Collaborative Sciences Center for ROAD SAFETY

FINAL REPORT

Assessing how private beliefs conflict with public action on Safe Systems

August 2023

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Acknowledgement of Sponsorship

This project was supported by the Collaborative Sciences Center for Road Safety, www.roadsafety.unc.edu, a U.S. Department of Transportation National University Transportation Center promoting safety.

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. CSCRS-R38	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle: Assessing how private beliefs conflict with public action on Safe Systems		5. Report Date August 2023 6. Performing Organization Code
7. Author(s) Seth LaJeunesse (ORCID: 0000-0003-4908-3823) Alyson West (ORCID: 0000-0001-9134-587X) Stephen Heiny (ORCID: 0000-0001-8875-180X) Wes Kumfer (ORCID: 0000-0002-6705-5298) Molly De Marco (ORCID: 0000-0002-5039-586X) Judit Alvarado (ORCID: 0000-0002-7758-2411) Jill Cooper (ORCID: 0000-0003-3117-3943) Aqshems Nichols (ORCID: 0000-0002-4208-8114)		8. Performing Organization Report No.
9. Performing Organization Name and Address University of North Carolina Highway Safety Research Center 730 Martin Luther King Jr Blvd Suite 300 Campus Box 3430 Chapel Hill, NC 27599-3430		10. Work Unit No. 11. Contract or Grant No. Collaborative Sciences Center for Road Safety (Grant # 69A3551747113)
12. Sponsoring Agency Name and Address Collaborative Sciences Center for Road Safety 730 Martin Luther King Jr. Blvd., Suite 300 Chapel Hill, NC 27599		13. Type of Report and Period Covered Final Report (May 2021 – May 2022) 14. Sponsoring Agency Code
15. Supplementary Notes Conducted in cooperation with the U.S. Department of Transportation, Federal Highway Administration.		

16. Abstract

Having surveyed 1,000 residents of North Carolina about their transportation values and travel mode aspirations, among other factors, the research team discovered that participants most favored having self-direction in travel, being comfortable, and avoiding injury while traveling. They valued avoiding being stuck in traffic or reducing their environmental footprint less. Participants aspired to drive cars in the future, and most sought to walk more. Fewer aspired to use transit, ride bicycles, or ride motorcycles in the future.

Participants were not always accurate with their assessment of others' values and travel mode aspirations, and this pluralistic ignorance around others' values and aspirations varied according to the latent class participants aligned with: (1) *Convenience Enthusiasts*—unemployed or retired older middle-aged and politically disengaged adults who were satisfied with their primary travel mode of driving; (2) *Injury Emphasizers*—young, employed, modally dissatisfied, and politically engaged pedestrians and transit users; and (3) *Aspiring Multimodalists*—younger middle-aged, current and aspiring multimodalists who were satisfied with their usual travel mode, and both politically and socially engaged with transportation issues. Convenience Enthusiasts overestimated others' values around avoiding being stuck in traffic, as well as others' biking and transit use aspirations. Aspiring Multimodalists underestimated the degree to which others aspired to bike.

In the last stage of this study, we carried out a phronetic analysis of North Carolina Department of Transportation (NCDOT) artifacts, including their stated mission, vision, goals, and values; statewide transportation investments law; and the agency's Safety and Mobility Unit introductory webpage. We find that NC General Assembly and NCDOT priorities and policies appear to be organized around affording travelers swift, less-delayed travel, rather than provisioning viable and safe mobility choices. We end the report with conclusions and practical implications toward addressing pluralistic ignorance about what others most want and need from their transportation system and aligning transportation investments with communities' expressed values and aspirations.

17. Key Words	**18. Distribution Statement**
Traffic safety, Pluralistic ignorance, Transportation values, Travel mode aspirations, Public-agency priority alignment	No restrictions. This document is available through the Collaborative Sciences Center for Road Safety (roadsafety.unc.edu), Chapel Hill, NC

19. Security Classif. (of this report)	**20. Security Classif. (of this page)**	**21. No. of Pages**	**22. Price**
Unclassified	Unclassified	61	

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Executive Summary

By and large, people enjoy having meaningful choices in life. This includes choices in transportation. The team surveyed 1,000 residents of North Carolina about their transportation values, travel mode aspirations, perceptions of others' values and aspirations, travel habits, transportation-related political activity, and demographic factors. We discovered that participants most favored self-direction in travel, followed by being comfortable and avoiding injury while traveling. They cared less about being stuck in traffic or reducing their environmental footprint. Participants also aspired to drive private vehicles in the future, and a sizable number aspired to walk more, with fewer aspiring to use transit, ride bicycles, or ride motorcycles in the future.

Study participants were not always accurate with their assessment of others' values and travel mode aspirations. Nearly 44% of participants mistakenly believed others placed higher priority on avoiding being stuck in traffic than was the case, and roughly 25% of participants overestimated the degree to which other adults in their communities aspired to ride bikes and take transit.

Such pluralistic ignorance around others' transportation values and travel mode aspirations varied according to the latent class participants aligned with. Latent class analysis was employed to subgroup participants into classes based upon their values, aspirations, travel habits, time affluence, and modal satisfaction. Three classes emerged: (1) *Convenience Enthusiasts*—unemployed or retired older middle-aged adults who are satisfied with their primary travel mode of driving politically disengaged drivers; (2) *Injury Emphasizers*—young adults, employed, mildly modally dissatisfied and politically engaged pedestrians and transit users; and (3) *Aspiring Multimodalists*—younger middle-aged, current and aspiring multimodalists who are satisfied with their usual travel mode, and both politically and socially engaged with transportation issues. Convenience Enthusiasts, especially, overestimated others' values around avoiding being stuck in traffic, as well as others' biking and transit use aspirations; whereas Aspiring Multimodalists underestimated the degree to which others aspired to bike to get places. We attribute the ignorance around being stuck in traffic to biased exposure to information and biased memory for information, both of which are likely shaped by media portrayals of traffic congestion and travel delays as social problems to be efficiently addressed.

In the last stage of this study, we carried out a phronetic analysis of North Carolina General Assembly and North Carolina Department of Transportation (NCDOT) artifacts, including the DOT's stated mission, vision, goals, and values; the General Assembly's statewide transportation investments law; and the DOT's Safety and Mobility Unit introductory webpage. We find that General Assembly and NCDOT policies and practices appear to be organized around affording travelers swift, less-delayed travel, rather than provisioning meaningful, safe, and accessible mobility choices. We end the report with conclusions and practical implications toward addressing pluralistic ignorance about what others most want and need from their transportation system and aligning transportation investments with communities' expressed values and aspirations.

Assessing how private beliefs conflict with public action on Safe Systems

Introduction

A majority (~90%) of people in the United States support local requirements to safely accommodate pedestrians and bicyclists in street projects, and more than half support an increase in their taxes to provide bicycle and pedestrian infrastructure (e.g., Cradock et al., 2018). In Los Angeles County, most residents endorse funding for walking, biking, and bus/rail transportation, as well as redirecting funds to safe, active transportation investment (Gase et al., 2015). Moreover, in North Carolina, 67% of adults agree strongly that engineers and planners should do more to make bicycling and walking safer (Hancock et al., 2020). Despite these realities, the FAST Act apportioned less than 6% of transportation funds to explicitly advance safety projects and programming—as indicated by Highway Safety Improvement Program (HSIP) funding levels (United States Department of Transportation & Federal Highway Administration, 2020)—and in North Carolina's project prioritization formula, the safety of transportation projects receives no more than 25% of their weighting and often considerably less (e.g., the safety of "mobility projects" are given weights of 10%, whereas congestion receives 30% of these projects' scoring weight) (North Carolina Department of Transportation, 2019).

This striking mismatch between what the public desires and what federal, state, and local agencies provide the public may be partly driven by common misjudgements about the beliefs of others, also known as "pluralistic ignorance." Underpinning pluralistic ignorance are misconceptions about what others most value in life. For example, in the United Kingdom, most people overestimate the importance others place on "selfish values" (e.g., valuing money and social status) and underestimate others' orientations toward "compassionate values" (e.g., valuing close relationships and nature) (Common Cause Foundation, 2016). In systems thinking terms, pluralistic ignorance reflects "mental models"—or commonly held values and assumptions about the transportation system.

Pluralistic ignorance can suppress corrective action, as in the case of workplace sexual harassment where most employees believed they were alone in their discomfort with harassment and thus failed to report incidents of it (Halbesleben, 2009). The same pattern of incorrect normative beliefs has held true in variety of other contexts, including climate change (Geiger & Swim, 2016), men not taking advantage of paternity leave in Japan (Miyajima & Yamaguchi, 2017), and acceptance of aggression (Vandello et al., 2009), among other social issues. Similarly, pluralistic ignorance is likely ubiquitous in public perceptions about transportation investment priorities, and such ignorance thwarts public and political support for safe, healthy transportation options.

As with other social issues, the consequences of biased normative beliefs about transportation priorities could be that most concerned people avoid publicly supporting investments in safe, healthy transportation out of concern for deviating from a misperceived social norm. This lack of action from the public in turn might lead policymakers to underestimate the support for ambitious road safety and health policies.

Our team sought to explore potential pluralistic ignorance around safe transportation by surveying participants representative of the population of North Carolina. We grounded our Transportation Priorities Questionnaire in social theory on basic human values (Schwartz et al., 2016), travel mode aspirations, and agency priority analysis to uncover what people most want from their local and state transportation agencies, in terms of travel mode choices and trip purposes.

Organization of this final report

- This report introduces our study's research questions, and the methods we employed in designing, testing, refining, and administering our survey instrument.
- Next, we report results from the survey and discuss their potential social and political significance.

- We then describe the methods and results of an analysis of North Carolina General Assembly and North Carolina Department of Transportation priorities and the extent to which they align with public values and aspirations related to transportation.
- Following the analysis, we discuss the practical significance of public-General Assembly and NCDOT priorities (mis)alignment.
- We end the report with a general discussion of the practical utility of assessing public values and aspirations in transportation and conclude with a call to better integrate public desires into transportation-related decision-making.

Research questions

1. What do survey participants most value for their personal transportation?
2. How important is being able to get places by foot, bike, transit, or car to survey participants (i.e., what are their "travel mode aspirations")?
3. How consistent (or inconsistent) are participants' own transportation values and travel mode aspirations with their perceptions of others' values and aspirations?
4. How might transportation values and travel mode aspirations segment the North Carolina population into subgroups of traveler types or classes?
    a. How do these traveler classes differ according to their demographics; typically used travel modes; life circumstances; and transportation-related values, aspirations, and beliefs?
    b. To what extent does ignorance of others' transportation values interplay with participants' engagement in political and social matters related to transportation issues?
5. To what degree do public values in transportation and travel mode aspirations align (or not) with NCDOT's evident priorities and travel mode affordances?

