HW3 - SDS 315

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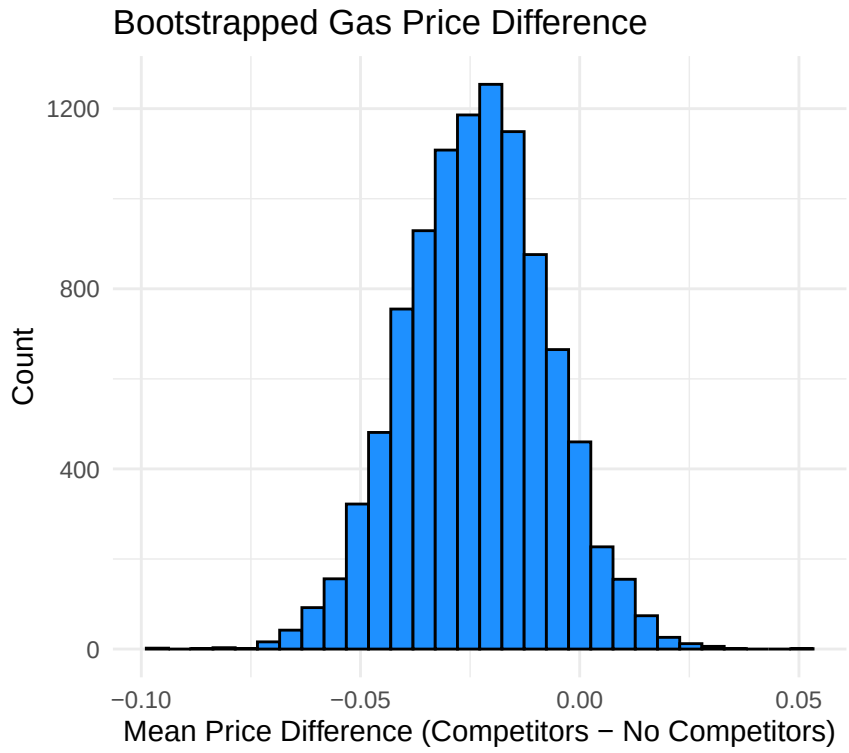
Github Link: https://github.com/Ahantya/SDS315/blob/main/HW3/HW3Markdown.Rmd

Problem 1 - Gas Prices

A.



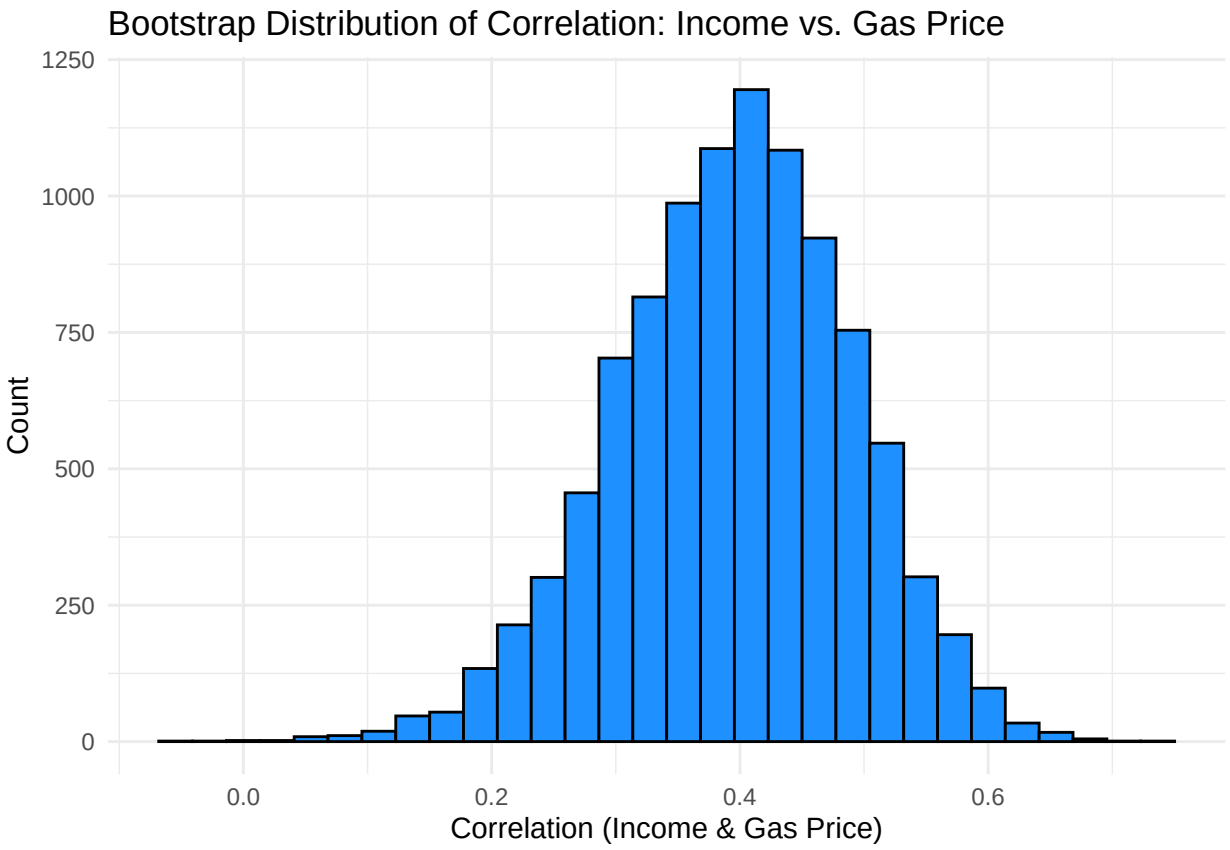

```
##       name       lower       upper level     method    estimate
## 1 diffmean -0.05515161 0.008079563  0.95 percentile -0.02523715
```

