



13. Invent Yourself : Hearing

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Introduction



The problem statement

Some years ago a mondegreen called “Yanny or Laurel” was posted on a social media platform and caused controversy since some people were able to hear Yanny, others Laurel and others both. Investigate this effect and the role of important parameters.



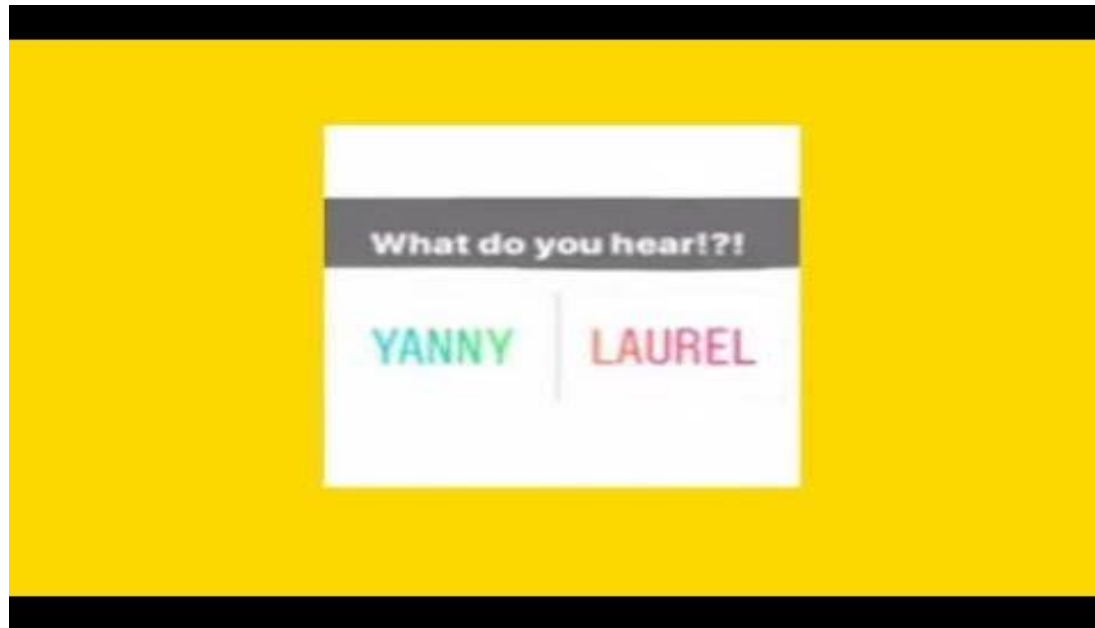
Yanny or Laurel

In 2018, an audio “illusion” called “Yanny or Laurel” was posted on Reddit and soon went viral.





Original Video



Theory



Mondegreens

A mondegreen is a word or phrase that results from mishearing or misinterpreting a statement or song lyric.



Frequency

Audio frequency is a periodic vibration whose frequency is in the band audible to the average human, the human hearing range.



Theoretical Factors

- Familiar sounds
- Bass levels
- Age
- Gender



Familiar sounds

The brain tends to interpret sounds based on experience.



Bass levels

Bass levels affect the way we perceive sounds.



Gender

Females as a group are more sensitive than males as a group by about 3 dB and this sex difference exists in children as well as adults.



Age

It has been observed that as we get older the inability to hear high frequency sounds worsens.

Hypotheses



First Hypothesis

People who hear sounds similar to Yanny or Laurel in their everyday life are most likely to hear Yanny or Laurel, respectively.



Second Hypothesis

The lower the bass levels the more likely it is to hear Laurel.

The higher the bass levels the more likely it is to hear Yanny.



Third Hypothesis

The older the person is the more likely it is to hear Laurel (low frequency sound).

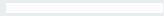


Fourth Hypothesis

Women will hear Yanny (high frequency sound) while men will most likely hear Laurel (low frequency sound).

Experiments

First Experiment





What I needed

- ❖ 20 teenagers (12-18) with a relative named Yanni
- ❖ 20 teenagers (12-18) who have seen “Laurel and Hardy”
- ❖ A smartphone
- ❖ The original video



Experimental Process

- ❖ I asked 20 people who had seen the TV show “Laurel and Hardy” to listen to the audio and then report what they heard.



Experimental Process

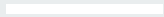
- ❖ **Then, I asked another 20 people who had some close relatives named Yanni to listen to the audio and report what they heard, as well.**



Constants

- ❖ **Audio**
- ❖ **Age**
- ❖ **Hearing Problems**
- ❖ **Device**
- ❖ **Bass levels**
- ❖ **Environment**
- ❖ **Gender (10 boys - 10 girls)**

Second Experiment





What I needed

- ❖ 20 girls (12-18)
- ❖ A smartphone
- ❖ The original video
- ❖ Speakers with bass response





Experimental Process

- ❖ I asked 20 people to listen to the audio and report what they heard.



Experimental Process

- ❖ **I asked the same people to listen to the audio with the volume down and report what they heard.**



Experimental Process

- ❖ **At last, I connected my phone to the speakers and asked them to listen to the audio again and report what they heard.**



Constants

- ❖ Age
- ❖ Audio
- ❖ Hearing Problems
- ❖ Device
- ❖ Relatives
- ❖ Environment
- ❖ TV shows
- ❖ Gender

Third Experiment



What I needed

- ❖ 20 girls and boys (12-18)
- ❖ 20 women and men (30-45)
- ❖ 20 elderly women and men (65+)
- ❖ A smartphone
- ❖ The original video



Experimental Process

- ❖ **At first, I asked the girls and boys to listen to the audio and report what they heard.**



Experimental Process

- ❖ **Then, the women and men from age 30 to 45 listened to the same clip and reported what they heard.**



