

Musicality

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#Packages

```
#install.packages("readr")  
library("readr")  
#install.packages("ggplot2")  
library("ggplot2")  
#install.packages("viridis")  
library("viridis")
```

```
## Loading required package: viridisLite
```

```
library("tinytex")
```

#Data

```
Data <- read.csv("Musicality_Fall_2025.csv")  
  
#Subset Data for groups  
Data <- Data[c(13,14,15,4,5,6,10,11,12,46,47,48,37,38,39,43,44,45), ]
```

#Research Questions -Can practice improve rhythm? Practice can improve rhythm overtime. -Does previous musical experience lead to improved sense of pitch/rhythm? Musical experience can lead to improvement on sense of pitch/rhythm overtime. -Is there a relationship between rhythm and pitch? There is definitely a correlation between rhythm and pitch.

```
##Model 1

``` r
#Can practice improve rhythm?
Model1 <- glm(Rhythm ~ Attempt, data = Data)
summary(Model1)
```

```
##
Call:
glm(formula = Rhythm ~ Attempt, data = Data)
##
Coefficients:
Estimate Std. Error t value Pr(>|t|)
(Intercept) 693.50 45.13 15.365 5.32e-11 ***
Attempt 30.17 20.89 1.444 0.168

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
(Dispersion parameter for gaussian family taken to be 5238.26)
##
Null deviance: 94733 on 17 degrees of freedom
Residual deviance: 83812 on 16 degrees of freedom
AIC: 209.11
##
Number of Fisher Scoring iterations: 2
```

##Figure 1

``` r
ggplot(data = Data,
 aes(x = as.factor(Attempt),
 y = Rhythm,
 col = as.factor(Attempt))) +
 geom_jitter() +
 geom_boxplot() +
 geom_smooth(aes(x = Attempt,
 y = Rhythm,
 col = Attempt),
 method = lm) +
 ggtitle("Can practice improve rhythm?") +
 ylab("Rhythm Score") +
 xlab("Attempt") +
 guides(color = guide_legend(title = "Attempt")) +
 scale_color_viridis(discrete = TRUE,
 option = "viridis") +
 theme_bw()
```

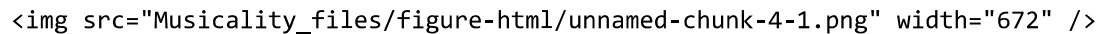
```

```
## `geom_smooth()` using formula = 'y ~ x'
...

```

```
## Warning: The following aesthetics were dropped during statistical transformation:
## colour.
## i This can happen when ggplot fails to infer the correct grouping structure in
## the data.
## i Did you forget to specify a `group` aesthetic or to convert a numerical
## variable into a factor?
...

```



Homework Questions:

-What was the hypothesis? Was it supported or rejected? The hypothesis was that the rhythm score will change based on attempts. So the hypothesis was rejected.

-What does the figure show us? The figure shows that there is not a correlation between attempts and rhythm scores.

Model 2

Is there a relationship between rhythm and pitch?

```
Model2 <- glm(Rhythm ~ Pitch, data = Data)
summary(Model2)

```

```
##
## Call:
## glm(formula = Rhythm ~ Pitch, data = Data)
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   201.47      239.69   0.841   0.4479
## Pitch         23.60       11.04   2.137   0.0994 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for gaussian family taken to be 6523.548)
##
## Null deviance: 55887  on 5  degrees of freedom
## Residual deviance: 26094  on 4  degrees of freedom
## (12 observations deleted due to missingness)
## AIC: 73.294
##
## Number of Fisher Scoring iterations: 2