Methods

Procedures

Our team sought to address each of these research questions by drawing upon best practices in survey design, construct development, and measurement, and ensuring we facilitated participation from populations that reflected the geographic, socioeconomic, age-related, and racial/ethnic diversity of North Carolina.

Questionnaire development

To develop the questionnaire administered in this study, the team drew upon theory and complementary methodology. The following method subsections outline the theories and constructs our team referenced in designing the survey.

Transportation values

Schwartz's Theory of Basic Human Values provided a foundation for developing the list of seven values used in the questionnaire. This theory posits that values, which integrate emotions and beliefs about evaluative subjects (e.g., social relationships, life accomplishments) are central to conceptualizations of culture and the formation of opinion (Goren et al., 2016). Moreover, values are cognitively organized in a circular fashion, with those values located closer together in the circle relating to one another and those located on opposing ends of the circle suppressing each other (Schwartz, 1994). An example of a value is *Benevolence*, which pertains to care and concern for close others in one's life. *Benevolence* is conceptually located close to values of *Universalism,* or compassion for all living beings and for nature. These more "intrinsic values" are arranged on opposite ends of the values circle from *Power* values, which relate to control over people and resources. *Power* values are associated with *Achievement* values—connoting demonstrating competence by adhering to social standards of success—which together are considered "extrinsic values" (**Table 1**).

Table 1. An adapted *Transportation Values and Priorities Index* (adapted from Schwartz, et al., 2016).

Value	Operational Definition	Transportation Values Items
Power	Social status and prestige, control or dominance over people and resources	• Keeping travel costs low • Avoiding being stuck in traffic
Achievement	Personal success through demonstrating competence according to social standards	*Not measured*
Hedonism	Pleasure and sensuous gratification for oneself	• Being comfortable
Stimulation	Excitement, novelty, and challenge in life	*Not measured*
Self-Direction	Independent thought and action—choosing, creating, exploring	• Having freedom in where and when I go
Universalism	Understanding, appreciation, tolerance, and protection of the welfare of all people and of nature	• Protecting other road users from getting injured (*social*) • Reducing my impact on the environment (*nature; biospheric*)
Benevolence	Preservation and enhancement of the welfare of people with whom one is in frequent personal contact	*Not measured*
Tradition	Respect, commitment, and acceptance of the customs and ideas that traditional culture or religion provide the self	*Not measured*
Conformity	Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms	*Not measured*
Security	Safety, harmony, and stability of society, of relationships, and of self	• Not getting injured

Note. Unmeasured values appear to be less associated with modal choice (e.g., Stark & Hössinger, 2018) and climate actions.

Travel mode aspirations

In addition to values, we sought information about participants' travel mode aspirations. The Aspiration Index developed by Kasser and Ryan (1996) served as the inspiration for our travel mode aspirations questions. We focused on the "importance" of being able to use certain travel modes to get places in our analysis. Importance is one of the three dimensions of aspirations, with the others including the perceived likelihood an aspiration will be realized, and the degree to which the aspiration has already been attained. Thus, for example, we could have asked participates how likely they are to take transit for utilitarian purposes in the future and whether they already took transit for such purposes. Instead, we opted to limit our aspiration questions to the perceived importance of using various travel modes, namely walking, biking, driving vehicles, taking transit, and riding motorcycles.

Typical travel mode

In measuring participants' predominant travel modes, we asked them to select that mode they *usually* used to get somewhere (i.e., "When I need to get somewhere, I usually get there by...walking; riding a bicycle; taking transit; riding a motorcycle; driving a car, SUV, or truck; or riding in a car, SUV, or truck as a passenger"). Participants' response to this question then appeared in the stem for the following question, which was inspired by the methodology employed by Klein et al., (2022). That is, participants were asked how often they got around using their typical travel mode during the prior month (e.g., "I get around by [walking]: for every trip; for nearly every trip, but I occasionally got around by other means; for about half of all trips, as I also got around by other means; Other: I did not leave my house to go anywhere in the past month"). Gathering information beyond participants' typical travel modes allowed the team to identify those who always used certain modes from those who tended to use more than one travel mode.

Travel mode satisfaction

In addition to collecting information on participants' typical travel modes and modal aspirations, we adapted a scale from Bösehans and Walker (2020) to assess the degree to which participants were satisfied or dissatisfied with their typical utilitarian travel mode. A single question indicated participants' travel mode satisfaction: "In general, how satisfied are you with the main way you get around these days?: Very satisfied; Satisfied; Neither satisfied nor dissatisfied; Dissatisfied; Very dissatisfied."

Antecedents to transportation-related political engagement

The team theorized that several social psychological constructs would likely help explain variation in participants' transportation-oriented political activity. Borrowing from the Theory of Planned Behavior (e.g., Ajzen, 2020), insights gleaned from research incorporating time affluence into travel psychology (e.g., LaJeunesse & Rodríguez, 2012), and item-specific response option measurement approaches (e.g., Saris et al., 2010), the research team assessed the following constructs:

> *Willingness and preparedness to discuss transportation-related changes.* Indicated by four items: (1) "How willing are you to talk about needed changes in transportation?"; (2) "How much do you think that sharing your transportation concerns will lead to needed changes?"; (3) "How confident are you that sharing your transportation ideas with others can lead to needed changes?"; and (4) "How confident are you in discussing transportation issues with others?"
>
> *Travel mode habits*. The team measured this construct by leveraging an abbreviated version of the Habit Index (Verplanken & Orbell, 2003) and applied it to participants' stated typical travel modes. Three items indicated the strength of participants' travel mode habits: (1) "How much effort would be required not to get places by [typical travel mode]?"; (2) "For how long have you been [typical travel mode]?"; and (3) "To what extent does [typical travel mode] belong to your daily routine?"
>
> *Time affluence.* Three items drawn from Kasser and Sheldon's (2009) *Monetary and Time Affluence Scale* and referencing the prior month indicated participants' time affluence: (1) "How rushed do you feel your life is?"; (2) "At how leisurely a pace have you been able to take your life?"; and (3) "How hectic are things for you these days?"

Sociodemographics

Sociodemographic control variables included participants' age, sex, race/ethnicity, education level, employment status, income level, household size, number of children in the household, duration of living in current residence (in number of years), zip code, and main school travel mode (before turning 16 years of age).

Transportation-related political and social engagement

Finally, participants' transportation-related political and social engagement was measured using a binary yes/no response option around (1) contacting (i.e., emailing, calling, or speaking to) elected or appointed officials or (2) municipal staff within the past month about transportation issues; and (3) discussing transportation issues with others.

Cognitive interviewing

Prior to administering the survey, the research team sought to ensure the legibility and interpretability of the instrument. To do this, the team drew recommendations from Conrad and Blair (2009) to develop a cognitive interview protocol (see Appendix C for the protocol used in this study) designed to uncover problems respondents have with (1) understanding questions, (2) retrieving and integrating information used to answer questions, and (3) communicating answers to revise questions for greater clarity. Our team also translated the questionnaire into Spanish prior to cognitively interviewing volunteers.

The team recruited eight volunteers and compensated them monetarily to thank them for their assistance with refining questionnaire items. These cognitive interviews informed the reconfiguration of the response format for transportation values items and travel mode aspirational questions.

Sample selection

Also prior to administering the survey, the research team coordinated with Qualtrics in the interest of securing complete responses from 1,000 respondents living in North Carolina. Qualtrics's Panels platform provided the team with a pre-arranged pool of respondents based in North Carolina who had agreed to be contacted by research companies and respond to surveys.[i]

The team worked with Qualtrics staff to establish response goals organized around gathering useful information from a representative sample of adults living in North Carolina along the lines of gender (Male – 48%; Female – 52%; Other gender - 5%), age group (18-34 years old – 30%; 35-54 years old – 32%; 55+ years old – 38%), and race/ethnicity (N=300 Black; N=300 Latino/a; and N=600 All other races).

Survey administration, refinement, and weighting

The team administered the survey starting on April 8, 2022, and received an original 1,000 survey responses by April 26, 2022. On May 2, 2022, the UNC team identified 22 records that indicated straightlining or satisficing behavior (see: Reuning & Plutzer, 2020) based upon either exceedingly low completion times (< 2 minutes), straightlining either "Very important..." or "Not important at all..." for all Likert response options, or both. On May 3, 2022, Qualtrics replaced the 22 problem records and data cleaning, weighting, and analysis commenced.

The team calculated and applied poststratification adjustment to make the sample a better representative of the general North Carolina population (i.e., adults 18 years of age or older who reside in North Carolina) using rural and urban residential locations, gender, age group, and race/ethnicity as poststratification variables. We calculated final weights after aligning base weights to the adult North Carolina population (United States Census Bureau, 2021).

Table 2 displays the demographics, household characteristics, and transportation and travel patterns of the 1,000 study participants. Comparing the study sample with the general North Carolina population statistics, study participants tended to live in more urbanized areas of the state, be between the ages of 25 and 34 years, be employed, and have slightly more formal education. Otherwise, participants in this study reflected the racial and income-based diversity of the state.

Additionally, most study participants reported living in their current residence for 10 years or less, having access to one or two motor vehicles, and driving motor vehicles for utilitarian purposes. A sizable minority (adding up to 28.6% of study participants) of the sample predominantly got around via walking, taking transit, and riding bicycles, whereas less than 10% of the sample tended to ride in motor vehicles as passengers or on motorcycles to get places. Prior to acquiring a driver's license, more than 40% of participants traveled to school on a school bus. Another 23% walked to school, 21% rode in a motor vehicle, nearly 11% biked, and roughly 5% rode public transit to school (**Table 2**).

Descriptive Results

Table 2. Survey respondent demographics and travel patterns.