Claim: Gas stations charge more if they lack direct competition in sight.

Evidence: At a 95% confidence interval, the difference in mean prices between gas stations with competitors and gas stations without competitors is from -0.056 to 0.008 dollars. Because a possible difference of zero dollars is contained within this confidence interval, there is no statistical significance (at the 5% level) to claim that gas stations charge more if they lack direct competition in sight.

Conclusion: The theory is unsupported by the evidence, as there is no data to support a statistically signficant mean difference between prices and gas stations with / without competition in sight.

B.



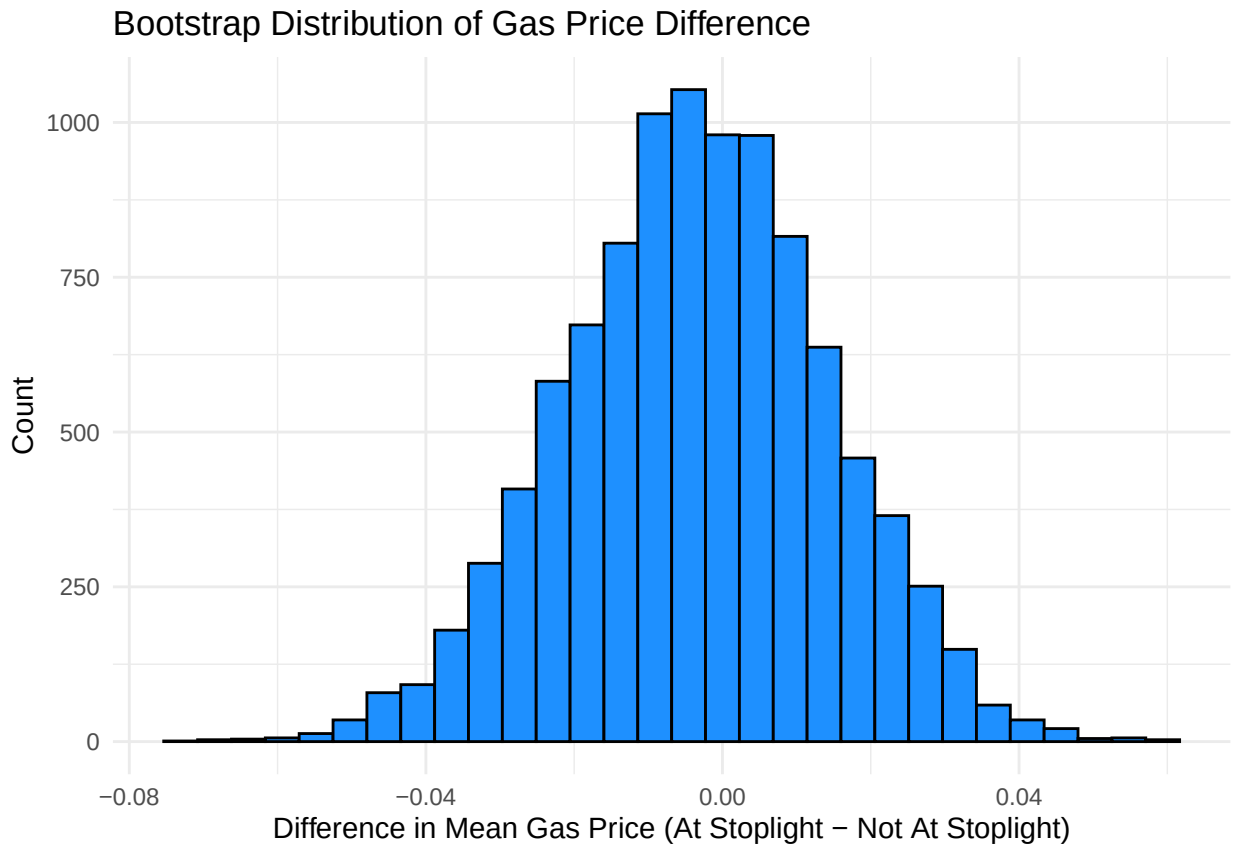

```
##     name     lower     upper level     method  estimate
## 1 result 0.2004683 0.5708969  0.95 percentile 0.3867474
```

Claim: The richer the area, the higher the gas prices.