```

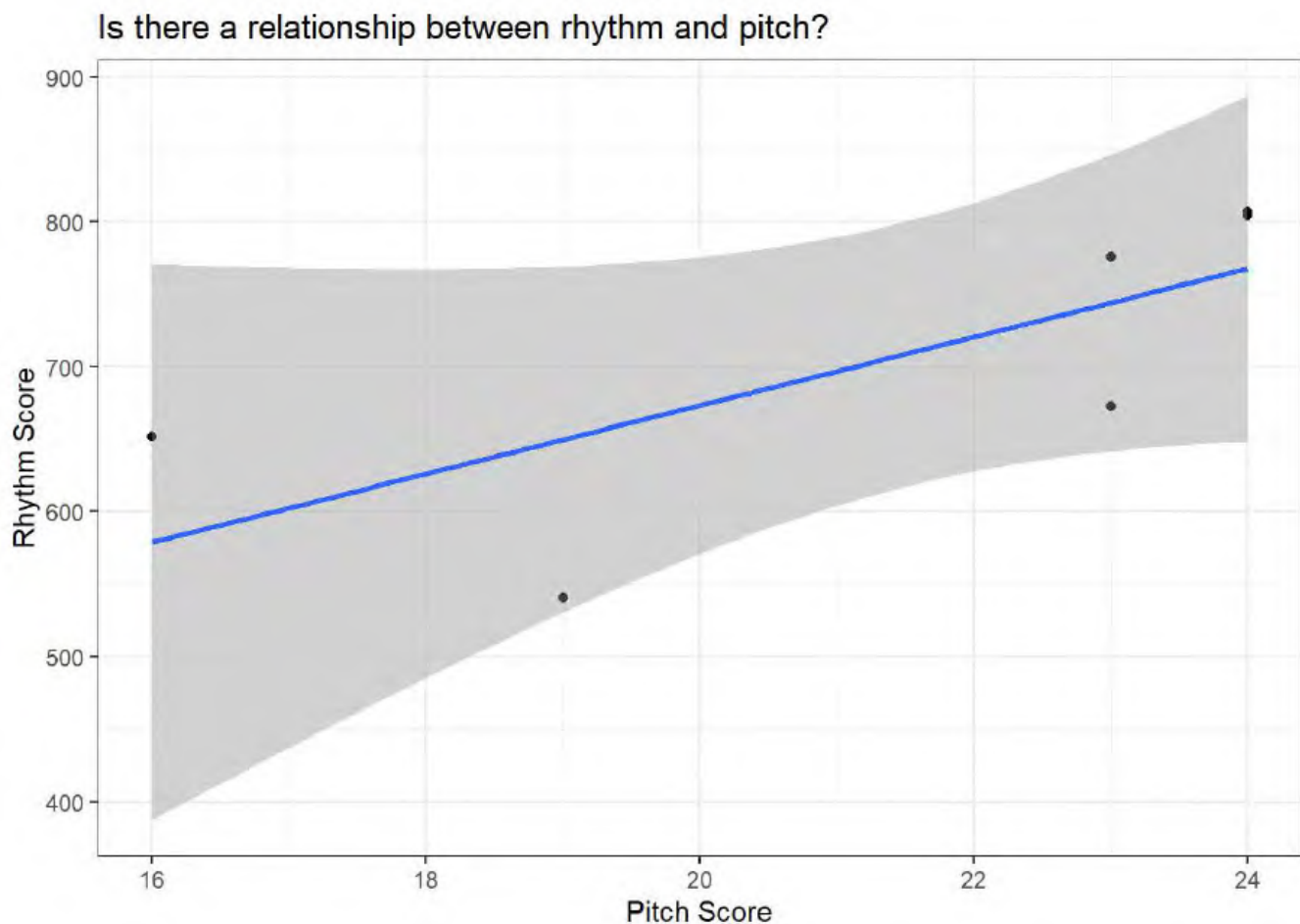
Figure 2

```
ggplot(data = Data,
       aes(y = Rhythm,
           x = Pitch)) +
  geom_point() +
  geom_smooth(method = lm) +
  ylab("Rhythm Score") +
  xlab("Pitch Score") +
  ggtitle("Is there a relationship between rhythm and pitch?") +
  theme_bw()
```

```
## `geom_smooth()` using formula = 'y ~ x'
```

```
## Warning: Removed 12 rows containing non-finite outside the scale range
## (`stat_smooth()`).
```

```
## Warning: Removed 12 rows containing missing values or values outside the scale range
## (`geom_point()`).
```



###Homework Questions: -What was the hypothesis? Was it supported or rejected? The hypothesis was rejected and the hypothesis was that there was a correlation between rhythm and pitch scores. -What does the figure show us? The results show that there is a marginal correlation between rhythm and pitch

```

##Model 3

``` r
#Does previous musical experience lead to improved sense of rhythm/pitch?
Model3 <- glm(Experience ~ Ratio, family = "binomial", data = Data)
summary(Model3)
```

```
##
Call:
glm(formula = Experience ~ Ratio, family = "binomial", data = Data)
##
Coefficients:
Estimate Std. Error z value Pr(>|z|)
(Intercept) 9.2140 10.5793 0.871 0.384
Ratio -0.2622 0.3056 -0.858 0.391
##
(Dispersion parameter for binomial family taken to be 1)
##
Null deviance: 8.3178 on 5 degrees of freedom
Residual deviance: 7.0919 on 4 degrees of freedom
(12 observations deleted due to missingness)
AIC: 11.092
##
Number of Fisher Scoring iterations: 4
```

##Figure 3

``` r
ggplot(data = Data,
 aes(x = Ratio,
 y = Experience)) +
 geom_point() +
 stat_smooth(method = "glm",
 method.args = list(family = "binomial"),
 se = T) +
 ylab("Musical Experience") +
 xlab("Rhythm/Pitch Score") +
 ggtitle("Does previous musical experience lead to improved sense of rhythm/pitch?") +
 theme_bw()
```

```
`geom_smooth()` using formula = 'y ~ x'
```

```
Warning: Removed 12 rows containing non-finite outside the scale range
(`stat_smooth()`).
```

```

```
```
```

```
Warning: Removed 12 rows containing missing values or values outside the scale range
(`geom_point()`).
```
```

```

```

###Homework Questions:

- What was the hypothesis? Was it supported or rejected? The hypothesis was rejected and though t that musical experience had positive correlation between rhythm/pitch score.
- What does the figure show us? The figure shows that more musical experience did not lead to h igher rhythm/pitch score.
- What does a higher or lower rhythm/pitch ratio mean? Higher rhytm/pitch ratio means that rhyt hm is better than pitch.