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Education as a Key Factor in Policy Support: An Evaluation of National Mileage Fee Support as it Varies with Information and Attitudes

March 2024

A Research Report from the National Center for Sustainable Transportation

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National Center for Sustainable Transportation
A USDOT University Transportation Center

THE UNIVERSITY OF VERMONT
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16. Abstract
As governing bodies continue to explore mileage fees as an alternative to the gas tax, the uncertainty surrounding public support remains a critical barrier to policy uptake. This study examines the extent to which public perceptions of mileage fees are guided by misinformation or lack of information using a national, internet-based survey. Hypothetical voting opportunities were used to gather respondent support for mileage fees, coupled with educational treatments that address mileage fee fairness, privacy, and costs. The findings indicate that respondents are largely misinformed or lack information about mileage fees and the gas tax. Pre-education, only 32% of respondents supported the policy, but post-education, 46% of respondents supported the policy. Through binomial, multinomial, and fixed effect modeling, we examined the factors associated with policy support, changes in policy support, and the educational treatments. Ultimately, our findings indicate that education can play a key role in increasing support for a mileage fee policy as an alternative to the gas tax.

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Education as a Key Factor in Policy Support: An Evaluation of National Mileage Fee Support as it Varies with Information and Attitudes

A National Center for Sustainable Transportation Research Report

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EXECUTIVE SUMMARY

Motor fuels taxes (colloquially, “gas taxes”) face significant challenges in generating sufficient revenue to fund the maintenance and operation of our surface transportation system due to the diversification of fuels and vehicles used, increasing vehicle fuel and energy efficiency and inflation. Mileage fees are a potential alternative gaining popularity amongst state and federal transportation departments, but they have limited public support. Public criticisms of mileage fees, such as privacy, cost, and equity concerns, have held up many states pursuing the policy. In this study, we hypothesize that public opinions about milage fees are largely guided by a lack of policy information. Using simple, personalized educational experiences delivered through a survey format, we assess the extent to which education can cause changes in policy support, and how these changes vary across demographic and attitudinal divides.

In the survey, respondents were given three opportunities to vote on a mileage fee as an alternative to the gas tax, with educational treatments in between the votes. The educational experiences were provided through videos and survey questions and covered the history of the gas tax, current political motivation to replace the gas tax, what mileage fees are, what is known about mileage fees as of now (i.e., up-to-date research on mileage fee equity, costs, options for collecting mileage fees, etc.), and how much a mileage fee would cost each respondent based on their unique travel behavior. The survey was fielded through Qualtrics using quota-based sampling between July 22nd, 2023, and September 14th, 2023. One of three surveys was randomly assigned to each respondent. Each survey was identical except for the way it proposed collecting mileage information in the voting opportunity (annual odometer readings, plug-in devices without GPS, and plug-in devices with GPS). This allowed us to control how respondents assumed their mileage would be collected when voting on the policy. The final, combined data set from these three surveys contains 2,114 responses roughly representative of the US population in terms of age, gender, race, ethnicity, income, education, and employment status.

We find that initial support for mileage fees is low, at 32% of the respondents in our study. The between-subject variation was limited, with support varying minimally by the type of mileage collection option presented to the respondents. However, within-subject variation was statistically significant. Over the course of the three voting opportunities and two educational treatments in the survey, 45% of respondents changed their support for a mileage fee at least once. Using a fixed-effect modelling approach, we find that support for mileage fees is between five and ten times more likely after a respondent engaged with the policy and cost educational treatments. The findings also identify a variety of factors that have a statistically significant association with initial mileage fee support and the likelihood of changing support with

education. These include trust for the systems that would run a mileage fee, personal perception of fairness, and estimated personal financial burden.

Overall, our findings suggest that simple educational experiences can significantly increase support for mileage fees. While we cannot state whether the policy education was more effective than the cost education, since the order of the educational treatments was not randomized, when asked, most respondents stated that the cost education was the most important factor in their decision-making. We also note that regardless of whether a mileage fee would cause a respondent pay more or less than they currently do with the gas tax, the policy and cost education increased their likelihood of voting "Yes". We highly recommend states invest in public outreach, giving priority to cost education and doing more general policy education about fairness, collection options, and motivations for replacing the gas tax when reasonable. Our findings have implications for additional policy analyses and suggest that low-levels of information likely have a substantial impact on public opinion surveys, calling into question whether they are a reliable source of information for policymakers without an education element.

Introduction

Motor fuels taxes (colloquially, "gas taxes") collected by states and the federal government contribute the largest proportion of funding for transportation maintenance and construction in the United States. In recent years, the revenue generating ability of gas taxes has rapidly declined largely as the result of rising vehicle fleet efficiency and electric vehicle adoption. At the same time, inflation has eroded the purchasing power of this declining revenue stream. Federal and state departments of transportation are actively assessing how quickly and effectively a more stable funding source, such as utility-based and distance-based fees, can replace the gas tax. However, a distance-based fee (i.e., mileage fee) raises public concerns, and current reports of mileage fee support are critically low. In this study, public support for mileage fees is assessed by assuming the average citizen is not rationally informed about mileage fee or gas tax costs, fairness, and technology.

Interest in mileage fees began when departments of transportation began noticing declining revenue from the gas tax. Some states considered supplementing lost revenue by increasing the gas tax (*1–3*), but this has received criticism. For one, a purely fuel-consumption based tax will remain unreliable as the fuel efficiency of the vehicle fleet continues to increase (*4–6*). Beyond general increases in vehicle efficiency, some have noted the gas tax is not equipped to charge drivers of a diverse vehicle fleet, since even small differences in fuel economy can mean a large difference in gas tax payments. Additionally, others note that under-resourced households are less able and less likely to purchase more efficient vehicles, so continuing to rely on the gas tax may disproportionately impact under-resourced households (*7*).

Other options to supplement transportation funding without increasing the gas tax have been proposed, such as increased tolling, congestion charging, heightened vehicle registration and inspection fees, or shifting funding from other funding streams such as sales and income taxes. Mileage fees have received the widest attention, due to their utilitarian design where every road user pays the same amount for every mile they travel. In past decades, the ability to collect mileage information from users was limited, but rising data-availability from in-vehicle navigation units, on-board devices used by insurance companies, and odometer readings have made it possible to collect mileage information at a wide-scale. Some states require annual vehicle safety or emission inspections, making odometer reading collection an easy transition. Currently, more than half the states in the U.S. are researching, piloting, or writing policy to create optional or mandatory mileage fee programs. The federal government is also exploring a national mileage fee pilot program (*8*).

Existing research shows mileage fee support is low amongst the public despite the necessity of replacing the gas tax, the modern feasibility of implementing mileage fees, and their political momentum. Stated preference surveys and polling find support ranges from 19% and 53%, averaging at 24% (*9–13*). Through public outreach and survey commentary, studies find that opposition to mileage fees typically stems from at least one of the following reasons: perceived increases in annual costs, concerns about privacy and mileage collection technology, and concerns about the fairness of mileage fees for different communities and income groups, particularly low income and rural drivers.

Efforts to assess and address mileage fee cost, fairness, and privacy concerns have typically been ineffective at reaching large audiences or are small in scale. An example of ineffective communication of research lies with mileage fee equity. In the past decade, a wide range of researchers across the country have used vehicle data to analyze the spatial and horizontal equity of replacing the gas tax with a mileage fee. They have collectively dismissed the perception of disproportionate financial burdens for rural and low-income households (*6*, *14*–*18*), yet perceptions of mileage fee inequity persists amongst the public (*9*, *10*). On a related front, active engagement with the community about mileage fee cost, fairness and privacy concerns have been frequently limited by small sample sizes. For example, uncertainty surrounding mileage fee collection technologies has only been addressed through mileage fee pilot programs, and these participants only represent a small percentage of the population. Through these pilots, participants can choose the mileage collection technology that suits their comfort level, such as an odometer reading inspection or the more data-intensive GPS-enabled plug-in device. While highly effective at abating privacy concerns and increasing support through familiarity and flexible mileage collection choices, these pilot programs are expensive and have a limited influence.

As of October 2023, the Hawaii Road-User Charge (HiRUC) Study is the only large-scale educational mileage fee engagement by a governing body known to the researchers (*19*). In this study, mailers were sent to each registered vehicle address comparing their current annual gas tax costs (estimated using odometer readings) to a hypothetical revenue-neutral mileage fee. These mailers also provided an opportunity for further engagement with mileage fees through surveys and resources on a dedicated HiRUC website. This type of widespread outreach presents an opportunity to overcome what previous mileage fee opinion studies have assumed – that respondents are rational actors fully aware of the costs and impacts of an innovative policy (*20*). Confusion, uncertainty, and lack of awareness about mileage fees tend to yield more random and inconsistent opinions from survey participants (*21*–*24*). This creates a challenge for policymakers and public representatives who rely on their constituency's opinions. By acknowledging that members of the public likely lack information about or even lack a general awareness of transportation funding sources and alternatives, and addressing this information deficit through simple educational outreach, Hawaii observed unprecedented support for a mileage fee to replace their state gas tax.

Previous research establishes the public has, at best, a limited understanding of the current gas tax, and has little to no knowledge or awareness of mileage fees as an alternative to gas taxes (*25*). Therefore, treating participants of mileage fee opinion studies as rational actors is inappropriate and will produce misleading conclusions about the factors associated with policy support. In this study, we address the rational-actor problem by gathering background on respondent perceptions and awareness of mileage fees, providing simple education using videos and quiz-style questions, and allowing respondents to change and reflect on their opinions and perceptions. We hypothesize that support for mileage fees is significantly tied to pre-existing perceptions of mileage fee cost, fairness, and technology, and that these perceptions are not fixed, but rather a function of education about and engagement with a policy. We also hypothesize that attitudes and beliefs, in addition to demographic and various

extrinsic factors, likely play a large role in decision-making and momentary choices. This is grounded in prior research suggesting intrinsic motivations may play a substantial role in how people respond to policies affecting their travel (*26*). By allowing opinion change and reflection, we measure the extent to which education shifts support for mileage fees and assess how someone's likelihood of changing their opinion varies based on demographics and attitudes.

Methods

An internet-based survey was used to assess nation-wide support for replacing state gas taxes with a mileage fee. While the gas tax consists of both a state and federal component, we focus on state gas taxes because this is where there is currently the most momentum for change. Respondents were given three opportunities to vote for or against a mileage fee replacement, with educational treatments in between votes. The impact of education on respondent voting was evaluated using regression modelling methods.

Survey Conceptualization and Fielding

The survey was designed to address the three main public concerns and uncertainties related to mileage fees as identified in previous research: perceived increases in annual costs, concerns about privacy and mileage collection technology, and concerns about the fairness of mileage fees for different communities and income groups, particularly low income and/or rural drivers. In short, we call these three topics cost, privacy, and fairness. We designed the survey so these educational treatments were given to each respondent as a source of within-subject variation (see Survey Flow section).

We assume that respondents likely have a mileage collection technology in mind when they vote on mileage fees (i.e., many respondents may believe they would need to have a GPS-enabled device collecting their mileage). To address the unmeasured biases this entails, we present respondents with a specific mileage collection technology, and ask their support for a mileage fee collected using that specified method. The options are as follows: (1) an annual odometer reading, (2) a plug-in device without GPS technology, and (3) a plug-in device with GPS technology. This resulted in three identical surveys that differed only in the method they displayed for collecting mileage information. The surveys were each fielded separately, so the mileage fee collection option was a source of between-subject variation (see Survey Flow section and Figure 1).

Respondents were recruited to the survey by Qualtrics using a quota-based sampling scheme designed to achieve a demographically representative sample of the U.S. population. Since this research hypothesized that mileage fee opinions may be in part due to low information about mileage fees, we opted to omit respondents from states where widespread mileage fee education or mileage fee policies were implemented. As of July 2023, we identified California, Oregon, Utah and Hawaii as states where residents were likely meaningfully more educated about mileage fees and chose not to survey those populations. Hawaii was excluded due to their state-wide mileage fee outreach where they mailed every resident cost comparisons between a mileage fee and the gas tax using odometer reading data(*19*). Oregon and Utah

were excluded since each state has an active mileage fee program which includes wide-spread public outreach to gain participation. California was excluded since, at the time we started this research, they had a highly visible mileage fee pilot program and were investing in public opinion surveys. Several other states such as Virginia were in the early stages of implementing pilot programs, but we chose to keep them in the survey since public exposure was likely limited at the time of our study.