Evidence: At a 95% confidence interval, the correlation in prices between gas stations and the median household income in the surrounding of the gas station ranges from 0.196 to 0.567 dollars. Since the possibility difference of zero dollars is not contained within the interval, there is statistical significance (at the 5% level) to claim that the richer the area, the higher the gas prices.

Conclusion: The theory is supported by the evidence, as there is data to support a statistically significant correlation between the median household income and the gas prices.

C.



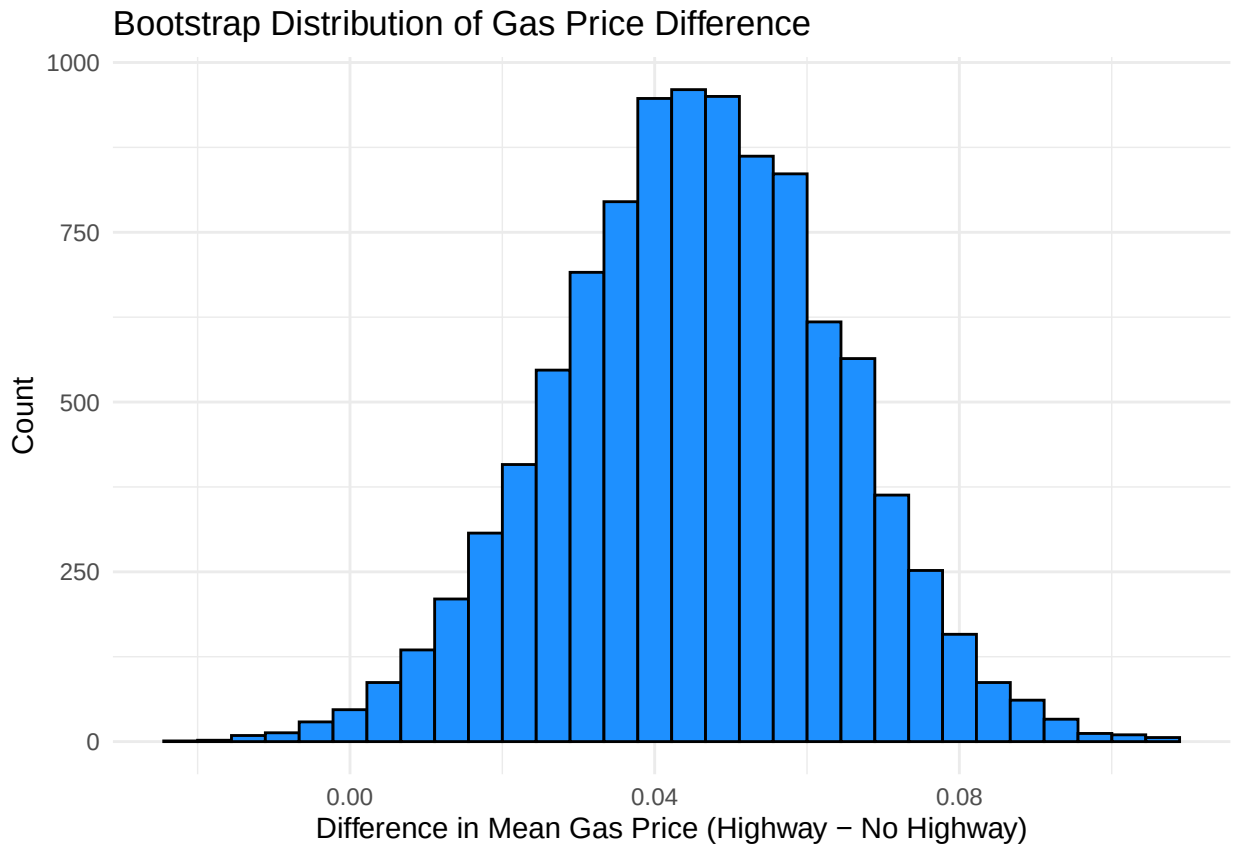

```
##       name       lower      upper level     method    estimate
## 1 diffmean -0.03831917 0.03037704  0.95 percentile 0.001817384
```

Claim: Gas stations at stoplights charge more.

