

Transportation Preferences and Climate Change

Lab Group 6



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Introduction:

Our group chose to ask if someone's thoughts on climate change influence their preferences when it comes to transportation and if other factors may contribute to their transportation preferences. For example, we asked if a person believed whether or not personal transportation methods contributed more to climate change compared to public transportation methods and we asked what their preferred method of transportation was. We then compared their answers to these two questions (Graph 1) and analyzed these responses. We accomplished this by asking various questions relating to one's thoughts on transportation, transportation's effect on the environment and climate change in general. We chose this study question because we thought it was important to see how different people try to change their behavior to help support the environment without directly asking them this question. We also asked certain demographic questions that helped us develop methods to further understand factors that may have contributed to one's transportation preferences.

Methods:

Logistically speaking, our survey consisted of 14 single-answer multiple choice questions (three of which were "choose one" questions), one multiple-answer multiple choice questions, one likert question, one ranking question, one interval scale question, and two open-ended questions (one of which was optional). Of those, we included five demographic questions, 11 transportation-related questions, two climate-related questions, and two transportation-climate-related questions. We included demographic questions to get a better understanding of our respondents' backgrounds to try to gauge their tendencies related to transportation and/or climate change. We included transportation-related questions to determine whether our respondents use and/or prefer personal transportation over public transportation or vice versa, and in doing so, gauging how much they impact the climate, such as causing the release of greenhouse gas emissions. We included climate-related questions to get a sense of our respondents' thoughts on and habits to maintain the climate. Lastly, we included transportation-climate-related questions to analyze the possible correlation between transportation and climate change in an attempt to answer our overall question: Does people's beliefs on and habits relating to climate change influence their preferred method of transportation, how prevalent they use such transportation, and the extent to which they use it?

In terms of our survey's distribution, our group polled students from both Northeastern and our respective high schools through GroupMe group chats. We distributed the survey as an anonymous link that we copied and pasted into each of these group chats. Our group ensured that we would get the minimum number of samples required for the survey assignment by tracking the number of respondents on Qualtrics. Fortunately, we were able to surpass the minimum number of twenty respondents. However, had we not reached that threshold, we would have considered re-sending the anonymous link to the survey in the same group chats.

Results:

The total estimated sample size that the survey was sent to was about 1,400 people, and of the polls we sent out, we received 59 total responses, 43 of which involved completed surveys. According to the raw data, it appeared that most of our respondents were not students of Northeastern University, lived in the suburbs, were female, were between the ages of 18 and 24, and had a standard Class D driver's license.

