



Beg, bag or bEYg: Reliability of self-reported /æɡ/-raising in North American English

Lisa Sullivan
July 27, 2021

Summer Phonetics/Phonology Forum 2021
University of Toronto

Introduction

- Self-report may be an easy way to collect data about the production of variation
- However, it may be unreliable, and not accurately reflect production
- This study compares self-reported and actual production of pre-velar /æ/-raising (/æɪg/-raising) in 18 speakers of North American English

Question: Does self-reported production accurately reflect actual production?

Outline

1

1. Introduction

2

2. Production of /æg/-raising

3

3. Self-reported production of /æg/-raising

4

4. Comparison of production and self-report

5

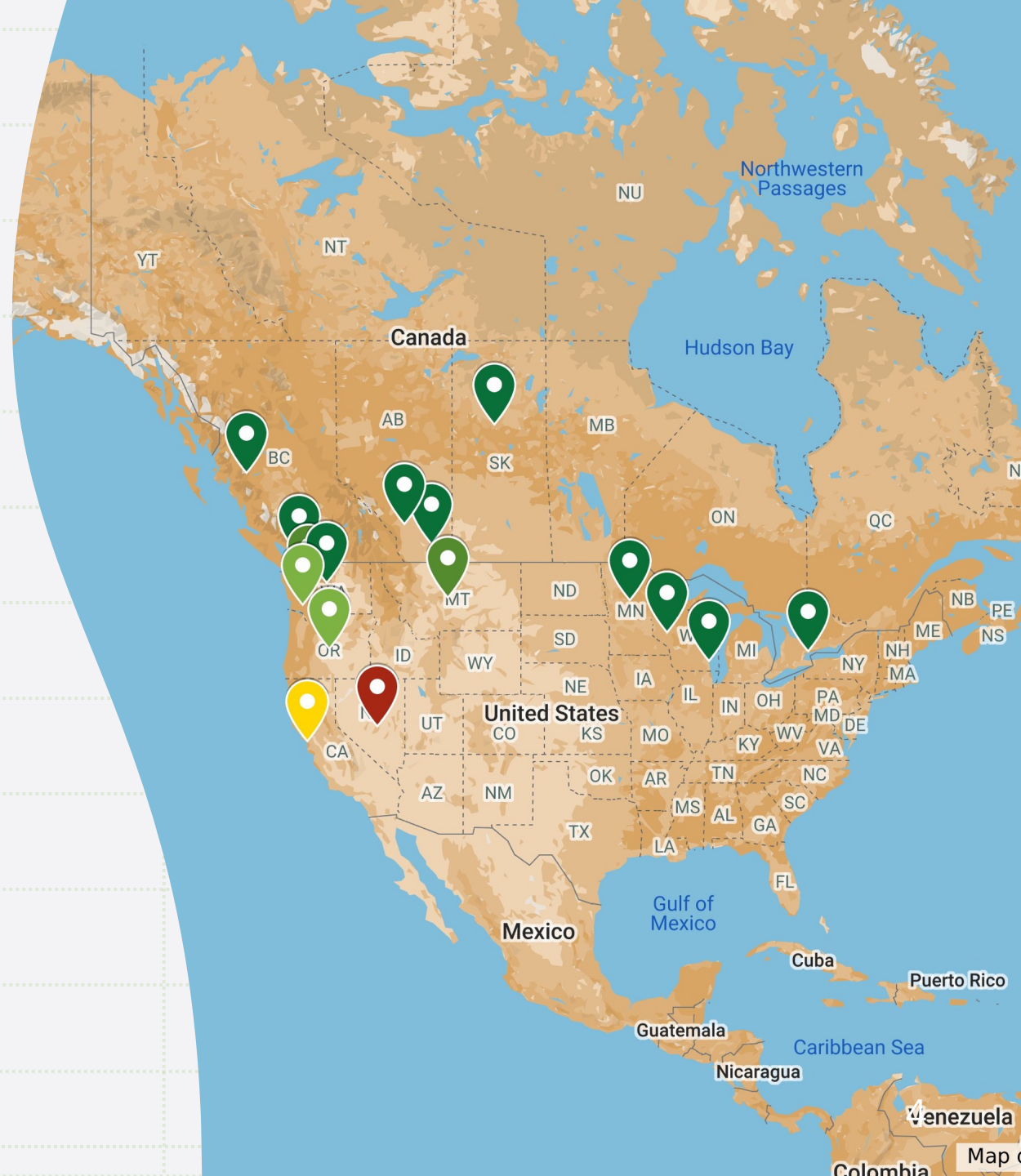
5. Conclusion

What is pre-velar /æ/-raising?

- Process whereby some N.A. English speakers raise /æ/ before /g/ (but not /k/) (e.g. in *bag*, but not in *back*)

/æ/ → raised / __ g

- Raised /æ/ will have lower F1 (& possibly higher F2)
- **Acoustic documentation:** Canada, Pacific Northwest, Upper Midwest (For a summary, see Stanley 2018, 2019)



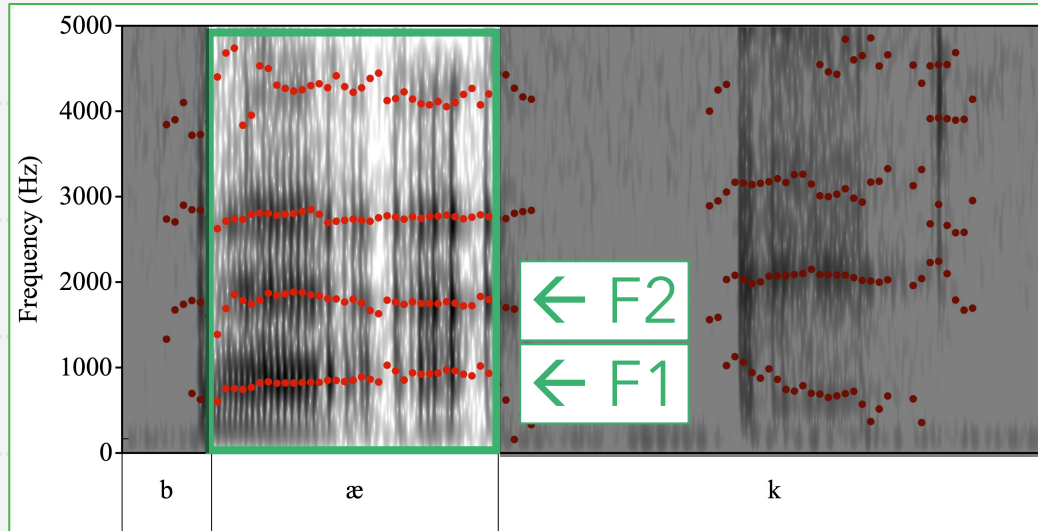
Spectrograms of a raiser and a non-raiser