Evidence: At a 95% confidence interval, the difference in mean prices for gas stations at stoplights and gas stations not at stoplights ranges from -0.039 to 0.306 dollars. Because a possible difference of zero dollars is contained within this confidence interval, there is no statistical significance (at the 5% level) to claim that gas stations at stoplights charge more.

Conclusion: The theory is unsupported by the evidence, as there is no data to support a statistically significant mean difference between gas station prices at a stoplight and gas station prices not at a stoplight.

D.



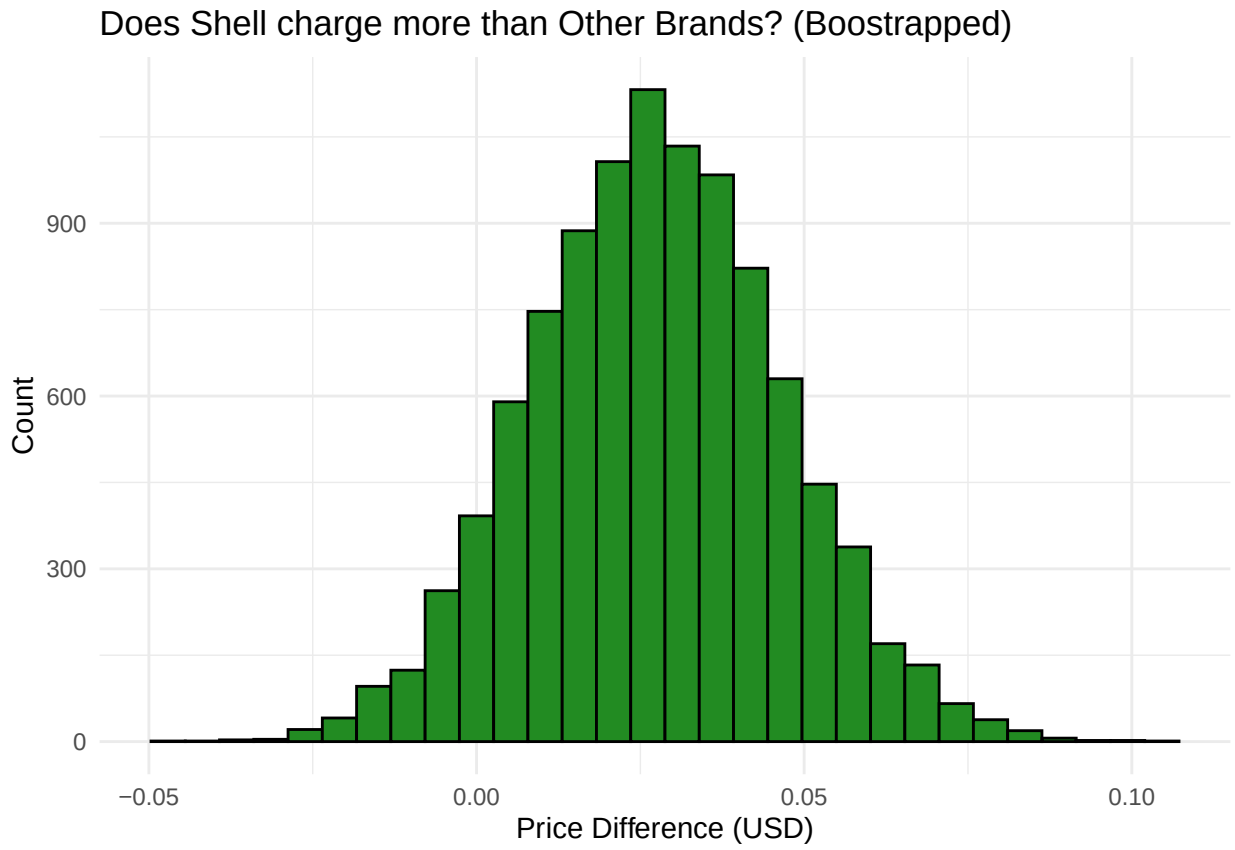

```
##       name       lower      upper level     method estimate
## 1 diffmean 0.008966373 0.08045608  0.95 percentile   0.0511
```

Claim: Gas stations with direct highway access charge more.

Evidence: At a 95% confidence interval, the difference in mean prices for gas stations with direct highway access and gas stations without direct highway access ranges from 0.008 to 0.082 dollars. Since the possibility difference of zero dollars is not contained within the interval, there is statistical significance (at the 5% level) to claim that gas stations with direct highway access charge slightly more than gas stations without direct highway access.

Conclusion: The theory is supported by the evidence, as there is data to support a statistically significant mean difference between gas stations with direct highway access and gas stations without direct highway access.