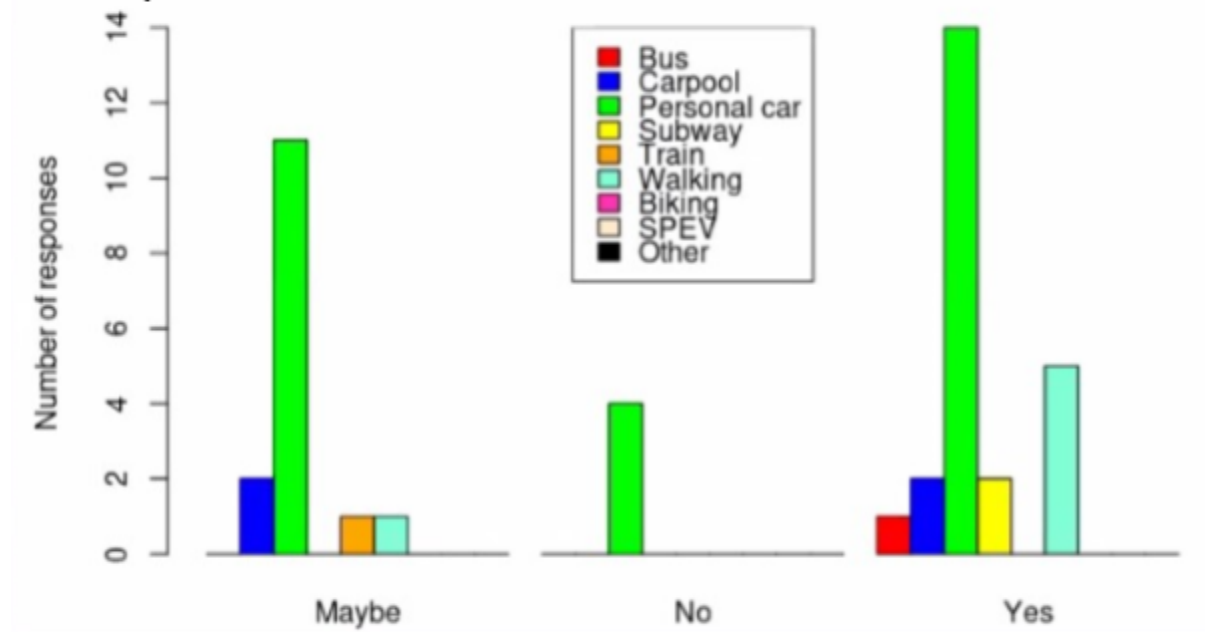
Table 1

Reasons for Not Using Public Transportation Given the Type of Community				
	Rural	Suburb	Urban	Total
Reason For Not Taking PT:				
Expensive	0	0	1	1
Frightening	0	1	2	3
Inconvenient	1	11	6	18
Not available in my area	1	13	0	14
Other	0	2	0	2
NA	0	2	3	5

Table 1 showed the different reasons for not using public transportation, separated by the type of community one may live in. The results clearly showed that the main hindrances to public transportation were its unavailability in suburban communities and that it was simply inconvenient in most communities. Combined, these results composed about 56% of respondents who said this is their reason for not using public transportation. This is important for climate protection because public transportation, and large-scale transportation like buses and trains, tend to be better for the environment by reducing carbon emissions, so getting as many people to use public transportation over, say, a personal car, would be beneficial. This comparison was also made to see if there were other factors (not just thoughts on climate change) contributing to a lack of change in one's preferences when it came to transportation.

Graph 1

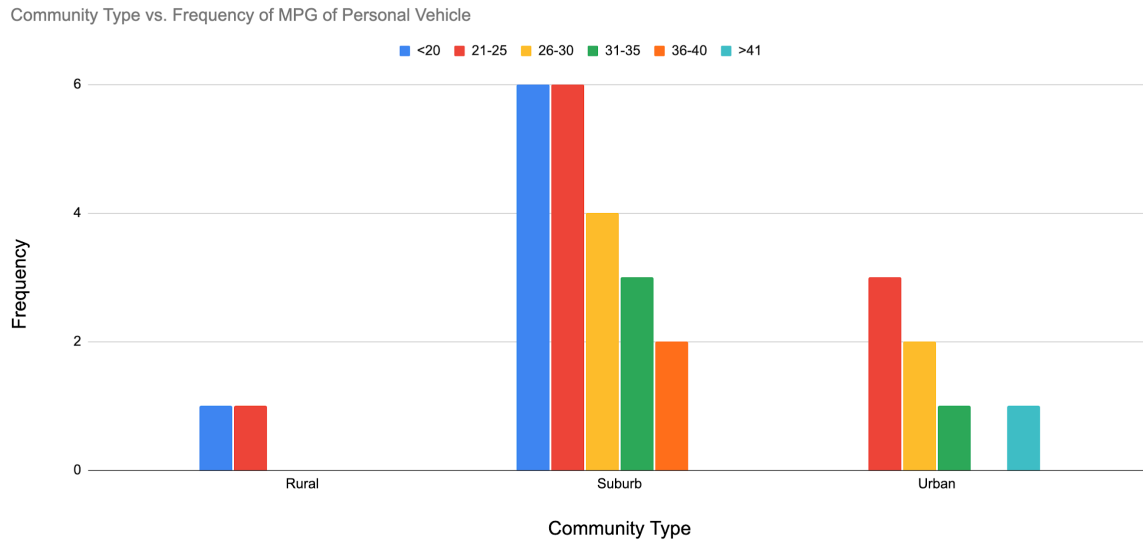
Belief that Personal Transportation Methods Impact the Climate More than Public Transportation Methods vs. Number of Respondents Who Prefer a Specific Method of Transportation



Does the respondent believe personal transportation methods contribute to climate change more than public transportation methods?

