Investigating the Factors Affecting Millennial Mobility

September 2016
The National Center for Sustainable Transportation Undergraduate Fellowship Report

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Introduction

This summer I chose to work with a research group to investigate how Millennials make mobility choices. In 2015, approximately three thousand young adults (Millennials) and members of the preceding Generation X (for comparative purposes) residing in California completed a survey that collected information about the factors affecting their transportation choices. Those completed surveys were analyzed by variable (over 900 variables were included in the dataset); in particular, during my internship I contributed to the data cleaning for this project: faulty and erroneous surveys were removed to create a cleaner dataset containing roughly 2300 cases. Among the results of the study, older adults (members of Gen X) are found to drive for commuting purposes more than Millennials. Also, Millennials multitask using electronic devices more during their commute trips than the members of Generation X. The goal of this research project is to improve the understanding of Millennials’ mobility and support public policy, future research, and city planning.

Participants

Participants were recruited through Decision Analyst (through which the American Consumer Opinion Panel was used), an opinion panel company which provided access to an online panel of Californian adults to take the survey. The company created a small “screener” survey to determine which of their 8 million subscribers were the right candidates for this mobility survey. The screener survey results were also used when sifting through survey results (more on that later).

Millennials

Millennials were the primary target of this survey. A Millennial is a young adult born roughly between 1981 and 1997. Young adults will use many forms of transportation for the next 60-70 years; understanding which options they choose, and why, will help transportation planning in the future. Millennials are often categorized in niche groups like hipsters, and seen as tech savvy and Uber-reliant. Our research proved that this was not the case, and not all Millennials behave in this fashion. While Millennials in large urban cities relied more on public transit and on-demand transportation services, young adults in rural cities and small towns preferred driving alone for commute and leisure purposes.

Generation Xers

Generation X members are those born between 1960 and 1980. Their input and choices are also important in predicting transportation patterns in the future. Their data was also used to compare the choices of Millennials. The comparison will quantify the changes in transportation choices between the two generations and help predict trends in popular mobility choices with future generations. The Gen X members had mostly similar responses amongst themselves; there were not many subdivisions between Generation X participants.
Survey Information

The primary source of data for this project was a carefully crafted survey. Over 3000 Californian adults between the ages of 18 and 50 completed the survey, and just under 2400 surveys were used. Each survey had a disclaimer which warned the participant that the information they provide will be used in a research project administered by the University of California, Davis, and that personal contact information will never be disclosed in any reports or presentations.

Survey Topics

The survey had eleven sections which were used to group questions on various topics. The topics included Attitudes and Preferences (e.g. on residential location, environment, etc.), Employment and Study Activities, Current Travel Choices, Driver’s License and Vehicle Information, Sociodemographic Traits, and other relevant topics. The goal of the survey was to provide a wholesome review of the participant’s mobility and opinions on mobility. By asking questions regarding the participant’s household (how many cars/licensed drivers are in the household), the survey also gained insights into some of the mobility choices of other members. This provided more detail and insights into the mobility options available to the participants.

Each section served a different purpose; Attitudes and Preferences was an important section because it provided a glimpse of the types of transportation and life choices the participant likes, and would disclose later on in the survey. This section asked the opinion of the participants on a number topics, e.g. if they would mind living closer to the city but in a smaller home, if they felt they had job security, their opinion on environmental awareness, and other social/personal opinions. Understanding the participant’s daily habits and stance on social media helped determine the social habits of the participants, and how they relate to several transportation choices, e.g. whether the participant would be inclined to use transportation that relied on social media (e.g. rides obtained through Facebook groups) or using a mobile device (Uber). This section asked the participant how many hours per day they spent watching TV and using the internet, how often they used Facebook/Instagram/other social media, and if they regularly used a series of electronic devices. The Residential Location section asked the participant for the cross streets of where they lived, together with other information on living arrangements. This part was used to understand what type of region the participant lived in (rural, urban, or suburban city). Region types limit the availability of many mobility options (for example, one would not find Uber in rural Plainfield, CA). The section named Current Travel Choices asked the participant how often they traveled to work or school, by various modes, and how often they traveled around for leisure purposes (entertainment, companionship, social events, necessities, etc.), together with other information about their leisure and commuting trips.