E.




```
##       name        lower      upper level     method   estimate
## 1 diffmean -0.009180512 0.06593604  0.95 percentile 0.01439906
```

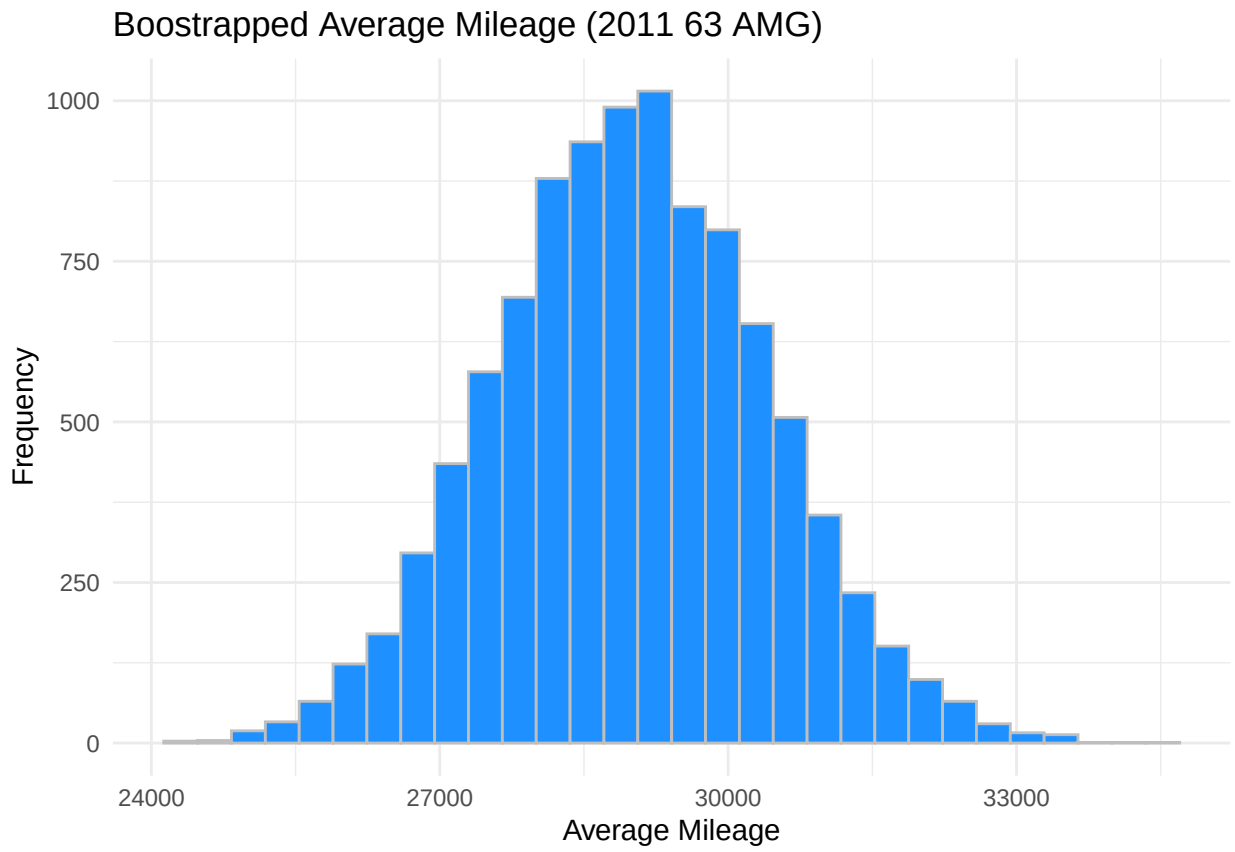
Claim: Shell charges more than all other non-Shell brands.

Evidence: At a 95% confidence interval, the mean difference in gas station prices at Shell Gas Stations and non-Shell gas stations range from -0.011 to 0.065 dollars. Because a possible difference of zero dollars is contained within this confidence interval, there is no statistical significance (at the 5% level) to claim that Shell charges more than all other non-Shell branded gas stations.

Conclusion: The theory is unsupported by the evidence, as there is no data to support a statistically significant mean difference between gas station prices at Shell gas stations and gas station prices at non-Shell gas stations