Experimental Process

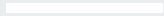
- ❖ **Finally, the elderly women and men repeated the same process.**



Constants

- ❖ Bass levels
- ❖ Audio
- ❖ Hearing Problems
- ❖ Device
- ❖ Relatives
- ❖ Environment
- ❖ TV shows
- ❖ Gender

Fourth Experiment





What I needed

- ❖ 20 girls (12-18)
- ❖ 20 boys (12-18)
- ❖ A smartphone
- ❖ The original video



Experimental Process

- ❖ **I asked 20 teenagers (12-18) of different gender to listen to the audio and report what they heard**



Constants

- ❖ Bass levels
- ❖ Audio
- ❖ Hearing Problems
- ❖ Device
- ❖ Relatives
- ❖ Environment
- ❖ TV shows
- ❖ Age



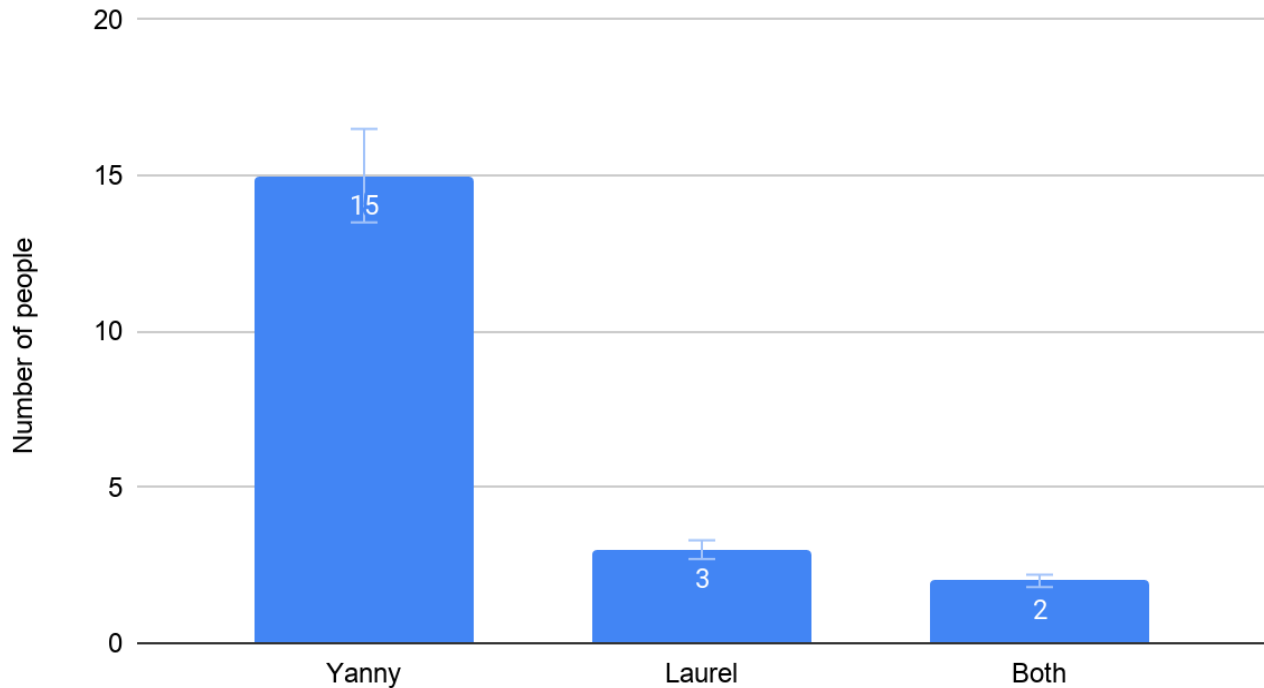
Possible Errors

- ❖ **Undiagnosed hearing problems**
- ❖ **Some people may sometimes hear the other sound after many repetitions**
- ❖ **Some environmental sounds couldn't be avoided**
- ❖ **In the first experiment, some people may also know some people called Yanni**

