Perceptual bias

October 17, 2016

Can we trust our ears?

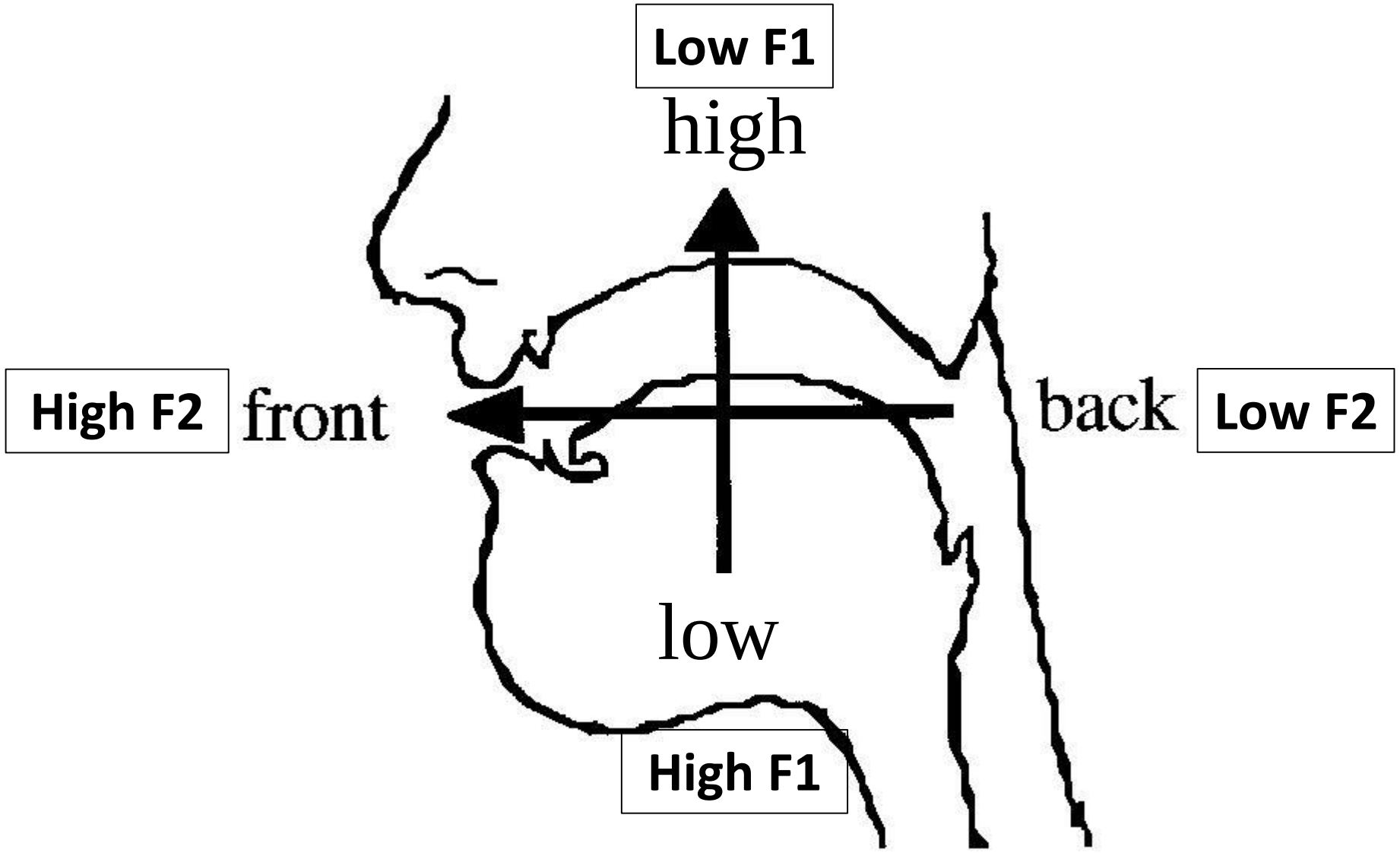
- We trust our ears to tell us what we're hearing, but:
  - Our ears are connected to our brain.
  - Our brain processes a lot of information other than sound.
- The result is that we can't fully trust what we "hear", because the auditory input gets mixed in with other signals and representations your brain is simultaneously processing.
- A good example of this is the McGurk effect.

