

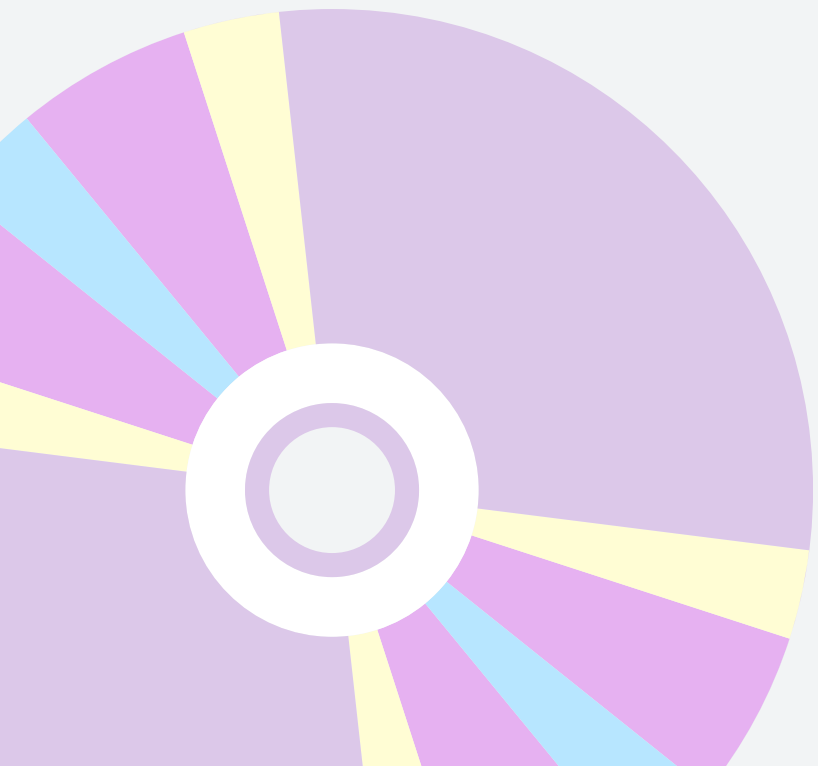


# MUSICALITY

DANAE DIAZ & RICHARD WONG

