

CAFE

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CAFE

references:

- Cannon, et al., Stat2, chapter 09, example 10.1
- Cannon, et al., Student R Manual, chapter 10

Import the data.

```
data <- read.csv("CAFE.csv", header=TRUE)
head(data)
```

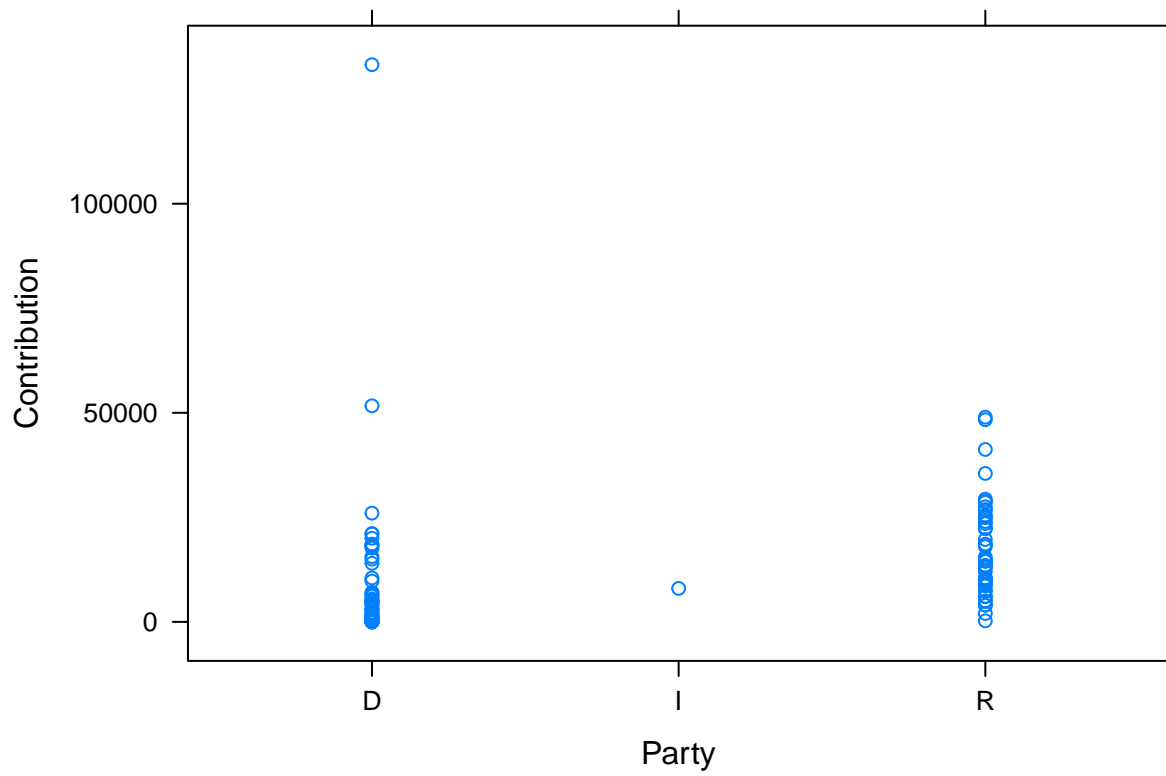
```
##           Senator State Party Contribution LogContr Dem Vote
## 1 Murkowski, Frank   AK     R      19700 4.305351    0    1
## 2     Stevens, Ted   AK     R      13000 4.130334    0    1
## 3   Sessions, Jeff   AL     R       9500 4.000000    0    1
## 4  Shelby, Richard   AL     R      25000 4.406540    0    1
## 5 Hutchinson, Tim    AR     R       4900 3.732394    0    1
## 6 Lincoln, Blanche  AR     D       5500 3.778151    1    1
```

```
dim(data)
```

```
## [1] 100  7
```

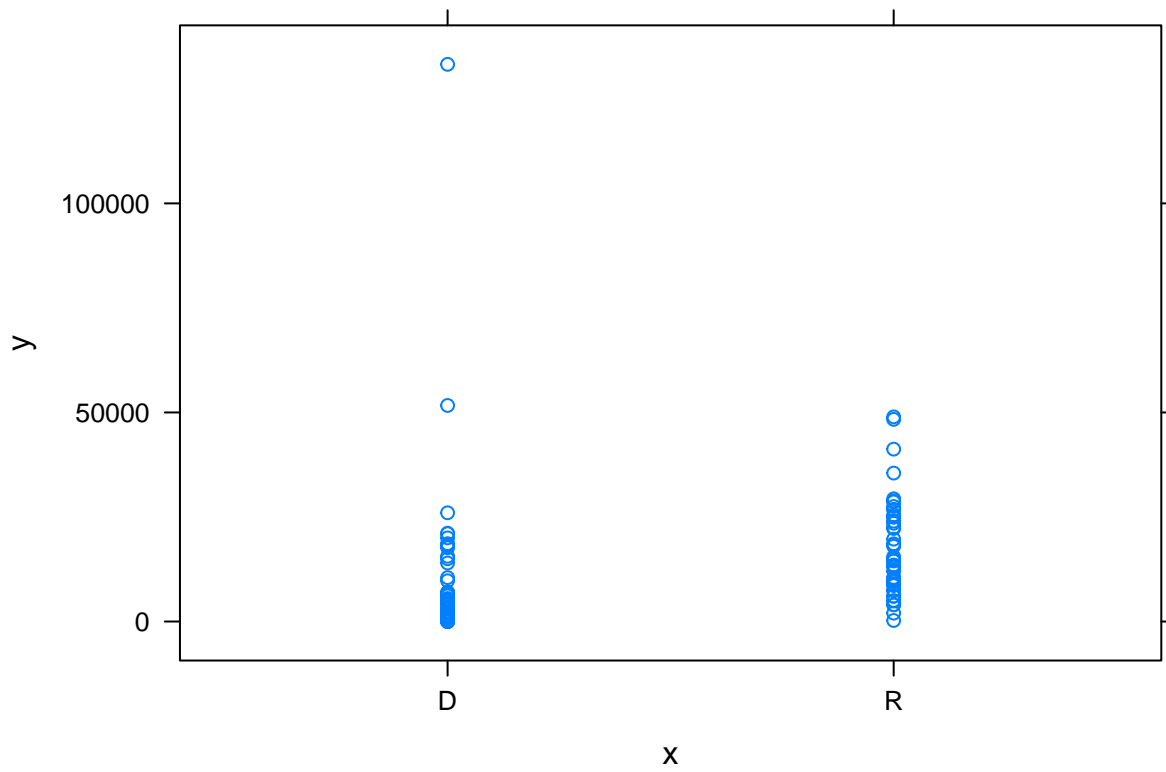
View the data.

```
library(lattice)
xyplot(Contribution ~ Party, data=data)
```