Raiser
(CAN F 31)

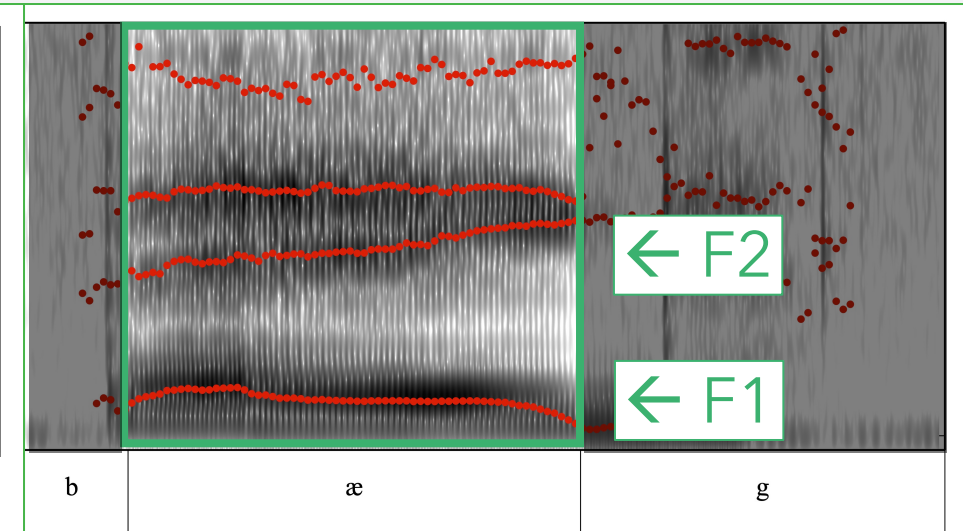
 *back*

 *bag*

back



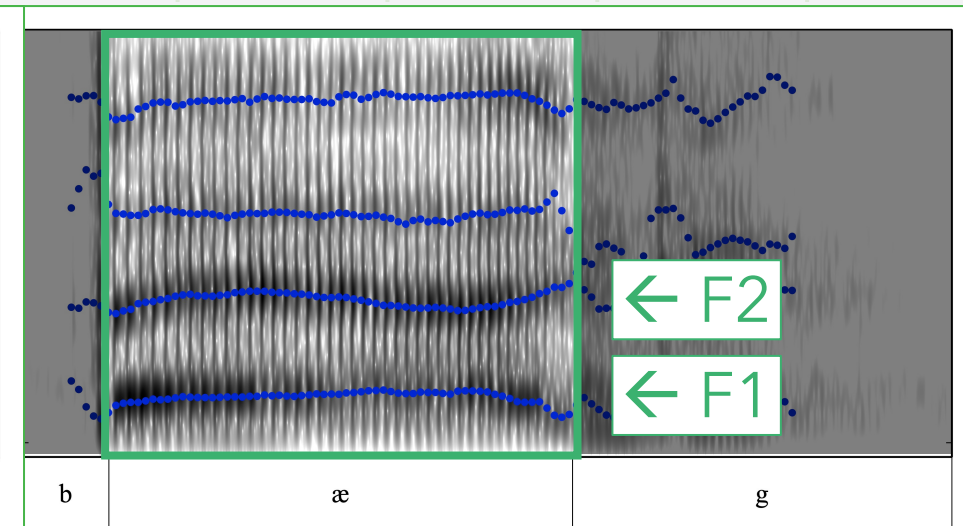
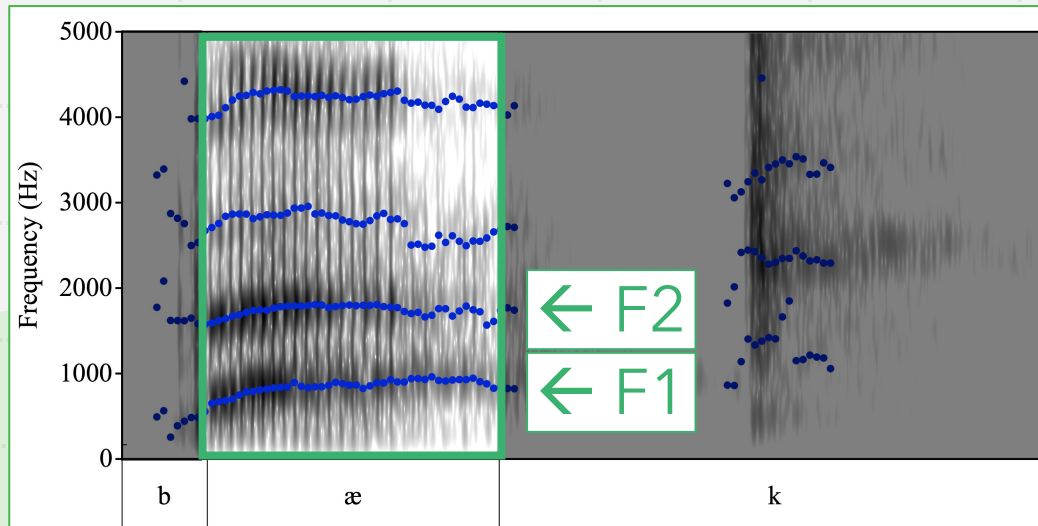
bag



Non-Raiser
(US M 27)

 *back*

 *bag*



Stanley (2018, 2019a): Self-reported /æɡ/-raising

How widespread is prevelar raising (1) geographically and (2) in the lexicon?