Results

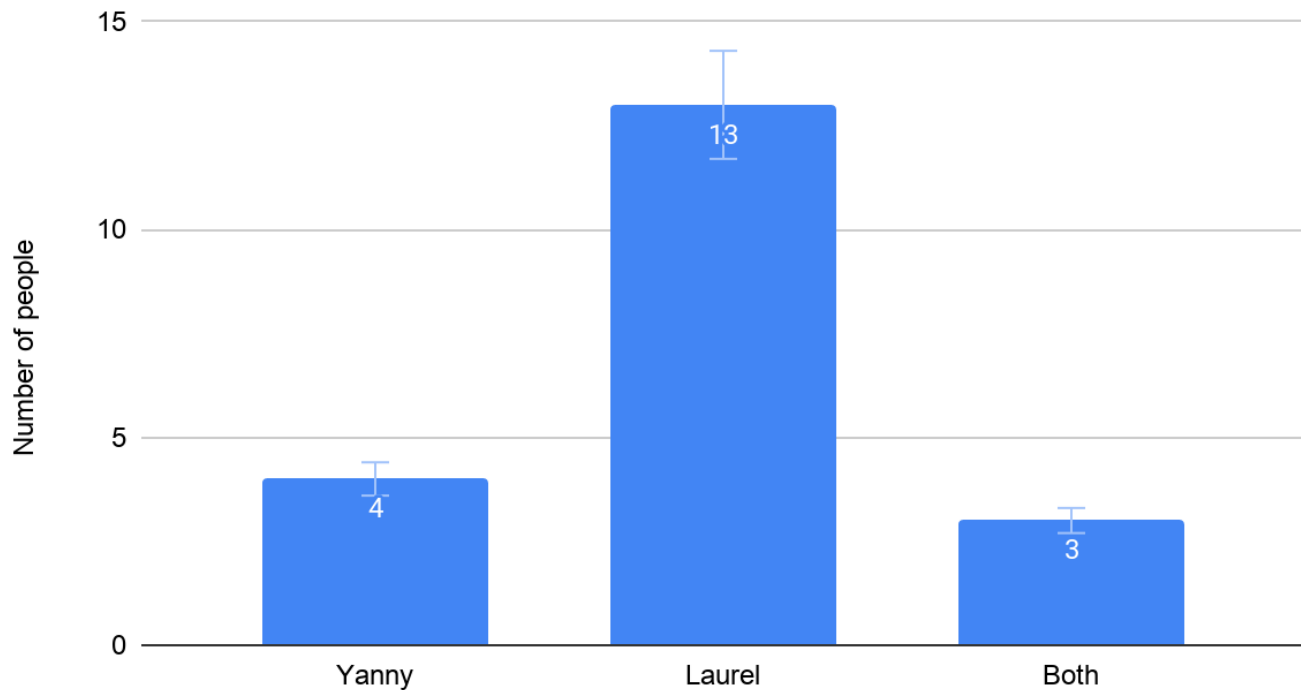
First Experiment

People who are used to hearing Yanny



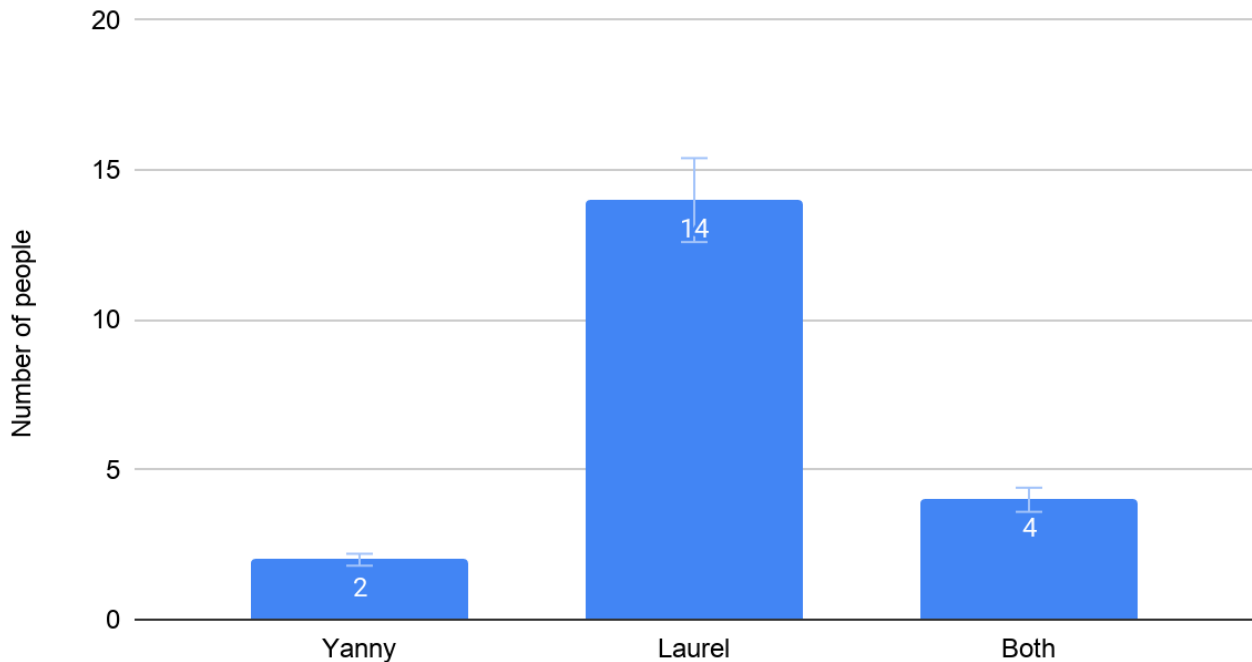
First Experiment

People who are used to hearing Laurel