Problem 2 - Mercedes S-Class Vehicles

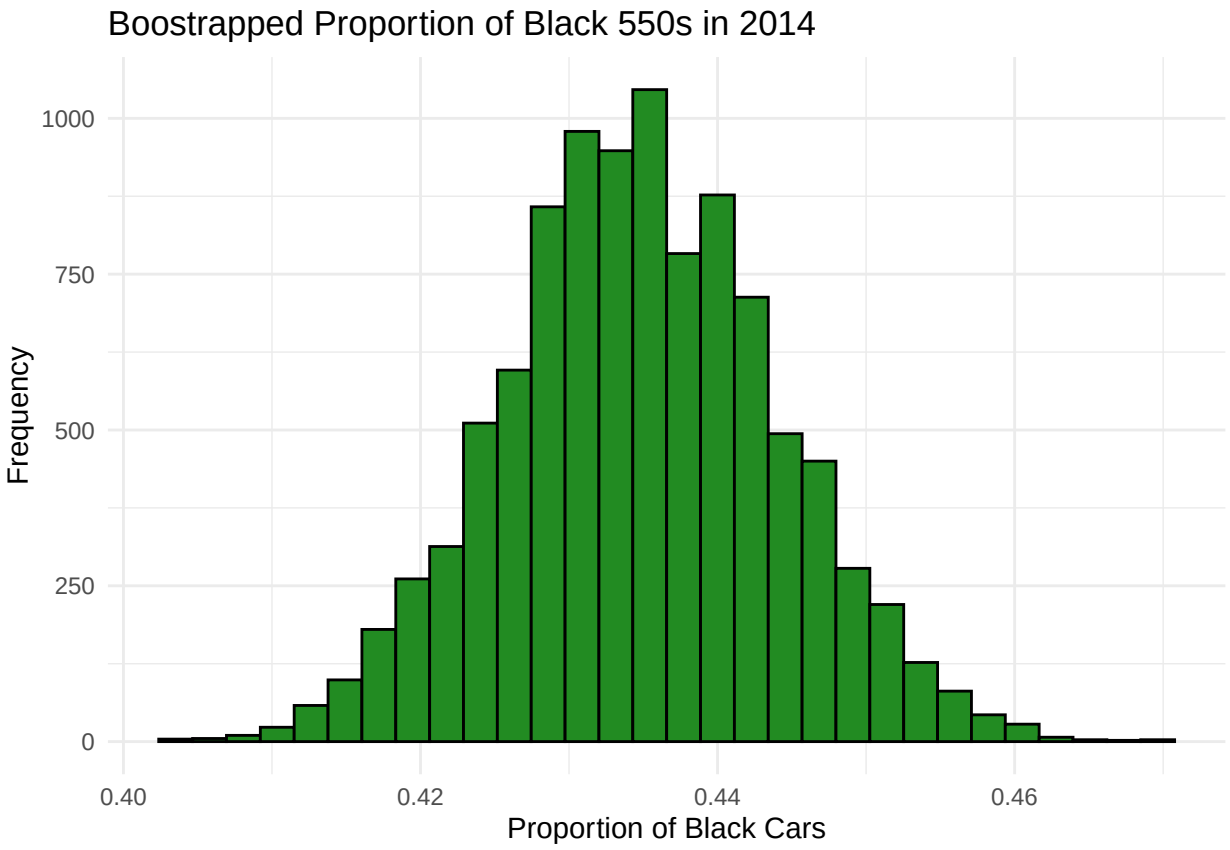
Part A - 2011 S-Class 63 AMGs




```
##   name    lower    upper level     method estimate
## 1 mean 26251.75 31791.41  0.95 percentile 26959.14
```

With 95% confidence, the average mileage of all 2011 S-Class 63 AMGs that were hitting the used-car market when this data was collected ranged from 26226 to 31823 miles.