			Sample (N = 1,000)	North Carolina (N = 10,551,162)
Geography[1]		Number	Percentage	Percentage
	Country/Rural Area	320	32.1%	43.4%
	Town/City	676	67.9%	56.6%
Demographics[2]				
Age				
	18 - 24	140	14.0%	12.2%

			Sample (N = 1,000)	North Carolina (N = 10,551,162)
	25 - 34	258	25.8%	16.6%
	35 - 44	299	29.9%	16.4%
	45 - 54	101	10.1%	16.4%
	55 - 64	104	10.4%	16.6%
	65 - 74	68	6.8%	13.4%
	75 years and over	30	3.0%	8.3%
Race/Ethnicity				
	American Indian or Alaska Native	18	1.8%	1.6%
	Asian	29	2.9%	3.2%
	Black or African American	257	25.7%	22.2%
	Hispanic or Latino	105	10.5%	9.8%
	Multiracial or Biracial	20	2.0%	2.3%
	Native Hawaiian or Pacific Islander	1	0.1%	0.1%
	Other	3	0.3%	---
	White	567	56.7%	62.6%
Gender identity				
	Male	466	46.6%	48.8%
	Female	521	52.1%	51.2%
	Non-binary / third gender	8	0.8%	---
	Prefer not to say	5	0.5%	---
Employment status				
	Employed	716	71.6%	57.4%
	Unemployed	87	8.7%	3.5%
	Not in the labor force	197	19.7%	37.8%
Education level				
	High school or less	259	25.9%	35.2%
	Some college	356	35.6%	39.9%
	4-year degree	226	22.6%	21.7%
	Masters or more	159	15.9%	13.2%

			Sample (N = 1,000)	North Carolina (N = 10,551,162)
Total household income before taxes				
	Less than $10,000	77	7.7%	
	$10,000 - $19,999	102	10.2%	
	$20,000 - $29,999	118	11.8%	
	$30,000 - $39,999	111	11.1%	
	$40,000 - $49,999	97	9.7%	
	$50,000 - $59,999	110	11.0%	
	$60,000 - $69,999	57	5.7%	$61,972 (median household income in North Carolina)
	$70,000 - $79,999	76	7.6%	
	$80,000 - $89,999	40	4.0%	
	$90,000 - $99,999	43	4.3%	
	$100,000 - $149,999	112	11.2%	
	$150,000 - $199,999	28	2.8%	
	$200,000 or more	29	2.9%	
Household Characteristics				
Total number of people in household				
	1	438	43.8%	
	2	263	26.3%	
	3	188	18.8%	
	4	76	7.6%	
	5 or more	35	3.5%	
Number of children in household				
	0	438	43.8%	
	1	263	26.3%	
	2	188	18.8%	
	3 or more	111	11.1%	
Length of tenure at current residence				
	0 to 5 years	447	44.7%	
	6 to 10 years	270	27.0%	

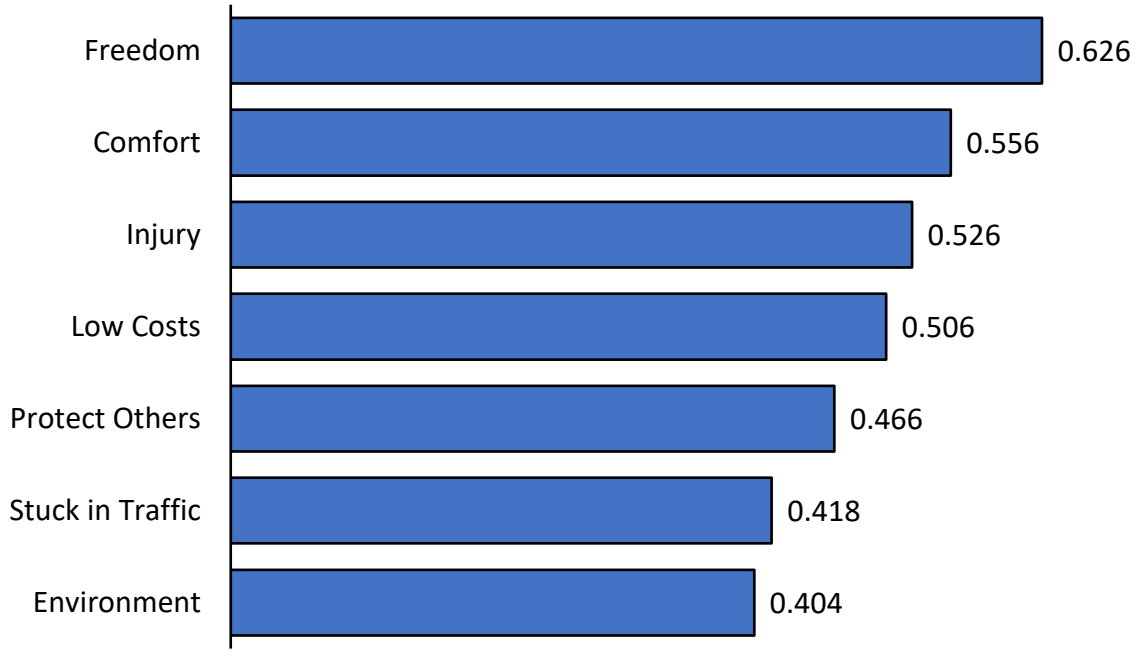
			Sample (N = 1,000)	North Carolina (N = 10,551,162)
	10 to 15 years	124	12.4%	
	More than 15 years	159	15.9%	
Transportation and Travel Patterns				
Number of available vehicles				
	0	47	4.7%	
	1	476	47.6%	
	2	380	38.0%	
	3 or more	97	9.7%	
Typical ultilitarian travel mode				
	Driving a car, SUV, or truck	626	62.6%	
	Riding a bicycle	83	8.3%	
	Riding a motorcycle	15	1.5%	
	Riding in a car, SUV, or truck as a passenger	73	7.3%	
	Taking transit	98	9.8%	
	Walking	105	10.5%	
School travel mode prior to turning 16 years old				
	Rode in a car, truck, or SUV	211	21.1%	
	Rode the school bus	402	40.2%	
	Walked	230	23.0%	
	Bicycled	108	10.8%	
	Rode public transit	49	4.9%	

[1]North Carolina Office of State Budget and Management (2020). [2]United States Census Bureau (2021).

RQ1: What do survey participants most value for their personal transportation?

Figure1 provides a response to the first research question. It displays the distribution of rankings that participants assigned to each of seven transportation values—or values' weighted-average ranks. Study participants ranked "Having Freedom to Go Where and When I Want to" highest. Next came "Being Comfortable", "Not Getting Injured", and "Keeping Travel Costs Low", all which received weighted-average ranks greater than 0.50, signifying a point at which most participants assigned a rank higher than the middle rank, which was 3.5 out of a possible 7 ranking.

Figure 1. Weighted-average rank of transportation values (N = 1,000).

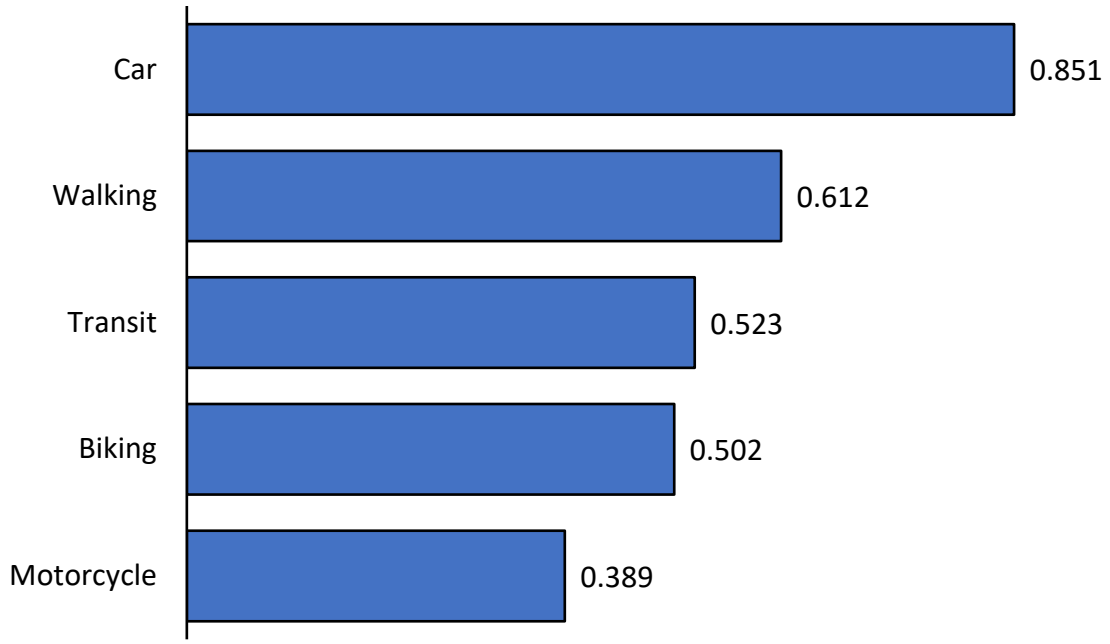


Note. Freedom = “Having freedom in where and when I go”; Comfort = “Being comfortable”; Injury = "Not getting injured”; Low Costs = “Keeping travel costs low”; Protect Others = “Protecting other road users from getting injured”; Stuck in Traffic = “Not being stuck in traffic”; Environment = “Reducing my impact on the environment”

RQ2: How important is being able to get places by foot, bike, transit, or car to survey participants (i.e., what are their “travel mode aspirations”)?

As with **Figure 1, Figure 2** responds to the second research question by displaying participants’ weighted-average mean travel mode aspirations. Participants generally believed being able to drive motor vehicles in the future was most important. Next came the importance of walking, taking transit, and riding bicycles to get places, all of which were important to most (> 50%) study participants. The least important prospective travel mode for participants was the motorcycle; nonetheless a sizable minority of participants reported motorcycling aspirations.

Figure 2. Participants' weighted-average mean travel mode aspirations (N = 1,000).



Note. Car = "taking a car, SUV, or truck"; Walking = "walking"; Transit = "taking transit"; Biking = "biking"; and Motorcycle = "riding a motorcycle"

Thus far, we have explored participants' reported transportation values and travel mode aspirations. We now turn to the third research question, which pertains to a central concern of this research: whether and to what extent pluralistic ignorance regarding others' perceived transportation values and aspirations for which modes they use to get around exists within the study sample.

Evidence of Pluralistic Ignorance

RQ3: How consistent (or inconsistent) are participants' own transportation values and travel mode aspirations with their perceptions of others' values and aspirations?

In responding to RQ3, the team employed the Wilcoxon sign rank test. This procedure compares two matched samples (i.e., participants' self-reported transportation values and their beliefs about others' values) to assess the magnitude of observed differences between two sets of values rankings from the same participants. In **Table 3**, a z score with a p value of < 0.05 indicates a statistically significant disparity between self and perceived others' values rankings. The "Positive" column reports the sum of positive ranks, whereas the "Negative" column reports the sum of negative ranks, and the "Same" column reports the proportion of self and perceived other rankings that were identical to one another. In this context, "Positive" signifies the proportion of participants who *believed they held the value in higher regards than others* had, and "Negative" signifies the proportion of participants who b*elieved others ranked the value higher than they themselves* had.