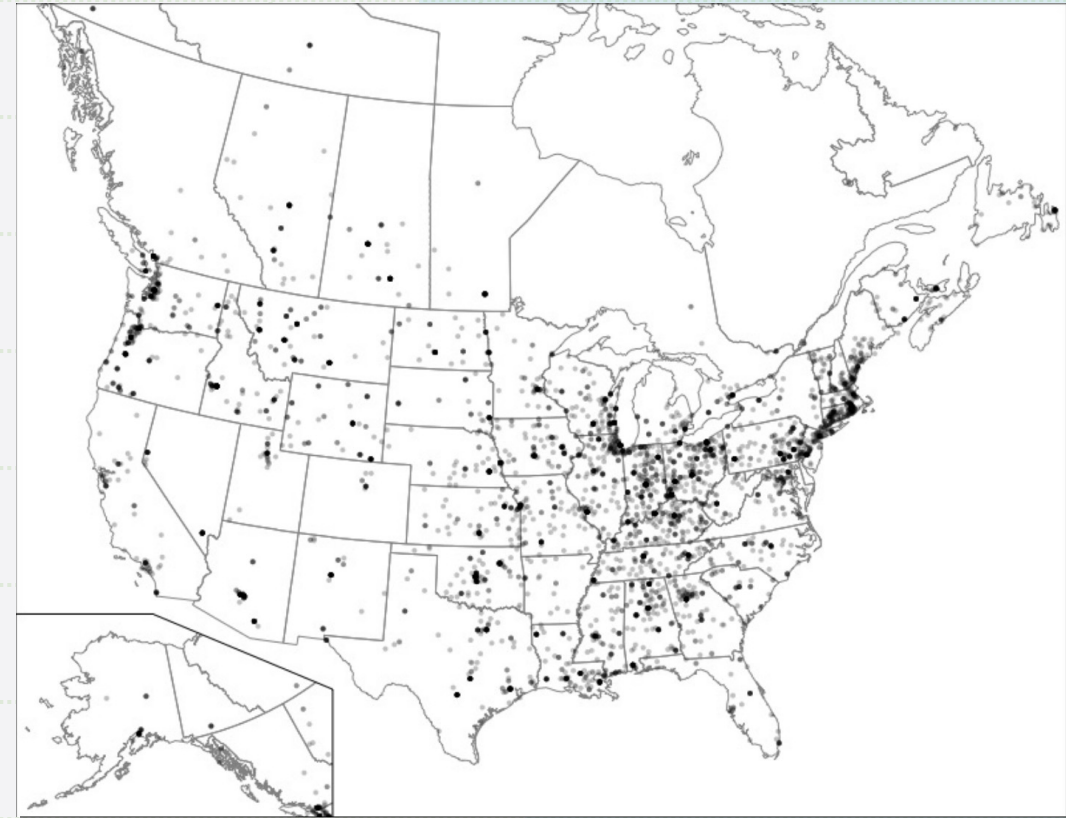
1. Mass data collection across the US and Canada using Reddit for recruitment
2. Ask about a large number of words with different frequencies, morphological structures, phonological structures, etc.

Method

Do you pronounce the following highlighted vowel sounds?

bag

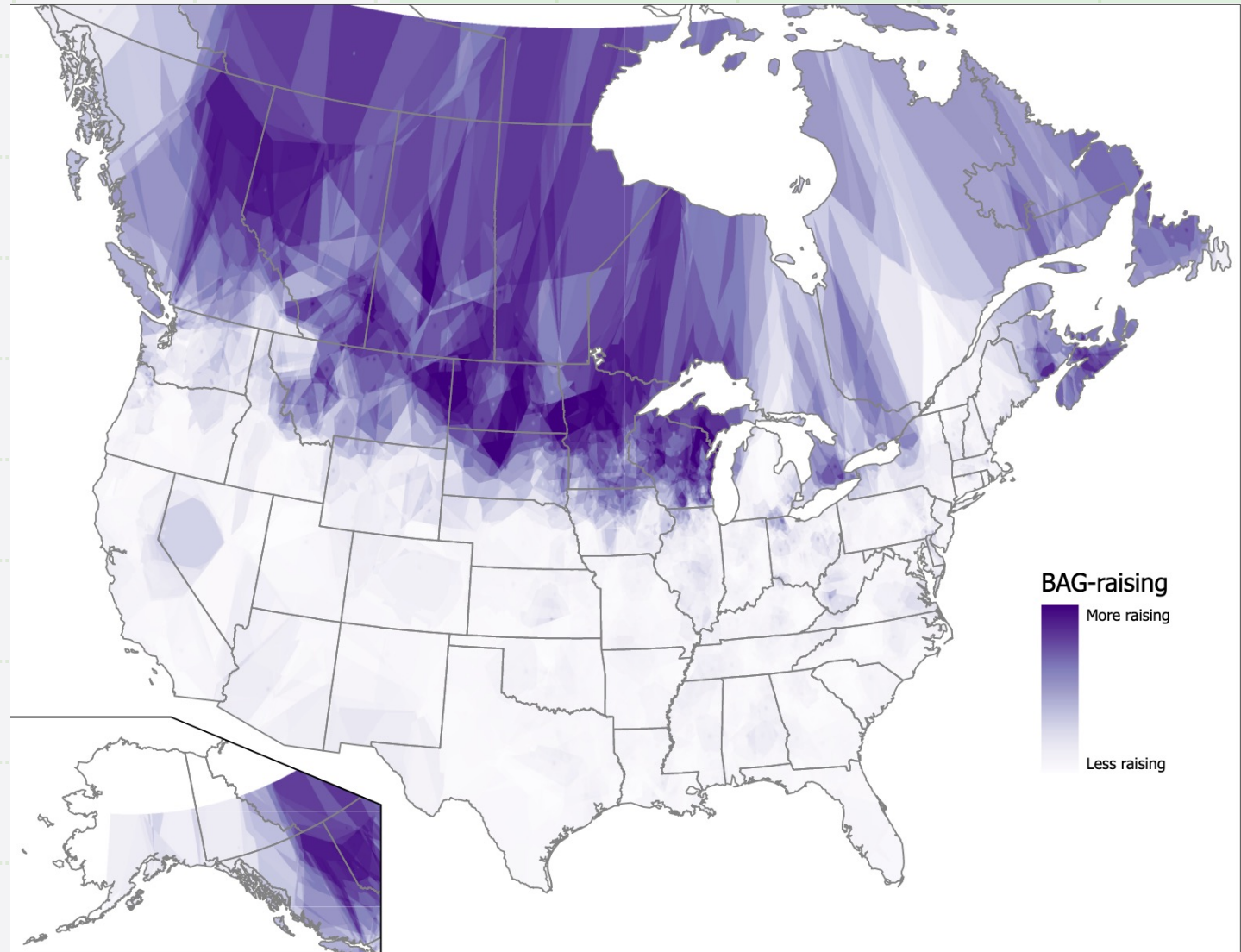
1. Like the vowel in BAKE
2. Like the vowel in DECK
3. Like the Vowel in BACK
4. Somewhere between BAKE and DECK
5. Other