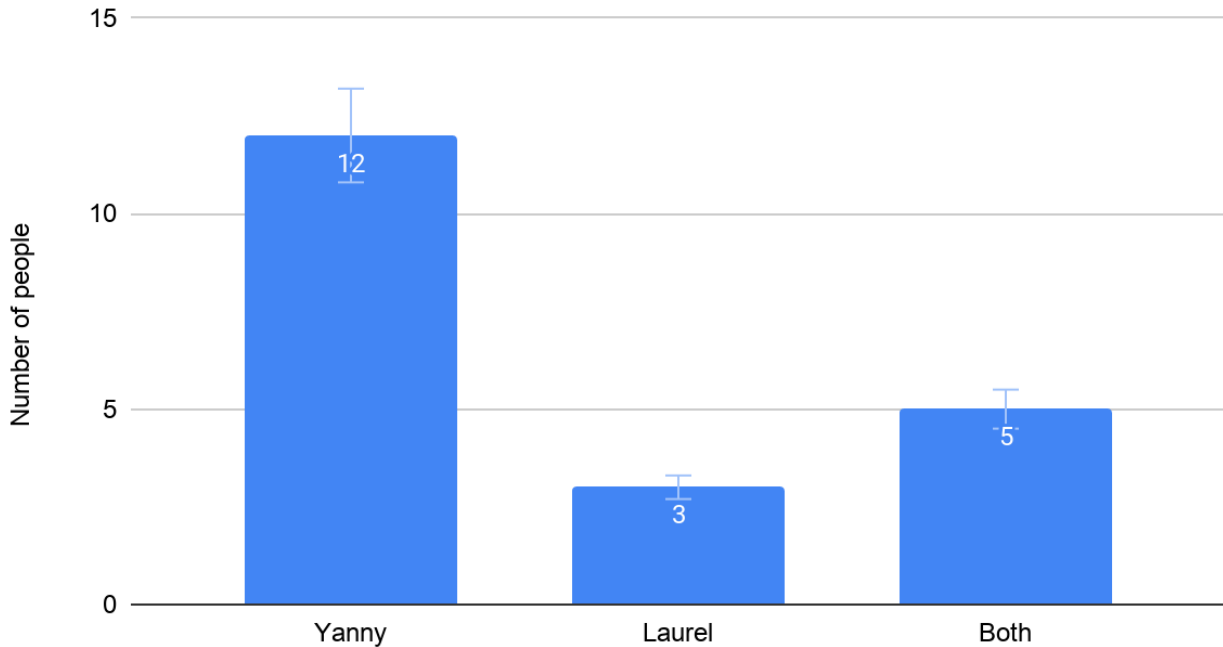
Second Experiment

Speakers with bass response



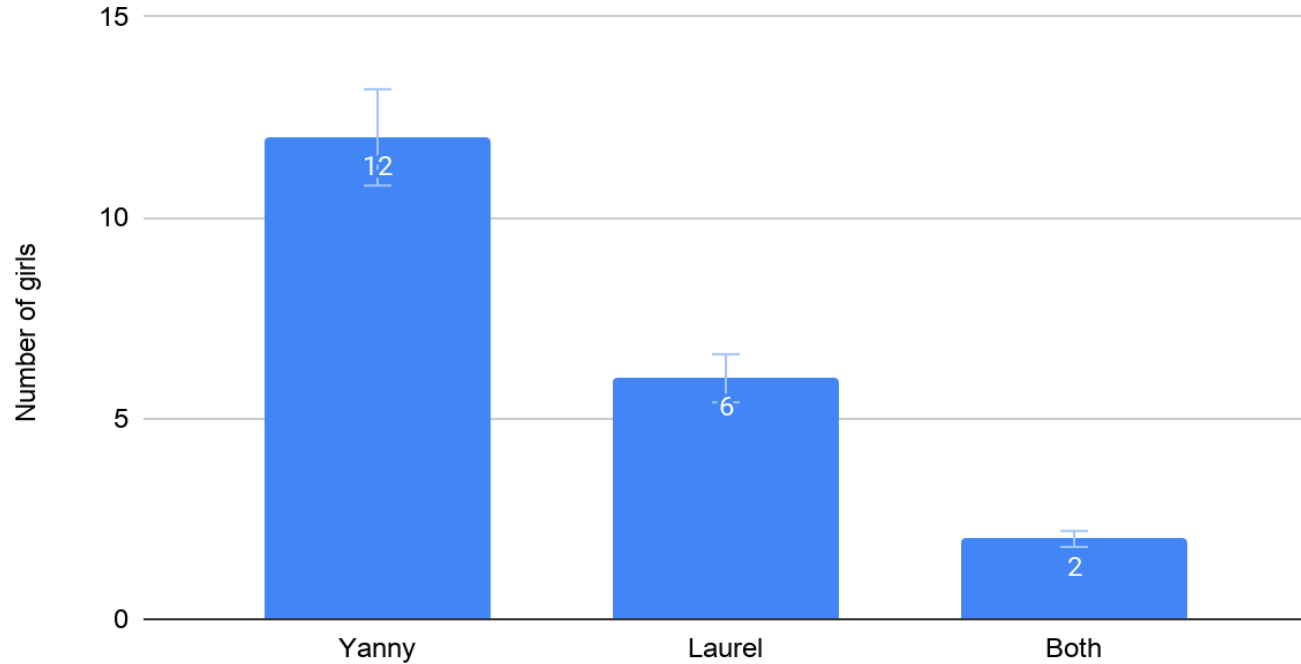
Second Experiment

Volume down



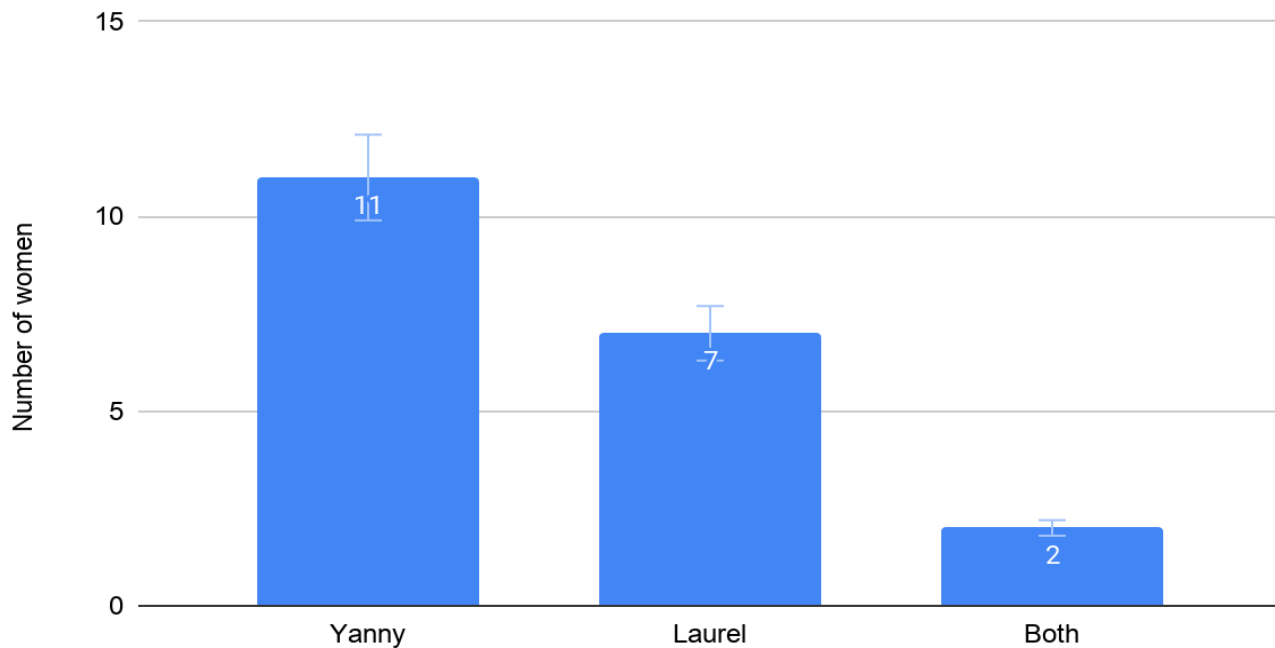
Third Experiment