As displayed in **Table 3**, a disproportionate percentage (43.9%) of participants mistakenly believed that others valued avoiding being stuck in traffic more than truly privileged this value.

Table 3. Wilcoxon sign rank test results comparing participants' self- and perceived other assessments of ranked transportation values.

Value	z	*p*	Positive	Negative	Same
Have freedom in when and where I go	1.536	0.125	36.6%	32.4%	31.0%
Keep travel costs low	0.581	0.562	40.6%	37.9%	21.5%
Avoid being stuck in traffic	**-3.759***	0.000	34.6%	**43.9%**	21.5%
Be comfortable	0.444	0.657	40.0%	36.6%	23.4%
Protect others from injury	1.187	0.236	41.8%	36.5%	21.7%
Reduce my environmental impact	1.549	0.121	40.2%	33.9%	25.9%
Avoid injury	0.393	0.695	38.4%	37.4%	24.2%

And as displayed in **Table 4**, pluralistic ignorance around others' travel mode aspirations pertained to biking and taking transit. That is, more than a quarter of study participants overestimated the degree to which others aspired to ride bicycles or take transit.

Table 4. Wilcoxon sign rank test results comparing participants' self- and perceived other assessments of rated travel mode aspirations.

Aspirations	z	*p*	Positive	Negative	Same
Walking aspirations	1.173	0.241	21.2%	19.0%	59.8%
Biking aspirations	**-3.815***	0.000	18.7%	**26.6%**	54.7%
Transit aspirations	**-4.054***	0.000	17.6%	**25.7%**	56.7%
Car travel aspirations	2.228*	0.026	15.4%	11.9%	72.7%

Next, we explore how study participants might be divided according to their transportation values, travel mode aspirations, travel habits, and additional factors.

Traveler classes

RQ4: How might transportation values and travel mode aspirations segment the North Carolina population into subgroups of traveler types or classes?

a. How do these traveler classes differ according to their demographics; typically used travel modes; life circumstances; and transportation-related values, aspirations, and beliefs?
b. To what extent does ignorance of others' transportation values interplay with participants' engagement in political matters pertaining to transportation issues?

To identify potential traveler classes among the study sample, the team employed latent class analysis (LCA), which uses statistical methods to subgroup people or objects into classes according to shared features across class members. LCA models work on the assumption that the observed distribution of the variables is the result of an unobserved blend of underlying distributions. Using a set of observed indicators, LCA models identify solutions that best describe these latent classes within which the indicators follow the same distribution. Once identified, mathematically, the classes are homogeneous within, but distinct from each other. LCA models do not assign individuals to latent classes; rather, ***probabilities*** are generated for membership in all the identified classes in the model. Unlike cluster analysis, which segments populations into smaller groups based on shared characteristics, LCA does not rely on researcher-selected distance measures to identify clusters; instead, LCA employs model fit statistics to determine the most appropriate number of classes.

In the present study, lower Akaike's and Bayesian information criterion (AIC and BIC, respectively) scores demonstrated the appropriateness of a three-class solution.

- 3-factor solution: 47083.652 AIC; 47387.933 BIC
- 4-factor solution: 48827.330 AIC; 49210.135 BIC

These three distinct latent classes are summarized in **Table 5**. Aligned with results from Bösehans and Walker (2020) on supramodal goals, our team's analysis identified: (1) Convenience Enthusiasts; (2) Injury Emphasizers; and (3) Aspiring Multimodalists.

The **Convenience Enthusiasts**—constituting about 35% of the study sample (n = 352)—tended to favor car travel to other modes and possessed the strongest travel mode habits and highest relative satisfaction with their travel modes than members of other classes. They also valued freedom in when and where they travel more than others and possessed strong car-driving aspirations and weak walking aspirations.

Injury Emphasizers—representing about 16% of the study sample (n = 162)—relied less on car travel than members of other classes (typically walking and taking transit to get places), were least satisfied with their primary travel modes, valued avoiding injuries and protecting others from injury more than members of other classes, and possessed high relative aspirations to walk and ride bicycles.

The final group were the **Aspiring Multimodalists.** Members of this group, representing nearly half of the study sample (n = 486), oriented their travel patterns toward blending driving with other modes and were more likely than Convenience Enthusiasts to walk for all trip purposes. Aspiring Multimodalists also possessed moderate travel habits and travel mode satisfaction, valued reducing their environmental impact more than others, and aspired to both drive and walk to get around.

Table 5. Traveler class summaries.

Class	Main Modes	Habit	Travel Mode Satisfaction	Defining Transportation Value(s)	Travel Mode Aspirations
Convenience Enthusiasts (n = 352)	Always Car 56.5% Car + Other Modes 24.7% Passenger 7.7%	Highest overall (*M* =2.34, *SD* = 0.62)	Highest overall (*M* =3.07, *SD* = 0.99)	Freedom (0.762) / *Other Classes (0.626)*	Car Aspiration (0.968) Walking Aspiration (0.402)
Injury Emphasizers (n = 162)	Walker 21.6% Transit 21.0% Car + Other Modes 19.8%	Lowest overall (*M* =1.41, *SD* = 0.57)	Lowest overall (*M* =2.12, *SD* = 1.11)	Avoiding Injury (0.603) / *Other Classes (0.526)* Protecting Others (0.541) / *Other Classes (0.466)*	Walking Aspiration (0.457) Biking Aspiration (0.453)
Aspiring Multimodalists (n = 486)	Always Car 35.2% Car + Other Modes 27.4% Walker 10.5%	Moderate (*M* =2.08, *SD* = 0.63)	Moderate (*M* =3.04, *SD* = 1.02)	Reducing Environmental Impact (0.491) / *Other Classes (0.404)*	Car Aspiration (0.916) Walking Aspiration (0.816)

Note. "Defining Transportation Value(s)" refers to the values that class members rated significantly higher than members of other classes.

Table 6 shows that Class 1 members (Convenience Enthusiasts) were more likely than members of other classes to mistakenly believe others valued avoiding being stuck in traffic than was the case.

Table 6. Wilcoxon sign rank test results comparing participants' self- and perceived other values around avoiding being stuck in traffic by latent class assignment.

	z	*p*	Positive	Negative	Same
Class 1	**-3.638***	0.000	31.0%	**46.3%**	22.7%
Class 2	-1.642	0.101	35.2%	46.9%	17.9%
Class 3	-1.348	0.178	37.0%	41.2%	21.8%

Tables 7 and **8** provide evidence of pluralistic ignorance around others' biking and transit use aspirations. In **Table 7**, we see that nearly 43% of Class 1 members (Convenience Enthusiasts) overestimated the extent to which other adults in their communities aspired to ride bicycles. Conversely, a little more than 24% of Class 3 members (Aspiring Multimodalists) underestimated the degree to which others aspired to bike to get places. **Table 8**, on the other hand, indicates that 34.4% of Class 1 members (Convenience Enthusiasts) overestimated the degree to which other adults in their communities aspired to take transit to get places.

Table 7. Wilcoxon sign rank test results comparing participants' self- and perceived others' biking aspirations by latent class assignment.

	z	*p*	Positive	Negative	Same
Class 1	**-9.519***	0.000	7.4%	**42.6%**	50.0%
Class 2	0.068	0.513	26.5%	22.2%	51.2%
Class 3	**2.879***	0.004	**24.3%**	16.5%	59.3%

Table 8. Wilcoxon sign rank test results comparing participants' self- and perceived others' transit use aspirations by latent class assignment.

	Z	*p*	Positive	Negative	Same
Class 1	**-6.448***	0.000	11.9%	**34.4%**	53.7%
Class 2	-1.132	0.261	19.8%	27.2%	53.1%
Class 3	0.720	0.474	21.0%	18.9%	60.1%

As depicted in **Table 9**, participants assigned to Class 1 (Convenience Enthusiasts) were more likely than the rest of the study sample to be retired or unemployed, be older than 35 years of age, drive most places, possess strong travel mode habits, and have been driven to school growing up. Convenience Enthusiasts were less likely than members of other classes to ride a bike, take transit, or walk most places today. They were also less likely than others to have ridden a bike to school growing up, or to feel ready and prepared to engage politically or socially in transportation-related discussions, which seems to be related to their lower likelihood of engaging politically and socially with transportation issues.

Participants assigned to Class 2 (Injury Emphasizers) tended to be employed and to walk, bike, or take transit rather than drive cars to get places as compared with other participants. Injury Emphasizers were also more likely than participants in other classes to engage politically in transportation issues, despite reporting not feeling ready and prepared to be politically involved with transportation matters.

Finally, Class 3 participants (Aspiring Multimodalists) tended to be employed and both more willing and prepared to engage politically and socially with transportation issues, as well as more politically and socially engaged than others. They were less likely than others to predominantly drive cars to get places and to have ridden on a school bus growing up. Instead, Aspiring Multimodalists were more likely than others to have ridden a bike to school growing up (**Table 9**).

Table 9. Demographic and behavioral characteristics of latent class members.

	Class 1		**Class 2**		**Class 3**	
	OR	**SE**	**OR**	**SE**	**OR**	**SE**
Town	1.137	0.205	0.958	0.216	0.913	0.143
Number of household vehicles						
0	referent					
1	1.356	0.567	0.813	0.336	0.761	0.275
2	1.640	0.712	0.625	0.273	0.701	0.262
Female	1.080	0.185	1.149	0.253	0.893	0.133
Age (> 35 years)	**1.507***	0.284	0.819	0.193	0.850	0.138
Black	2.094	0.862	0.753	0.280	0.963	0.288
Hispanic / Latinx	2.248	1.024	0.746	0.329	0.854	0.289

	Class 1		Class 2		Class 3	
	OR	**SE**	**OR**	**SE**	**OR**	**SE**
White	1.938	0.758	0.594	0.205	1.042	0.293
Tenure (> 10 years)	0.843	0.161	0.967	0.254	1.092	0.185
College degree or higher	0.926	0.176	0.626	0.167	1.277	0.213
Children in household	0.929	0.170	0.707	0.167	1.293	0.206
Household income ($60,000 or higher)	0.822	0.161	1.173	0.304	1.089	0.185
Retired/unemployed	**2.395***	0.527	**0.520***	0.163	**0.623***	0.125
Strong modal habit	**2.271***	0.449	**0.245***	0.057	1.215	0.205
Willing and prepared to engage	**0.537***	0.094	**0.239***	0.062	**3.277***	0.500
Car driver	**2.012***	0.374	**0.311***	0.104	**0.690***	0.122
Cyclist	**0.331***	0.159	**2.255***	0.827	0.973	0.289
Transit rider	**0.358***	0.124	**2.644***	0.831	0.993	0.258
Walker	**0.463***	0.158	**2.449***	0.798	0.923	0.244
Rode in a car to school	**2.084***	0.776	1.577	0.455	1.084	0.209
Walked to school	1.738	0.643	1.149	0.323	1.247	0.241
Rode a bike to school	**0.388***	0.133	0.624	0.236	**2.382***	0.630
Rode a bus to school	**2.575***	0.884	1.602	0.606	**0.420***	0.111
Discuss transportation with others	**0.624***	0.118	0.995	0.260	**1.645***	0.284
Politically engaged with transportation issues	**0.284***	0.056	**2.324***	0.559	**1.585***	0.259
Constant	0.086	0.060	1.074	0.654	0.393	0.200
Log likelihood	-470.809		-302.484		-588.265	
Pseudo R2	0.274		0.317		0.151	
AIC	991.619		654.967		1226.52	
BIC	1114.313		777.661		1349.22	

Note. OR = odds ratio. SE = standard error of the mean. *$p < 0.05$. AIC = Akaike's Information Criteria; BIC = Bayesian Information Criteria.