Geographic Distribution of 5291
Participants (Stanley, accepted, p 18)

Results

- Raising most frequently reported in Canada, the Pacific Northwest and the Upper Midwest
- Sporadic reporting of raising outside these areas as well



Geographic Distribution /æg/-raising in North America (Stanley, accepted, p 23)

Conclusion & Caveat

1. /æg/-raising primarily occurs in regions previously studied, but may also be more widespread
2. /æg/-raising occurs uniformly across the lexicon

However, "... these findings should be backed up with acoustic data..." (Stanley, accepted, p. 36)

This Study

Goal

Directly compare speakers' actual and self-reported production of /æɡ/-raising to see if they are correlated

Question

Does self-report accurately reflect production?

Yes

Self-reported
raising =
produced raising

No

Self-reported
raising \neq
produced raising

Method: Participants & Production

Participants: 18 native speakers of North American English (7 US, 11 CAN)

Production: Word list reading task (3x)

- Target stimuli (6): *lag, bag, mag, nag, tag, sag,*
bat

► Analysis: Production

1. Annotation and Formant Measures in Praat (Boersma, 2001)
2. F1, F2 at 1/3 point of the vowel
3. Scores converted to Bark and Lobanov-normalized in R (R Core Team, 2020)
4. Pillai scores calculated to measure the degree of overlap between the production of *bat* and that of the /æɡ/ stimuli
 - Corresponds with the use of b_t stimuli in self response survey

Analysis: Pillai Scores

- Measure of the degree of overlap between two distributions
- Bounded by $[0, 1]$