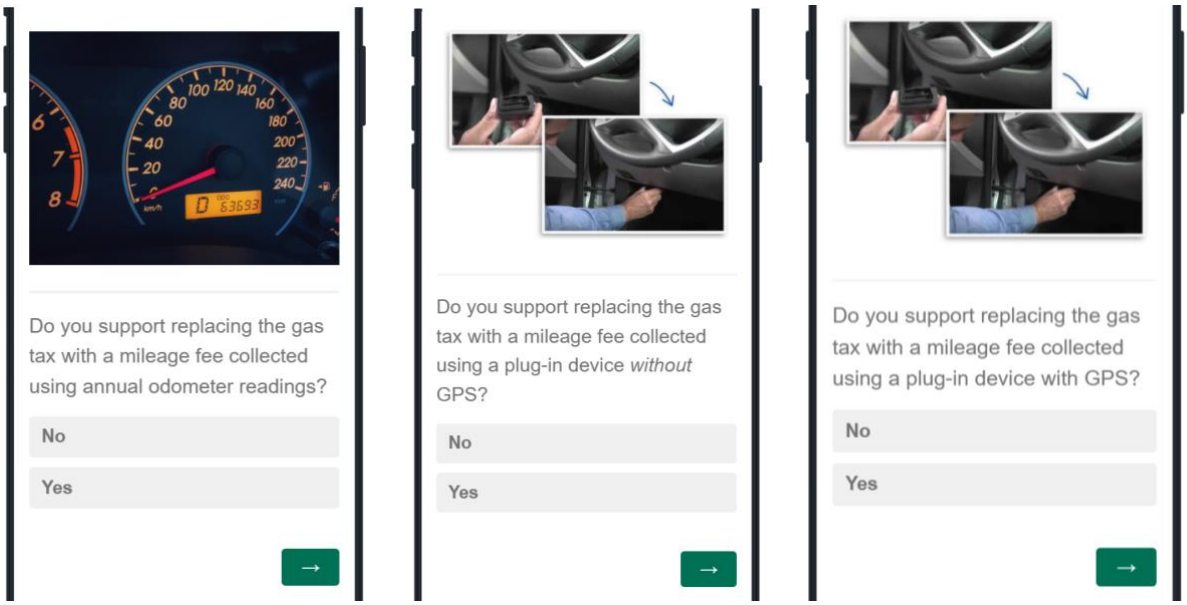
Responses were collected between July 22nd, 2023, and September 14th, 2023. Data collection ceased when there were approximately 800 usable responses per survey (odometer, plug-in device without GPS, and plug-in device with GPS) from a representative national sample by age, gender, race, ethnicity, income, and community types (urban, rural, and suburban respondents).

Survey Flow

The survey used a within-subjects design to gather changes in policy opinion across educational treatments. In total, respondents were given three opportunities to vote for or against a mileage fee to replace their state gas tax, assuming the specified mileage collection technology for their survey (between-subject variation). In between each vote, respondents were presented with educational treatments covering mileage fee cost, fairness, and privacy (within-subject variation).

We began the survey by establishing each respondent's background with the subject matter. We asked whether they had previously heard of mileage fees or participated in a pilot program. We then collected their age, gender, race, ethnicity, household income and community type (urban, rural, or suburban).

We then established a pre-existing opinion on mileage fees through a control vote. Each opportunity to vote for or against a mileage fee was presented as a ballot item, or referendum. The policy was introduced with this short paragraph: "Your state is considering alternatives to the vehicle fuels tax, which you may know as the 'gas tax'. You pay the gas tax every time you purchase vehicle fuel. The mileage fee will remain revenue neutral, so the total amount of money collected by the state will remain the same, but the amount you pay may increase, decrease, or stay about the same. Your state plans to replace the gas tax with a mileage fee of 1.5 cents per mile.". After reading this introductory paragraph, respondents were directed to vote "Yes" or "No" for a mileage fee where mileage was collected using the method outlined in their survey version. The three versions of the control vote are shown in Figure 1.



(A **(B)** **(C)**

Figure 1. Ballot Items for Vote 1, also known as the Control Vote. A) Odometer Survey, B) Plug-in without GPS Survey, C) Plug-in with GPS Survey

After the control vote, respondents were presented with the first educational treatment, which we referred to as policy education. We started with an educational video that walked respondents through the motivation behind replacing the gas tax (timed at 2 minutes and 42 seconds). Respondents learned about the history of the gas tax, what the gas tax is used for, and its current inability to gain funding from more fuel efficient or electric vehicles. The video was followed by quiz-style questions and concept checks to reinforce the information presented in the video. Then, respondents watched a second video timed at 4 minutes and 6 seconds) about mileage fees. The video established the motivation to replace the gas tax with a mileage fee and discussed current knowledge (as of July 2023) about the fairness of a mileage fee for various groups of people. This video also took the time to talk about the benefits and drawbacks of three mileage fee collection technologies (odometer readings, plug-in devices without GPS, and plug-in devices with GPS). The second video was also followed by quiz-style questions and concept checks to reinforce the information presented in the video. Appendix A contains links to online versions of the videos.

After the policy education videos, respondents were asked to vote on a mileage fee to replace the gas tax a second time. The ballot item introduction, specifics of the mileage fee, and the voting opportunity were all identical to the control vote.

After the second vote, respondents were asked questions about the vehicles they use and their travel. This included the number of vehicles owned, leased, or available for regular use in their household as well as specifics about the vehicle they used most frequently (vehicle type, fuel type, fuel economy, and annual mileage). Using their vehicle information, we estimated how much the respondent paid in gas taxes in the last year and how much they would pay with a

mileage fee. The gas tax was assumed to be 31 cents per gallon based on the national average state gas tax. The mileage fee was estimated as 1.5 cents per mile travelled. This value was calculated to be approximately revenue neutral value based on gas tax revenues. These calculated annual gas tax and mileage fee cost estimates were displayed to the respondent for consideration.

After the cost education, respondents were asked to vote on a mileage fee to replace the gas tax a third time. The ballot item introduction, specifics of the mileage fee, and the voting opportunity were all identical to the control vote. If a respondent did not have a vehicle, they skipped the cost information and the third vote, as no costs could be estimated for them.

After the third vote, respondents were asked to reflect and elaborate on their decision-making process. This gave us insight into how they shaped their opinions about mileage fees beyond the binary "Yes" or "No" votes. We started by asking what educational topics were the most important in their final voting choice. We also gave respondents the opportunity to share their tolerance for various types of mileage fees. This included asking if their support for a mileage fee would increase, decrease, or stay the same if the flat rate of 1.5 cents per mile was changed to a variable rate based on income, pollution, EV ownership, or a block rate. In this scenario, a block rate means drivers get a reduced rate for the first number of miles they travel in a year and a heightened rate for any additional miles they travel. Additionally, respondents were asked if their support for a mileage fee would increase, decrease, or stay the same if their mileage information was collected using the other mileage collection technologies. For instance, if a respondent was answering the survey where mileage fees were collected using annual odometer readings, they were asked if their support would increase, decrease, or stay the same if their mileage was collected using either a plug-in device without GPS or a plug-in device with GPS. Recall that each respondent learned about these mileage collection technologies in the policy education.

At the end of the survey, respondents provided socio-demographic information. This included educational achievements, employment status, household size and number of children in addition to their level of agreement with fifteen Likert-scale attitudinal statements. These statements gathered latent attitudes that may relate to respondents' response to education in a survey format and their willingness to support a transportation funding policy change. Specifically, the statements related to perceptions of both state and local government, community involvement, climate change, vehicle dependence, and support for or trust in technology. These attitudinal statements are described in more detail in the Factor Analysis section below. For a full list of questions in the survey, please refer to Appendix B.

Respondent Demographic and Travel Behavior Characteristics

Table 1 shows the demographic representation of our sample based on the U.S. population. Our sample contains 2,114 total responses. For the three survey versions where mileage fees were collected using odometer readings, plug-in devices without GPS, and plug-in devices with GPS, our sample contains 730, 691, and 693 responses respectively.

The sample is representative of the U.S. population by gender, age, and ethnicity (Table 1). Slightly over-represented groups include those with a bachelor's degree or higher, the unemployed, racially white, and households making less than $50,000 per year. Slightly under-represented groups include those with less than a high school degree, those not in the labor force, those identifying as two or more races or some other race alone, and households making over $100,000 per year.

Of the 2,114 respondents, 858 had at least one vehicle that they owned, leased, or had available for regular use by the people they currently live with. Most respondents had two vehicles available in their household. For their primary vehicle, 40% used an SUV, 39% used a small car, like a sedan or a hatchback, 9% used a pick-up truck, 5% used a minivan or van, and the rest used a different type of vehicle. Most of these vehicles were gasoline-powered (90%), 2.7% were diesel, 2.7% were electric or hybrid-electric, and the rest used a different type of fuel. Fuel economy and vehicle miles travelled (VMT) in the last year were reported using binned categories (i.e., 16 – 20 mpg and 10,000 – 15,000 mi). The average value for each binned category was used to create a continuous fuel economy and VMT estimate. The average fuel economy was 24.5 mpg, with a median of 23 mpg. The average and median VMT was 10,000 miles a year.

Table 1. Demographic Representation

Socio-Demographic Variable	Survey (Sample Data)		Study Area (Population Data)[1]
	Count	Percent	U.S.
TOTAL	1322	100%	282,777,717
GENDER [2]	2114		
Female	1136	53.7%	50.5%
Male	59	45.4%	49.5%
Other	19	0.9%	--
AGE [2]	2114		
19 – 64 yrs	1616	76.4%	84.5%
65+ yrs	483	22.8%	15.5%
EDUCATION [2]	2102		
Less than high school degree	50	2.4%	10.3%
High school graduate	446	21.2%	27.3%
Some college but associate's degree	467	22.2%	28.3%
Bachelor's degree or higher	1139	54.2%	34.0%
EMPLOYMENT [2]	2102		
Employed	1276	60.7%	59.6%
Unemployed	227	10.8%	4.0%
Not in labor force	599	28.5%	36.3%

Socio-Demographic Variable	Survey (Sample Data)		Study Area (Population Data)[1]
	Count	Percent	U.S.
RACE [2]	2114		
White alone	1575	74.5%	67.9%
Black or African American alone	280	13.2%	13.7%
Two or more races	60	2.8%	8.2%
Asian or Asian American alone	96	4.5%	4.3%
American Indian or Alaska Native alone	32	1.5%	0.8%
Some other race alone	71	3.5%	5.0%
ETHNICITY [2]	2114		
Hispanic / Latino / Spanish (of any race)	398	18.8%	15.9%
HOUSEHOLD INCOME [2]	583		
Less than $50,000	763	36.1%	61.8%
$50,000 to $75,000	745	35.2%	16.1%
$75,000 and over	606	28.7%	22.1%
REGION [2]	2114		
Midwest *(IL, IN, MN, OH, WI, IA, KA MN, MO, NE, ND, SD)*	496	23.5%	24.3%
Northeast (*CT, ME, MA, NH, RI, VT, NJ, NY, PA)*	327	15.5%	20.2%
South *(MD, DE, VA, WV, KY, TN, NC, SC FL, GA, AL, MS, LA, AK, TX, OK)*	1068	50.5%	44.9%
West *(CO, ID, MT, NV, WY, AK, WA)*	223	10.5%	10.7%

[1] Note that the states California, Utah, Oregon, and Hawaii are not included in the population data since we did not sample these populations.

[2] All population data percentages gathered from the United States Totals in 2022 ACS 1-Year Estimates.

Regression Modelling

The relationship between demographics, personal attitudes, policy support and educational treatments were studied using three modeling approaches. The sample for modelling is limited to vehicle owners, as vehicle owners received all forms of education. Recall that respondents without access to a primary vehicle did not receive the cost education and therefore skipped the third vote.

We began our analysis by assessing the demographics and personal attitudes associated with a respondent's initial support for mileage fees based on their response to the control vote using a binomial logistic regression model. This model predicts the likelihood of a respondent voting "Yes" to the mileage fee in the first vote, with a dependent variable equal to 0 if the respondent voted "No" and equal to 1 if the respondent voted "Yes".

We then analyze whether the education treatments caused a statistically significant change in policy support, controlling for individual respondent demographics and attitudes. We use a fixed effect model as shown in **Equation 1**.

$$y_{it} = \beta x_{it} + \alpha_{it} + u_{it} \qquad \textbf{Eq. 1}$$

Where $i = 1, \ldots, N$ with N being the total number of survey respondents, $t = 1, \ldots, T$ where T is the total number of voting opportunities, α_{it} are respondent-specific intercepts that capture the heterogeneity across each individual respondents' votes, and u_{it} are the normally distributed error terms. The predictor variable, y_{it}, is a binary variable equivalent to 1 if a respondent voted "Yes" and equivalent to 0 if a respondent voted "No". The explanatory variable, x_{it}, is a binary indicator variable with levels for each voting opportunity. If a respondent voted "Yes" at Vote 1, then $y_{1,Vote\,1} = 1$ (the voting response) and $x_{1,Vote\,1} = 1$ (the ballot item at which the response occurred).

Finally, we assess the extent to which respondent demographics and attitudes can explain the observed changes in voting using binomial logistic regression models. In theory, this explores how different groups of people respond to education through a survey format. To accomplish this goal, we create two sets of models. The first set of models assesses the likelihood of a respondent increasing their support for mileage fees after the educational treatments (those who voted "No" at the beginning of the survey and "Yes" at the end of the survey, relative to those who voted "No" at the beginning of the survey and "No" at the end of the survey). The second set of models assesses the likelihood of a respondent decreasing their support for mileage fees after the educational treatments (those who voted "Yes" at the beginning of the survey and "No" at the end of the survey, relative to those who voted "Yes" at the beginning of the survey and "Yes" at the end of the survey).