A famous example of perceptual bias

- The U.S. city of Detroit is right next to the Canadian city of Windsor. Even though the cities are in different countries, and both speak English, they share many aspects of pronunciation, including “Canadian raising”.
- **Canadian raising** is the pronunciation of /a/ like [ʌ]. This results in a word like “house” sounding like “hoose”.

Canadian raising in Detroit

- According to Niedzielski (1995, 1997), Canadian raising is a stereotype of Windsor speech held by most residents of Detroit.
- They think that people from Windsor have Canadian raising, but people from Detroit do not.
- However, white middle-class Detroit residents *do* have Canadian raising as well – *they're just not aware of it*.
- How much do beliefs about a speaker influence listeners' judgements about that speaker's pronunciation?


Low F1
high
High F2
front
back
Low F2
low
High F1

The experiment

- Listeners heard a Detroit speaker reading a set of sentences, and were told to pay close to attention to the vowel in a particular word.
- Then, they chose a synthesized vowel that they thought was most similar to the vowel in the sentence they just heard.
- For half of the listeners, the word “Michigan” was printed at the top of the response sheet. For the other half, the word “Canadian” was printed. This was the only difference between the two groups.
  - This type of manipulation is called **priming**: Being exposed to one thing (a sound, a word, etc) influences your response to something else.

Results

Table 1
Formant Values for Tokens Chosen by Respondents for Words Containing /aw/

No. of Token	F1	F2	Label of Onset[a]
2	900	1,600	Ultralow
3	830	1,330	Canonical /a/
4	675	1,150	Actual onset produced by speaker

Table 2
House: *Influence of Nationality Labels on Token Selection*

Token (Label)	2 (Ultralow)	3 (Canonical /a/)	4 (Actual Token)	Total
Canadian	15%	25%	60%	
n	6	10	24	40
Michigan	38%	51%	11%	
n	15	20	4	39

Note. $\chi^2 = 23.48$; $p < .001$.

Conclusions

- The perception of a speaker's pronunciation is influenced by listeners' beliefs about the speaker
- But how easily can listeners be swayed in this way?
  - The listeners weren't even biased that explicitly – the response sheet just said "Michigan" or "Canadian", and that's it.
  - Hay, Nolan, and Drager (2006) replicated the study with "New Zealand" and "Australian".
  - Could the priming be even more subtle?

Hay & Drager 2010

- Australian and New Zealand (NZ) English differ in their KIT /ɪ/ and DRESS /ɛ/ vowels.
  - Australian /ɪ/ is more high and front
  - NZ /ɪ/ is more central and low
- Listen to sentences (produced by a NZ speaker) containing words with /ɪ/ and /ɛ/ vowels, and then listen to synthesized tokens and pick the closest match.

Hay & Drager 2010: Procedure

- When the participant entered the room and sat down, the experimenter opened a cupboard to get some papers and would feign surprise to find a stuffed animal on top of the papers
  - The stuffed animal was either (1) a kangaroo or koala, or (2) a kiwi bird
  - The experimenter then placed the stuffed animal on the desk where there participant was seated.
- This method ensured that the participant's attention was drawn to the animal (i.e. we know they noticed it), and because the experimenter acted surprised, the participant would not ask questions about why it was there, and therefore draw unequal amounts of attention from different participants.

Hay & Drager 2010: Results

- The stuffed animals affected listeners' perception. When listeners were sitting with the kangaroo or koala they were more likely to choose a higher/fronter KIT /ɪ/ vowel.

What do we think now?

- How does this apply to how we think and talk about Korean dialects?
- What kind of experiments could we do to test whether the perception of certain linguistic features are affected by beliefs about the speaker?