Part B - 2014 S-Class 550s

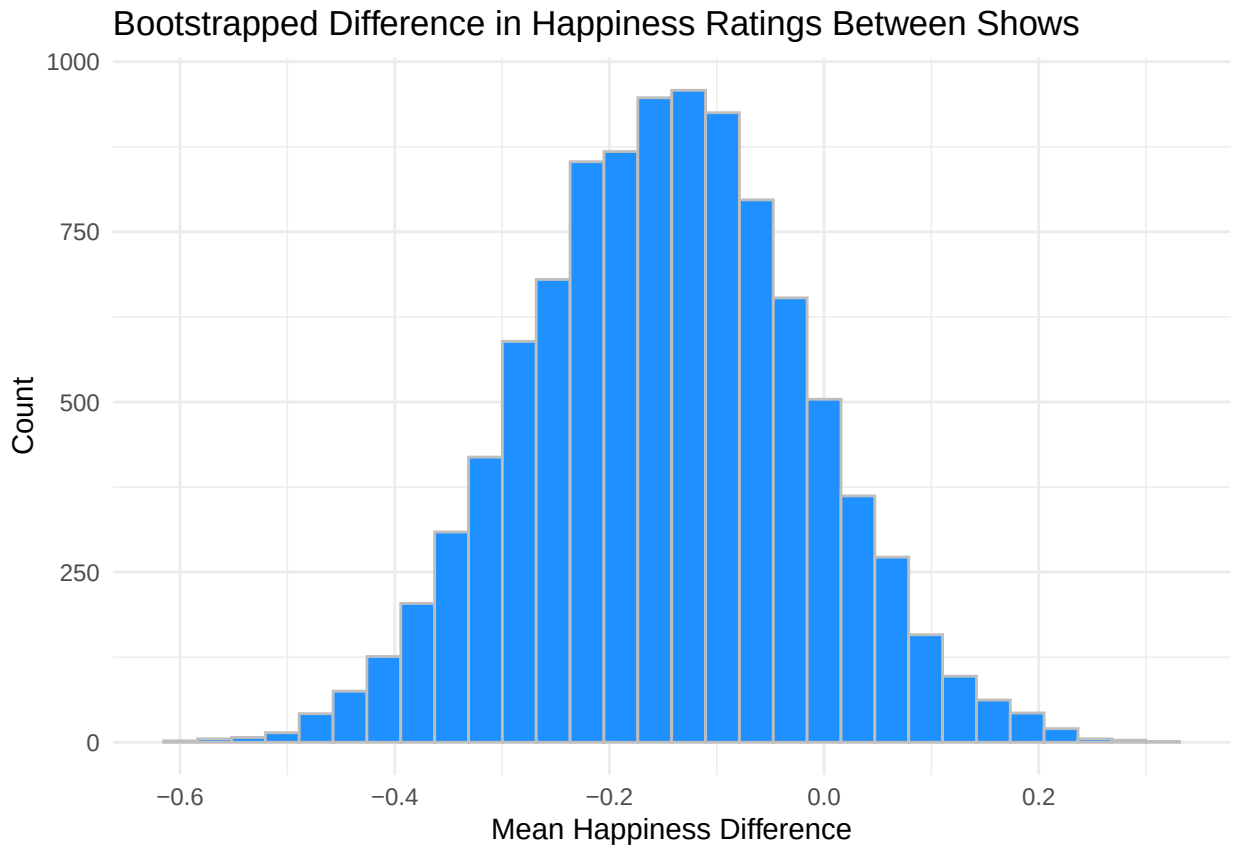



```
##        name     lower    upper level     method  estimate
## 1 prop_TRUE 0.4167532 0.453098  0.95 percentile 0.4250606
```

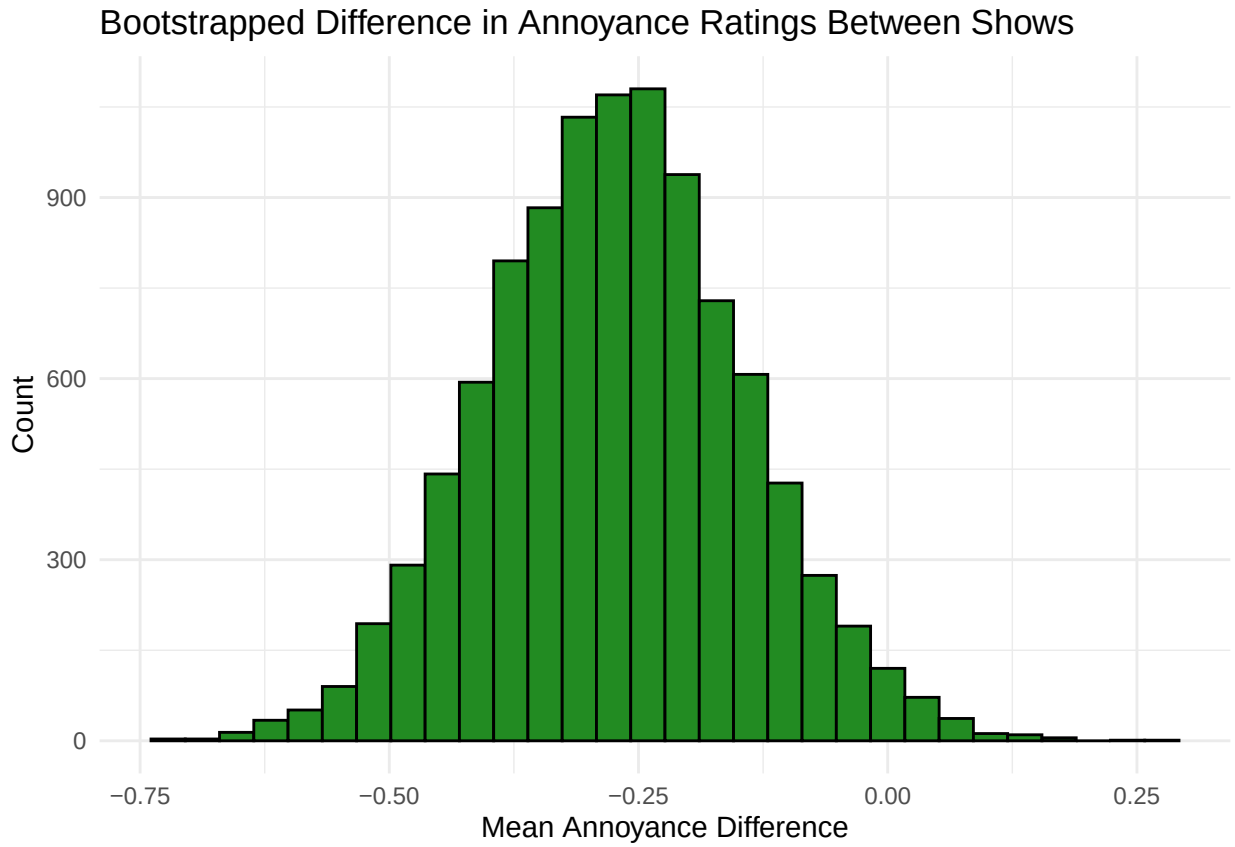
With 95% confidence, the proportion of all 2014 S-Class 550s that were painted black ranged from 0.417 to 0.453 when this data was collected. In other words, 41.7% to 45.3% of 2014 S-Class 550s listed in the market (from this data) were painted black.