The independent variables, or predictors, in the binomial logistic regression models include socio-demographic descriptors (income, age, gender, employment status, educational achievements, race, ethnicity, number of children, and household size), travel information (annual vehicle miles travelled, primary vehicle fuel type), geographic information (community type, region of the United States), and attitudinal variables (latent attitudes developed using factor analysis, perceptions of mileage fee fairness). And finally, the models include a variable indicating whether the respondent learned they would save money with a mileage fee or lose money with a mileage fee based on the cost estimates they were shown.

We then aggregated categorical variables if a response option had a very small sample size, such as the number of respondents who achieved less than a high school education, or if the number of response options were deemed too large for regression modelling. These categorical combinations were applied to the income, education, employment, and race variables.

Factor Analysis

Factor analysis was used to reduce the fifteen attitudinal questions for modelling, as shown in Table 2. This allowed us to create a latent set of variables more broadly summarizing attitudes held by the respondents. We used a set of attitudinal questions that we developed for a prior travel behavior study (*27*). In that prior study, we compiled attitudinal questions from a review of published studies that included surveys asking about attitudes and beliefs around government, the environment and climate change, travel, and technology.

Due to the non-multivariate normality of the data, principal axis factor analysis was used. A varimax rotation was applied to interpret the factors. The standardized factor loadings, loosely defined as the correlation between the response to the original question and the reduced set of factors, are shown in Table 2. Loadings greater than 0.4 were deemed meaningful in creating the factor score and were used to create descriptive titles for the factors. Factor 1 was most strongly related to questions 1, 2, 3, 7, 8, and 9 and was summarized as "Trust in Governing Systems". Factor 2, most strongly related to questions 6, 13 and 15, was summarized as "Distrust in Science and Tech". Factor 3, most strongly related to questions 4, 5, 11 and 12, was summarized as "Preference for Autonomy".

Table 2. Factor Analysis: Standardized Factor Loadings from Principle Axis Factor Analysis

	Statement of Attitudes / Beliefs	F1	F2	F3
Q1	*Taxes are an irreplaceable form of funding for state and federal programs.*	0.40		
Q2	*Sometimes the government needs to pass laws to help protect vulnerable populations.*	0.53		
Q3	*I trust my state government.*	0.40		
Q4	*I would prefer less government involvement in my life.*			0.49
Q5	*Funding for state programs is mismanaged.*			0.41
Q6	*Environmental threats such as global warming and deforestation have been exaggerated.*		0.46	
Q7	*I frequently think about how my choices will impact my community.*	0.69		
Q8	*Vehicle emissions in my state have a large impact on air quality.*	0.58		
Q9	*I frequently think about whether my travel choices have an impact on the environment.*	0.63		
Q10	*Driving a car is good for society.*			
Q11	*My lifestyle is dependent on having a car.*			0.54
Q12	*Owning a vehicle provides me with freedom.*			0.65
Q13	*Technology does more harm than good.*		0.69	
Q14	*I'm tracked everywhere I go through my phone.*			
Q15	*Technology has made life too complicated.*		0.68	

Note: Standardized factor loadings less than 0.40 are not shown in this table for simplicity.

Findings

Using a combination of summary statistics and regression models, we evaluate the extent to which mileage fee support varies when respondents are provided with simple policy and cost educational treatments (within-subject variation) and based on their survey type, which specified one of three mileage collection technologies (between-subject variation). We also assess associations between respondents' likelihood of changing their opinion and their attitudes and demographics to better understand how different groups of people respond to education about mileage fees.

Mileage Fee Support by Educational Treatment and Mileage Collection Technology

Existing support for a mileage fee is low, at around 32% across the United States (Figure 2). Support is slightly higher in the Western states (40%) and slightly lower in the Midwestern states (25%) (Figure 3). Despite the perceived privacy concerns of collecting mileage fees with more data-intensive devices, we find minimal initial differences in mileage fee support based on the mileage collection technology at the national level (Figure 2), and inconsistent differences at the regional level (Figure 3). Support for mileage fees increased after the first educational treatment and remained elevated after the second educational treatment when compared with the initial level of support (Figure 2 and Figure 3). Mileage fee support increased more in the group of respondents who were told their mileage would be collected by odometer readings or plug-in devices without GPS (Figure 2 and Figure 3).

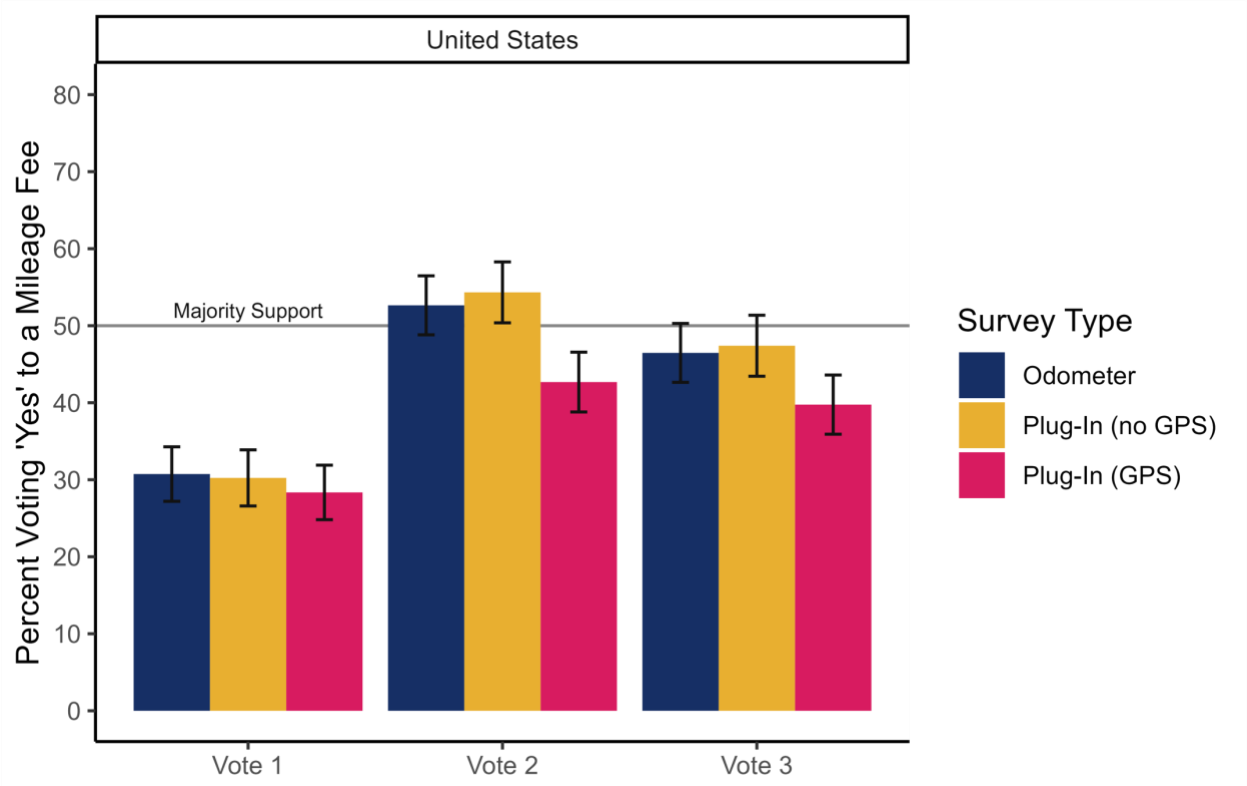


Figure 2. National Variation in Mileage Fee Support Across the Three Voting Opportunities in the Survey. *Recall that between Vote 1 and Vote 2, respondents were provided with mileage fee equity and tech education. Between Vote 2 and Vote 3, respondents were provided with mileage fee cost education. 95% error bars are shown.*

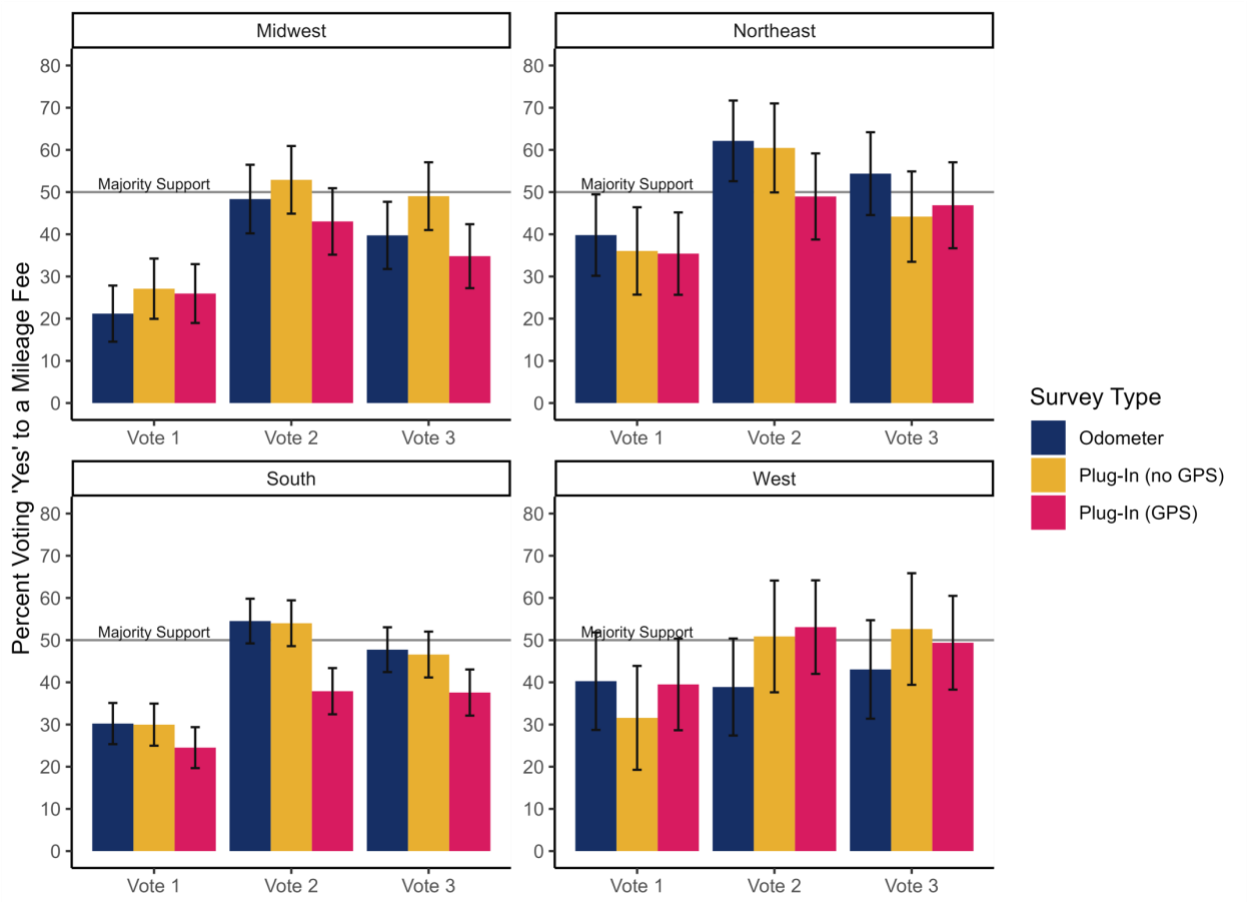


Figure 3. Regional Variation in Mileage Fee Support Across the Three Voting Opportunities in the Survey. *Recall that between Vote 1 and Vote 2, respondents were provided with mileage fee equity and tech education. Between Vote 2 and Vote 3, respondents were provided with mileage fee cost education. 95% error bars are shown.*

While Figure 2 and Figure 3 show how aggregate support for a mileage fee varied across the educational treatments (within-subject variation) and the mileage collection options based on survey type (between-subject variation), they do not show how individual respondents changed their support. Table 3 captures the nuances of the voting opportunities. We can see that 535 respondents increased their support for a mileage fee after policy education, and 640 respondents increased their support for a mileage fee after both the policy and cost education. Of the respondents who changed their votes from survey start to finish, approximately 75% of respondents increased support and 25% decreased support.

