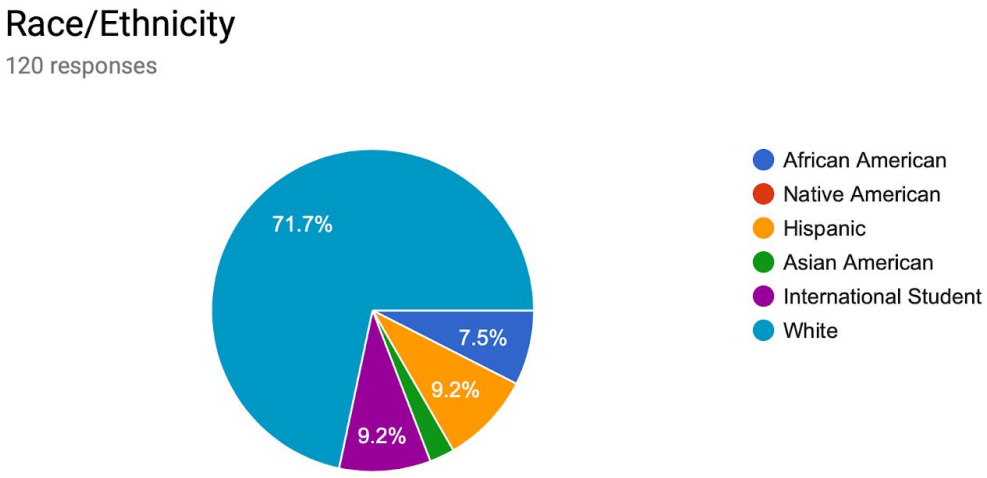
Introduction

The next decade will likely mark the largest shift the auto industry has seen since Henry Ford pioneered the assembly line. As legislators tighten emissions standards to meet sustainability goals, most car companies have embraced battery electric cars as the future and the internal-combustion engine as a thing of the past. Besides Tesla, many brands including Volvo, Mercedes Benz, BMW, Audi, Chevrolet, Ford, Nissan, and Kia have recently released battery electric car models. A survey of Drew University students was conducted to study the perception of electric cars amongst the student body.

Are Drew students embracing the shift away from gas-powered cars towards electric cars? Are Drew male or female students more likely to consider buying an electric car? Do political views and views on sustainability affect the likelihood of Drew students considering buying an electric car? Using statistical techniques performed in SPSS, these questions are answered by my analysis.

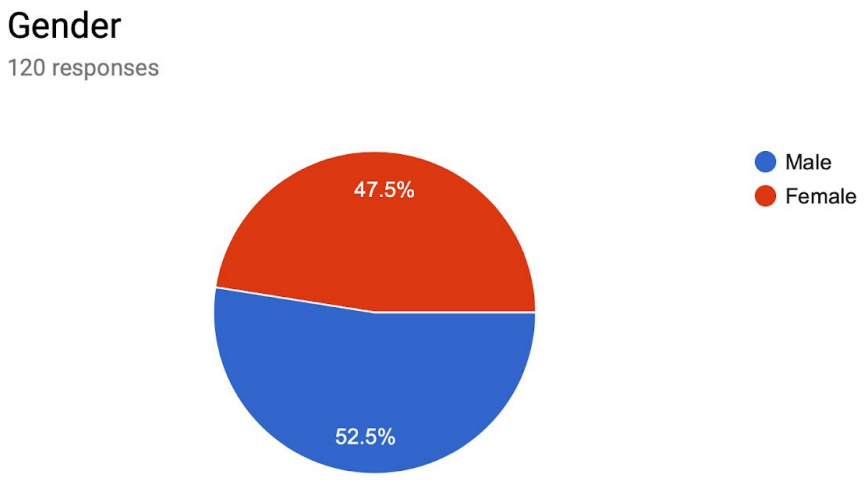
The Survey Sample

There were a total of 120 survey respondents from the Drew undergraduate student body. To gather responses, I sent my survey to various athletic team group chats and professors who shared the survey with their students. Although these survey methods exhibit convenience sampling, only a small subset of all students exposed to my survey responded, making the study inherently random.



The sample statistics match up fairly well with Drew University's actual demographic distribution. Respondents by year (freshman, sophomore, junior, senior) were split almost evenly into quarters. Notable differences include an over-representation of white students (71.7% survey vs 48.4% actual) and an under-representation of international students (9.2% survey vs 16.7% actual) and Asian students (2.5% survey vs 4.6% actual). Furthermore, gender split is actually

58/42 female, rather than the 52.5/47.5 male split seen in the sample. Overall, the sample is still representative of Drew undergraduate students, the sampling frame.