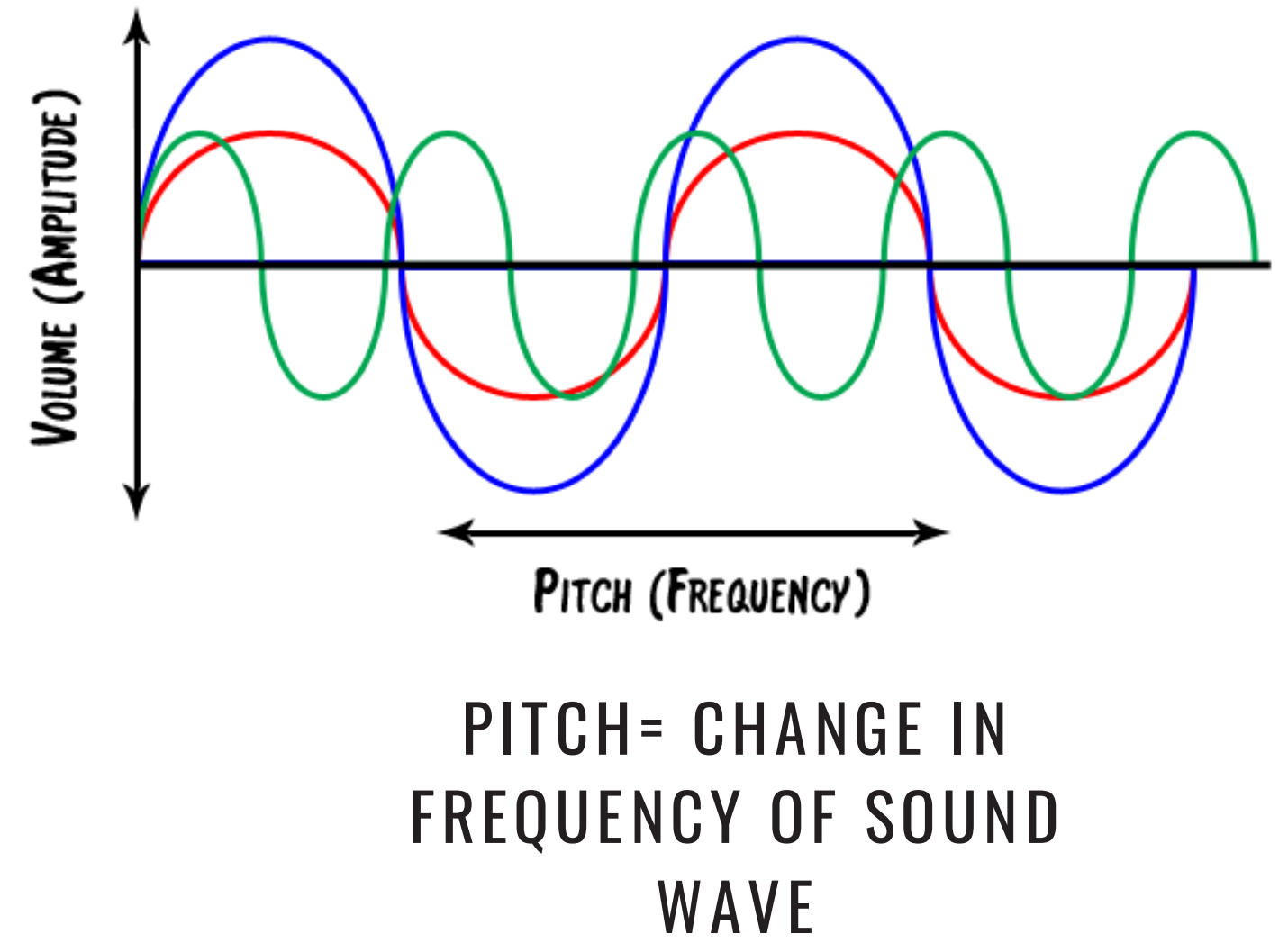
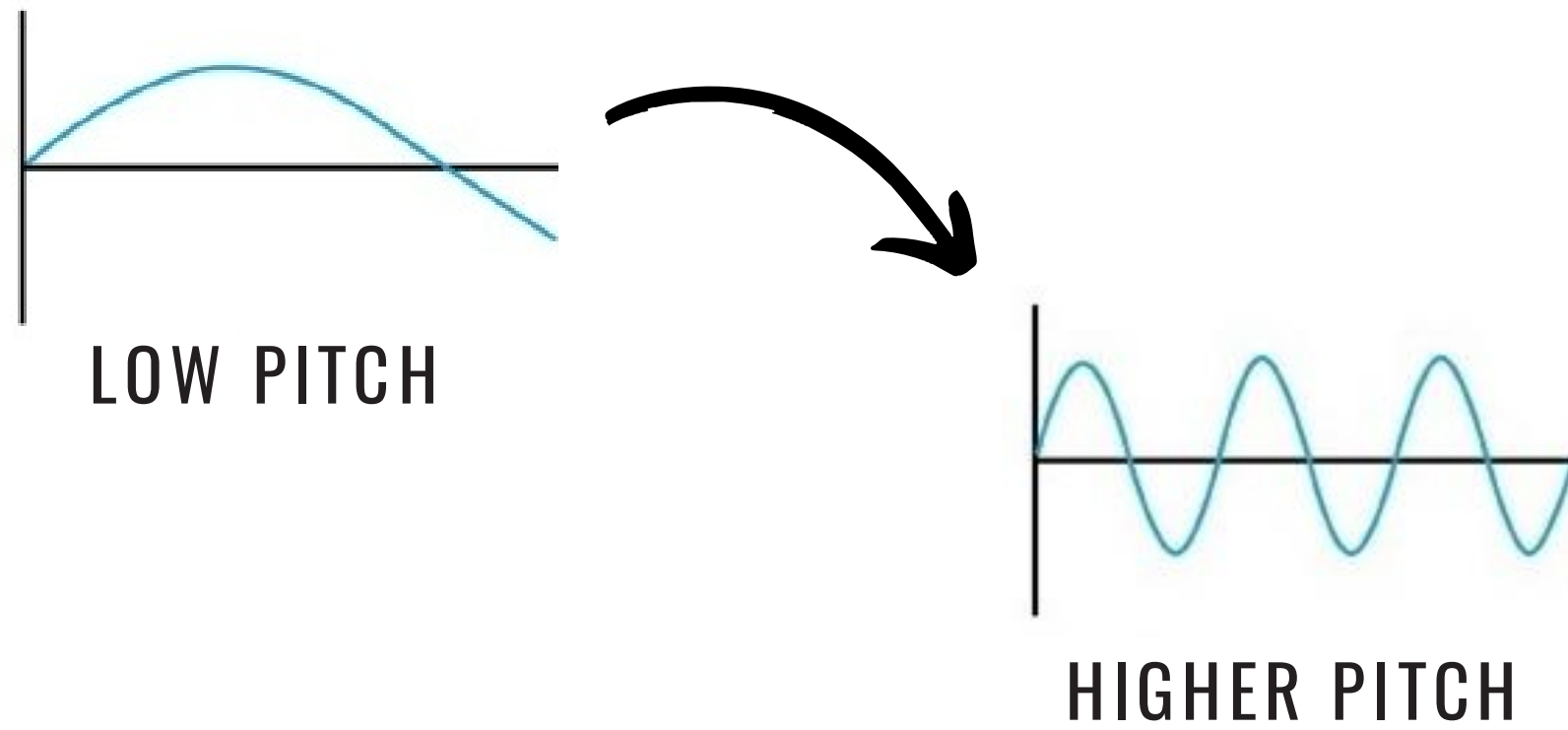
# CONTENT