Graph 1 compared respondents' beliefs on if personal transportation methods contribute to climate change more than public transportation methods to their preferred method of transportation. The personal car dominated the preferred method of transportation; however, for people who confidently believed that personal transportation methods contribute to climate change more than public transportation methods, other methods of transportation, namely walking, were more common. This may be because the people that believed that personal transportation methods contribute to climate change more than public transportation methods use personal transportation methods more often, were generally more cognisant of their effects on the environment, and were more likely to take action and change their habits to protect the environment.

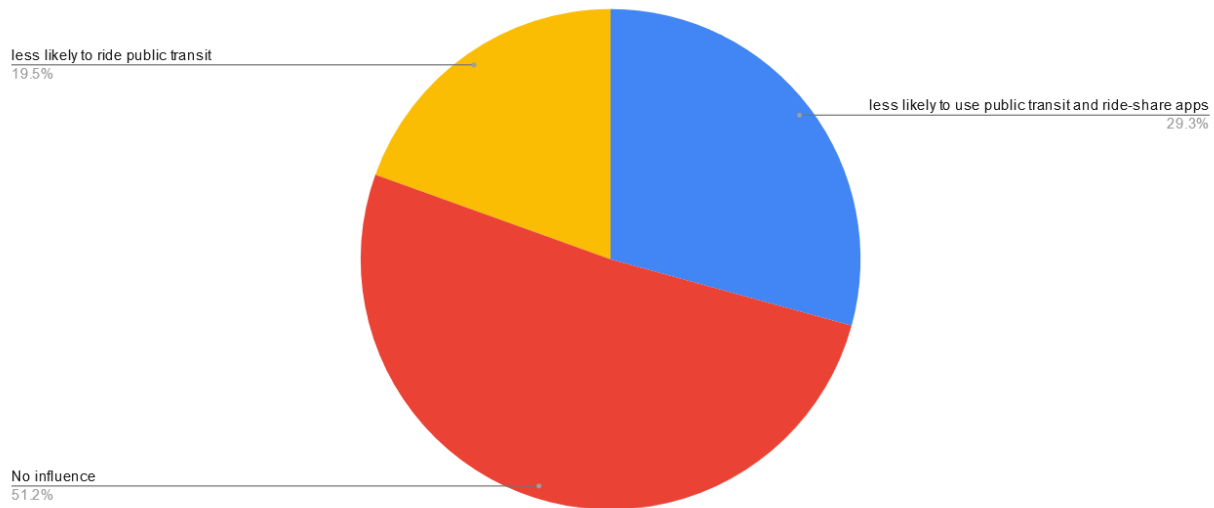
Graph 2



In the analysis of the comparison of the two questions that asked respondents the type of community that they live in and the miles per gallon of their personal vehicle, we found that most of the respondents of our survey lived in a suburban setting, and of those respondents, most had personal vehicles with either less than 21 miles per gallon or between 21 and 25 miles per gallon. Broadly speaking, the respondents who lived in rural settings were least in number and drove personal vehicles with MPGS of between 21 and 25 or less, the respondents who lived in suburban settings were greatest in number and drove personal vehicles with MPGS as low as below 20 and as large as 36 to 40, and the respondents who lived in urban settings were in the middle in terms of frequency and drove personal vehicles with MPGs as small as between 21 and 25 and as large as over 41. Overall, one can make the observation that the respondents in urban or partially urban settings were higher in number and drove more often, and, therefore, they were more likely to be a detriment to the environment.