How might this interact with race?

- We've talked about expectations and dialect in Korean, but what about expectations and race?
  - Do Koreans expect people of certain races to talk a certain way?
  - What if someone goes against this expectation?
- Is it possible people might think you have a foreign accent (even when you don't) simply because of your race?
- Is it possible you might be able to pass for a native speaker of Korean (even though you're not) simply because of your race?

Rubin (1992): The TA study

- It is common for native speakers to complain about non-native accents.
  - Many teaching assistants (TAs) in U.S. universities are non-native (and foreign) speakers of English.
  - Students claim they can't learn the material because their TA's English is so poor.
- Do such claims have merit?

Rubin (1992): The TA study

- Recorded two lectures, read from a script by a female native speaker of English.
- The lectures were on different topics (helium scarcity and the Mahabharata).
- Students listened to one of the recorded lectures while being shown one of two faces on a screen: a Caucasian (white) or Asian (Chinese) woman.

Rubin (1992): The TA study

- Afterwards students took a quiz (cloze test) based on the content of the lecture.
- They also filled out a survey asking a bunch of questions about the lecturer.
  - "Shares my values …… Doesn't share my values"
  - "Poor teacher …….. Effective teacher"
  - "Speaks with American accent ……. Speaks with foreign accent"
  - "Caucasian ethnicity …… Asian ancestry"
  - … and 12 other questions
- What do you think he found?

Rubin (1992): The TA study

Lecture Topic:	Humanities				Science			
Instructor Ethnicity:	Caucasian		Asian		Caucasian		Asian	
N =	16		17		16		13	
Perceived accent	3.44	(2.56)	4.94	(1.98)	2.75	(2.44)	3.77	(1.88)
Perceived ethnicity	2.75	(1.98)	5.53	(1.97)	2.06	(1.39)	6.23	(0.93)
Comprehension	11.94	(4.34)	9.93	(5.70)	12.5	(5.9)	7.31	(4.70)
Teaching qualifications	8.69	(3.61)	8.18	(1.81)	7.25	(2.46)	9.15	(2.73)
Attitude homophily	5.56	(5.51)	6.00	(4.95)	2.38	(4.24)	3.38	(4.37)
Background homophily	12.75	(4.12)	12.18	(4.03)	13.25	(4.48)	10.31	(3.54)
Values homophily	15.88	(4.53)	14.94	(2.88)	14.81	(3.21)	14.46	(3.86)
Appearance homophily	11.13	(5.04)	10.71	(5.77)	10.13	(4.77)	7.69	(3.22)