- 01** INTRODUCTION
- 02** MINI-LESSON
- 03** DEMO- PITCH
- 04** DEMO-RHYTM
- 05** PAPER DISCUSSION
- 06** DATA ANALYSIS
- 07** WRAP-UP



# PITCH

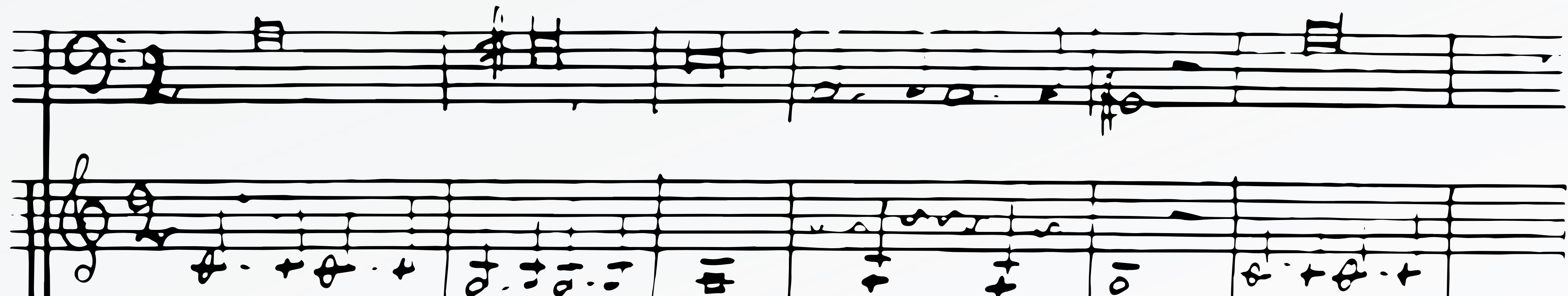
The quality that makes it possible to judge sounds as "higher" and "lower" in the sense associated with musical melodies