Higher score = More raising

Lower score = Less raising

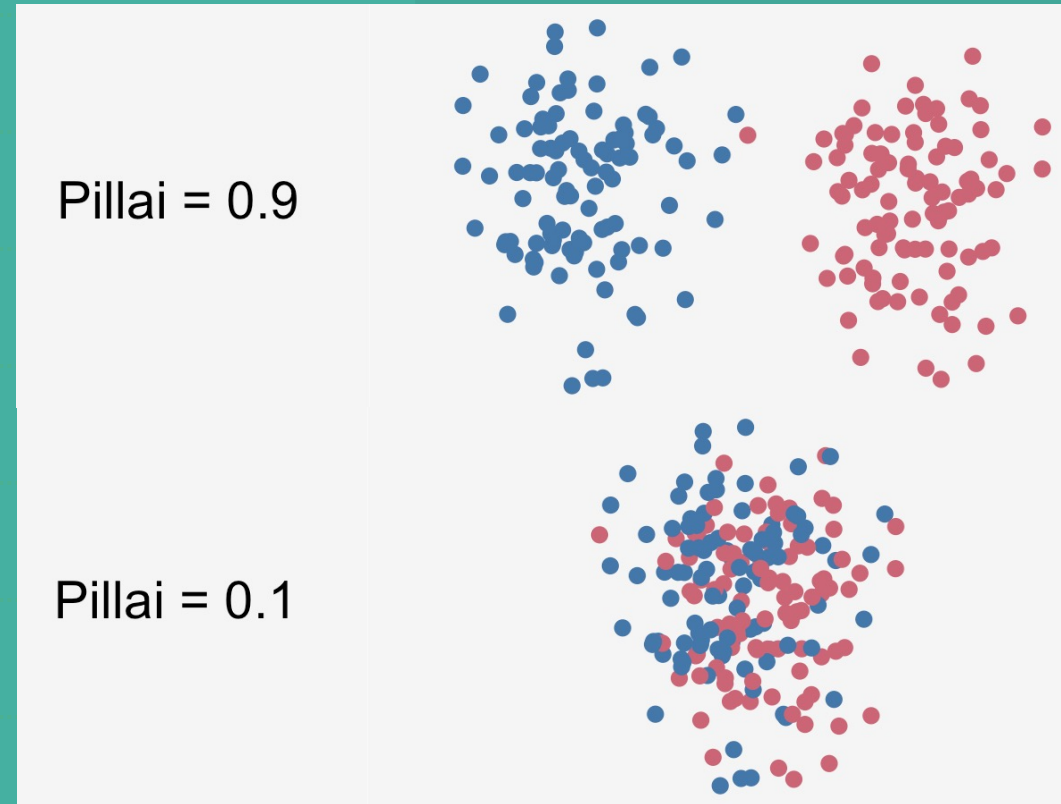


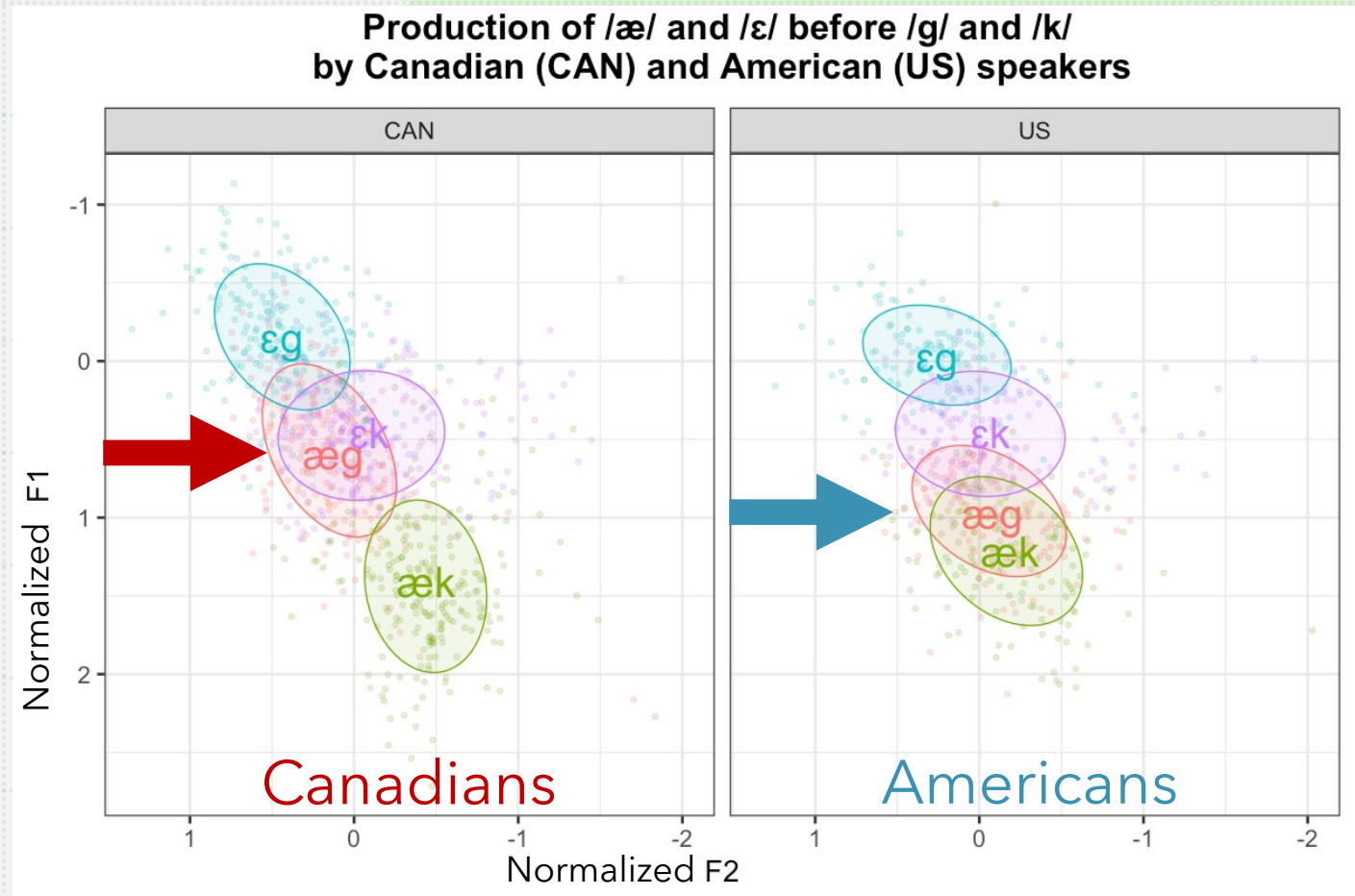
Image Source: Stanley 2019b

Production by country

/æɡ/ is higher for Canadians than Americans

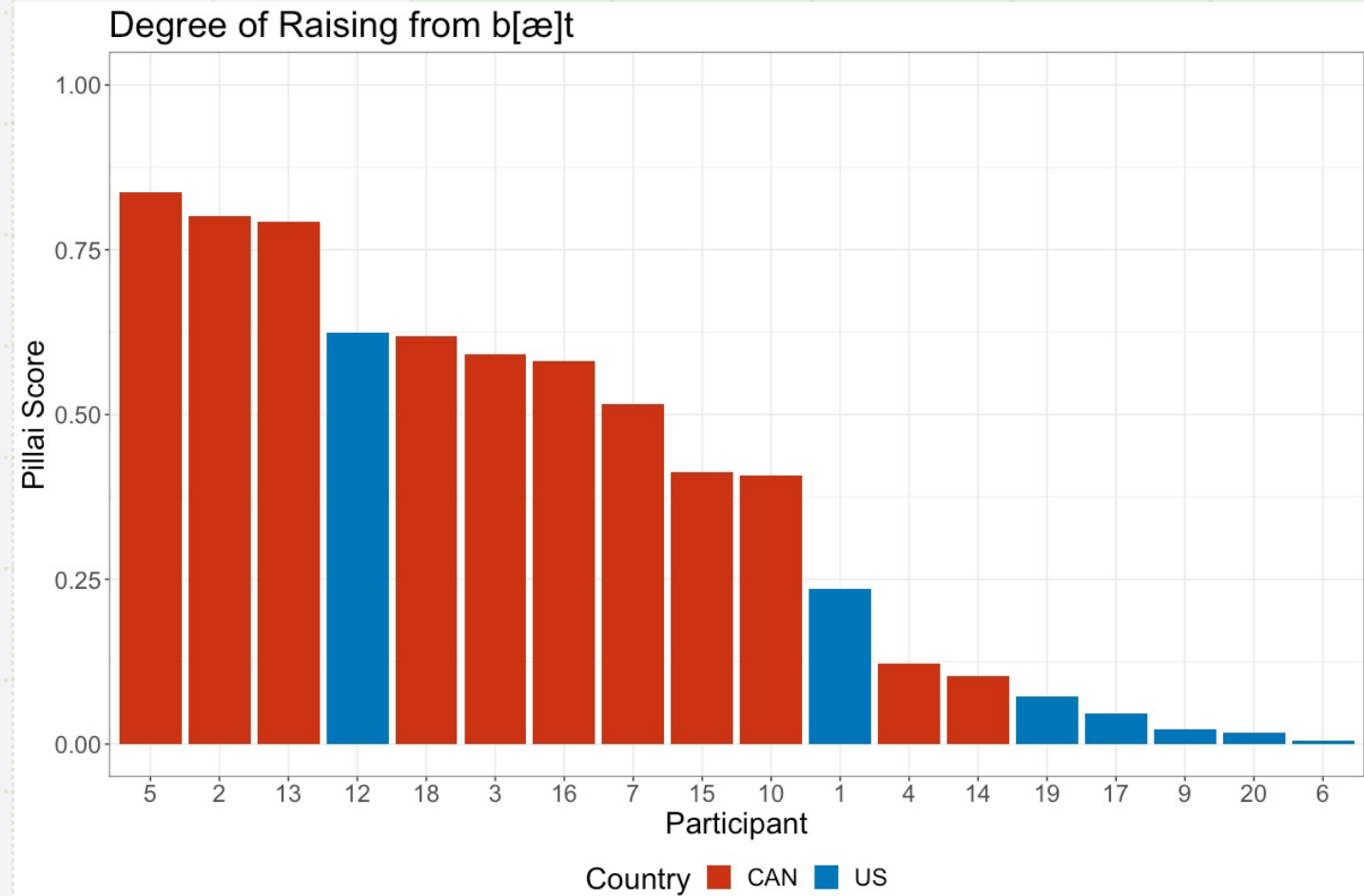
Suggests (these) Canadians /æɡ/-raising, but (these) Americans do not