Girls 12 - 18



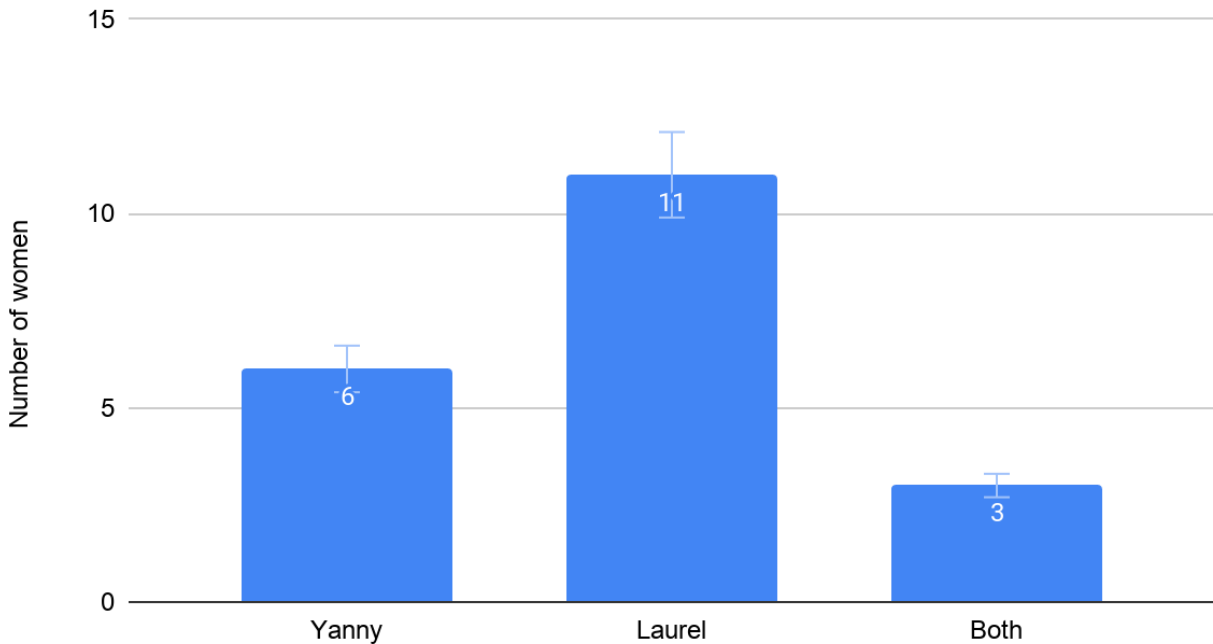
Third Experiment

Women 30-45



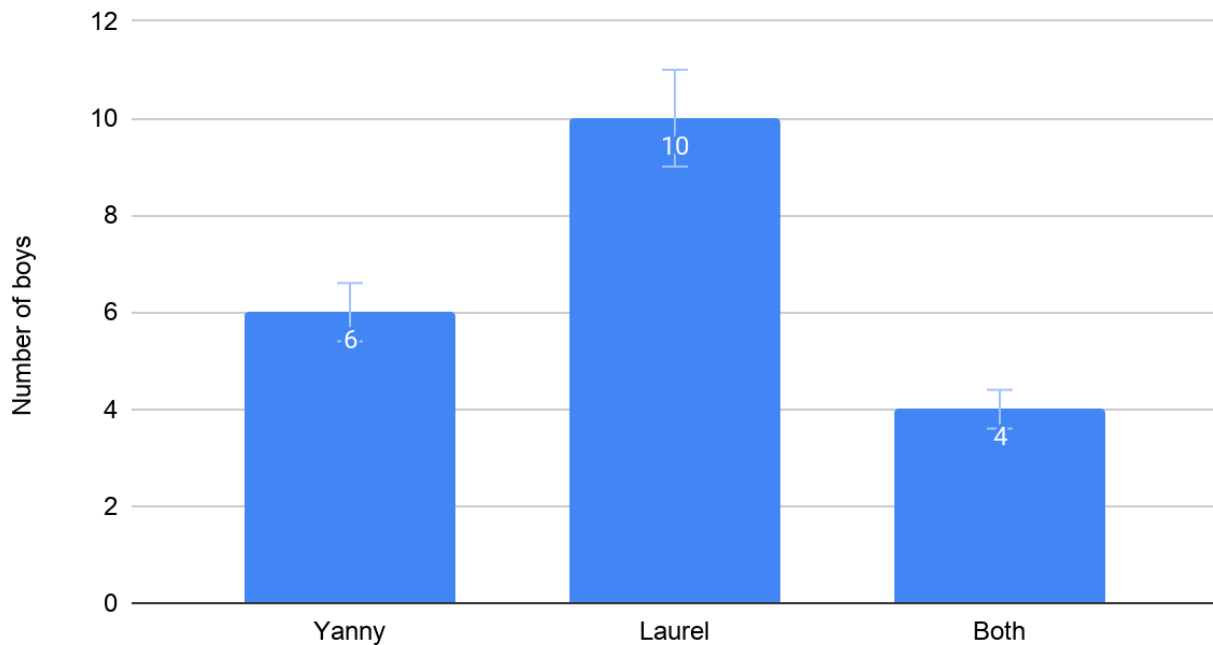
Third Experiment

Women 65+



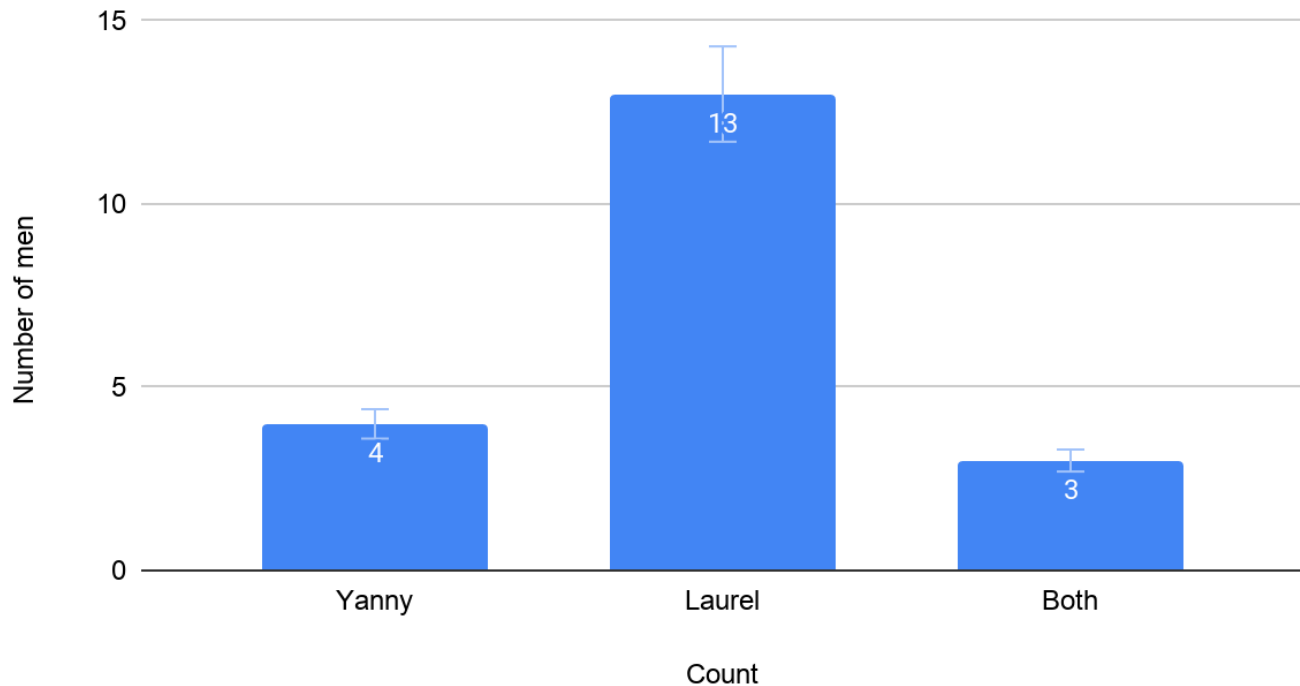
