

arcsine.R

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```
# arcsine.R
# One-way ANOVA for proportions

# Load necessary libraries
library(ggplot2)

# Read in data set
arcdata <- read.table(header=T,colClasses=c("factor","numeric"),text="
predators survivors
0 18
0 18
0 18
0 16
0 19
0 19
0 17
0 18
0 20
0 17
10 14
10 17
10 15
10 10
10 17
10 14
10 13
10 17
10 14
10 15
20 12
20 16
20 16
20 12
20 6
20 12
20 13
20 10
20 9
20 10
")

# Apply transformations here
```

```
arcdata <- transform(arcdata,prop=survivors/20)
arcdata <- transform(arcdata,y=asin(sqrt(prop)))
```

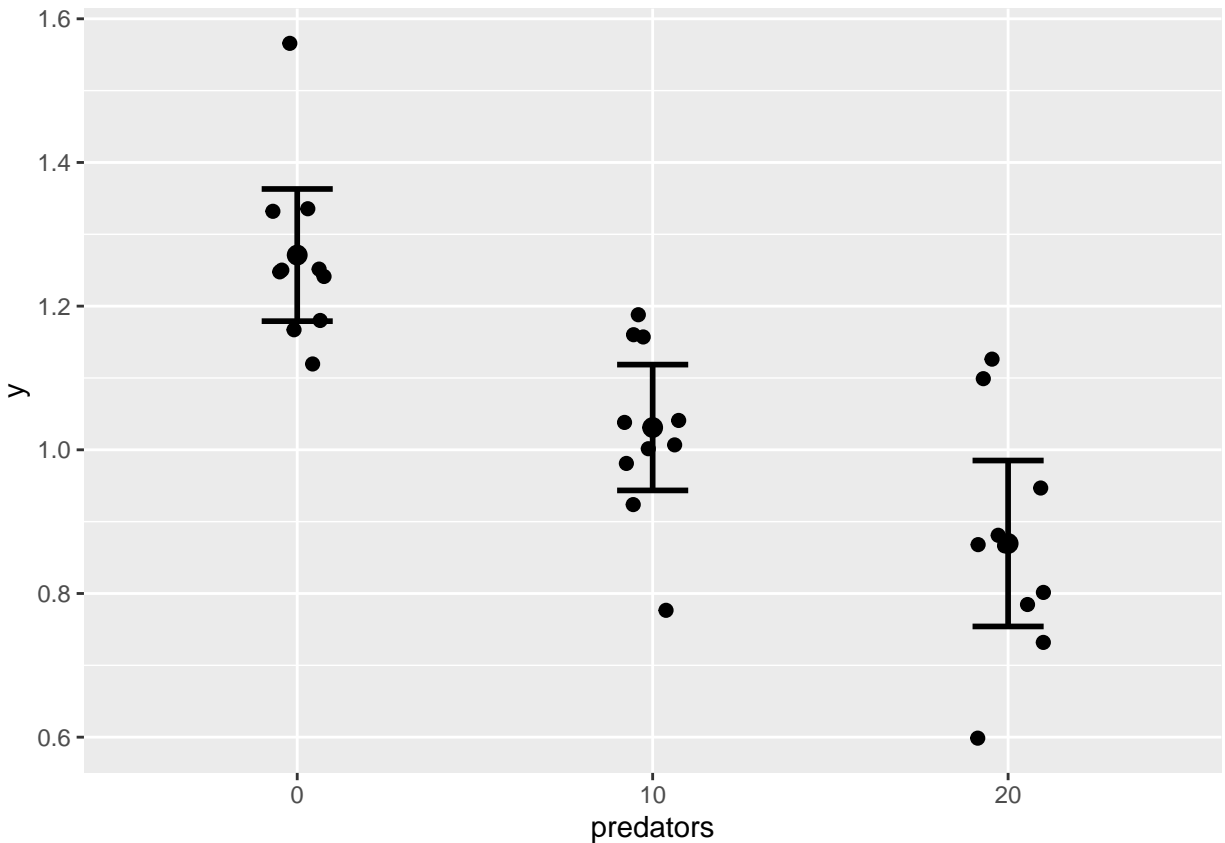
```
# Print data
```