Table 3. Voting Summary Table: Shifts in Support Based on Educational Treatments and Mileage Collection Technology

			Survey Type: Mileage Collection Technology			
Vote 1	Vote 2 (Policy Education)	Vote 3 (Policy and Cost Education)	Odometer	Plug-In (no GPS)	Plug-In (GPS)	All Respondents
No	No	No	229	286	211	726
No	No	Yes	46	37	35	118
No	Yes	No	72	51	65	188
No	Yes	Yes	124	91	132	347
Yes	No	No	30	34	29	93
Yes	No	Yes	17	15	15	47
Yes	Yes	No	33	20	29	82
Yes	Yes	Yes	129	115	119	363
TOTALS						
Number of respondents			680	635	649	1964
Changed support at least once			322 (47%)	305 (30%)	248 (38%)	875 (45%)
Changed support Vote 1 to Vote 2			243 (36%)	191 (22%)	241 (37%)	675 (34%)
Increased support			196	142	197	535
Decreased support			47	49	44	140
Changed support Vote 2 to Vote 3			168 (25%)	123 (19%)	144 (22%)	435 (22%)
Increased support			63	52	50	165
Decreased support			105	71	94	270
Changed support Vote 1 to Vote 3			233 (34%)	182 (29%)	225 (35%)	640 (33%)
Increased support			170	128	167	465
Decreased support			63	54	58	175

To further evaluate if the changes in mileage fee support shown in Figure 2 and Figure 3 were statistically significant while controlling for differences between respondents, we used a fixed effects model (Table 4). The fixed effect models evaluated the relative changes in voting for each respondent, which controls for the unique demographics and attitudes of each individual. The models were able to explain approximately 20% of the variation in respondent voting.

We find that there was indeed a statistically significant increase in mileage fee support associated with the educational treatments. After the policy education treatment (Vote 2), respondents were between six and thirteen times as likely to support a mileage fee policy relative to their initial vote. Recall that during the policy education, respondents learned about the history of the gas tax, why some states and the federal government are considering replacing the gas tax, and the current research on the equity and technology of mileage fees. After the policy and cost education treatments (Vote 3), respondents were between four and six times as likely to support a mileage fee policy relative to their initial vote. Recall that the cost education showed respondents personalized cost estimates of their annual gas tax and

hypothetical mileage fee expenditures. In short, we can say with more than 99% confidence that the educational treatments increased support for mileage fees.

The effect of education was generally stronger amongst the lower-tech mileage collection technologies (odometer readings and plug-in devices without GPS) relative to the higher-tech option (plug-in devices with GPS).

Table 4. Fixed Effects Model: Impact of Educational Treatments on Mileage Fee Support

	Survey Type: Mileage Collection Technology							
	Odometer		Plug-In (no GPS)		Plug-In (GPS)		All Respondents	
Predictors	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE
Vote 2 (Policy Education)	**10.42*** **	**2.08**	**13.32*** **	**2.82**	**6.23*** **	**1.33**	**9.70*** **	**1.16**
Vote 3 (Policy and Cost Education)	**5.31*** **	**1.00**	**6.11*** **	**1.20**	**4.28*** **	**0.89**	**5.23*** **	**0.60**
NChange[A]	322		305		248		875	
NRespondent	680		635		649		1964	
R^2_{adj} [B]	0.214		0.236		0.173		0.207	

[A] *Number of respondents who changed their vote at some point across the survey*

[B] *R^2_{adj} = 1 – [(Residual Deviance – K) / (Null Deviance)] where K is the number of additional parameters relative to the null model* (*28*)

*Note: Significant at the… * 90% confidence level, ** 95% confidence level, *** 99% confidence level*

Factors Associated with Mileage Fee Support Pre-Education

After establishing with confidence that the educational treatments increased support for mileage fees, we then examined respondent characteristics that may be associated with support for mileage fees pre-education using a binary logistic regression model (Table 5). The survey sample was separated based on the type of mileage collection technology displayed to the respondent (odometer readings, plug-in devices without GPS, and plug-in devices with GPS). The results in Table 5 report the odds ratios. Odds ratios greater than one indicate model parameters that are associated with a greater likelihood of voting "Yes" while odds ratios less than one indicate a reduced likelihood of voting "Yes". For example, an odds ratio of 1.5 indicates that a one unit increase in the associated model parameter would increase the odds of voting "yes" by a factor of 1.5 (i.e., the odds would increase by 1.5 times) while an odds ratio of 0.5 would indicate that a one unit increase in the parameter would reduce the odds of voting "yes" by a factor of 0.5 (i.e., the odds would be cut in half). The models were able to explain approximately 20% of the variation in respondent voting for the odometer reading and plug-in with GPS survey, and 14% of the variation in respondent voting for the plug-in devices without GPS survey, as noted by the R^2 values in Table 5.

We find that attitudes and beliefs are consistently associated with mileage fee support, regardless of how a respondent was told their mileage would be collected. For example, mileage fee support is nearly three times more likely amongst those who felt a mileage fee was

fair to them, personally. Additionally, respondents with more government trust or less preference for autonomy were more likely to support a mileage fee.

We were unsurprised to find certain geographic and demographic factors were also significantly associated with mileage fee support. For example, rural residents are less likely to support mileage fees relative to urban residents. This has been established in previous studies. Households with more children, the employed (relative to the unemployed), and younger respondents (relative to those aged 31 to 64) were more likely to support mileage fees as well.

Table 5. Binary Logit Model: Factors Associated with Mileage Fee Support Pre-Education

	Survey Type: Mileage Collection Technology							
	Odometer		Plug-In (no GPS)		Plug-In (GPS)		All Respondents	
Predictors	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE
(Intercept)	**0.11*** **	**0.06**	**0.06*** **	**0.04**	**0.19*** **	**0.10**	**0.05*** **	**0.02**
SURVEY OPTION								
Ref: Odometer								
Plug-In (no GPS)							0.93	0.13
Plug-In (GPS)							0.83	0.11
DEMOGRAPHICS								
Annual Household Income								
Ref: $50k to $100k								
Less than $50k	0.92	0.25	1.03	0.27	0.78	0.23	0.97	0.15
More than $100k	1.07	0.28	0.84	0.22	**1.59***	**0.42**	1.15	0.17
Age								
Ref: 31 to 64 years old								
18 to 30 years old	**1.55***	**0.39**	1.49	0.39	**2.31*** **	**0.61**	**1.62*** **	**0.23**
65+ years old	1.71	0.64	0.73	0.23	0.90	0.32	1.01	0.20
Gender								
Ref: Female								
Male	**1.63** **	**0.35**	**1.46***	**0.32**	1.40	0.33	**1.54*** **	**0.19**
Employment								
Ref: Employed								
Retired	0.67	0.24	1.22	0.40	1.34	0.48	1.02	0.20
Unemployed	**0.60***	**0.18**	**0.57***	**0.19**	1.24	0.40	**0.74***	**0.13**
Education								
Ref: High school or less								
College degree	0.88	0.24	1.06	0.29	1.49	0.42	1.07	0.16
Some college	0.74	0.22	1.32	0.41	1.10	0.36	1.00	0.17
Race								
Ref: White								
Asian	1.02	0.46	1.65	0.67	0.71	0.44	1.15	0.30
Black	1.24	0.41	0.78	0.25	1.40	0.47	1.11	0.20
Other race	1.16	0.45	1.08	0.44	0.85	0.34	1.05	0.23

	Survey Type: Mileage Collection Technology							
	Odometer		Plug-In (no GPS)		Plug-In (GPS)		All Respondents	
Predictors	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE
(Intercept)	**0.11*** **	**0.06**	**0.06*** **	**0.04**	**0.19*** **	**0.10**	**0.05*** **	**0.02**
Ethnicity								
Ref: Not Hispanic/Latino/Spanish								
Hispanic/Latino/Spanish	**1.70***	**0.49**	0.73	0.21	**1.80****	**0.52**	1.29	0.20
Child num	**1.23****	**0.12**	0.99	0.09	**1.29*** **	**0.12**	**1.16*** **	**0.06**
HHSize num	**1.32*** **	**0.13**	0.87	0.09	0.90	0.10	1.02	0.06
TRAVEL								
Annual Vehicle Miles Travelled (in 1000s of miles)	1.01	0.01	1.01	0.02	0.99	0.02	1.00	0.01
Vehicle Fuel Type								
Ref: Owns an internal combustion engine vehicle								
Owns an alternative fuel vehicle	1.34	0.71	1.48	0.75	1.14	0.76	1.34	0.42
Community Type								
Ref: Rural								
Suburban	1.50	0.44	**2.16*** **	**0.62**	1.29	0.38	**1.55*** **	**0.25**
Urban	**1.73***	**0.56**	**2.16****	**0.69**	**1.81***	**0.57**	**1.84*** **	**0.32**
Region of the Country								
Ref: Midwest								
Northeast	**1.97****	**0.64**	1.25	0.41	1.19	0.39	**1.42***	**0.26**
South	1.52	0.40	1.11	0.27	0.87	0.23	1.16	0.17
West	**2.33****	**0.86**	1.41	0.55	1.42	0.50	**1.73*** **	**0.35**
Financial Implications of Mileage Fee								
Ref: Losing Money with a Mileage Fee								
Saving Money with a Mileage Fee	1.05	0.23	1.17	0.25	1.11	0.26	1.08	0.13

	Survey Type: Mileage Collection Technology							
	Odometer		Plug-In (no GPS)		Plug-In (GPS)		All Respondents	
Predictors	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE
(Intercept)	**0.11*** **	**0.06**	**0.06*** **	**0.04**	**0.19*** **	**0.10**	**0.05*** **	**0.02**
ATTITUDES								
Trust in Gov	**1.39*** **	**0.16**	**1.36*** **	**0.15**	**1.67*** **	**0.19**	**1.46*** **	**0.09**
Distrust Science Tech	0.96	0.10	0.93	0.09	1.11	0.11	0.99	0.05
Pref for Autonomy	**0.79** **	**0.09**	0.84	0.09	**0.73*** **	**0.08**	**0.80*** **	**0.05**
Perceptions of Fairness								
Ref: Believe it's unfair to these groups								
Fair to Rural	1.14	0.27	1.24	0.32	1.35	0.35	**1.26***	**0.17**
Fair to Low Income	1.44	0.34	1.17	0.29	1.31	0.33	**1.28***	**0.17**
Fair to Me, Personally	**2.43*** **	**0.64**	**2.99*** **	**0.91**	**1.76***	**0.54**	**2.23*** **	**0.36**
Fair to those that Drive A Lot	1.09	0.26	1.34	0.32	1.24	0.32	1.23	0.17
Fair to EV Owners	1.33	0.34	0.88	0.22	1.05	0.29	1.06	0.16
Observations	656		615		632		1903	
R^2	0.206		0.143		0.216		0.161	

*Note: Significant at the… * 90% confidence level, ** 95% confidence level, *** 99% confidence level*

Factors Associated with Mileage Fee Support Post-Education

Acknowledging that there was a statistically significant increase in support for mileage fees across the survey, we then assessed factors associated with increases or decreases in mileage fee support using binary logistic regression models.

We begin with the group of respondents who originally voted "No" to a mileage fee. The models in Table 6 predict the likelihood of a respondent voting "Yes" after the two educational experiences, relative to those who remained opposed to mileage fees. The models explain between 20% and 23% of the variation in respondent voting changes.

A few factors stick out in these models: trust for the systems that would run a mileage fee, personal perception of fairness, and personal financial burden. We find, regardless of the way mileage fees are collected, respondents who harbor greater trust in government, science, and technology are more likely to increase their support for a mileage fee. Additionally, respondents are nearly three times as likely to increase their support for mileage fees if they felt it would be fair to themselves, personally. And most notably, respondents who learned they would save money with a mileage fee were three to five times more likely to increase their support.

Variation was also observed between survey types. For example, the model predicting support for a mileage fee collected using GPS-enabled plug-in devices showed lower likelihoods of increased support across the statistically significant variables. Respondents who took the

odometer reading survey were five times as likely to support a mileage fee if they were saving money, while respondents who took the plug-in device with GPS survey were only three times as likely to support a mileage fee if they were saving money. This suggests it may be harder to increase support for mileage fees if they are collected with more data-intensive technologies.

Finally, respondents who received the odometer reading survey were nearly five times as likely to increase their support for mileage fees if they owned an alternative fuel vehicle. Vehicle ownership was not statistically significant in predicting increases in support for plug-in devices with or without GPS. This suggests, again, that privacy concerns related to higher-tech mileage collection options influence support for a mileage fee, and that simple educational experiences may not be sufficient in changing these attitudes.