Third Experiment

Boys 12-18



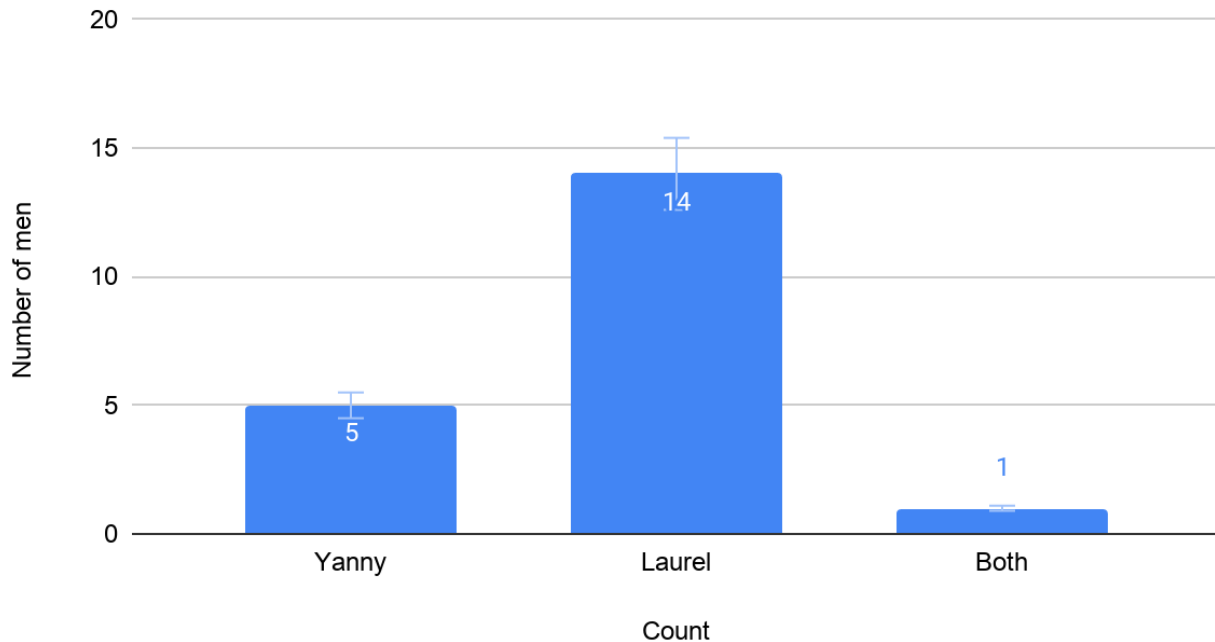
Third Experiment

Men 30 - 45



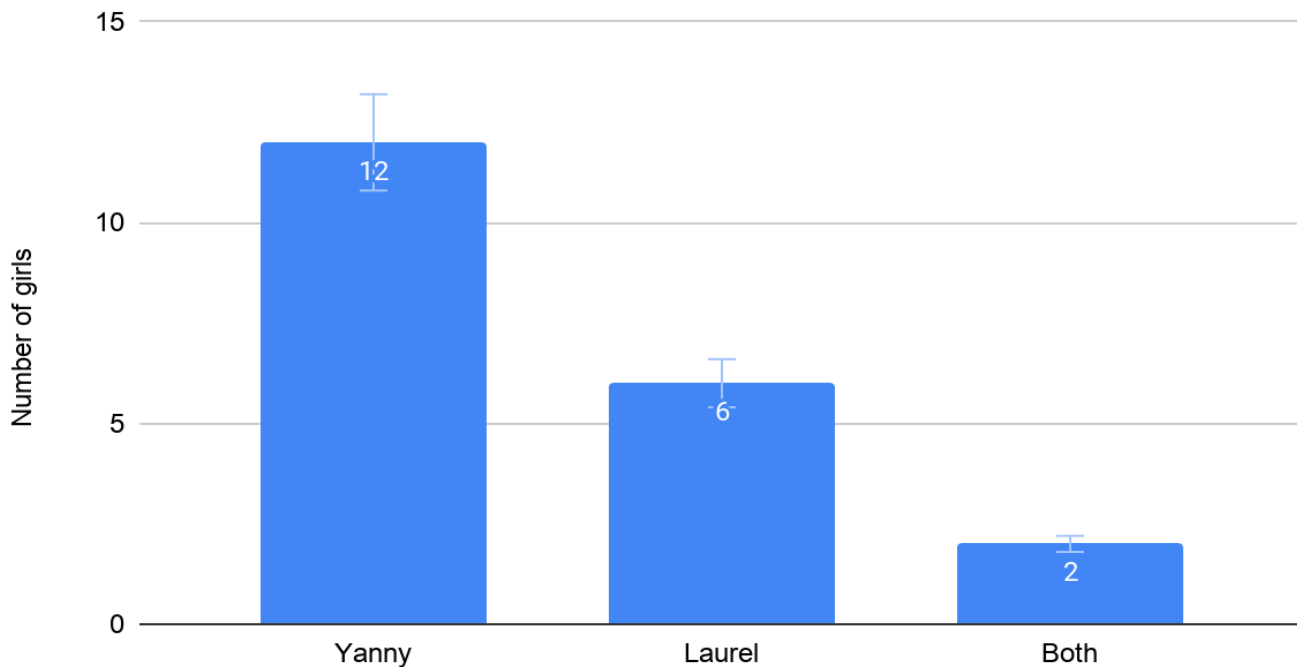
Third Experiment

Men 65+



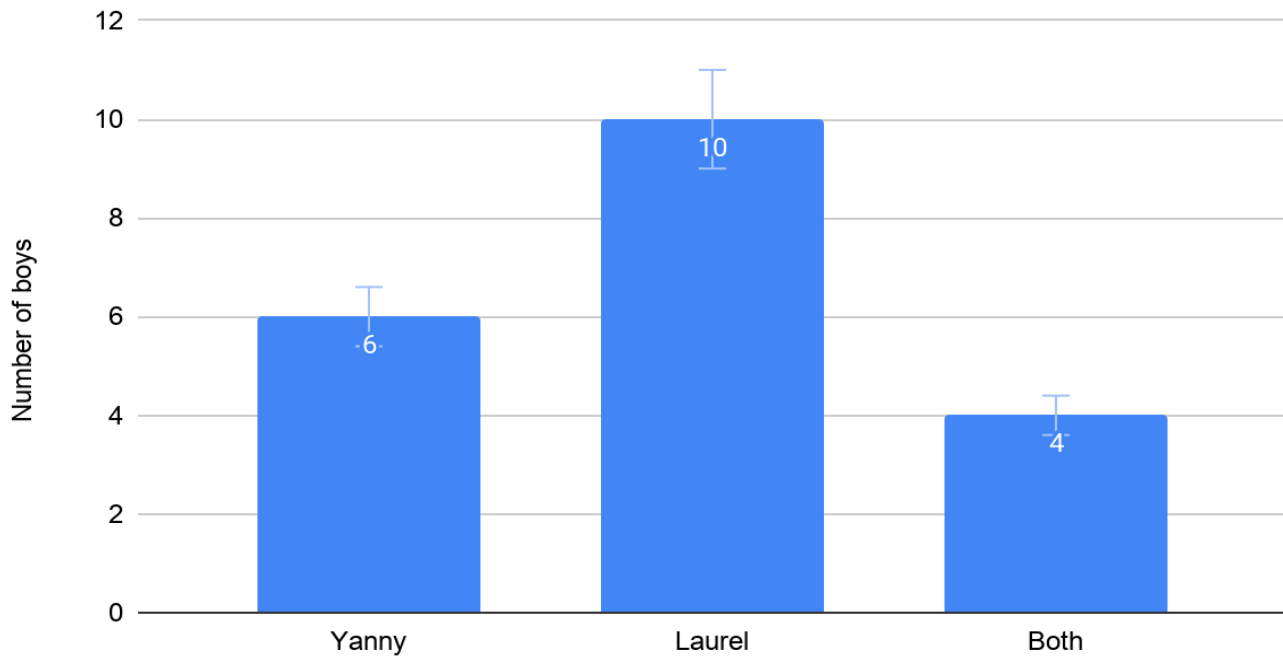
Fourth Experiment

Girls 12 - 18



Fourth Experiment

Boys 12-18



Conclusions



Conclusion I

All of my hypotheses were confirmed.



Conclusion II

Women are more likely to hear high frequency sounds than men.