- Significant correlation between perceived accent and perceived ethnicity

Rubin (1992): The TA study

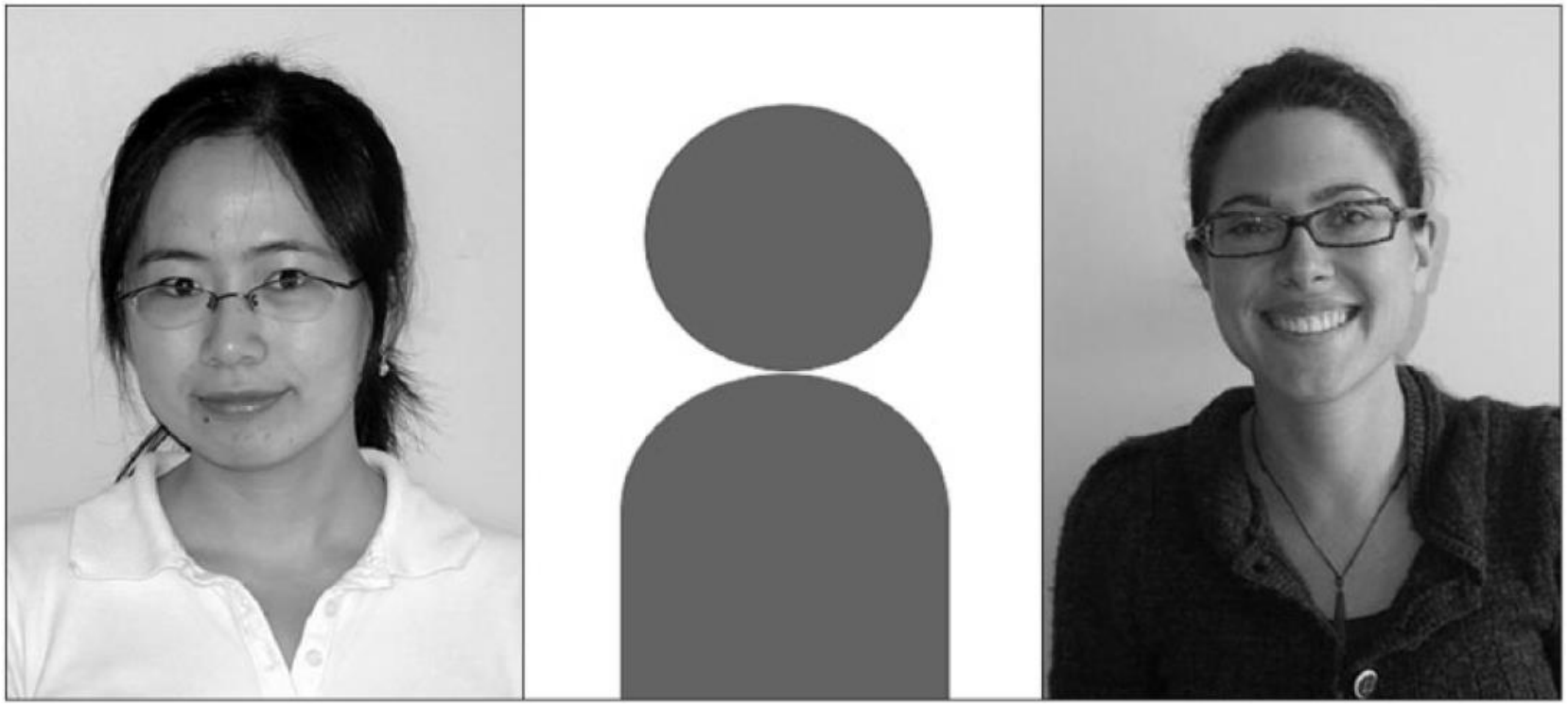
- Significant correlation between perceived accent and perceived ethnicity
- Race may have also affected the cloze test scores.
- In an additional experiment with a larger subject group, they found that the best predictor of comprehension was whether the student had already taken a class from a non-native speaking instructor.

An alternate explanation?

- No question that the picture affected the perceived accent, but how exactly did the picture affect the comprehension test scores?
  - Do American listeners “shut down” when they see an Asian face?
  - Or do people just get confused when the voice doesn’t match their expectation?
- Is this a case of racial bias, or confusion due to unmet expectations?