# RHYTHM

*Placement of sounds in time*

*Regular repeated patterns*

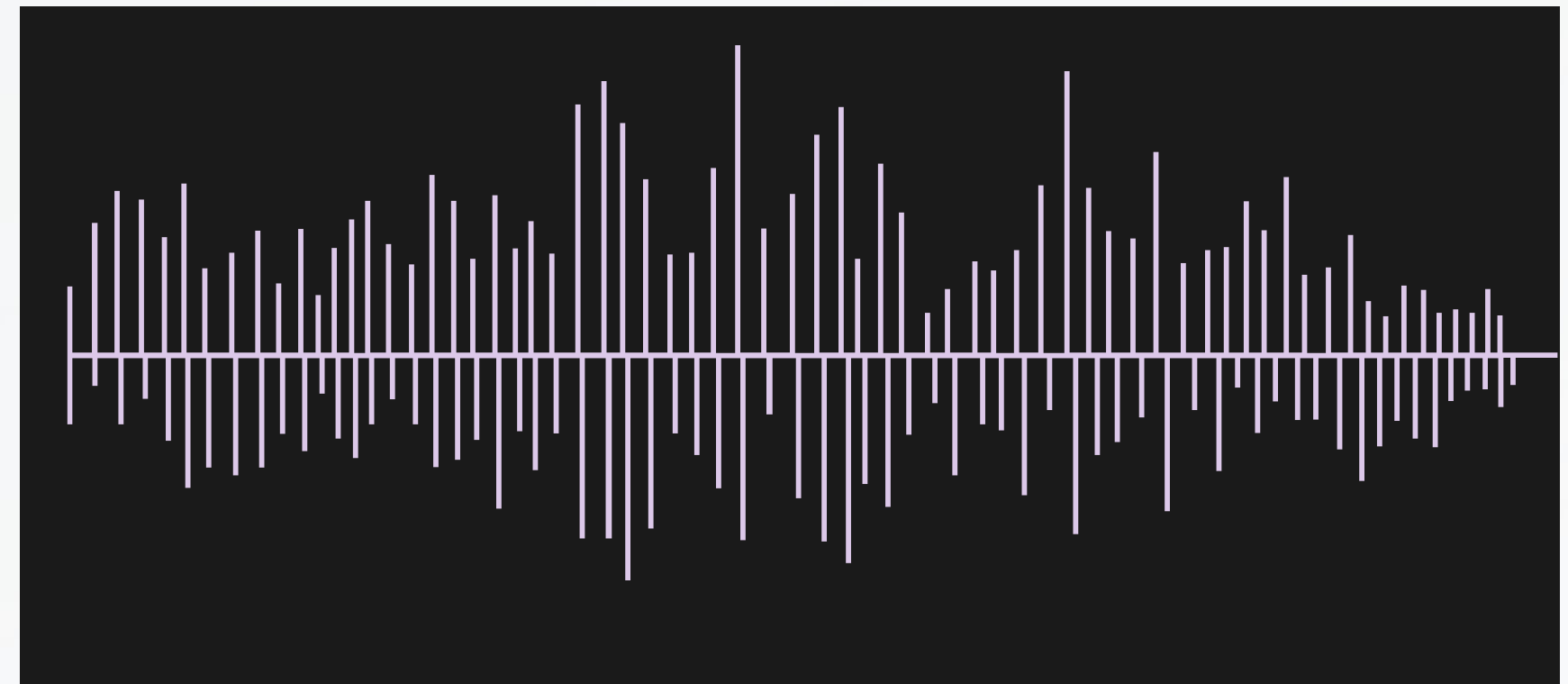


# RELATIONSHIP BETWEEN RHYTHM AND PITCH

For slow things, our consciousness distinguishes individual events and interprets them as what we call "rhythm."

For very fast things, our consciousness isn't fast enough to distinguish the individual events, and our pitch hearing kicks in.

[Tiny hairs in our cochlea](#) - each one specialized in resonating at a certain pitch.





# DEMO



## *Pitch Test*



### Distorted Tunes Test

- <http://www.nidcd.nih.gov/>
- You will hear a series of tunes and be asked whether the tune was played correctly yes or no.
- You will receive a score at the end

### Got rhythm?

- <https://www.concerthotels.com/got-rhythm>
- You will be asked to tap your space key to the beat of the rhythm and given a score.
- Take the test three times and write each score on board under trial 1, trial 2, and trial 3.