Table 6. Binary Logit Model: Factors Associated with Increases in Mileage Fee Support Post-Education

	Survey Type: Mileage Collection Technology							
	Odometer		Plug-In (no GPS)		Plug-In (GPS)		All Respondents	
Predictors	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE
(Intercept)	0.57	0.35	1.14	0.71	**0.13*** **	**0.08**	**0.51** **	**0.17**
SURVEY OPTION								
Ref: Odometer								
Plug-In (no GPS)							**0.59*** **	**0.09**
Plug-In (GPS)							0.92	0.14
DEMOGRAPHICS								
Annual Household Income								
Ref: $50k to $100k								
Less than $50k	0.74	0.24	0.64	0.21	1.37	0.45	0.87	0.15
More than $100k	1.47	0.46	1.03	0.32	0.90	0.30	1.12	0.19
Age								
Ref: 31 to 64 years old								
18 to 30 years old	1.25	0.43	0.92	0.32	1.45	0.47	1.14	0.21
65+ years old	0.66	0.28	1.15	0.43	0.82	0.33	0.82	0.18
Gender								
Ref: Female								
Male	0.86	0.22	1.06	0.28	1.03	0.29	1.01	0.15
Employment								
Ref: Employed								
Retired	0.99	0.38	0.59	0.23	0.65	0.27	0.79	0.17
Unemployed	0.65	0.21	1.20	0.42	0.89	0.30	0.93	0.17
Education								
Ref: High school or less								
College degree	0.76	0.26	0.66	0.21	0.69	0.22	0.76	0.13
Some college	1.61	0.55	0.67	0.25	0.91	0.33	1.02	0.20

	Survey Type: Mileage Collection Technology							
	Odometer		Plug-In (no GPS)		Plug-In (GPS)		All Respondents	
Predictors	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE
(Intercept)	0.57	0.35	1.14	0.71	**0.13*** **	**0.08**	**0.51** **	**0.17**
Race								
Ref: White								
Asian	**2.54***	**1.36**	1.14	0.68	0.61	0.42	1.28	0.41
Black	0.87	0.34	**2.28** **	**0.84**	0.68	0.30	1.26	0.27
Other race	1.25	0.58	0.98	0.50	0.81	0.37	1.14	0.29
Ethnicity								
Ref: Not Hispanic/Latino/Spanish								
Hispanic/Latino/Spanish	1.42	0.50	1.16	0.39	0.93	0.33	1.17	0.22
Child num	1.05	0.13	1.10	0.12	1.03	0.14	1.04	0.07
HHSize num	1.04	0.13	1.00	0.13	**1.49*** **	**0.19**	**1.18** **	**0.08**
TRAVEL								
Annual Vehicle Miles Travelled (VMT), standardized	0.82	0.53	**0.33***	**0.22**	1.29	0.95	0.64	0.24
Vehicle Fuel Type								
Ref: Owns an internal combustion engine vehicle								
Owns an alternative fuel vehicle	**4.98***	**4.67**	0.62	0.49	0.63	0.65	1.07	0.48
Community Type								
Ref: Rural								
Suburban	0.73	0.22	0.79	0.24	**2.09** **	**0.70**	1.10	0.18
Urban	0.56	0.20	0.67	0.25	1.38	0.54	0.81	0.16
Region of the Country								
Ref: Midwest								
Northeast	**2.05***	**0.80**	0.96	0.40	0.93	0.38	1.08	0.24
South	**1.99** **	**0.58**	0.82	0.23	1.05	0.31	1.14	0.18
West	1.08	0.51	**2.73** **	**1.28**	0.91	0.41	1.27	0.32
Financial Implications of Mileage Fee								
Ref: Losing Money with a Mileage Fee								
Saving Money with a Mileage Fee	**4.79*** **	**1.25**	**3.78*** **	**0.99**	**2.99*** **	**0.78**	**3.48*** **	**0.49**

	Survey Type: Mileage Collection Technology							
	Odometer		Plug-In (no GPS)		Plug-In (GPS)		All Respondents	
Predictors	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE
(Intercept)	0.57	0.35	1.14	0.71	**0.13*** **	**0.08**	**0.51** **	**0.17**
ATTITUDES								
Trust in Gov	**1.81*** **	**0.26**	**1.81*** **	**0.25**	**1.40** **	**0.18**	**1.61*** **	**0.12**
Distrust Science Tech	**0.75** **	**0.09**	**0.66** **	**0.09**	0.97	0.12	**0.81*** **	**0.06**
Pref for Autonomy	0.93	0.14	0.82	0.11	0.82	0.11	**0.87***	**0.06**
Perceptions of Fairness								
Ref: Believe it's unfair to these groups								
Fair to Rural	0.66	0.18	0.89	0.26	0.66	0.20	**1.38** **	**0.22**
Fair to Low Income	0.96	0.27	0.86	0.25	1.01	0.30	1.08	0.17
Fair to Me, Personally	**0.59***	**0.16**	**0.34*** **	**0.1**	**0.33*** **	**0.11**	**2.22*** **	**0.37**
Fair to those that Drive A Lot	0.70	0.19	1.47	0.44	1.14	0.35	0.90	0.14
Fair to EV Owners	0.99	0.27	0.90	0.26	1.61	0.49	0.91	0.15
Observations	452		427		453		1332	
R^2	0.228		0.234		0.199		0.178	

*Note: Significant at the… * 90% confidence level, ** 95% confidence level, *** 99% confidence level*

Next, we evaluate the group of respondents who originally voted "Yes" to a mileage fee. The models in Table 7 predict the likelihood of a respondent voting "No" after the two educational experiences, relative to those who remained in support of mileage fees. The models explain between 23% and 37% of the variation in respondent voting changes. Note that the results from models specific to each mileage collection method should be considered with some caution due to the smaller sample sizes used which result in less statistical power. For example, some factors that are not found to be statistically significant in the individual models are statistically significant in the combined model that has a larger sample size.

Like the models in Table 6, we find a few factors are significantly associated with decreases in mileage fee support: trust in the systems that would run a mileage fee and personal perception of fairness. Specifically, respondents were twice as likely to decrease their support for mileage fees if they distrusted their government and distrusted science and technology. Additionally, respondents were three to five times as likely to decrease support for mileage fees if they felt the fees would be unfair to them, personally.

A few demographic factors were associated with specific decreases in support for mileage collection technologies. For example, mileage fee support decreased significantly amongst households with more children and those who lived in suburban areas (for the odometer reading survey) relative to those who lived in rural areas.

Table 7. Binary Logit Model: Factors Associated with Decreases in Mileage Fee Support Post-Education

	Survey Type: Mileage Collection Technology							
	Odometer		Plug-In (no GPS)		Plug-In (GPS)		All Respondents	
Predictors	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE
(Intercept)	0.21	0.23	0.16	0.19	0.68	0.89	1.60	1.04
SURVEY OPTION								
Ref: Odometer								
Plug-In (no GPS)							1.25	0.32
Plug-In (GPS)							1.00	0.25
DEMOGRAPHICS								
Annual Household Income								
Ref: $50k to $100k								
Less than $50k	0.81	0.45	1.33	0.75	2.59	1.81	1.29	0.37
More than $100k	0.49	0.26	1.17	0.68	0.59	0.35	0.73	0.21
Age								
Ref: 31 to 64 years old								
18 to 30 years old	0.80	0.36	0.98	0.57	0.80	0.46	0.87	0.22
65+ years old	0.61	0.55	1.20	0.84	0.52	0.46	1.19	0.46
Gender								
Ref: Female								
Male	0.53	0.24	1.72	0.85	0.40	0.24	0.91	0.22
Employment								
Ref: Employed								
Retired	0.64	0.59	**0.29***	**0.21**	1.86	1.64	0.59	0.23
Unemployed	0.36	0.22	0.95	0.65	1.12	0.84	0.68	0.23
Education								
Ref: High school or less								
College degree	**0.42***	**0.22**	0.79	0.49	1.52	1.06	0.68	0.19
Some college	0.77	0.42	0.65	0.43	0.60	0.47	0.70	0.22
Race								
Ref: White								
Asian	1.00	0.78	3.20	2.54	0.17	0.25	1.29	0.57
Black	**0.31***	**0.21**	1.35	1.03	1.96	1.40	0.78	0.27
Other race	1.52	1.17	**5.74****	**4.89**	2.38	1.99	**2.06***	**0.81**
Ethnicity								
Ref: Not Hispanic/Latino/Spanish								
Hispanic/Latino/Spanish	1.01	0.56	0.35	0.25	0.41	0.28	0.75	0.23
Child num	**0.70***	**0.15**	0.82	0.19	**0.55*****	**0.12**	**0.76*****	**0.07**
HHSize num	1.04	0.16	1.14	0.24	**2.05*****	**0.54**	**1.19***	**0.11**

	Survey Type: Mileage Collection Technology							
	Odometer		Plug-In (no GPS)		Plug-In (GPS)		All Respondents	
Predictors	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE	Odds Ratios	SE
TRAVEL								
Annual Vehicle Miles Travelled (VMT), standardized	0.98	1.02	1.14	1.37	**0.03****	**0.0**	0.61	0.35
Vehicle Fuel Type								
Ref: Owns an internal combustion engine vehicle								
Owns an alternative fuel vehicle	0.26	0.34	2.35	2.26	5.19	6.83	1.30	0.72
Community Type								
Ref: Rural								
Suburban	**3.41***	**2.39**	0.85	0.51	1.57	1.12	1.59	0.51
Urban	2.61	1.96	**0.19****	**0.13**	1.40	1.09	0.88	0.31
Region of the Country								
Ref: Midwest								
Northeast	**6.67****	**5.28**	3.10	2.27	**0.19****	**0.15**	1.44	0.51
South	**5.99****	**4.38**	**3.35****	**2.00**	**0.34***	**0.21**	1.53	0.45
West	**8.64****	**7.50**	**5.62****	**4.76**	**0.12*****	**0.10**	1.35	0.51
Financial Implications of Mileage Fee								
Ref: Losing Money with a Mileage Fee								
Saving Money with a Mileage Fee	0.66	0.30	**0.43***	**0.22**	0.64	0.34	**0.58****	**0.14**
ATTITUDES								
Trust in Gov	**0.55****	**0.13**	**0.66***	**0.15**	**0.47*****	**0.13**	**0.63*****	**0.08**
Distrust Science Tech	**1.39***	**0.27**	0.97	0.21	**1.85****	**0.45**	**1.23****	**0.13**
Pref for Autonomy	1.16	0.25	1.26	0.27	1.07	0.24	1.14	0.12
Perceptions of Fairness								
Ref: Believe it's unfair to these groups								
Fair to Rural	0.99	0.46	2.28	1.24	1.55	0.91	0.81	0.21
Fair to Low Income	0.82	0.37	**2.87****	**1.49**	0.96	0.56	**0.66***	**0.17**
Fair to Me, Personally	**3.53****	**1.85**	1.09	0.84	**4.72****	**3.65**	**0.39*****	**0.12**
Fair to those that Drive A Lot	1.07	0.52	0.45	0.24	0.72	0.43	1.14	0.29
Fair to EV Owners	0.67	0.38	2.12	1.23	1.68	1.12	0.90	0.25
Observations	204		188		179		571	
R^2	0.233		0.284		0.368		0.160	

*Note: Significant at the… * 90% confidence level, ** 95% confidence level, *** 99% confidence level*

Reflections on Mileage Fee Support or Opposition

While the binary "Yes" and "No" votes combined with regression modelling provide some insight into the decision-making process of respondents, we expand on this analysis through a series of reflection questions provided to the respondents.

Importance of Treatments

We were particularly curious how respondents felt about the various educational treatments. We divided the types of education into six key points that could potentially be easily replicated in other studies or in outreach campaigns: personal costs, learning the federal government is exploring mileage fees, learning state governments are exploring mileage fees, learning low-income drivers would on average experience financial savings, learning rural drivers would on average experience financial savings, and learning about the history of the gas tax. We asked respondents to rate the importance of each educational key point on a 3-point scale from "Not at all important" to "moderately Important" to "Very important" (Figure 4). 85% of respondents indicated that all aspects of education were at least moderately important in deciding their final vote. However, learning about personal costs was "Very important" to the largest proportion of people.

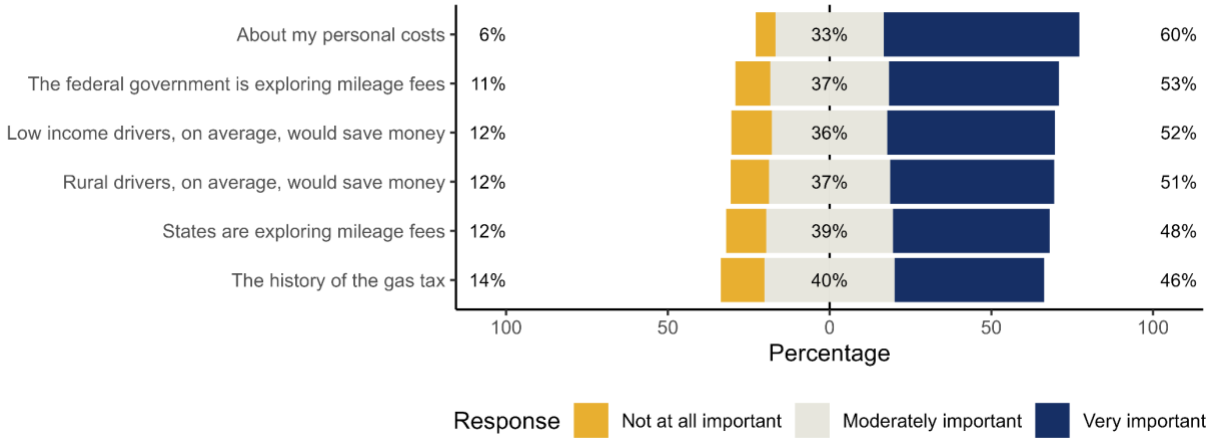


Figure 4. Importance of Educational Treatments in Changing Mileage Fee Support

Fairness

Based on Figure 4, it's clear perceptions of fairness (as they relate to low income and rural drivers) are important to respondents when voting on mileage fees. However, we were curious how this perception of fairness extended to other communities of concern, and whether these perceptions of fairness were meaningfully changed from the beginning to the end of the survey. To accomplish this goal, we asked respondents to rate how fair they felt a mileage fee would be to various communities both before and after the educational treatments (Figure 5). If a respondent felt mileage fees were unfair to a community at the beginning of the survey, but neutral or fair at the end of the survey, we classified them as "more fair". If a respondent felt mileage fees were fair to a community at the beginning of the survey, but neutral or unfair at

the end of the survey, we classified them as “less fair”. If a respondent did not change their opinion, we classified them as “same response”.