Variables Used in the Analysis

Name	**Explanation**	**Coding**	**Level**
GENDER	Gender	1 = Female 2 = Male	Nominal
POLITICAL	Political Views	0 = No Political Affiliation 1 = Very Liberal 2 = Somewhat Liberal 3 = Independent 4= Somewhat Conservative 5= Very Conservative	Scale
SUSTAINABI-LITY	Views on sustainability and protecting the environment	1 = Very concerned about sustainability and protecting the environment 2 = Somewhat concerned about sustainability and protecting the environment 3 = Not concerned about sustainability and protecting the environment 4 = Not at all concerned about sustainability and protecting the environment	Scale
ELECTRIC	If you were in market for buying a car, what is the likelihood that you'd consider	1 = Very Likely 2 = Likely 3 = Somewhat Likely 4 = Somewhat Unlikely	Scale

	an electric car?	5 = Unlikely 6 = Very Unlikely	
GAS	If you were in market for buying a car, what is the likelihood that you'd consider a gas-powered car?	1 = Very Likely 2 = Likely 3 = Somewhat Likely 4 = Somewhat Unlikely 5 = Unlikely 6 = Very Unlikely	Scale

Analysis

Can the political views of Drew students be used to predict their likelihood of considering an electric car when in market for buying a car?

I performed a regression analysis to answer this question. Drew student respondents who said they have no political affiliation were not included in this analysis.

There is a statistically significant, moderately strong, positive correlation between political views and the likelihood of considering an electric car when in market for buying a car, $r(N = 96) = .40$, $p < .0005$. As political views of Drew students become more liberal, their likelihood of considering an electric car when in market for buying a car increases, and vice versa.

According to the results of the ANOVA, the regression model is statistically significant, $F(1,94) = 17.94$, $p < .0005$. The regression equation is ELECTRIC = .443(POLITICAL) + 1.502. Approximately 40% of the variance in the likelihood of considering an electric car when in market for buying a car can be explained by political views.

Can the views on sustainability of Drew students be used to predict their likelihood of considering an electric car when in market for buying a car?

I performed a regression analysis to answer this question. There is a statistically significant, strong, positive correlation between views on sustainability and the likelihood of considering an electric car when in market for buying a car, $r(N = 120) = .54$, $p < .0005$. As the concern of Drew students about sustainability and protecting the environment increases, their likelihood of considering an electric car when in market for buying a car increases, and vice versa.

According to the results of the ANOVA, the regression model is statistically significant, $F(1,118) = 47.83$, $p < .0005$. The regression equation is ELECTRIC = 1.109(SUSTAINABILITY) + .991. Approximately 29% of the variance in the likelihood of considering an electric car when in market for buying a car can be explained by views on sustainability and protecting the environment.

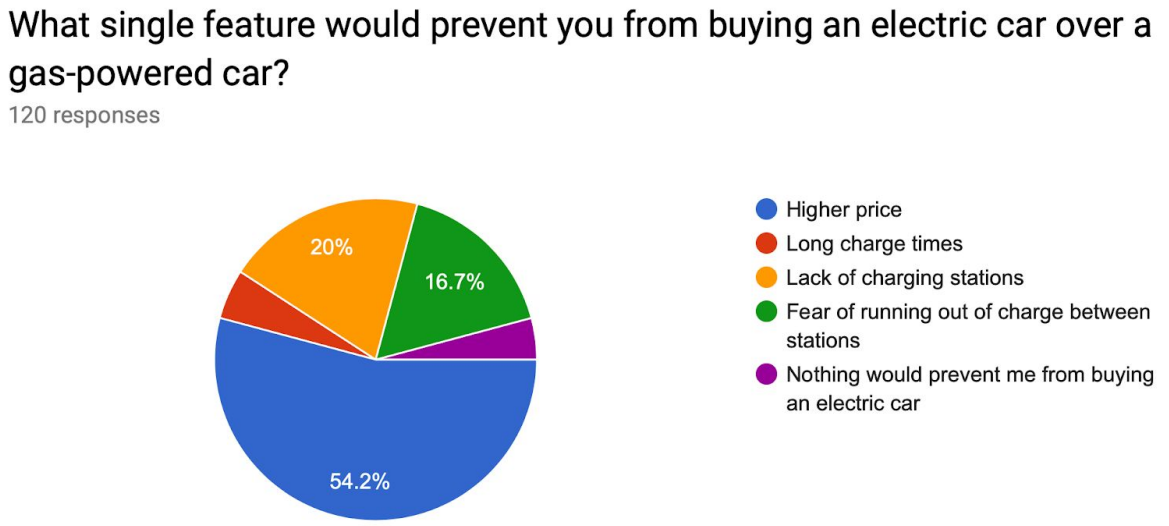
Are Drew students more likely to consider an electric car or a gas-powered car when in market for buying a car, based on gender?