Remove Independent Senator.

```
x <- with(data, Party[!Party == "I"])
y <- with(data, Contribution[Party != "I"])
xyplot(y ~ x)
```



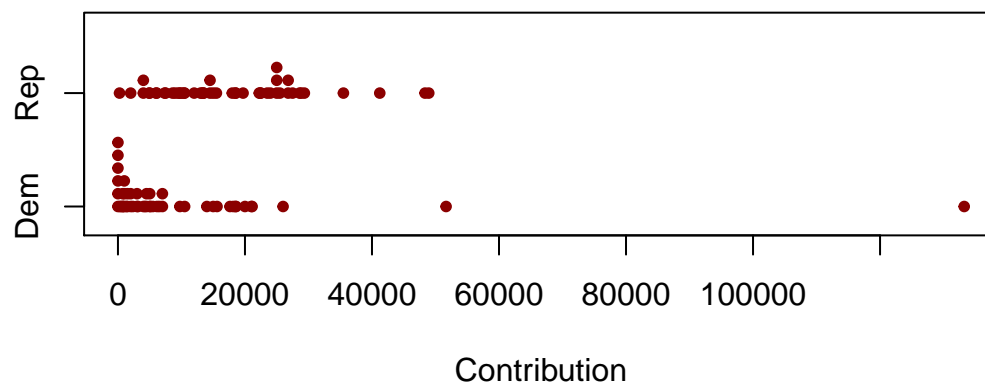
Somewhat different illustrations of the same data.

```
plot(jitter(as.numeric(x), amount=.05), y,  
      xlab='Party', ylab='Contribution', xaxt="n", col="steelblue")  
axis(1, 1:3, labels=c("Dem", "", "Rep"), tck=0)
```



Dotplot.

```
dem <- with(data, Contribution[Party == "D"])  
rep <- with(data, Contribution[Party == "R"])  
stripchart(list(dem, rep), ylim=c(1, 2), at=c(1.1, 1.65),  
           pch=20, col="darkred", method="stack",  
           group.names=c("Dem", "Rep"), xlab="Contribution")
```



glm.

```
CAFE.glm <- glm(Vote ~ log(1+Contribution) + Dem, data=data, family=binomial)  
options(show.signif.stars=FALSE)  
summary(CAFE.glm)
```

```
##
## Call:
## glm(formula = Vote ~ log(1 + Contribution) + Dem, family = binomial,
##      data = data)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -2.2370  -0.8185   0.4291   0.5514   2.9891
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -2.5547     1.8651  -1.370 0.170769
## log(1 + Contribution)  0.4833     0.1964   2.460 0.013884
## Dem            -1.9012     0.5594  -3.399 0.000677
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 132.813  on 99  degrees of freedom
## Residual deviance:  93.226  on 97  degrees of freedom
## AIC: 99.226
##
## Number of Fisher Scoring iterations: 5
```

Interaction?

```
CAFE.glm2 <- glm(Vote ~ LogContr*Dem, data=data, family=binomial)
summary(CAFE.glm2)
```

```
##
## Call:
## glm(formula = Vote ~ LogContr * Dem, family = binomial, data = data)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -2.5711  -0.6419   0.3023   0.5631   2.2532
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)   -10.164     5.401  -1.882  0.0599
## LogContr        3.002     1.357   2.212  0.0270
## Dem             2.544     5.974   0.426  0.6703
## LogContr:Dem   -1.088     1.515  -0.719  0.4724
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 132.813  on 99  degrees of freedom
## Residual deviance:  86.781  on 96  degrees of freedom
## AIC: 94.781
##
## Number of Fisher Scoring iterations: 5
```

CI using “profile likelihood” rather than Wald z-statistic

```
confint(CAFE.glm)
```

```
## Waiting for profiling to be done...
```

```
##           2.5 %    97.5 %  
## (Intercept) -6.590346  0.6331929  
## log(1 + Contribution) 0.157270  0.9136299  
## Dem          -3.063969 -0.8428995
```