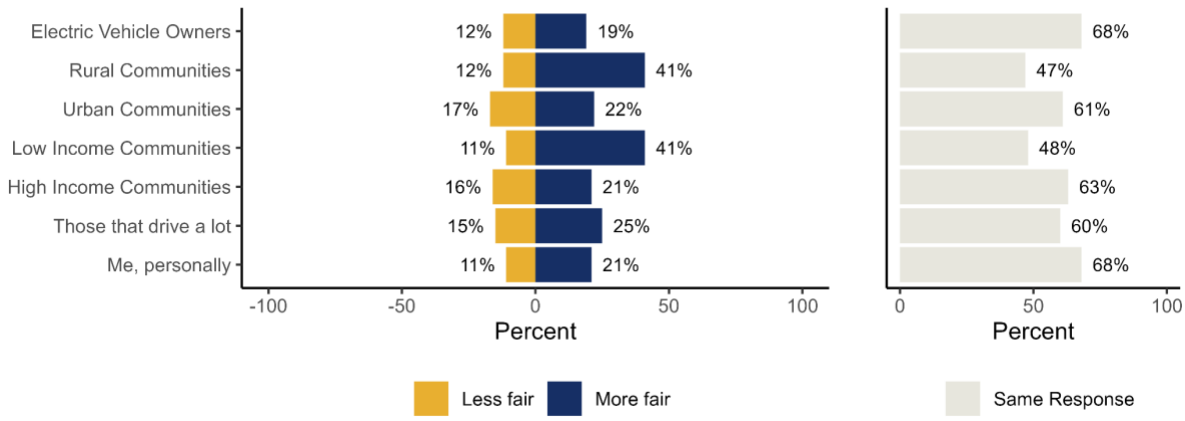


Figure 5. Changes in Perceived Mileage Fee Fairness Post Educational Videos

On average, 60% of the respondents did not feel the education changed their perception of mileage fee fairness. Of those who changed their opinion, most felt mileage fees were more fair, particularly to rural and low-income communities.

Mileage Fee Rate Structure

Conversations about how to address the perceived unfairness and inequity of mileage fees have largely centered around rate-structures for the fees. In this survey, all voting opportunities were presented as a 1.5 cent per mile fee to replace the gas tax (i.e., a flat rate). At the end of the survey, we asked respondents about their tolerance for various types of mileage fee rate structures, including an income-based rate, a pollution-based rate, a lower rate for EVs, and a block rate. The question was phrased as follows: “How do the following rate-adjustments change your level of support for a mileage fee?”. Respondents could reply “Decrease support”, “Increase support” or “Neutral”. The way each rate was presented to respondents in the survey is shown in Table 8.

Table 8. Description of Alternative Mileage Fee Rate Structures in the Survey

Mileage Fee Rate Structure	Wording in the Survey
Income-Based	Households with lower incomes pay lower mileage fees.
Pollution-Based	Mileage fees are higher for vehicles that pollute more and lower for vehicles that pollute less.
Lower for EVs	Mileage fees are lower for electric vehicles.
Block Rate	Everyone gets a "free" number of miles every year before they start getting charged for the miles they travel.

We find that approximately 40% of respondents reported their support for a mileage fee would not change if there was a different rate structure (Figure 6). Notably, a lower rate for EVs was the only rate adjustment that garnered more opposition than support, with 36% of respondents reporting they would be less likely to support this type of mileage fee. Income-based, pollution-based, and block rates all had more support than opposition, with block rates yielding the largest increase in support. Of the respondents who ended the survey opposing mileage fees (Last Vote: No in Figure 6), 53% said a block rate mileage fee would increase their support. While the question does not directly ask, "Would you vote 'Yes' if….", variable-rate structures present an avenue for increasing mileage fee support amongst those who are opposed even after education.

Mileage Collection Technology

And finally, we gave respondents an opportunity to share whether their support for a mileage fee would change if the fee was collected using one of the collection technologies not presented in their survey. Recall that respondents were asked to vote on a mileage fee collected using a specific mileage collection technology (odometer readings, plug-in devices with GPS, and plug-in devices without GPS). We were curious, for those who took the GPS-enabled plug-in device survey, if they be more likely to support the policy if their mileage fee was collected using, say, odometer readings. In Figure 7, this scenario is represented as "Plug-In with GPS : Odometer". Overall, approximately 40% of respondents reported that their support for a mileage fee would not change if their mileage was collected differently.

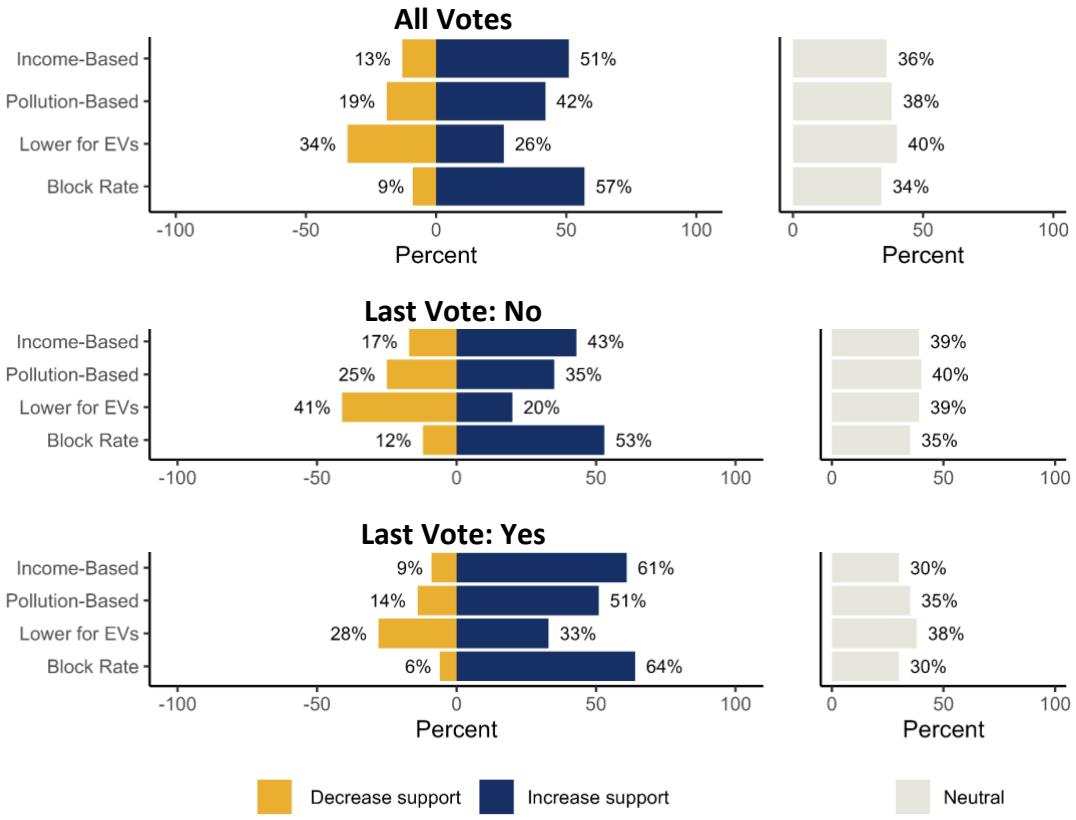


Figure 6. Impact of Varying Mileage Fee Rate Structures on Mileage Fee Support

For respondents who voted on a mileage fee program that would use a plug-in mileage collection option (either GPS or non-GPS enabled), 40% stated that collecting mileage through odometer readings would increase their support for a mileage fee program. Preferences for mileage collection options were amplified when looking at how each respondent voted on the last ballot item. Mileage fee opposition deepened amongst the mileage fee opposers when asked if they'd prefer a higher-tech mileage collection option (Plug In : Plug in with GPS or Odometer : Plug In (GPS or non-GPS). Similarly, support increased amongst mileage fee supporters when asked if they'd prefer a lower-tech mileage collection option (Plug In with GPS : Plug In or Plug In (GPS or non-GPS) : Odometer). This suggests support for mileage fees is closely linked to privacy concerns with higher-tech collection options, specifically plug-in devices, and more specifically GPS-enabled plug-in devices with GPS.

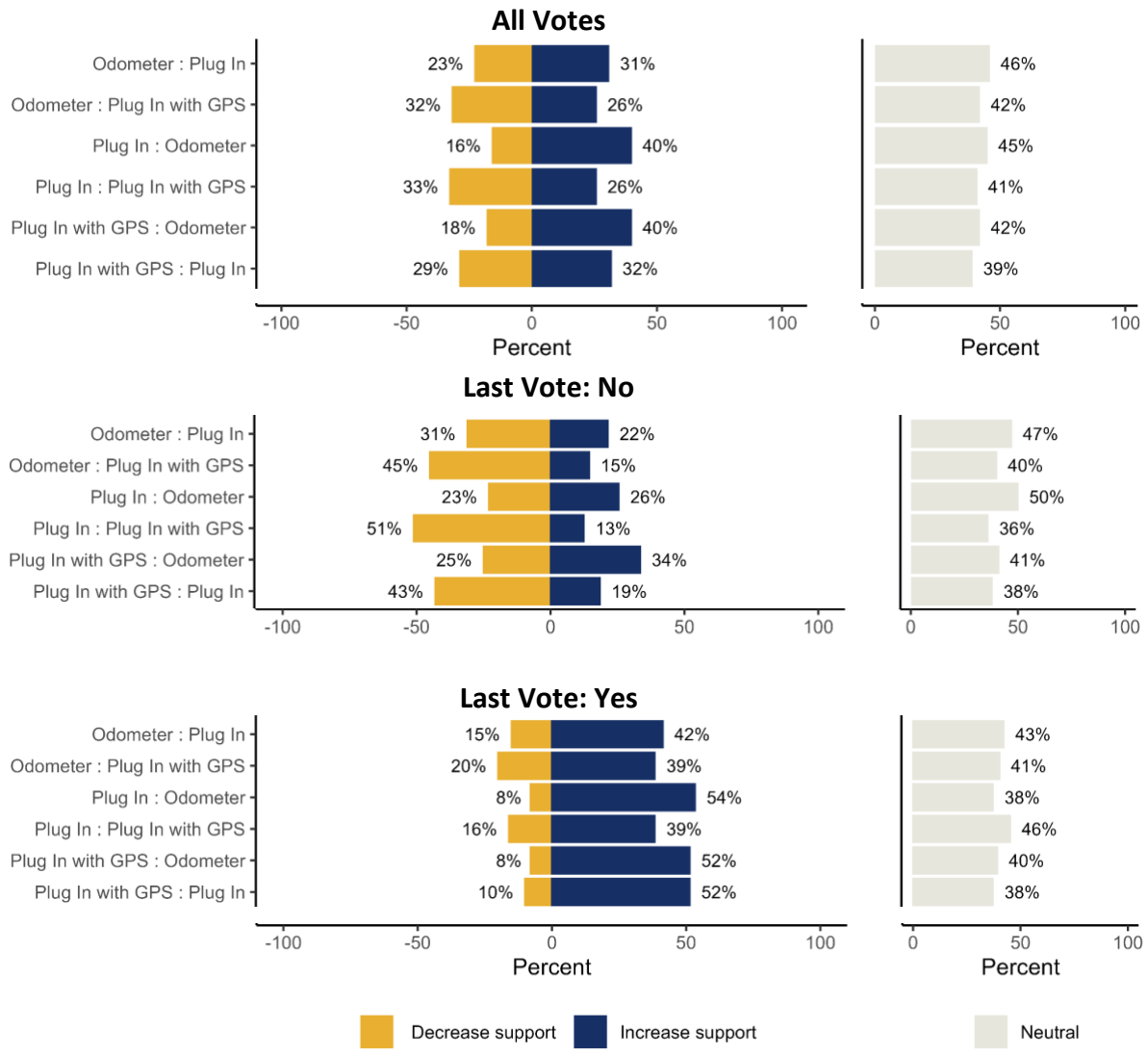


Figure 7. Impact of Varying Mileage Fee Collection Technologies on Mileage Fee Support

Conclusions

Mileage fees are the most frequently proposed alternative to the gas tax and are being explored across the nation by governing bodies. As states continue to invest money in research, pilot programs, and opt-in mileage fees, it is necessary that public concerns are collected, measured, and addressed. This study tackled this critical area of research by measuring public support for mileage fees through a survey and addressing the general lack of understanding about mileage fees through educational interventions related to mileage fee cost, fairness, and privacy.