Figure 3 provides weighted distributions of participants' transportation values by latent class membership. Class 1 members (Convenience Enthusiasts) privileged "having freedom in where and when I go", followed by "being comfortable" and "avoiding injury." Class 2 members (Injury Emphasizers) prioritized "avoiding injury" and "protecting other road users from getting injured", then favored "having freedom in where and when I go." Lastly, Class 3 members (Aspiring Multimodalists) prioritized "having freedom in where and when I go", "being comfortable" and then "keeping travel costs low." The black line in Figure 3 illustrates the weighted mean distribution of value rankings among all 1,000 study participants.

Figure 3. Transportation values by latent class membership.

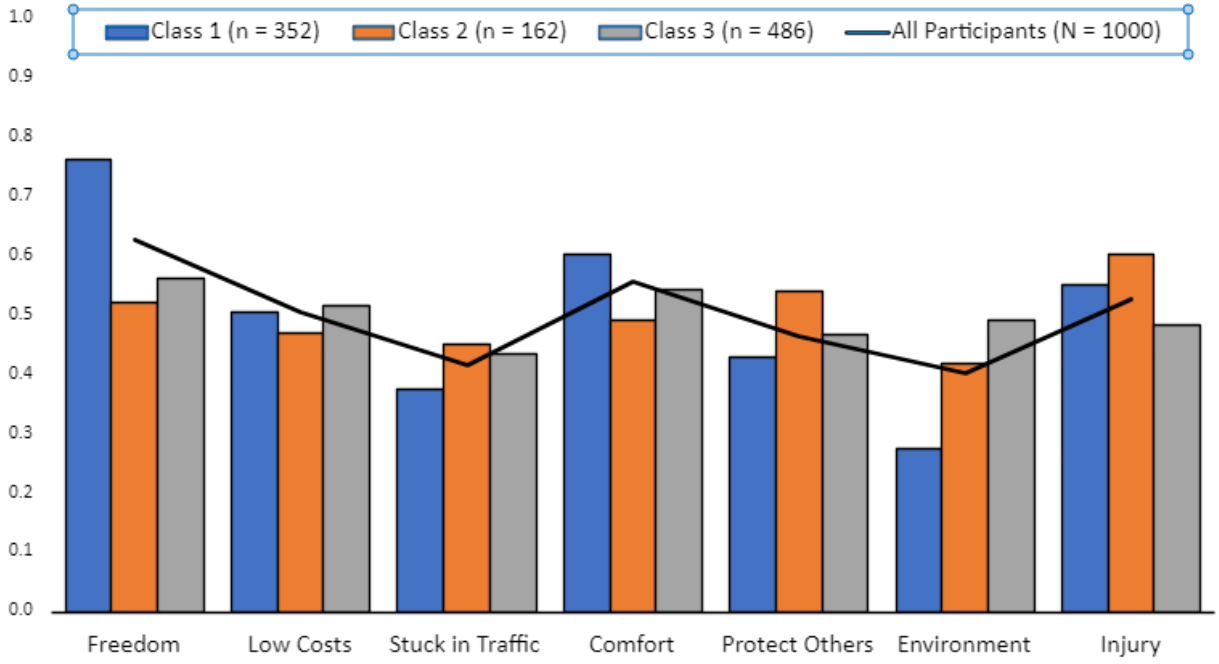
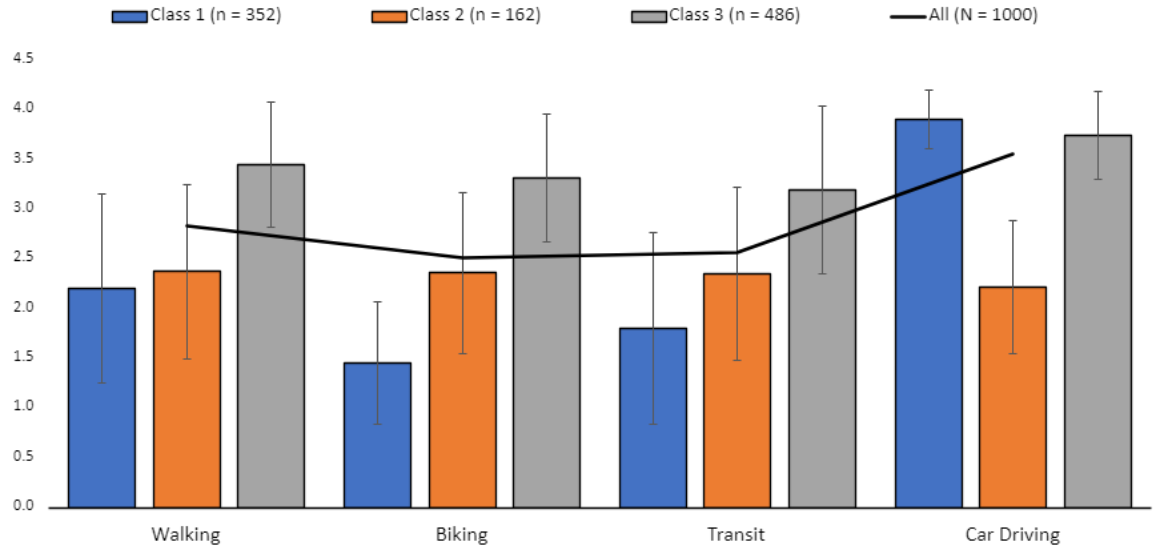


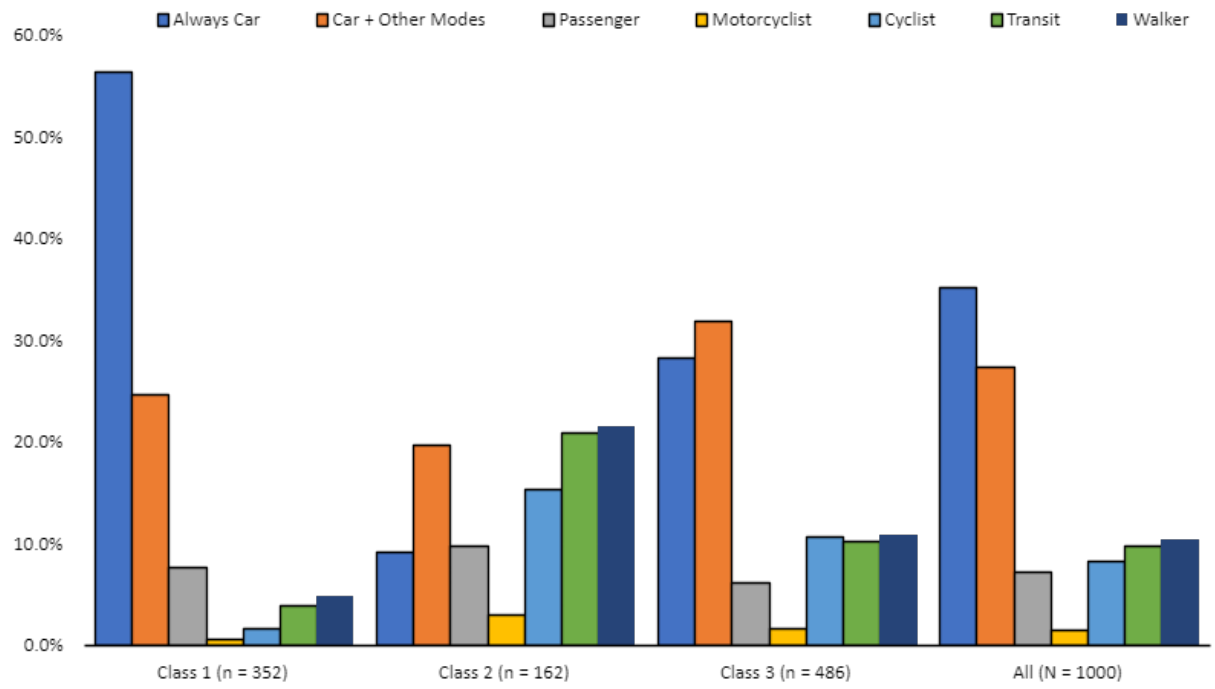
Figure 4 provides average ratings and standard errors for latent class members' travel mode aspirations. Class 1 members (Convenience Enthusiasts) aspired to drive cars, SUVs, and trucks, followed by a distant second aspiration to walk more. Conversely, Class 2 members (Injury Emphasizers) aspired to walk, take transit, and ride bicycles more than they aspired to drive motor vehicles. Class 3 members (Aspiring Multimodalists) aspired to drive motor vehicles, then to walk, bike, and take transit. The black line in Figure 4 depicts average travel mode aspiration ratings among all 1,000 study participants.

Figure 4. Travel mode aspirations by latent class membership.



Largely aligned with their travel mode aspirations, **Figure 5** details latent class members' typical travel modes. Class 1 members (Convenience Enthusiasts) overwhelmingly always drove motor vehicles to get to places, sometimes blended car use with other modes and rode in cars as a passenger. They seldom used other modes, such as walking, taking transit, bicycling, or motorcycling. In contract to Class 1 members, Class 2 members (Injury Emphasizers) tended to walk, take transit, blend car driving with other modes, and to ride bicycles to get to places. They less frequently than others rode in cars as passengers, always used cars, or rode motorcycles to travel. Finally, Class 3 members (Aspiring Multimodalists) were oriented more toward blending car travel with other modes, then with solely using motor vehicles. About 10% of Aspiring Multimodalists took transit, walked, or bicycled to get places, whereas very few of them rode motorcycles for utilitarian purposes. **Figure 5** illustrates how Aspiring Multimodalists closely resembled all 1,000 study participants in their travel mode behaviors, yet the former group engaged in greater degrees of bicycling and blending of motor vehicle travel and other modes.