Conclusion III

The age is a very important factor in speech recognition.



Conclusion IV

Whether somebody hears Yanny or Laurel depends on the bass levels.



Conclusion V

People tend to perceive sounds based on their personal experience.

References



References

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- <https://www.telegraph.co.uk/science/2018/05/17/yanny-vs-laurel-explanation-people-hear-different-names-listen/>
- <https://www.thoughtco.com/what-is-a-mondegreen-1691401>
- <https://www.youtube.com/watch?v=ebX65ds03PA>
- <https://plato.stanford.edu/entries/ambiguity/>
- <https://www.nytimes.com/interactive/2018/05/16/upshot>



Thank you for your attention

Appendix



First Experiment

The majority of people who were used to hearing Yanny on a daily basis reported that they heard Yanni while the ones who have watched the TV show “Laurel and Hardy” said that they heard Laurel.



First Experiment

The majority of people who were used to hearing Yanny on a daily basis reported that they heard Yanni while the ones who have watched the TV show “Laurel and Hardy” said that they heard Laurel.



Third Experiment

The older the people of each age group, the more likely it was for them to hear Laurel instead of Yanny.



Second Experiment

**When we turn the volume down
somebody will most likely hear Yanny
but if we listen to the audio via speakers
we will probably hear Laurel.**

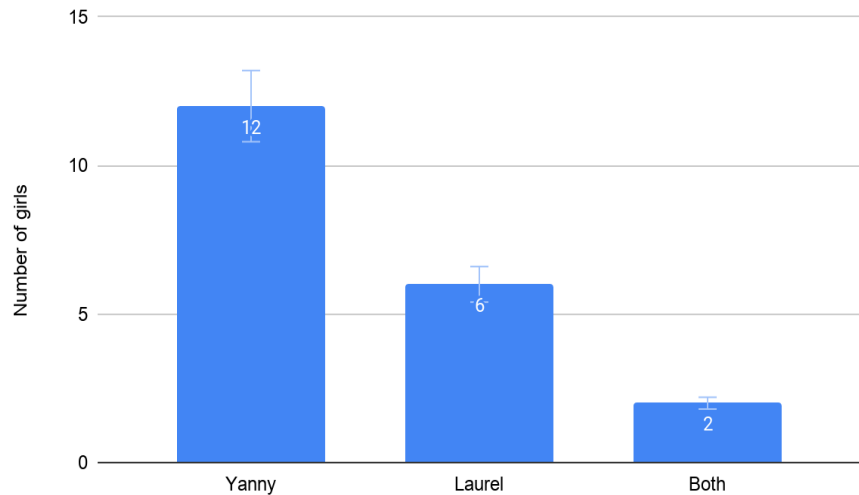


Fourth Experiment

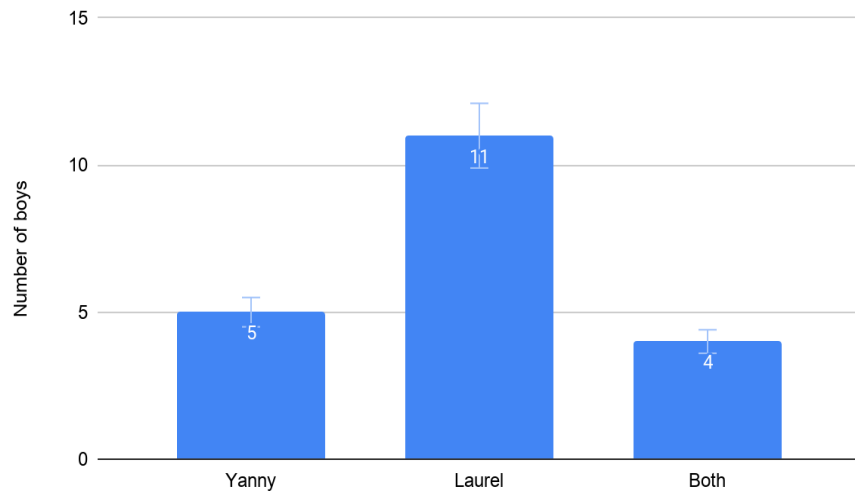
Most of the females heard Yanny (high frequency sound) while the majority of males heard Laurel (low frequency sound)

Fourth Experiment

Girls 12 - 18

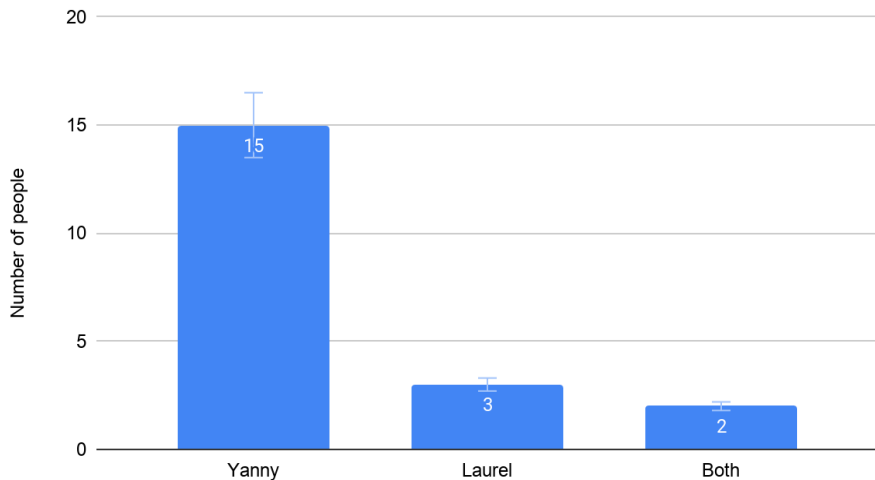


Boys 12 - 18



First Experiment

People who are used to hearing Yanny



People who are used to hearing Laurel