```
arcdata
```

```
##      predators survivors prop      y
## 1           0         18 0.90 1.2490458
## 2           0         18 0.90 1.2490458
## 3           0         18 0.90 1.2490458
## 4           0         16 0.80 1.1071487
## 5           0         19 0.95 1.3452829
## 6           0         19 0.95 1.3452829
## 7           0         17 0.85 1.1730969
## 8           0         18 0.90 1.2490458
## 9           0         20 1.00 1.5707963
## 10          0         17 0.85 1.1730969
## 11          10         14 0.70 0.9911566
## 12          10         17 0.85 1.1730969
## 13          10         15 0.75 1.0471976
## 14          10         10 0.50 0.7853982
## 15          10         17 0.85 1.1730969
## 16          10         14 0.70 0.9911566
## 17          10         13 0.65 0.9377445
## 18          10         17 0.85 1.1730969
## 19          10         14 0.70 0.9911566
## 20          10         15 0.75 1.0471976
## 21          20         12 0.60 0.8860771
## 22          20         16 0.80 1.1071487
## 23          20         16 0.80 1.1071487
## 24          20         12 0.60 0.8860771
## 25          20          6 0.30 0.5796397
## 26          20         12 0.60 0.8860771
## 27          20         13 0.65 0.9377445
## 28          20         10 0.50 0.7853982
## 29          20          9 0.45 0.7353145
## 30          20         10 0.50 0.7853982
```

```
# Graphics using ggplot2
```

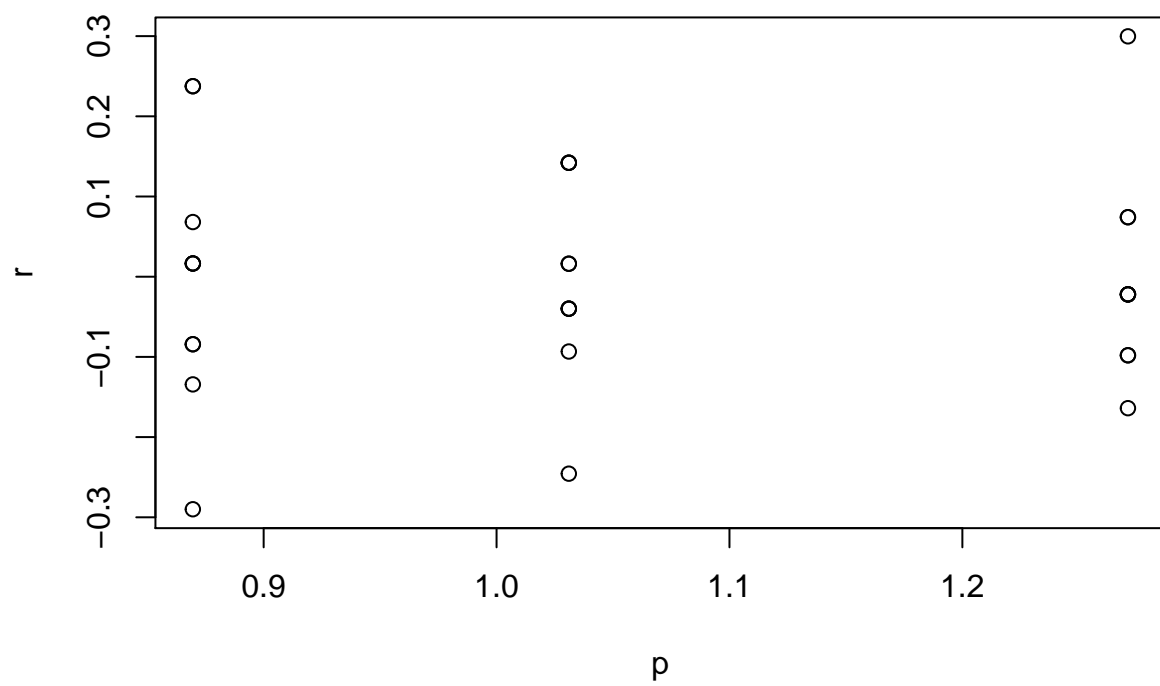
```
ggplot(arcdata,aes(predators,y))+
  geom_jitter(size=2,position=position_jitter(width=0.1))+
  stat_summary(fun="mean",geom="point",size=3)+
  stat_summary(fun.data="mean_cl_normal",geom="errorbar",width=0.2,linewidth=1)
```



```
# One-way ANOVA
aovout <- aov(y~predators,data=arcdata)
anova(aovout)

## Analysis of Variance Table
##
## Response: y
##          Df Sum Sq Mean Sq F value    Pr(>F)
## predators  2  0.81626  0.40813   21.259 2.852e-06 ***
## Residuals 27  0.51834  0.01920
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

# Diagnostic plots to check ANOVA assumptions
p <- predict(aovout)
r <- resid(aovout)
plot(p,r)
```



`qqnorm(r)`

Normal Q-Q Plot