Significant (Sullivan 2020a,b)



Pillai Scores

- Most Canadians raise
- Most Americans don't
- There is variation across participants



Method: Self-report

- **Target stimuli:** *lag, bag, mag, nag, tag, sag*
- **Instructions:** You will be presented with a series of words. For each word, indicate how you pronounce the first vowel in the word. Does it sound like the vowel in *bat*, the vowel in *bet*, the vowel in *bait* or somewhere between the vowel in *bet* and the vowel in *bait*.

How do you pronounce **bag**?

- ☐ Like the vowel in ***bat***
- ☐ Like the vowel in ***bet***
- ☐ Like the vowel in ***bait***
- ☐ Somewhere between the vowel in ***bet*** and the vowel in ***bait***
- ☐ Other

► Analysis: Self-Report

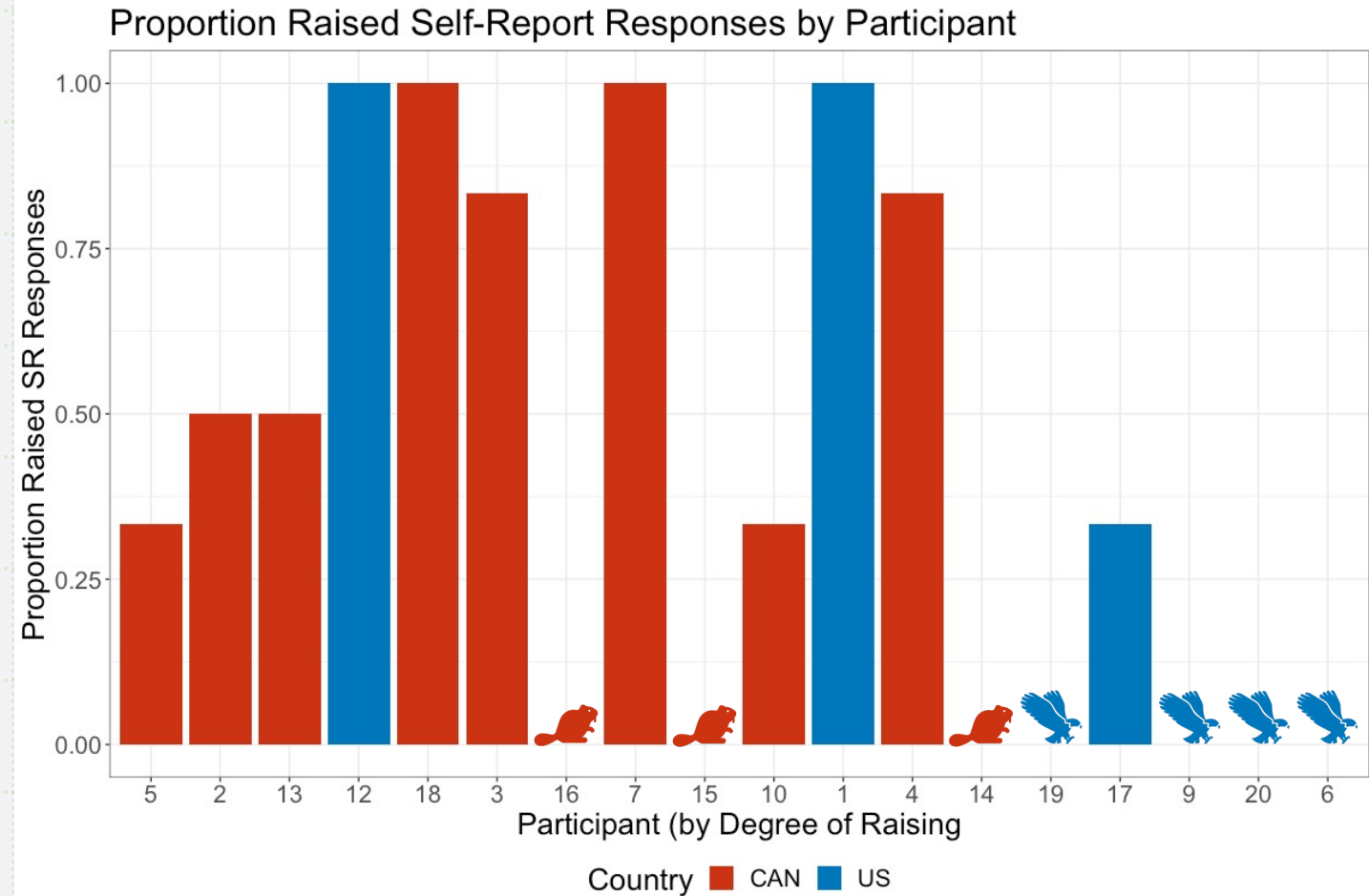
- Responses are categorized as raised (*bait, bet, between bait and bet, other*) or unraised (*bat*)
- Proportion of reported raising calculated by dividing the number of raised responses by the total number of target words (e.g. $3/6 = 0.5$ if the participant reported raising on 3 words)