## *Rhythm Test*





# DEMO



## *Record Data*



- Please record scores onto the Google Sheet
- In the Experience column, have you had previous musical experience (1) or no (0)

# DISCUSSION

**Drake and Palmer  
2000**

**Liu et al. 2023**

**Ayotte et al. 2002**

What conclusions can  
actually be drawn from  
the work?

What are the results?  
What claims did they  
make?

What, if anything,  
would you do  
differently?

What did they actually  
do?

What is the  
overarching goal of  
the paper?



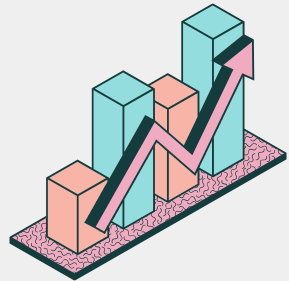
What would the  
next steps be?



# DATA EXPEDITION



What are our hypotheses?



Analyze Data Using R



Create three graphs

- Can practice improve rhythm?
- Does experience improve pitch/rhythm?
- Relationship between rhythm and pitch?



Submit to Dr. Johnsen & [dmd76@duke.edu](mailto:dmd76@duke.edu)

- Three Graphs
- Each graph will have a few questions relating to the figure

# WHAT ARE YOUR HYPOTHESES?

e.g. Performance on  
rhythm tests improves  
across trials

**CAN PRACTICE  
IMPROVE  
RHYTHM?**

e.g. Individuals with  
previous music  
experience will perform  
better on the rhythm test  
but not the pitch test.

**DOES EXPERIENCE  
IMPROVE  
PITCH/RHYTHM?**

e.g. Performance on pitch  
test is not correlated with  
performance on rhythm  
test.

**RELATIONSHIP BETWEEN  
RHYTHM AND PITCH?**

# STATISTICS

## Tests



- What is a GLM (generalized linear model)

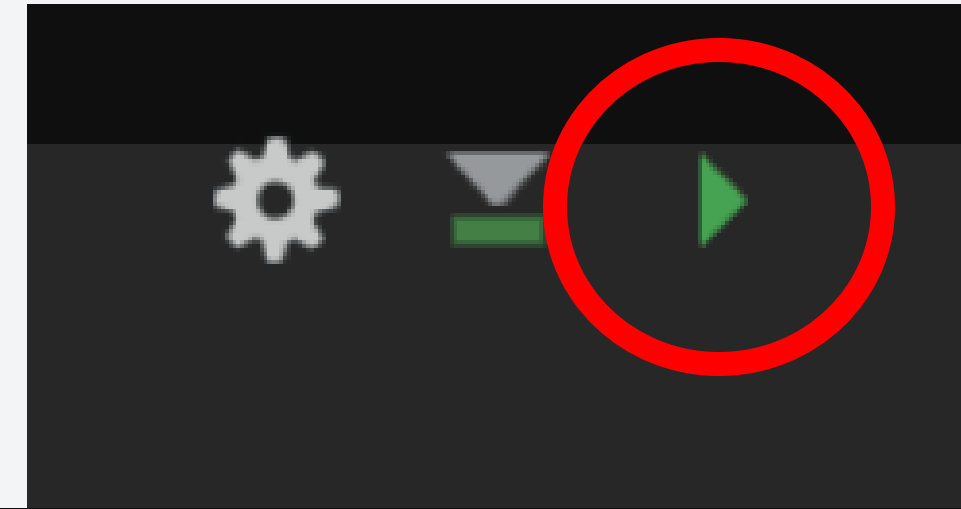
- What is a p value?
- Interpreting graphs
- Reporting Results

## Results



# DATA EXPEDITION

1. Input your demo scores to the google sheets
2. Download R folder
3. Download the google sheet as a .csv
4. Move the .csv file into the R folder
5. Run code chunks and answer homework questions



```
Call:
glm(formula = Rhythm ~ Attempt, data = Data)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-521.24  -16.91   44.76   79.95  176.76

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  809.3519    56.9726   14.208  <2e-16 **
Attempt      -0.5556    26.3732  -0.021    0.983
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 25039.59)

    Null deviance: 1302070  on 53  degrees of freedom
Residual deviance: 1302059  on 52  degrees of freedom
AIC: 704.13

Number of Fisher Scoring iterations: 2
```