Question 3 - NBC Pilot Surveys

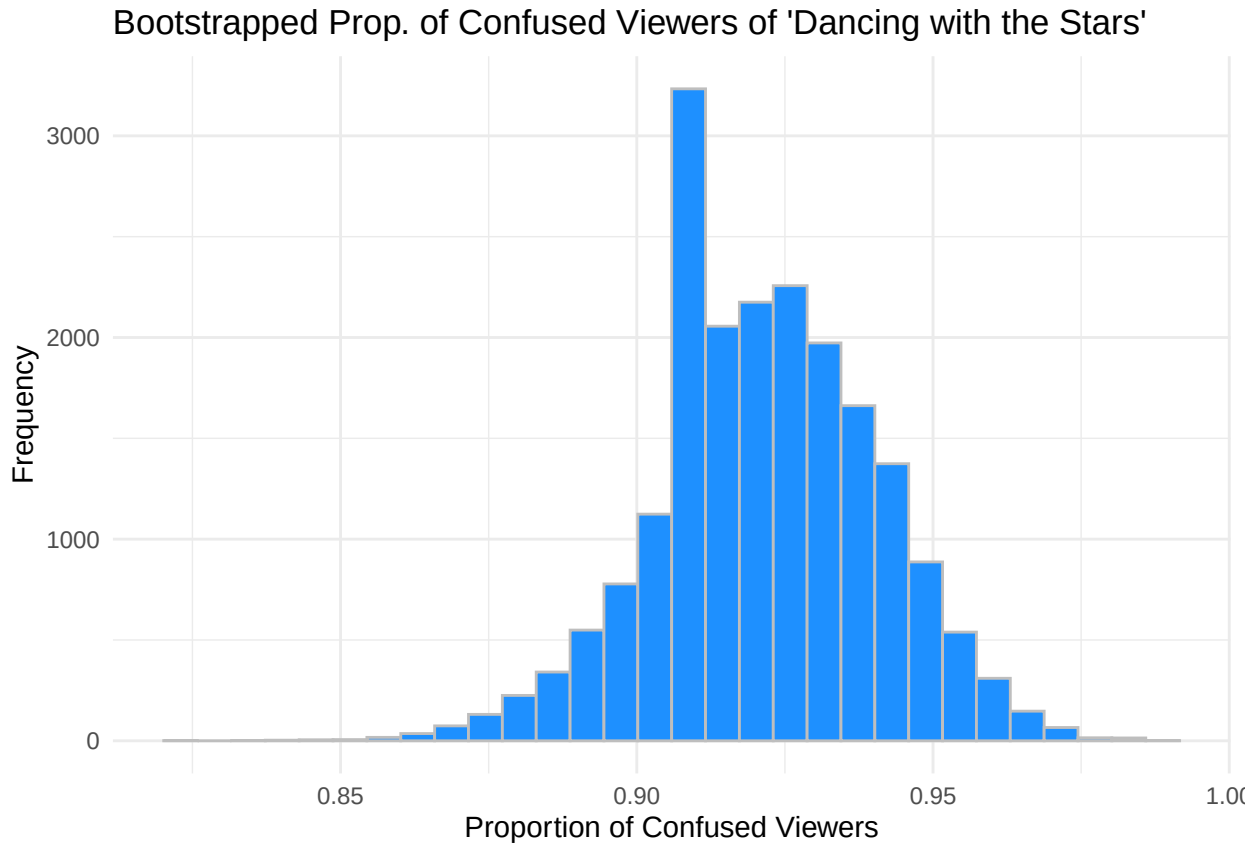
Part A - Difference of Means in Happiness



Part B - Difference of Means in Annoyingness



Part C - Proportion of Confusion in Dancing with the Stars



Problem 4 - EBay