Figure 5. Typical travel mode by latent class membership.



As explored thus far, our team has discovered that members of different latent classes differ along demographic, perceptual, political, and behavioral dimensions. We now investigate ways in which participants' transportation values and travel mode aspirations and their beliefs about others' values and aspirations interplay with the different latent classes' engagement in transportation-oriented political and social activity.

Transportation-related political and social engagement of traveler classes

Table 10 displays results of exploratory logit models which estimated the probability of political engagement according to participants' assignment to one of three latent classes. Those participants assigned to Class 1 (Convenience Enthusiasts) were the least politically engaged class, especially among those Convenience Enthusiasts who believed other adults in their community did not aspire to ride bicycles and those who had lived in their communities for less than 10 years. Conversely, Class 2 (Injury Emphasizers) tended to be more politically engaged than members of other classes. Further, Injury Emphasizers with children under 18 years of age at home and who valued reducing their travel-related environmental impact were particularly involved politically in transportation issues. Finally, those Class 3 members (Aspiring Multimodalists) who were younger than 35 years, living in rural areas of North Carolina, and who believed others possessed strong motorcycling aspirations were more politically involved with transportation than others in their class (**Table 10**).

Table 10. Demographics, travel behaviors, and political engagement among members of the three identified latent classes.

	Class 1		Class 2		Class 3		All participants	
	OR	**SE**	**OR**	**SE**	**OR**	**SE**	**OR**	**SE**
Town	1.155	0.455	0.730	0.363	**0.521***	0.126	**0.674***	0.116
Number of household vehicles								
0	referent		referent		referent		referent	
1	3.047	3.816	0.783	0.638	1.289	0.836	0.920	0.359
2	5.096	6.468	1.273	1.075	1.478	0.978	1.111	0.446
Female	0.946	0.363	0.922	0.472	0.803	0.173	0.800	0.129
> 35 years	0.513	0.207	0.792	0.401	**0.526***	0.118	**0.539***	0.090
Black	0.406	0.332	0.213	0.191	1.158	0.501	0.613	0.196
Hispanic / Latinx	0.336	0.296	**0.126***	0.132	0.700	0.341	**0.411***	0.148
White	0.240	0.188	**0.147***	0.121	1.033	0.420	**0.482***	0.145
Tenure (> 10 years)	**2.865***	1.189	0.801	0.498	1.106	0.270	1.343	0.249
College degree or higher	0.886	0.357	0.955	0.583	1.475	0.370	1.207	0.221
Children in household	1.054	0.410	**3.946***	2.046	1.179	0.295	**1.431***	0.252
Household income of $60,000 or higher	0.661	0.297	0.446	0.255	0.799	0.199	0.797	0.149
Retired / unemployed	0.873	0.444	0.953	0.615	0.841	0.294	0.884	0.207
Strong modal habit	0.436	0.191	**0.108***	0.064	**0.529***	0.129	**0.321***	0.057

	Class 1		Class 2		Class 3		All participants	
	OR	**SE**	**OR**	**SE**	**OR**	**SE**	**OR**	**SE**
Willing and prepared to engage	1.447	0.527	1.290	0.901	1.669*	0.395	1.254	0.218
Stuck in traffic-self	1.086	0.401	1.380	0.684	1.415	0.310	**1.374***	0.221
Stuck in traffic-others	0.638	0.246	2.167	1.087	1.218	0.258	1.131	0.182
Environment-self	1.066	0.399	**2.944***	1.592	1.375	0.305	1.371	0.225
Environment-others	2.106	0.817	0.774	0.405	1.382	0.301	**1.462***	0.236
Biking aspiration-self	2.734	1.660	0.672	0.341	1.438	0.549	**1.592***	0.304
Biking aspiration-others	**2.176***	0.845	0.786	0.413	0.707	0.222	0.918	0.180
Motorcycling aspiration-self	**3.364***	1.862	1.704	1.060	1.626	0.425	**1.803***	0.349
Motorcycling aspiration-others	0.573	0.260	2.803	1.616	**1.948***	0.527	**1.505***	0.288
Discuss transportation with others	**3.453***	1.446	**7.113***	3.805	**4.637***	1.429	**4.657***	0.950
Constant	0.083	0.142	1.377	1.865	0.120	0.105	0.358	0.200
Log likelihood	-117.129		-67.425		-287.144		-517.013	
Pseudo R2	0.205		0.350		0.147		0.205	
AIC	284.259		184.845		616.288		1084.027	
BIC	380.850		262.040		704.198		1206.721	

Note. OR = odds ratio. SE = standard error of the mean. *$p < 0.05$. AIC = Akaike's Information Criteria; BIC = Bayesian Information Criteria.

Complementing the political engagement models displayed in **Table 10, Table 11** provides results of exploratory logit models estimating the probability of discussing transportation matters with others according to participants' assignment to one of three latent classes. Class 1 (Convenience Enthusiasts) participants who lived in towns or cities in North Carolina, believed others possessed motorcycling aspirations, and who were politically engaged in transportation issues were more likely than others in their class to discuss these issues with others. Class 2 (Injury Emphasizers) participants who racially identified as White and reported being political engaged in transportation matters were more likely than others in their class to discuss these matters with others. And Class 3 (Aspiring Multimodalists) participants with children in their households, strong travel mode habits, a penchant to engage in transportation-related political activity, and beliefs in others valuing reducing their environmental travel impact were more likely than others in their

class to discuss transportation matters with other people. Across the entire study sample, social engagement with transportation issues was associated with having children in the house, possessing a willingness and readiness to discuss transportation, and a higher probability to be politically involved with transportation matters.

Table 11. Demographics, travel behaviors, and likelihood of discussing transportation with others among members of the three identified latent classes.

	Class 1		Class 2		Class 3		All	
	OR	**SE**	**OR**	**SE**	**OR**	**SE**	**OR**	**SE**
Town	**2.043***	0.561	1.196	0.602	1.038	0.314	1.225	0.201
Number of household vehicles								
0								
1	0.437	0.286	0.518	0.406	1.155	0.711	0.721	0.251
2	0.332	0.226	0.557	0.449	1.643	1.074	0.817	0.297
Female	0.725	0.199	0.477	0.246	1.016	0.284	0.814	0.131
Age (> 35 yearse)	0.840	0.264	0.905	0.466	1.370	0.416	0.902	0.160
Black	0.294	0.252	3.324	2.318	0.816	0.452	0.817	0.262
Hispanic / Latinx	0.736	0.673	1.023	0.659	1.053	0.665	1.894	0.747
White	0.361	0.297	**6.632***	4.371	1.093	0.568	1.032	0.313
Tenure (> 10 years)	**0.448***	0.128	0.584	0.333	1.022	0.329	**0.675***	0.118
College degree or higher	0.854	0.243	0.596	0.322	0.820	0.275	0.826	0.150
Children in household	1.101	0.322	1.336	0.678	**1.993***	0.601	**1.680***	0.287
Household income ($60,000 or higher)	1.225	0.390	2.227	1.332	0.913	0.308	1.190	0.225
Retired / unemployed	**0.328***	0.101	0.608	0.372	**0.340***	0.127	0.379*	0.074
Strong modal habit	1.600	0.551	1.601	1.004	**2.184***	0.633	1.135	0.199
Willing and prepared to engage	1.647	0.458	0.306	0.215	**2.545***	0.752	**1.890***	0.328
Stuck in Traffic-self	1.134	0.311	1.033	0.486	0.591	0.175	0.898	0.145
Stuck in Traffic-others	0.885	0.248	0.682	0.368	0.903	0.255	1.061	0.172
Environment-self	1.692	0.486	1.198	0.606	0.663	0.197	1.243	0.208

	Class 1		Class 2		Class 3		All	
	OR	**SE**	**OR**	**SE**	**OR**	**SE**	**OR**	**SE**
Environment-others	0.948	0.297	0.810	0.406	**1.969***	0.593	1.364	0.232
Biking aspiration-self	0.565	0.310	0.435	0.227	0.677	0.360	1.253	0.239
Biking aspiration-others	0.990	0.308	0.925	0.463	1.490	0.552	1.296	0.245
Motorcycling aspiration-self	0.592	0.276	1.788	1.191	**0.495***	0.173	0.972	0.206
Motorcycling aspiration-others	**1.974***	0.685	0.805	0.482	1.004	0.354	1.280	0.254
Politically engaged with transportation issues	**3.456***	1.444	**7.209***	3.923	**4.655***	1.455	**4.517***	0.914
Constant	4.984	5.900	0.794	1.010	1.047	1.025	1.410	0.741
Log likelihood	-195.642		-66.218		-181.41		-487.200	
Pseudo R2	0.197		0.250		0.226		0.209	
AIC	441.284		180.437		412.830		1024.40	
BIC	537.875		250.864		517.485		1147.09	

Note. OR = odds ratio. SE = standard error of the mean. *$p < 0.05$. AIC = Akaike's Information Criteria; BIC = Bayesian Information Criteria.

It is worth noting that the logistic regression model results displayed in **Tables 10 and 11** do not report interaction effects between participants' own transportation values and aspirations and their assessment of others' values and aspirations. While identifying models with the best theoretical and empirical fit, the team found that none of the tested interaction effects were significantly associated with political or social activity around transportation matters. As such, we followed the advice of Lorah (2020) by focusing on the main effects of participants' self and perceived others' transportation values and travel mode aspirations.

Public and State DOT Priority and Value Alignment

From the results of our survey thus far, it appears that most study participants valued freedom in where and when they go, comfort, and avoiding injury, as well as blending car use with other modes such as walking and using transit to get around. This brings us to our fifth and final research question.

RQ5: To what degree do public values in transportation and travel mode aspirations align (or not) with NCDOT's evident priorities and travel mode affordances?

In addressing our final research question, the team first sought to conceptualize NCDOT priorities and values. We conceived of NCDOT's priorities by drawing upon three of the agency's values-expressing materials and policies via adhering to the notion that transportation policy, decision-making, and budgeting are all expressions of policymaker and agency values (e.g., see: Abdel-Monem et al., 2016). They are also illustrations of the authority required to pursue goals related to these values.

Methods

Material selection

To carry out the analysis, the team drew upon three NCDOT and North Carolina General Assembly resources:

1. The first values-expressing resource the team investigated included NCDOT's stated vision, mission, and goals, which the agency provides on its website.[ii]
2. The second resource included North Carolina's Strategic Transportation Investments (STI) law and policy caps, which the state's General Assembly created and NCDOT uses to prioritize projects and allocate funding for various purposes (e.g., construction, maintenance, debt service, "other modes" [aviation, rail, public transit, bike]).[iii]
3. And the third and final resource the team examined was NCDOT's Safety and Mobility Unit introductory page.[iv] We selected this departmental unit, as it is the office within the agency ostensibly tasked with ensuring and sustaining the safety and mobility needs of the traveling public.