We find that existing support for mileage fees is critically low (~32%), but simple educational experiences can increase support dramatically. In our survey, educating respondents about the motivations behind replacing the gas tax and the specifics of a mileage fee resulted in a

respondent being nearly 10 times more likely to support the policy. This suggests that unfamiliarity or incorrect assumptions about mileage fees are a causal factor in mileage fee opposition. States looking to increase public support for mileage fees should dedicate resources to community outreach and education to address this issue.

While we cannot state whether the policy education was more effective than the cost education, since the order of the educational treatments was not randomized, there are still some important takeaways for states looking to focus their educational efforts and reduce outreach costs. Most respondents reported that cost was the most important factor influencing how they voted. Therefore, cost sharing and comparison is valuable. Additionally, cost sharing may be an effective way to engage the public in further policy exploration by providing additional resources related to mileage fee fairness and privacy within the same platform as the cost sharing. We find that after engaging with both policy education and cost education, respondents in our survey were nearly five times more likely to support mileage fees regardless of whether they learned they were saving money or losing money. This is likely because public perceptions of transportation tax burdens tend to be inflated. In reality, most households only spend a few hundred dollars a year in gas taxes and would see small changes in costs under a mileage fee. While small is relative to individual financial situations, the literature has shown that mileage fees will, on average, save low income and rural households money. Through our analysis, we identified perceiving mileage fees as unfair to low income and rural communities as significant factors in mileage fee opposition. Therefore, by demonstrating that low income and rural communities will, on average, save money with a mileage fee, support for mileage fees can be increased.

Cost education can be achieved using a variety of methods based on scale, data availability and funding. For states with well-maintained vehicle records that contain both residential addresses and odometer readings, cost estimates of current gas tax expenditure and hypothetical mileage fee expenditure can be sent directly to households. The Hawaii Road User Charge (HiRUC) program presents a promising example of a state doing widespread cost education using real vehicle data. As an alternative approach for states that do not already collect mileage information, cost profiles could be shared through public outreach campaigns. This could range from mailers sharing the expected costs for drivers in different communities with different vehicle fuel economies, or publicly available data dashboards where drivers can manually input their fuel economy and annual mileage to calculate their expected costs.

We also note that public support for mileage fees can be increased through thoughtful policy construction, specifically relating to how mileage is collected. Respondents who opposed the mileage fee in our survey, even after education, were more likely to support a mileage fee if their mileage was collected using odometer readings. However, there were a large group of respondents who did not care which way their mileage was collected, and even preferred the more data-intensive options like a GPS-enabled plug-in devices. Therefore, it may be advantageous to offer flexible mileage collection options. This has multiple benefits. For one, allowing even a limiting range of freedom and choice are valuable in garnering support from those who are resistant to an idea. Additionally, mileage fee pilot programs have shown that

support for more data-intensive mileage collection technologies increases after exposure. It is likely that after the introduction of the fee, many drivers will become more comfortable switching to an automatic charging scheme like a plug-in device. This has added benefits for governing bodies wishing to cut down on manual labor. However, our findings show that enforcing a plug-in device, particularly a GPS-enabled plug-in device, will deter some members of the public from supporting the policy.

Expanding on thoughtful policy construction, coupling mileage fees with other pressing societal concerns is highly effective at increasing support. In our survey, we find that even amongst mileage fee opposers, support can be increased by proposing a mileage fee with rates that vary based on income and vehicle pollution. Most importantly, the idea of a block rate, where drivers receive a reduced rate for a set number of miles before being charged a heightened rate, is very popular. However, the increased societal benefit and public support brought on by variable rates should be weighed against the additional administrative costs these programs will require. Such topics should be explored in future work. Additionally, the structure of variable rates deserves more attention, such as the specific income level below which a household qualifies for a reduced rate.

Overall, we find that consumer preferences for transportation funding are not fixed, but rather a reflection of their current level of education and exposure to the policy. This is critically important in the design of more robust research studies evaluating support for policy alternatives. This research also demonstrates that it is feasible and reasonable to increase support for mileage fees through simple educational experiences relating to cost, fairness, and privacy. There are still barriers to overcome in garnering support for mileage fees. The lasting impacts of education were not explored in this study and could be explored in future longitudinal or panel studies by following up with respondents to see if increased support lasts. It is likely that educational efforts would need to be ongoing to create a lasting impact on individual opinion. Additionally, most respondents did not support a mileage fee at the end of the survey, showing that simple educational experiences can only go so far in increasing policy support. More studies, such as semi-structured interviews, are needed to better understand latent attitudes influencing opposition to mileage fees and to address outstanding public concerns as states and the federal government move away from the gas tax.

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Data Summary

Products of Research

Cleaned and anonymous responses to our national mileage fee survey as described in this report.

Data Format and Content

All data are provided as tabular text files in CSV format. The meta data available on Dryad where these data can be accessed contains a complete description of how data were collected and the definition of each data element.

Data Access and Sharing

The data collected and used in this project can be accessed for free on Dryad using the following DOI link: https://doi.org/10.5061/dryad.rv15dv4f0

Reuse and Redistribution

The data have a creative commons zero license (https://creativecommons.org/publicdomain/zero/1.0/). This is indicated in Dryad. There are no re-use restrictions.

Appendix A. Policy Education Videos

The policy education was split across two videos, linked below.

Video 1: https://www.youtube.com/embed/GdXGYQnq0-s?controls=0&rel=0&showinfo=0&modestbranding=1

The following questions were asked after the first video.

Question 1

Question Wording: Imagine this! The price of gas doubles. Your friend says that she's now paying double in gas taxes when she fills up her gas tank. What do you think? Did her gas taxes double?

Possible Answers: Yes, she's paying more in gas taxes; No, she's paying the same in gas taxes

Correct Answer: No, she's paying the same in gas taxes

Reinforcing Paragraph: The gas tax just depends on how much gas you buy, not the price. Some states have added charges based on the price of gas, but the base price is a flat fee per gallon of gas purchased.

Question 2

Question Wording: Imagine this! Your friend says that if gas taxes are increased, some of the money may go towards increasing funding for playgrounds in public parks instead of fixing roads. What do you think? Can gas tax money be used to pay for public parks?

Possible Answers: Yes, it's possible; No, it's not possible.

Correct Answer: No, it's not possible.

Reinforcing Paragraph: Gas taxes can only be spent on transportation related projects. This includes maintenance for roads and bridges, mass transit projects, and new construction.

Question 3

Question Wording: Concept check! Gas tax revenues are spent on…

Possible Answers: Any state government program; Only transportation related projects; Only highway related projects

Correct Answer: Only transportation related projects. Gas taxes can only be spent on transportation related projects. This includes maintenance for roads and bridges, mass transit projects, and new construction.

Video 2: https://www.youtube.com/embed/tN_qk_Y--Ag?controls=0&rel=0&showinfo=0&modestbranding=1

Question 1

Question Wording: TRUE OR FALSE? Many states are looking into mileage fees as an alternative to the gas tax.

Possible Answers: True; False

Correct Answer: True

Reinforcing Paragraph: Many states are looking into mileage fees as an alternative to the gas tax.

Question 2

Question Wording: TRUE OR FALSE? Existing research shows that low income and rural communities would pay more than higher income and urban communities if the gas tax was replaced by a mileage fee.

Possible Answers: True; False

Correct Answer: False

Reinforcing Paragraph: Low income and rural communities are more likely to save money with a mileage fee. This is partly because people in these communities tend to own vehicles that use more fuel because they are larger or less fuel efficient, so they pay more than the average person in gas taxes.

Question 3

Question Wording: Which of the following is TRUE about the gas tax?

Possible Answers: It was designed at a time when all vehicles were very similar; Its goal is to raise money for transportation systems; Its struggling to collect funding due to a rise in fuel efficient vehicles; Nowadays, how much you pay in gas taxes may depend more on what you drive (sedan, truck, hybrid, etc.) than how far you drive; All of the above

Correct Answer: All of the above

Reinforcing Paragraph: All of the following are true about mileage fees: It was designed at a time when all vehicles were pretty similar, Its goal is to raise money for transportation systems, Its struggling to collect funding due to a rise in fuel efficient vehicles, Nowadays, how much you pay in gas taxes may depend more on what you drive (sedan, truck, hybrid, etc.) than how far you drive

Appendix B. Survey Questionnaire

Note: The following survey questionnaire is for the survey where mileage is collected using odometer readings. The two other survey versions only differ in the way they say mileage is collected, as described in the Methods section of this report.

Consent to Participate in a University of Vermont Research Study

We invite you to take part in a study conducted by the University of Vermont Transportation Research Center about how transportation is paid for. Funding for this study was provided by the US Department of Transportation. To be eligible to participate, you must be at least 18 years of age and be willing to take an anonymous online survey that should take less than 20 minutes to complete. You will learn about the taxes used to fund our transportation systems and have the chance to share your views on alternative fees. There is no cost to participate in this study. As a participant in this study, there is no direct benefit for you; however, information from this study may benefit people in the future by providing guidance to future policymakers about preferred fees and taxes.

Protecting Your Privacy

Your participation in this study is completely voluntary. You are free to withdraw from the survey at any point. There are no known risks to participating in this survey. Anonymous survey responses will be stored on a secure server until the completion of this study. We will not collect or associate names, addresses, or other identifying information about you with the information you provide in the survey to protect your confidentiality. Your responses will remain anonymous. The data from this study will only be reported in aggregate and only used to support transportation research. We will provide a report describing the study results on our website (https://www.uvm.edu/cems/trc/trc-research-reports) when the study is completed.

Contact Information

If you have any questions or concerns about this study, please feel free to contact Clare Nelson (TRC Research Assistant) at clare.nelson@uvm.edu or Dr. Gregory Rowangould (Principal Investigator) at growangould@uvm.edu or (802) 656-3596. If you have questions regarding your rights as a research participant, then you may contact the Director of the UVM Research Protections Office at (802) 656-5040.

*It is recommended you print this information sheet for your records before continuing.

Page Break

Before we begin, we ask you to answer a few questions to help us understand who is taking the survey.

Do you currently live in California, Oregon, Utah, or Hawaii?

- ○ Yes
- ○ No

This survey will ask about mileage fees. They are sometimes called mileage-based user fees (MBUFs), vehicle miles travelled (VMT) fees and road-user charges (RUCs).

Have you previously participated in any pilot programs or focus groups related to this type of fee?

- ○ Yes
- ○ No

In what year were you born?

- ○ 2022
- ○ 2021
- ○ ……. (one year increments) ……
- ○ 1919
- ○ 1918

Please state your gender.

- ○ Female
- ○ Male
- ○ I identify as... _____

What is your race? (Mark all that apply)

- [ ] White
- [ ] Black or African American
- [ ] American Indian or Alaska Native
- [ ] Asian or Asian American
- [ ] Native Hawaiian or other Pacific Islander
- [ ] Other, please specify

_____

Are you Spanish, Hispanic, or Latino?

- ○ Yes
- ○ No

Please state your yearly household income.

- ○ Less than $20,000
- ○ $20,000 to $34,999
- ○ $35,000 to $49,999
- ○ $50,000 to $74,999
- ○ $75,000 to $99,999
- ○ $100,000 to $149,999
- ○ More than $150,000

How would you describe the area where you currently live?

- ○ Rural
- ○ Suburban
- ○ Urban

Page Break

Overview

During this survey you will have **three opportunities to vote on the same policy**. Between each vote, we'll provide you with a bit more information about the policy and its history. Please read the ballot item and vote to the best of your ability.

End of Block: Consent and Introduction

Start of Block: Control Vote

Page Break

Voting Opportunity #1, (1/3)

Your state is considering alternatives to the vehicle fuels tax, which you may know as the "gas tax". You pay the gas tax every time you purchase vehicle fuel.

Your state plans to replace the gas tax with a mileage fee of 1.5 cents per mile. Your mileage will be collected from your vehicle's odometer reading at an annual vehicle inspection.

The mileage fee will remain revenue neutral, so the total amount of money collected by the state will remain the same, but the amount you pay may increase, decrease, or stay about the same.

Do you support replacing the gas tax with a mileage fee collected using annual odometer readings?

- ○ **No**
- ○ **Yes**

End of Block: Control Vote

Start of Block: Gas Tax Perceptions

Let's talk more about the state gas tax:

The following video will walk you through the basics.

You'll be asked a few questions at the end.
The survey will advance once the video is complete.

Page Break

Imagine this!

The price of gas doubles. Your friend says that she's now paying double in gas taxes when she fills up her gas tank.

What do you think? Did her gas taxes double?

- ○ Yes, she's paying more in gas taxes.
- ○ No, she's paying the same in gas taxes.

Page Break

You've got it!

Not quite right...

The gas tax just depends on **how much gas you buy**, not the price.

Some states have added charges based on the price of gas,
but the base price is a flat fee per gallon of gas purchased.