Among other One of the most important sections asked the participants about several emerging transportation services. The survey asks if the respondent has heard of the service and, if they have, how often they’ve used that particular option. This section
tested the awareness of the participant and the popularity of new transportation services. It was a great indicator of mobility options that may become more useful in the years to come.

**Results**

Over 3000 surveys were completed (more than 5000 invitations to complete the survey were sent to subscribers of the opinion panel). The surveys were made available to the research group I worked with, without personal contact information. For additional information about the data collection and the preliminary results of this project, see Circella et al. (2016). The answers were analyzed using statistics programs like R and SPSS to view trends, anomalies, and to generate statistics on the various variables of interest. Among many other results from the study, the research confirms that Gen X participants tend to drive alone more for their daily commutes to work/school than young adults (Millennials). A large percentage of Millennials still drive alone for their commute to school or work, but the percentage of Gen X participants who drive their cars is larger. Many reasons may be behind these trends, including the different household characteristics with Millennials who tend to more often live in households with fewer children than Gen X respondents. Many additional analyses are being developed using the data collected as part of this project.

**Data Cleaning**

This was the stage of the research project I worked on. Data cleaning is an important step after collecting the data in order to make sure the dataset is as accurate and truthful as it can be. Many surveys had some issues and needed to be minutely modified or removed altogether. Further, as part of strategy adopted during the survey design, the survey had natural checkpoints to test if the participant was paying attention or randomly filling in answers; these were quality assurance questions (trap questions) that asked the participant to fill in a particular choice of the answers provided. There were three quality assurance questions in the survey; if a participant failed more than one trap question, the survey was automatically tossed from the data set (with all participants that failed even only one trap question who were put under scrutiny to identify potential inconsistencies and other problems in the data). Figure 1 shows an example of a trap question.

![Figure 1. Example of Trap Question in Survey](image-url)
Besides omitting faulty data, we also analyzed the time in which the respondent completed the survey. Surveys that were completed in less than twenty minutes or several hours were set aside to be carefully reviewed. Screener surveys were also taken into consideration, and compared with the responses in the socio demographic section of the survey (making sure the answers aligned with screener responses).

Inconsistencies in the answers to many questions were also considered. For example, if a respondent answered that they live alone in the “Residential Location and Living Arrangements” section, and then stated that there are three licensed drivers in the household in a following section of the survey, this inconsistency was flagged and carefully reviewed. Reviewing the cases typically meant pulling up the actual survey file and reading every answer the respondent gave, scanning for other problematic answers and making sure the survey was usable for research purposes.

Many surveys had multiple errors, resulting in a group decision on whether or not to keep the cases. If there was consensus to keep a case, small modifications would be made on the responses to remove the inconsistencies. Modifications were made only to logic responses and questions that do not contain opinionated answers; attitudes and preferences were never changed to represent different attitudes and opinions. In some cases, however, if a full section of the survey which contained faulty responses that contradict each other, the entire section was considered unusable and discarded.

**Recodes**

In order to modify responses or remove surveys from the data set, a recode must be made. A recode is a change (catalogued in an excel file, during my internship) that identifies the ID number of the survey, the variable that needs to be changed, the code for the original response, and the code for the recoded response. Codes for responses were created by the research group to modify the data set in the statistical programs. Once the codes are logged into Excel, the codes are run through the proper programs (usually, SPSS) to finalize the changes made to the dataset. Though it seems like a tedious system, once several recodes have been created, the process is quick and efficient. Figure 2 shows an example of the many recodes created to amend the data set.
Table 1. Example of Recodes

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Conclusions

My Summer Transportation Fellowship was spent working with a research group investigating the mobility of Millennials. Both Millennials and members of Generation X (the generation before Millennials) participated in the survey created by the research group as part of a research project at UC Davis. Surveys were completed by Californian residents between the age of 18 and 50. The Generation X surveys were used to compare with the Millennials and determine trends in Millennial mobility behavior. There were several results, including that Millennials drive alone for commute less than members of Generation X. The results were cleaned to filter out untruthful and contradictory surveys, a task to which I greatly contributed during my summer internship. We hope that this research project will help plan cities with millennial transportation in mind and shape policy and infrastructure in the future.
References