I performed a mixed-model ANOVA to answer this question. Normality does not need to be tested because the sample size is greater than 30 for both Drew male and female students. According to the results of Mauchly's test, the sphericity assumption is met. The equality of covariances assumption is also met according to the results of Box's M test.

According to the results of the mixed-model ANOVA, there is a statistically significant interaction between type of car powertrain and gender, $F(1, 118) = 8.44$, $p = .004$. Approximately 6.7% of the variance in response can be explained by the interaction between car powertrain and gender, controlling for main effects.

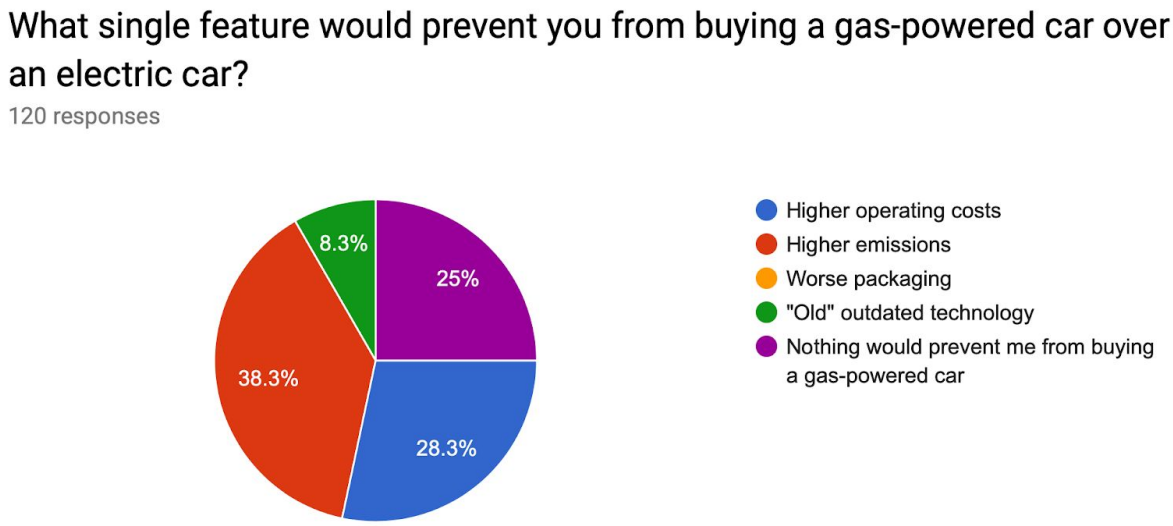
Holding type of powertrain constant, Drew female students are statistically significantly more likely to consider an electric car when in market for buying a car than Drew male students, on average. There is no statistically significant difference between Drew male and female students in the likelihood of considering a gas-powered car when in market for buying a car, on average.

Holding gender constant, for Drew female students there is no statistically significant difference in the likelihood of considering an electric or gas-powered car when in market for buying a car, on average. However, Drew male students are statistically significantly more likely to consider a gas-powered car than an electric car when in market for buying a car, on average.



The majority of survey respondents (54.2%) said that higher price is the single feature that would prevent them from buying an electric car over a gas-powered car. Another 41.7% of

survey respondents chose a feature that is negatively related to the process of charging electric cars.



38.3% of survey respondents said that higher emissions is the single feature that would prevent them from buying a gas-powered car over an electric car. Another 28.3% cited higher operating costs.

Concluding Points

- As political views of Drew students become more liberal, their likelihood of considering an electric car when in market for buying a car increases, and vice versa
- As the concern of Drew students about sustainability and protecting the environment increases, their likelihood of considering an electric car when in market for buying a car increases, and vice versa
- Drew female students are statistically significantly more likely to consider an electric car when in market for buying a car than Drew male students, on average
- There is no statistically significant difference between Drew male and female students in the likelihood of considering a gas-powered car when in market for buying a car, on average
- For Drew female students there is no statistically significant difference in the likelihood of considering an electric or gas-powered car when in market for buying a car, on average
- Drew males students are statistically significantly more likely to consider buying a gas-powered car than an electric car when in market for buying a car, on average

It would have been interesting to use race/ethnicity as a variable in my statistical analysis. Unfortunately, the sample size for certain racial and ethnic groups was too small to render such analysis possible.