Self-report by individual

Variation across participants

- Categorically raised
- Categorically unraised
- Non-categorical

All participants self-report pronouncing *back* the same as *bat*



► Analysis: Linear Regression

Can self-report predict production?

Response Variable: Production (Pillai score → continuous)

Predictor Variable: Self report proportion (continuous)

Self Report vs Individual Production

Positive correlation between Pillai score and self-reported raising

Significant at $p < 0.1$ level

$\beta = 0.3098$; $SE = 0.1635$;
t-value: 1.895; $p = 0.0762$



Summary

1. Country predicts raising: Canadians are more likely to raise than Americans

2. Self-report may predict production: People who raise more may be more likely to self-report raising

Conclusion

Does self-report accurately reflect production?

- Maybe?
- Seems to be accurate when there is no variation/phonological process (e.g. *back*)
- Positive correlation when there is variation, but more data is needed

Future Directions

1. Collect more data

2. Adjust the question being asked

- Participants never said /æɡ/ words sounded like *bet*
- Canadians frequently selected 'Other' for /æɡ/ words
- **Possible solutions:**
 - Add a choice for between *bait* and *bet*
 - Use a slider from *bait* to *bet* to *bat*

▶ Thank you!

Jessamyn Schertz, Yoonjung Kang,
Marisa Brook, Na-Young Ryu, Hyoungh
Seok Kwon, Simon Whedbee,
Anthony Fredette, Brianna Sullivan,
the participants in this project

This project was funded by a SSHRC
Doctoral Fellowship and a SSHRC
Institutional Grant



References

- Boersma, P. (2001). Praat, a system for doing phonetics by computer. *Glott International*, 5(9/10), 341-345. Retrieved from <http://www.praat.org/>
- R Core Team. (2018). R: A language and environment for statistical computing [Computer software manual]. Vienna, Austria. Retrieved from <https://www.R-project.org/>
- Stanley, J. A. (2018). The differences between and within beg and bag: Phonological, morphological, and lexical effects in prevelar raising. In *47th annual meeting of new ways of analyzing variation*. New York, NY.
- Stanley, J. A. (2019a). Are beg and bag-raising distinct? regional patterns in prevelar raising in North American English. In *American dialect society annual meeting*. New York, NY.
- Stanley, J.A. (2019b). *A tutorial measuring vowel overlap in R*. Retrieved from <https://joestanley.com/blog/a-tutorial-in-calculating-vowel-overlap>
- Stanley, J.A. (accepted). Regional patterns in prevelar raising. *American Speech*
- Sullivan, L. (2020a). *The production-perception link in phonologically-conditioned pre-velar /æ/-raising*. (Unpublished Manuscript)
- Sullivan, L. (2020b). The production and perception of prevelar/æ/-raising by Canadian and American English speakers. *The Journal of the Acoustical Society of America*, 148(4), 2809.

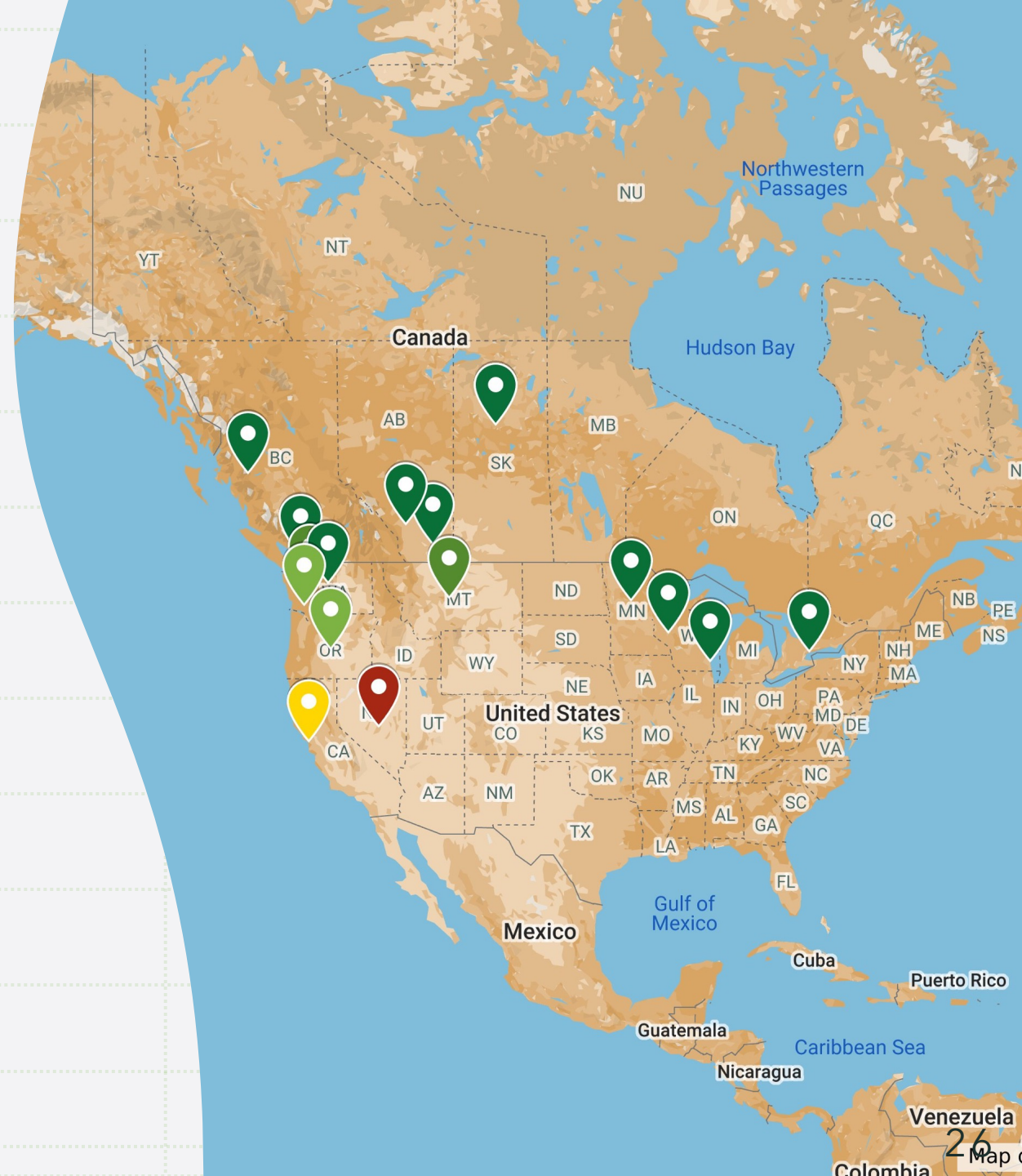
Where does /æ/-raising occur?