Graph 3

Graph 3: Covid effect on public transportation and ride-share transportation



Graph 3 was a visual representation of the respondents answer to question 17, “Has the Covid-19 pandemic influenced your use of transportation?” Covid-19 has had an immense impact on nearly every aspect of our lives. With that in mind, we sought to better understand how the pandemic influenced the respondents choices of transportation, namely public transportation. More than half of the respondents (51.2%) marked “No influence”, 19.5% marked “less likely to ride public transportation”, and 29.3% marked “less likely to use public transit and ride-share apps”. From the information and the pie chart, the frequency of the choices were clearly shown. It is reasonable to say this data suggested that Covid-19 has in fact had an impact on people’s views and use of public and rideshare transportation.

To be noted, there was one response which was an outlier. We are confident that this respondent was not taking this survey seriously, as their previous answers were also not serious. So we thought it best to remove this answer from the pie chart.

Discussion

Due to the combination of variables surveyed, a unique array of hypotheses were developed from the data. Firstly, based off of *Graph 1*, those that believed that personal transportation methods contributed more to climate change had a higher tendency to use public transportation than those that believed otherwise, and they were also more likely to walk. This suggested that one's beliefs about climate change did influence their decisions in relation to transportation. Based on *Table 1*, however, location may potentially have been a massive deterrent for use of public transportation. This claim makes sense, as some areas, suburban ones in particular, have little to no access to public transportation. Furthermore, more evidence suggesting that where people live impacted their choice of transportation, as seen from the data in *Graph 2*. Finally, as the data in *Graph 3* suggested, Covid-19 has had an impact on individuals' choice of transportation, as (19.5% + 29.3%) of respondents said they were less likely to use public transportation and rideshare apps respectively.

In this study, the researchers involved took exceptional care to avoid sources of bias and influence in our survey design. However, as is the nature of surveys, there were some potential sources of bias and error in methods. For example, in the data behind *Graph 1*, a response bias that favored suburbs and urban areas over exurbs and rural communities meant we had far more data for suburbs and urban communities compared to other communities. Furthermore, the data behind *Graph 3* may also have fostered some bias, due to some sensitive wording in the question. The question asked, "Has the Covid-19 pandemic influenced your use of transportation?". The use of the word "pandemic", which has very negative connotations, could have skewed the responses. It is likely that there may have been other biases involved with the survey not noticed by the authors.

After all the data was cleaned up and analyzed, it can be suggested that there were in fact complex correlations between stance on climate change, location, Covid-19 and use of ecologically responsible transportation.

Author Contributions

Element	Group member(s) and their contribution
Introduction	Gil wrote the introduction paragraph. Edited by Luke.
Methods	Luke wrote the method paragraphs. Edited by Gil.
Results	Preliminary info about response rates and sample size by Luke Table 1 created by and results by Gil Graph 1 created by group effort on R, results by Luke Graph 2 created by and results by Luke Chart 3 created by and results by Alex All three worked on edits.
Discussion	Alex wrote discussion paragraphs. Edited by Gil.

Supplementary Files (in the Google Drive Folder “ENVR 1500_LabAssign2_LabGroup6_Abbatessa_Anderson_Zaltsman”)

- Google Sheet with the raw data used to produce the R Markdown, two of the three graphs, and the one table (titled “Lab Group Assignment 2 - Raw Data and Visualizations - Luke Abbatessa, Alexander Anderson, Gil Zaltsman”)
- Reproducible .Rmd Markdown of the code we developed to analyze the survey data (titled “Proj2.Rmd”)
- The .html output of the .Rmd Markdown we developed to analyze the survey data (titled “Proj2.html”)
- Link:
<https://drive.google.com/drive/u/0/folders/1DR03FLGUAhsMhRUYk9qhJakc0wFHRMiZ>