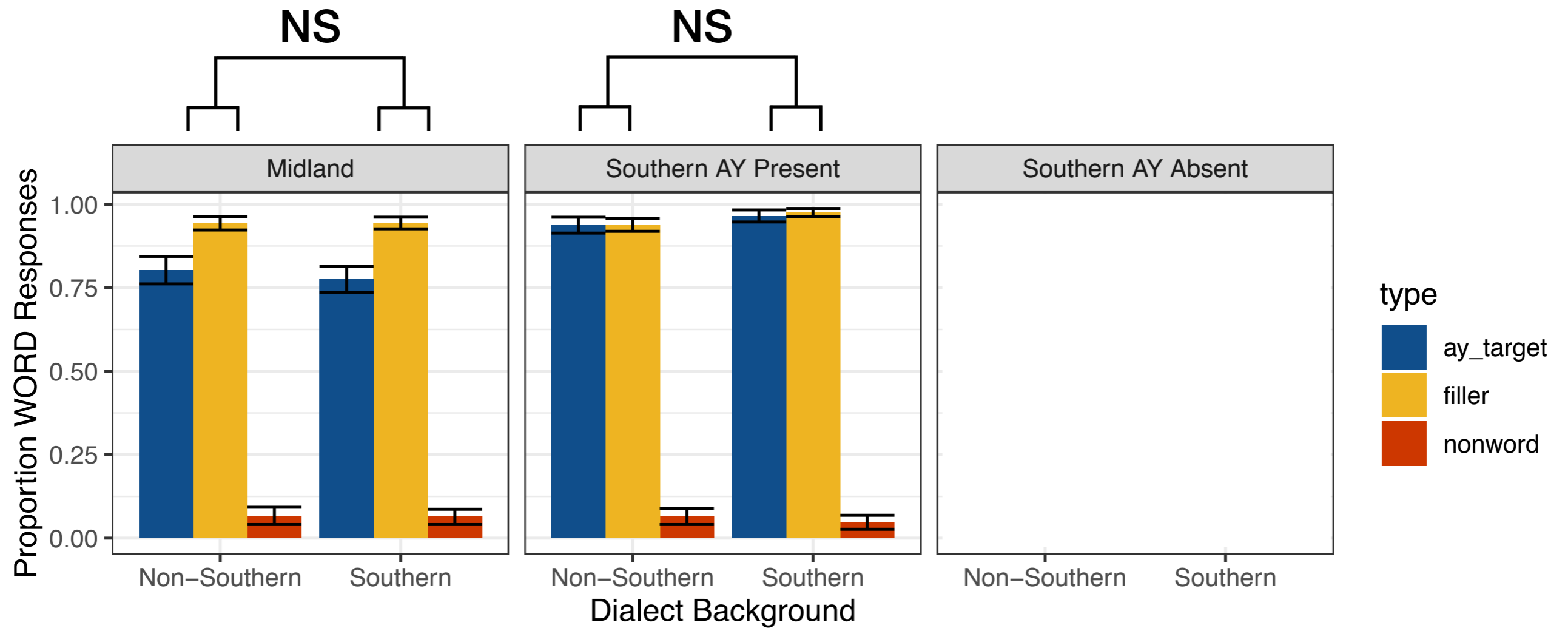
Results



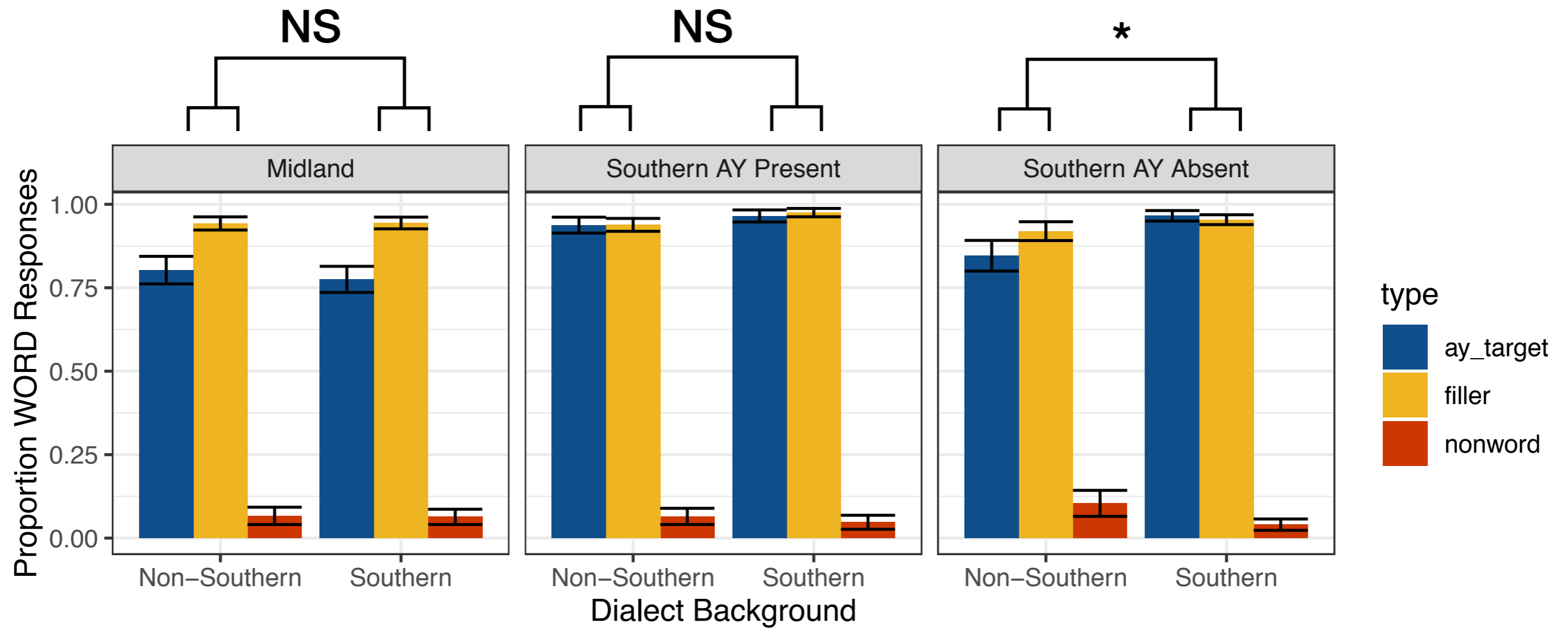
Results



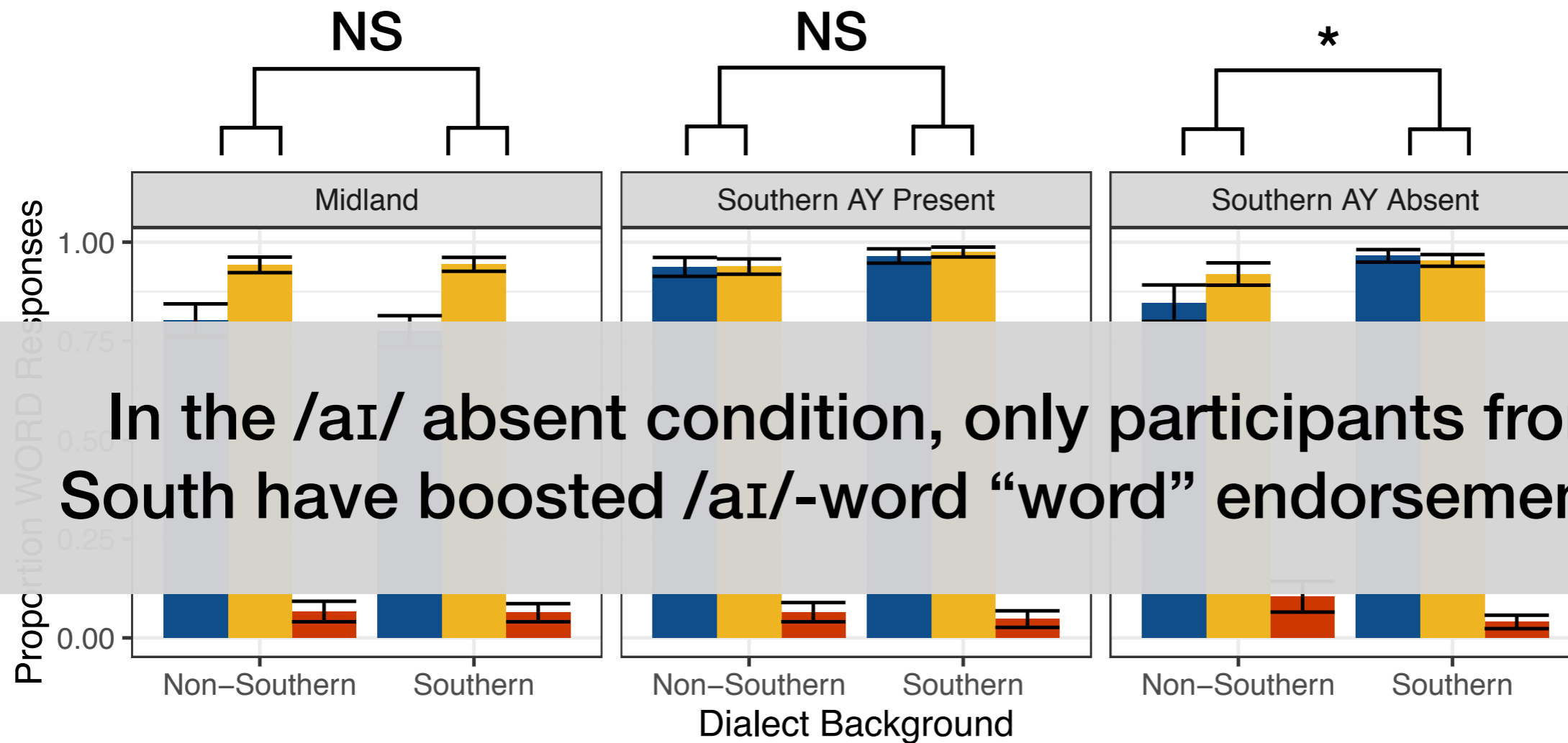
Results



Results



Results



Experiment 2 Summary

- ▶ All participants exhibit perceptual shifts after exposure to Southern **/aɪ/-present** stimuli
- ▶ Only Southern participants exhibit perceptual shifts after exposure to Southern **/aɪ/-absent** stimuli

Conclusions

Expectation-Driven Convergence

- ▶ can be observed in a controlled laboratory setting
- ▶ reflects mental sociolinguistic associations
- ▶ has perceptual underpinnings
- ▶ suggests an explanation besides (only) mechanistic perception-production feedback loops

Conclusions

- ▶ Social and linguistic categories are linked in the minds of language users
- ▶ Sociolinguistic expectations influence both perception and production
- ▶ Sufficient experience is necessary to form sociolinguistic expectations

Thank You

Acknowledgements



RA Sadie Butcher



RA Leila Pearlman

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