Acoustic Studies

Raising documented in:

- **Canada:** across the country, including Vancouver, BC, Calgary, southern Alberta, Toronto
- **US:** Pacific Northwest (Washington, Oregon, Montana), Upper Midwest (Minnesota, Wisconsin)

No raising or inconclusive results:
Nevada, California

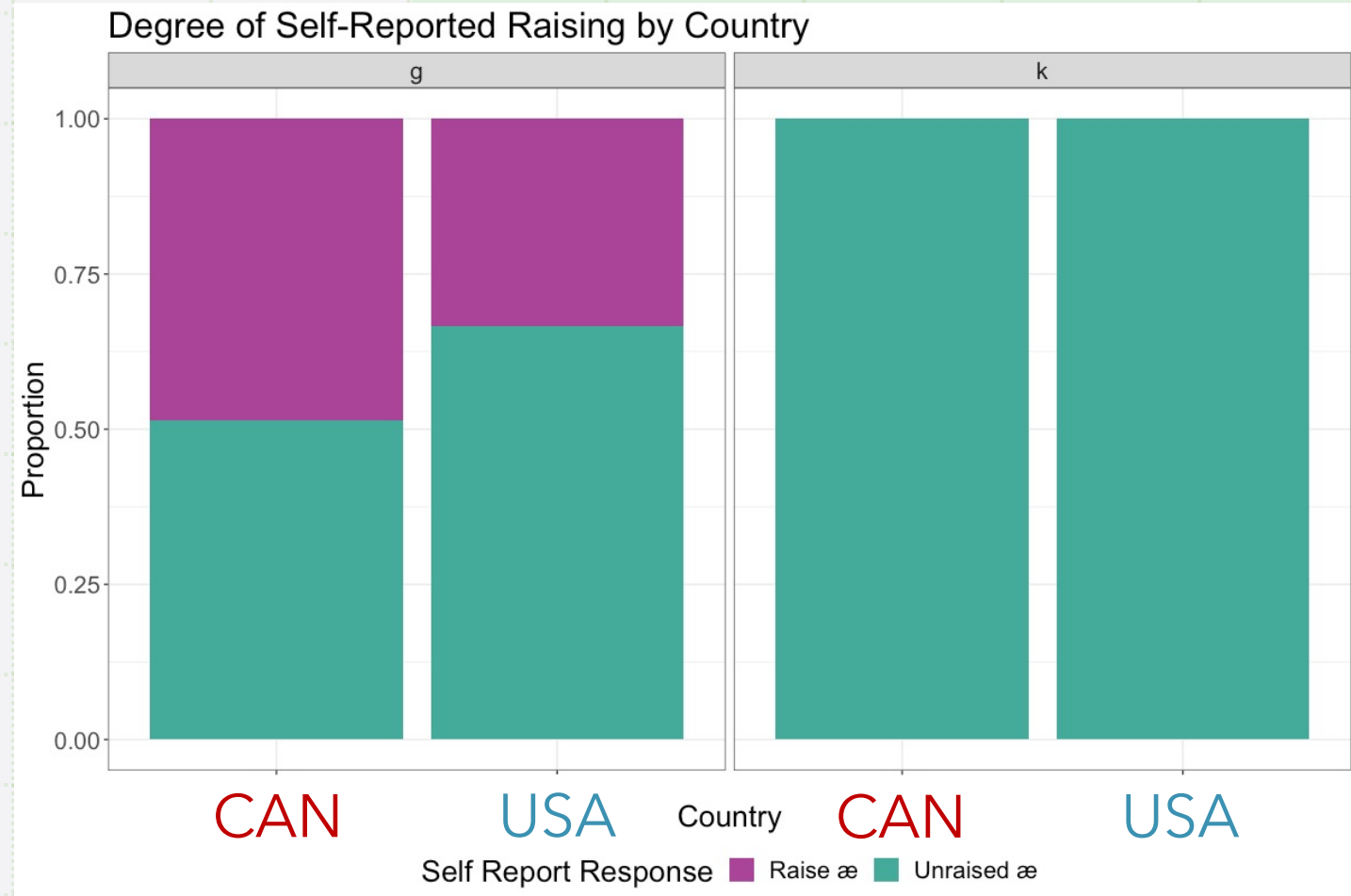


Self-report by country

Canadians self-report more pre-velar /æ/-raising than Americans

No significant effect of country on self-report

No one self-reports /æ/-raising before /k/ (e.g. in *back*)



Self Report vs Individual Production

Correlation is weaker for Canadians than Americans

No significant interaction between country and self-report on Pillai score