Page Break

Concept check!

Finish the following sentence. How much I pay in state gas taxes...

- ○ Varies with the amount of gas I buy
- ○ Varies with the price of gas

Page Break

You've got it!

Not quite right...

The gas tax just depends on **how much gas you buy**, not the price.

Some states have added charges based on the price of gas,
but the base price is a flat fee per gallon of gas purchased.

Page Break

Imagine this!

Your friend says that if gas taxes are increased, some of the money may go towards increasing funding for playgrounds in public parks instead of fixing roads.

What do you think? Can gas tax money be used to pay for public parks?

- ○ Yes, it's possible.
- ○ No, it's not possible.

Page Break

You've got it!

Not quite right...

Gas taxes can only be spent on **transportation related projects**. This includes maintenance for roads and bridges, mass transit projects, and new construction.

Page Break

Concept check!

Gas tax revenues are spent on...

- ○ Any state government program
- ○ Only transportation related projects
- ○ Only highway related projects

Correct!

Not quite right...

Gas taxes can only be spent on **transportation related projects**. This includes maintenance for roads and bridges, mass transit projects, and new construction.

End of Block: Gas Tax Perceptions

Start of Block: Mileage Fee Information

Let's talk more about mileage fees:

A mileage fee charges each vehicle a price per mile travelled. Before we tell you more, we'd like to hear your first thoughts about mileage fees.

Page Break

How do you feel about the following statements?

A mileage fee would be **fair** to...

	Disagree	Neutral	**Agree**
...Electric vehicle owners	○	○	○
...People living in rural areas	○	○	○
...People living in urban areas	○	○	○
...Households with low incomes	○	○	○
...Households with high incomes	○	○	○
...People with jobs that require lots of driving	○	○	○
...Myself, personally	○	○	○

Page Break

What is a mileage-based user fee?

The following video will walk you through the basics.

You'll be asked a few questions at the end.
The survey will advance once the video is complete.

Page Break

You'll be asked a few questions about the video. Answer to the best of your ability.

TRUE OR FALSE?

Many states are looking into mileage fees as an alternative to the gas tax.

- ○ True
- ○ False

Page Break

You've got it!

Not quite right...

Many states are looking into mileage fees as an alternative to the gas tax.

Page Break

TRUE OR FALSE?

Existing research shows that low income and rural communities ***would pay more than*** higher income and urban communities if the gas tax was replaced by a mileage fee.

- ○ True
- ○ False

Page Break

You've got it!

Not quite right...

Low income and rural communities are more likely to **save money** with a mileage fee. This is partly because people in these communities tend to own vehicles that use more fuel because they are larger or less fuel efficient, so they pay more than the average person in gas taxes.

Page Break

Which of the following is **TRUE** about the gas tax?

- ○ It was designed at a time when all vehicles were very similar
- ○ Its goal is to raise money for transportation systems
- ○ Its struggling to collect funding due to a rise in fuel efficient vehicles
- ○ Nowadays, how much you pay in gas taxes may depend more on what you drive (sedan, truck, hybrid, etc.) than how far you drive
- ○ All of the above

Page Break

You've got it!

You've almost got it...

All of the following are true about mileage fees:
It was designed at a time when all vehicles were pretty similar
Its goal is to raise money for transportation systems
Its struggling to collect funding due to a rise in fuel efficient vehicles
Nowadays, how much you pay in gas taxes may depend more on what you drive (sedan, truck, hybrid, etc.) than how far you drive

Page Break

Considering what you've learned, please share your response to the following statement. You may change your mind or maintain your same beliefs.

A mileage fee would be **fair** to...

	Disagree	Neutral	**Agree**
...Electric vehicle owners	○	○	○
...People living in rural areas	○	○	○
...People living in urban areas	○	○	○
...Households with low incomes	○	○	○
...Households with high incomes	○	○	○
...People with jobs that require lots of driving	○	○	○
...Myself, personally	○	○	○

End of Block: Mileage Fee Information

Start of Block: Informed Vote

Considering what you've learned, please vote on the following policy. You may vote the same or differently as you did in the prior vote.

Voting Opportunity #2, (2/3)

Your state is considering alternatives to the vehicle fuels tax, which you may know as the "gas tax". You pay the gas tax every time you purchase vehicle fuel.

Your state plans to replace the gas tax with a mileage fee of 1.5 cents per mile. Your mileage will be collected from your vehicle's odometer reading at an annual vehicle inspection.

The mileage fee will remain revenue neutral, so the total amount of money collected by the state will remain the same, but the amount you pay may increase, decrease, or stay about the same.

Do you support replacing the gas tax with a mileage fee collected using annual odometer readings?

- ○ **No**
- ○ **Yes**

End of Block: Informed Vote

Start of Block: Personal Vehicle Information

Personal Travel Experience

This section will ask you some basic questions about how much you drive and the vehicles that you use. This helps us understand your perspective when voting on transportation policies.

How many vehicles are owned, leased, or available for regular use by the people who currently live in your household?

- ○ No Vehicles
- ○ 1 Vehicle
- ○ 2 Vehicles
- ○ 3 Vehicles
- ○ 4 Vehicles
- ○ 5 Vehicles
- ○ 6 Vehicles
- ○ Other Amount: _____

Page Break

For the following questions, think about the single vehicle you use the *most*. We'll call this your **primary vehicle.**

What is your primary vehicle?

- ○ Small car (Sedan / Hatchback / Station Wagon)
- ○ SUV
- ○ Pick-Up Truck
- ○ Minivan / Van
- ○ Sports Car
- ○ Other _____

What type of fuel does your primary vehicle use?

- ○ Gasoline
- ○ Diesel
- ○ Gasoline Hybrid (not plug-in)
- ○ Plug-in hybrid (PHEV)
- ○ Fully electric (BEV)
- ○ Other

Page Break

To the best of your knowledge, what's is the fuel economy (miles per gallon) of your primary vehicle?

- ○ 5 - 10 mpg
- ○ 11 - 15 mpg
- ○ 16 - 20 mpg
- ○ 21 - 25 mpg
- ○ 26 - 30 mpg
- ○ 31 - 35 mpg
- ○ 36 - 40 mpg
- ○ 41 - 45 mpg
- ○ 46 - 50 mpg
- ○ 50+ mpg

To the best of your knowledge, what percentage of your driving is all-electric?

- ○ 10%
- ○ 20%
- ○ 30%
- ○ 40%
- ○ 50%
- ○ 60%
- ○ 70%
- ○ 80%
- ○ 90%
- ○ 100%

To the best of your knowledge, how far did you travel in your primary vehicle in the past year?

- ○ Less than 1,000 mi
- ○ 1,000 - 5,000 mi
- ○ 5,000 - 10,000 mi
- ○ 10,000 - 15,000 mi
- ○ 15,000 - 20,000 mi
- ○ 20,000 - 25,000 mi
- ○ 25,000 - 30,000 mi
- ○ More than 30,000 mi

End of Block: Personal Vehicle Information

Start of Block: Personal Vote

Personalized Cost Estimates

Based on what you told us about your primary vehicle, we estimated your annual costs.

Mileage Fee: (cost displayed here)

Gas Tax: (cost displayed here)

State gas tax rates vary. The estimates shown above are based on the national average state gas tax of $0.31 per gallon and a $0.015 per mile fee. On average, these rates would generate the same amount of funding for state transportation agencies.

Page Break

Considering what you've learned, we'd like you to vote on the policy one last time. You may vote the same or differently as you did in the prior votes.

Voting Opportunity #3, (3/3)

Your state is considering alternatives to the vehicle fuels tax, which you may know as the "gas tax". You pay the gas tax every time you purchase vehicle fuel.

Your state plans to replace the gas tax with a mileage fee of 1.5 cents per mile. Your mileage will be collected from your vehicle's odometer reading at an annual vehicle inspection.

The mileage fee will remain revenue neutral, so the total amount of money collected by the state will remain the same, but the amount you pay may increase, decrease, or stay about the same.

Do you support replacing the gas tax with a mileage fee collected using annual odometer readings?

- ○ **No**
- ○ **Yes**

End of Block: Personal Vote

Start of Block: Reflections (Vehicle)

Reflections

You've just finished voting on a new proposal for a mileage fee in your state. You've been given a variety of information. Think back on how you voted.

Page Break

How important were the following pieces of information in your final vote for or against a mileage fee to replace the gas tax?

	Not at all important	Moderately important	**Very important**
Learning how much a mileage fee would cost me compared to my current gas tax spending	○	○	○
Learning lower income households would, generally, not pay more than higher income households	○	○	○
Learning people living in rural areas would, generally, not pay more than people living in urban areas	○	○	○
Learning about the history of the gas tax and what it is used for	○	○	○
Learning states are already exploring mileage fees	○	○	○
Learning the federal government is already exploring mileage fees	○	○	○

End of Block: Reflections (Vehicle)

Start of Block: Reflections (No Vehicle)

Reflections

You've just finished voting on a new proposal for a mileage fee in your state. You've been given a variety of information. Think back on how you voted.

Page Break

How important were the following pieces of information in your final vote for or against a mileage fee to replace the gas tax?

	Not at all important	Moderately important	**Very important**
Learning lower income households would, generally, not pay more than higher income households	○	○	○
Learning people living in rural areas would, generally, not pay more than people living in urban areas	○	○	○
Learning about the history of the gas tax and what it is used for	○	○	○
Learning states are already exploring mileage fees	○	○	○
Learning the federal government is already exploring mileage fees	○	○	○

End of Block: Reflections (No Vehicle)

Start of Block: Attitudes

The mileage fee in this survey assumed everyone pays the same fee per mile they travel. Some people want to adjust the mileage fee for different drivers.

How do the following **rate-adjustments** change your level of support for a mileage fee?

	Decrease support	Neutral	**Increase support**
Households with lower incomes pay lower mileage fees.	○	○	○
Mileage fees are higher for vehicles that pollute more and lower for vehicles that pollute less.	○	○	○
Mileage fees are lower for electric vehicles.	○	○	○
Everyone gets a "free" number of miles every year before they start getting charged for the miles they travel.	○	○	○

How do the following **ways to collect mileage information** change your level of support for a mileage fee?

	Decrease support	Neutral	**Increase support**
Plug-in device without GPS	○	○	○
Plug-in device with GPS	○	○	○

Page Break

Are there any other comments or feedback you'd like to provide regarding your support or opposition to a mileage fee?

_____

_____

_____

_____

_____

End of Block: Attitudes

Start of Block: Demographics

Closing Questions

This final section asks some questions about you and your household.
This helps us understand who took our survey.

Page Break

State your level of agreement with the following statements. Providing this information helps ensure our research gets input from a broad range of viewpoints.

	Strongly disagree	Somewhat **disagree**	Neutral	Somewhat **agree**	**Strongly agree**
Taxes are an irreplaceable form of funding for state and federal programs.	○	○	○	○	○
Sometimes the government needs to pass laws to help protect vulnerable populations.	○	○	○	○	○
I trust my state government.	○	○	○	○	○
I would prefer less government involvement in my life.	○	○	○	○	○
Funding for state programs is mismanaged.	○	○	○	○	○
Environmental threats such as global warming and deforestation	○	○	○	○	○

	Strongly disagree	Somewhat **disagree**	Neutral	Somewhat **agree**	**Strongly agree**
have been exaggerated.					
I frequently think about whether my travel choices have an impact on the environment.	○	○	○	○	○
Vehicle emissions in my state have a large impact on air quality.	○	○	○	○	○
I frequently think about how my choices will impact my community.	○	○	○	○	○
Driving a car is good for society.	○	○	○	○	○
My lifestyle is dependent on having a car.	○	○	○	○	○
Owning a vehicle provides me with freedom.	○	○	○	○	○
Technology does more harm than good.	○	○	○	○	○
I'm tracked everywhere I	○	○	○	○	○

	Strongly disagree	Somewhat **disagree**	Neutral	Somewhat **agree**	**Strongly agree**
go through my phone.					
Technology has made life too complicated.	○	○	○	○	○

Page Break

What is the highest level of school you have completed or the highest degree you have received?

- ○ Less than high school degree
- ○ High school graduate (high school diploma or equivalent including GED)
- ○ Some college but no degree
- ○ Undergraduate college degree (Associates, Bachelors)
- ○ Graduate college degree (Masters, Doctorate, Professional Degree)

How many children (under 18) live in your household?

- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10 or more

How many adults (18 or over) live in your household, including yourself?

- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10 or more

What is your current employment status?

- ○ Employed full time
- ○ Employed part time
- ○ Unemployed and currently looking for work
- ○ Unemployed and not currently looking for work
- ○ Student
- ○ Retired
- ○ Unable to work

What is your ZIP code?

_____

In politics today, do you consider yourself a Republican, Democrat, or Independent?

- Republican
- Democrat
- Independent (no party affiliation)
- Some other party

Page Break

As of today, do you lean more to the Republican Party or more to the Democratic Party?

- Republican
- Democrat
- Neither

End of Block: Demographics