Analytic Procedures

To guide us in analyzing the content of the resources listed above, we consulted Flyvbjerg's "phronetic planning analysis." Flyvbjerg argues that a primary role for social research is to provide insight into the ways power and values shape outcomes and the consequences of these outcomes, thereby shedding light on means of nudging policy consequences in more socially beneficially directions (Flyvbjerg, 2002). Phronetic analysis is intended to add to an ongoing policy dialogue via posing questions designed to uncover interconnections between social organizations and the surrounding social structure. A phronetic analysis is similar to a case study in that it seeks to investigate the *how and the why* behind a phenomenon, yet can also be used to examine policy on a smaller scale and in greater depth. Flyvbjerg envisions this as an iterative process, rather than one which ends upon the discovery of some "right answer" (Flyvbjerg, 2002). In this process, the researcher and others who are interested in the process draw conclusions based on their interpretation of the *raison d'être* of the policies in question.

Our phronetic analysis was comprised of posing and responding to three questions associated with the policy resources under assessment:

1. Where are we going with planning?
2. Who gains and who loses, and by which mechanisms of power?
3. Is this development desirable?

In responding to each of the questions above, our team employed framing analysis, a methodological approach to textual analysis to investigate how entities portray social issues (Foley et al., 2019). To begin, we addressed the first phronetic analysis question—*Where are we going with planning?* We examined NCDOT's stated Vision, Mission, Goals and Values, North Carolina's STI law and policy caps, and the language framing

inherent in NCDOT's Safety and Mobility Unit introductory webpage. What is revealed from addressing the first question informed our responses to the second and third questions.

Results

Where are we going with planning?

In responding to this first phronetic analysis question, we turn the NCDOT's Vision, Mission, Goals and Values.[v] What follows are a listing of the agency's vision, mission, goals, and values, and then a term-based analysis of these.

Vision: "NCDOT: A global leader in providing innovative transportation solutions"
Mission: "Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina."

Goals:

- "Make transportation safer
- Provide GREAT customer service
- Deliver and maintain our infrastructure effectively and efficiently
- Improve the reliability and connectivity of the transportation system
- Promote economic growth through better use of our infrastructure
- Make our organization a great place to work"

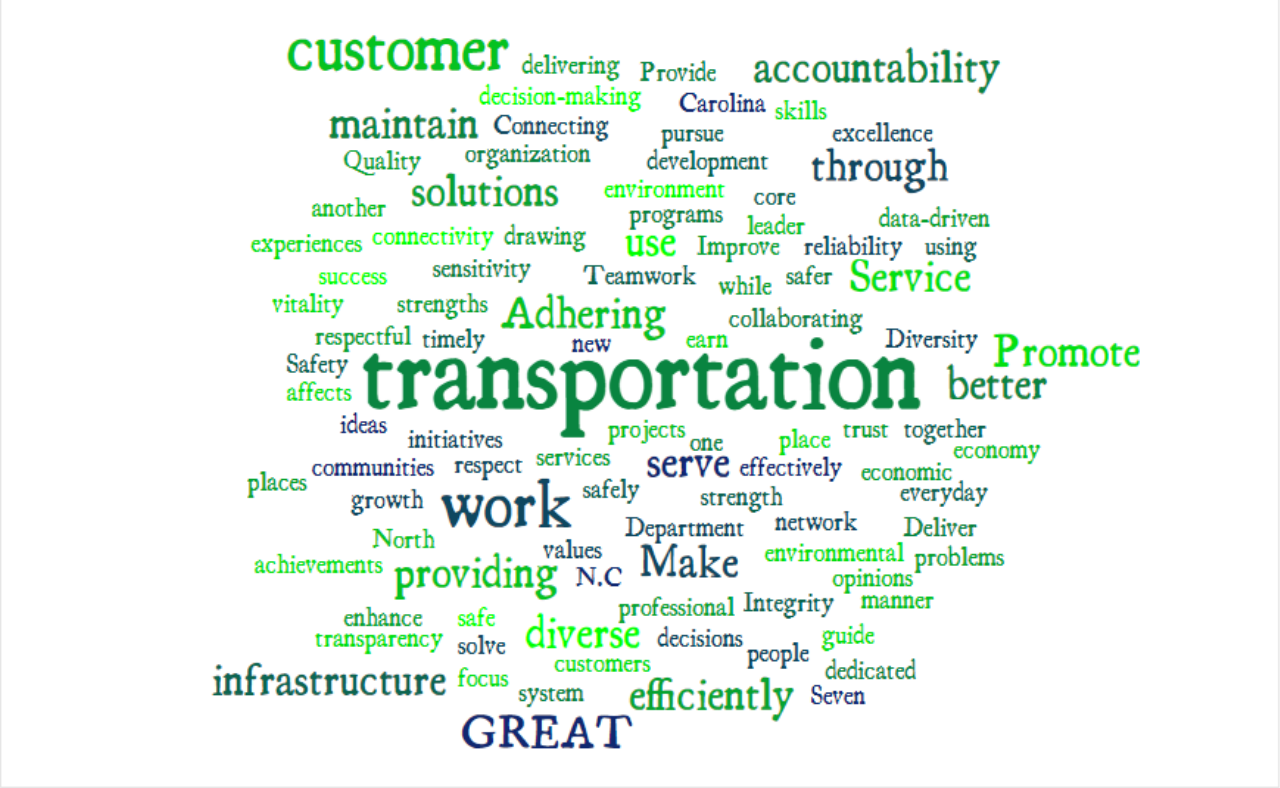
Values:

- "*Safety (and Health)*- We are dedicated to providing a safe transportation network and work environment.
- *Customer Service* – We serve our customers in a respectful, professional and timely manner.
- *Diversity (and Inclusion)* – We respect one another while drawing strength from our diverse options, ideas, and experiences.
- *Integrity (and Ethics)* – We earn and maintain trust through accountability, transparency and data-driven decisions.
- *Quality* – We pursue excellence in delivering our projects, programs, services and initiatives.
- *Teamwork (and Collaboration)* – We work together using our diverse strengths and skills, collaborating to solve problems and serve our communities.
- *Innovation (and Creativity)* – We promote the development and use of new and better solutions."

There is a great deal to unpack within NCDOT's vision, mission, goals, and values statements; thus, the team decided to visualize the terms used in these statements by generating the word cloud displayed in **Figure 6.** From the figure, terms such as "transportation", "work", "great", "customer" and "efficiently" are most conspicuous, indicating their relative frequency of use in the NCDOT's vision, mission, goals, and values statements. These terms outline the ostensible values and purpose of the agency.

Goal terms such as "safety", "safely", "diversity", and "trust" are smaller and thus less commonly referenced in the statements. Similarly, *social terms*, including "environment", "place(s)", "people", and "trust", are also less frequently mentioned in the statements. It appears the agency favors the term "customer" over "people", and "solutions" over "collaborating." Largely absent from the statements are additional *goal terms*, such as "choice" and "participation", words and phrases that evoke just participation in decision-making and the provision of meaningful mobility choices for communities. Thus, in terms of **where NCDOT is going with planning**, we conclude that it is toward the creation and maintenance of an efficient transportation system, one that affords efficient delivery of goods, and is responsive to perceived and real customer concerns about travel delays and traffic congestion.

Figure 6. A word cloud of NCDOT's Mission, Vision, Goals, and Values.



Source: https://worditout.com/word-cloud/create

The Strategic Transportation Investments (STI) Law determines the allocation of transportation funding across the state and ultimately defines what the state transportation landscape looks like. Projects are scored based on criteria determined by the Strategic Mobility Formula, which is broken down into "Division Needs", "Regional Impact", and "Statewide Mobility." In the "Statewide Mobility" funding category, 40% of all funding is dedicated to large highway projects, major airports, or freight rail projects. "Regional Impact" projects, which receive 30% of all funding, typically has motor vehicle projects compete with projects supporting other modes such as regional public transit for funding. The remaining 30% of funding goes to a category called "Division Needs" and includes smaller airports, all other road projects (e.g., secondary roads and some local roads), all other transit projects, ferry, and bicycle and pedestrian projects where a local match exists (NCDOT, 2023a).

As DeGood (2022) illustrates, local governments or Metropolitan Planning Organizations (MPOs) that plan for non-highway projects compete for an exceedingly small slice of the pie; namely, the 6% that remains after accounting for the funds dedicated to highway construction and maintenance. Thus, according to the STI Law, **where NCDOT and the North Carolina General Assembly are going with planning** is attempting to reduce or manage vehicle travel times through a program of road and seaport expansion, which commonly contribute to more driving, and quite possibly to a suppression of broader use of transit and active transportation modes (Santos et al., 2010; Downs, 2005).

Regarding NCDOT's Mobility and Safety Unit—the entity tasked with maintaining and improving the safety and mobility of transportation in North Carolina—its webpage begins with this statement:

> "North Carolina's population has grown tremendously in recent years, making the state one of the fastest growing in the nation. More people living, working, and visiting North Carolina also means more people on the roads."

From this initial frame (i.e., linking NC's rapid population growth with accompanying growth in "people on the roads"), the Unit provokes thinking about ever-growing amounts of traffic and congestion on the state's roads. This introduction presents population and thus traffic growth as linked problems to manage.

The next statement on the Safety and Mobility Unit's webpage outlines the Unit's purpose and function:

> "The N.C. Department of Transportation's Mobility and Safety Unit studies new designs for intersections, interchanges, and traffic signals to help keep people moving safely and reaching their destinations more quickly."

In framing analysis, it is important to examine what is said, but also what is left unsaid (Johnston, 2013). The Unit's webpage lets the reader know that "keeping people moving safely" is a goal, as is facilitating people reaching destinations "more quickly." Thus, it seems safe, efficient, and swift movement through innovative design of intersections is the purpose of the Mobility and Safety Unit[vi]. The Unit's webpage does not express values pertaining to other community goals, such as equitable access to destinations, transportation emissions reductions, or place-making functionalities (e.g., socializing, physical activity, community art).

In the third statement on the Safety and Mobility Unit's webpage, the Unit adds to its primary function with the following:

> "In addition to the innovative designs, the unit also relies on technology, data and other traffic management tools to identify the best feasible solutions for improving the transportation network."

It is not clear what is meant by "improving the transportation network", yet the preceding language, especially reference to "technology, data, and other traffic management tools", suggests that transportation network improvements relate to the initial Safety and Mobility Unit's function statement of "keeping people moving safely...and more quickly."