McGowan 2015

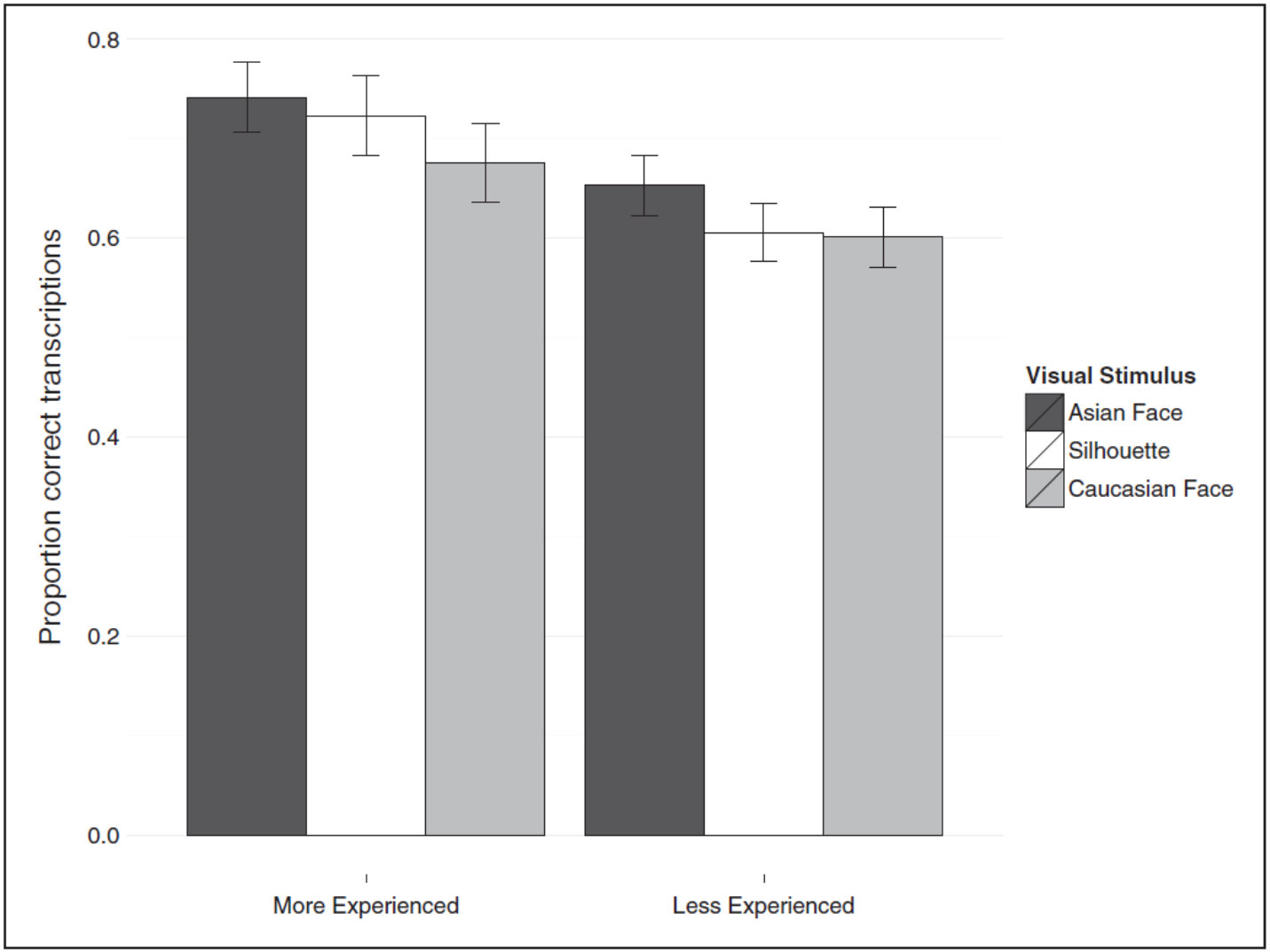
- What if a Chinese-accented voice were paired with Caucasian and Asian faces?



McGowan (2015)

- 30 pairs of high- and low-predictability sentences produced by a Chinese-accented speaker of English
  - High: “Last night, they had beef for dinner.”
  - Low: “He talked about the dinner.”
- Speech was mixed with noise, to make it harder to hear
- 78 listeners
  - 50 inexperienced with Chinese-accented speech
  - 28 experienced with Chinese-accented speech
- Listened to the sentences and wrote down as many words as they understood.

	High predictability	Low predictability
Asian face	0.79	0.58
Silhouette	0.73	0.55
Caucasian face	0.72	0.53



Conclusions

- It seems to be about expectations, and not necessarily perceived race
  - When the face and voice matched expectations, performance was good.
  - When they were mismatched, performance was bad.
- Are expectations themselves racist? Maybe sometimes, but it's possible to test them independently (as McGowan did).
- Do these results inform or interact with our experiences as/with non-native speakers and/or non-Koreans in Korea?