The Safety and Mobility Unit's introductory webpage ends with a table presenting labels and brief descriptions of 12 "innovations and other measures." These include: (1) All-Way Stops; (2) Bus on Shoulder; (3) Continuous Flow Intersection; (4) Diverging Diamond Interchange; (5) On-Ramp Signal; (6) Quadrant Left; (7) Roundabout; (8) Reduced Conflict Intersections; (9) Speed Limits; (10) Through-Cut Intersections; (11) Turbine Interchange; and (12) Dynamic Zipper Merge.

It is worth noting that 5 of these 12 innovations and measures mention the "safety" of road users, and 4 out of the 5 times "safety" or "safer" is referenced, it is coupled with "reducing travel delays" or managing "traffic flow." For example, the Unit's page describes the Diverging Diamond Interchange as a design that "moves high volumes of traffic through an intersection quicker and safer..." In contrast, All-Way Stops is the only listed measure that references safety without mentioning swift, less congested travel. Even here, All-Way Stops are described as an "efficient and cost-effective way to improve the safety" while none of the measures designed to "reduce travel times" are also framed as being "cost-effective".

Moreover, the design innovations listed on the Safety and Mobility webpage represent substantial investments in roadway environments that are nearly universally focused on the efficient movement of motor vehicles, rather than other community mobility goals (e.g., ensuring that people of varying abilities have safe access to community destinations, or providing North Carolina residents with viable mobility choices). Indeed, many Unit-privileged countermeasures are rather costly. For example, in 2013, NCDOT installed a turbine interchange at a cost of $92.2 million (Thompson, 2013).

Concerning **where the Safety and Mobility Unit is going with planning**, it appears the Unit is attempting to integrate motorists' safety as an add-on to a construction program designed to manage travel delays and afford quick and efficient motorized travel.

Who gains and who loses, and by which mechanisms of power?

Considering where NCDOT is going with planning—managing travel delays through a program of efficient motorized transportation—we turn to reflecting on **who gains and who loses, and by which mechanisms of power** under the current regime.

Who gains? It is evident from NCDOT's vision and mission language—which centers "efficient transportation for customers"—and the agency's budgets and prioritization methods, that the North Carolina General Assembly and NCDOT prioritize the efficient movement of freight and the affordance of automobility above other transportation values and goals. This means that people who own motor vehicles are privileged in the current system. Also privileged are people who can afford costs associated with parking and vehicle insurance and maintenance. Consider how 40% of Strategic Mobility Formula funding is dedicated to the "Statewide Mobility" funding category, which involves no local input and relies entirely on data (NCDOT, 2023a), or the Safety and Mobility Unit's presentation of design innovations and measures, most of which reference the measures' ability to reduce travel delays and deliver efficient traffic flows.

Who loses? Given NCDOT's stated vision, mission, and goals, which are organized around safe, efficient transportation that facilitates economic growth; the funding formulas and prioritization schemes embedded in the STI Law, which are oriented toward longer-distance interstate and intra-state travel and freight; and the Safety and Mobility Unit's prioritized travel time-reducing design innovations and measures, North Carolina community members who cannot or are unwilling to drive private vehicles, as well as those who struggle to afford automobility can be marginalized in the current system. These members include, at the very least, younger and older North Carolina residents who are legally or physically incapable of operating vehicles; lower-income communities that cannot afford to purchase, insure, and maintain private vehicles; and to a lesser extent, those who prefer to access essential services and community life using non-auto travel modes.

Funding allocations for communal and active transportation modes are limited to less than 6% of all STI funding (NCDOT, 2023a). And, critically, state law prevents state funding from being used as matching funds to support federally funded independent (i.e., not connected with additional roadway improvements) bicycle and pedestrian projects. Not only that, under the present structure of NCDOT owning and maintaining most of the state's principal roadways, counties and municipalities have little influence under the STI structure. Contextualized, local safety and access issues must often be addressed through a regional MPO or NCDOT Division, where projects from neighboring jurisdictions compete for points in the state's project prioritization process.

By which mechanisms of power. The primary mechanism of power in North Carolina's transportation system is the STI's "data-driven" process, which ultimately determines funding allocation per project. As referenced, this process is oriented toward automobility and efficient freight transportation. **Tables 12** and **13** provide information on the values (framed as "criteria"), measures of these values, and the weights each value is assigned for both highway mobility and bike and pedestrian projects.

Table 12. Highway Mobility Scoring (adapted from NCDOT, 2023a).

Criteria	Measure	Scoring Weight*
Congestion	Existing levels of mobility along congested roadways	22.5%
Benefit/cost	Expected benefits over a 10-year period relative to costs to NCDOT (a function of travel time savings + predicted crash reductions / project costs)	20.5%
Safety	Existing crashes along a project relative to expected future crash reductions	10%
Freight	Indicators of freight movement	14.5%
Economic competitiveness	Expected increase in gross domestic product and jobs over a 10-year period	10%
Accessibility/connectivity	Increased access to opportunity in rural and less affluent areas and improved connectivity to the existing transportation network	4.5%

Note. *Scoring weights account for (1) the weight assigned to each criterion within (2) each STI category. Highway Mobility projects are eligible to receive funding from all funding categories within the STI (i.e., Statewide Mobility, Regional Impact, and Division Needs).

Under the agency's Bike and Pedestrian scoring system, funding criteria (and indicators and average scoring weights) are shown in Table 13.

Table 13. Bike and Pedestrian Scoring (adapted from NCDOT, 2023a).

Criteria	Measure	Scoring Weight*
Safety	Number of crashes, posted speed limit, crash severity, and project safety benefit	15%
Access	Destination type and distance to prime destination	10%
Demand/density	Number of households and employees per square mile near facility	10%
Connectivity	Degree of bike/pedestrian separation from roadway, connectivity to a similar or better project type, part of/connection to a national/state/regional bike route	10%
Cost effectiveness	Safety + access + demand + connectivity / cost to NCDOT	5%

Note. *Scoring weights account for (1) the weight assigned to each criterion within (2) each STI category. Unlike Highway Mobility projects, Bike and Pedestrian projects are only eligible to receive funding from the Division Needs funding category within the STI (i.e., Statewide Mobility, Regional Impact, and Division Needs).

The STI's predominantly "data-driven" procedures evidently privilege indicators of congestion mitigation, followed by projects' benefit/cost ratios (i.e., a function of travel time savings + predicted crash reductions /

project cost), then indicators of freight movement (with an average 14.5% scoring weight), safety and economic competitiveness, and finally, projects' accessibility/connectivity.

The funding criteria that comprise the STI prioritization scheme constitute the primary mechanisms of power which shape who gains and who loses under the current transportation regime in North Carolina. The way the appointed funding criteria are operationalized is limited. For example, is "access" truly a simple measure of distance to certain destinations? And does the number of crashes adequately capture the construct of "safety"? What about near misses and the large number of bicycle and pedestrian crashes and injuries that are underreported to police each year (see: Edwards & Gutierrez, 2023; Sandt et al., 2020)? Another limitation of the funding criteria involves the omission of additional criteria, such as public health measures (e.g., population-level physical activity), environmental measures (e.g., local air quality, habitat restoration, climate change mitigation), measures of viable mobility choices, and equity access to these choices.

Is this development desirable?

To guide the team in answering whether and to what extent the current system in North Carolina is "desirable", we incorporate a few key findings from our study of people's transportation values and travel mode aspirations. We can then compare the evident values embedded in the transportation system at the state policy level, as represented in the reviewed policy documents and pages, to those of our study participants.

Whereas the 1,000 North Carolina-based participants in our study most valued "having freedom in where and when I go", "being comfortable", and "avoiding getting injured", they valued "avoiding being stuck in traffic" and "reducing my impact on the environment" the least. However, NCDOT, as expressed in its stated Vision, Mission, Goals, and Values, the North Carolina General Assembly's STI prioritization policy, and the Safety and Mobility Unit's ostensible purpose and innovative design measures, the organizing principle of NCDOT is to provide customers and freight entities some degree of safety, while providing efficient, time-saving transportation. Thus, there appears to be little alignment between study participants' and the General Assembly's and NCDOT's ostensible values in transportation.

Further, though most of our study's participants aspired to drive cars in the future, nearly half of the sample aligned with a latent class we identified as "Aspiring Multimodalists." These participants preferred blending car use with walking and taking transit to get around. Unfortunately, current NCDOT practices—e.g., privileging efficient automobility—are not consistent with multimodalism, nor are they responsive to Injury Emphasizers' concerns about their own and others' safety on the roads. Thus, the present development and management of North Carolina's road network is desirable to perhaps one-third of the traveling public in the state. In contrast, this development is likely to be perceived as less desirable to two-thirds of the population and ethically speaking, to future generations who will confront worsening realities from increasing population growth and climate disruptions in auto-dominated landscapes.

Discussion

The team surveyed 1,000 residents of North Carolina about their transportation values, travel mode aspirations, perceptions of others' values and aspirations, travel habits, transportation-related political activity, and demographic factors. Our team discovered that participants most favored self-direction in travel ("having freedom in where and when I go"), which was followed by a hedonism value ("being comfortable") and a security value ("avoiding getting injured"). The values which ranked lowest included the power value for "avoiding being stuck in traffic" and the universalism value of "reducing my impact on the environment."

We recognize that the phrase "having freedom in where and when I go" could be interpreted in diverse ways. For example, the phrase could reference desires for immediately gratifying private motor vehicle travel. However, this value was privileged across modal groups—except among cyclists, who most valued avoiding injury—and among at least two-thirds of the study sample. Together with "being comfortable", it appears people generally desire a pleasant, autonomy-supporting, convenient experience with their transportation.

In terms of participants' travel mode aspirations, by and large, they aspired to drive motor vehicles in the future. However, large numbers of participants aspired to walk more, which was followed by using transit, cycling, and finally, riding a motorcycle.

Interestingly, study participants were not always accurate with their assessment of others' values and travel mode aspirations. Nearly 44% of participants mistakenly believed others placed higher priority on avoiding being stuck in traffic than was reality. Regarding travel mode aspirations, participants overestimated the degree to which others aspired to ride bicycles or use transit. We attribute the ignorance around being stuck in traffic to biased exposure to information and biased memory for information (Mastroianni & Gilbert, 2023). For example, in an investigation of more than 1,110 U.S. TV news agencies' crash-featuring Facebook posts, researchers discovered that more than a third of all crash-featuring Facebook posts framed the occasions as phenomena that cause travel delays for motorists (LaJeunesse et al., 2021). Additionally, our findings are consistent with a Dutch study that discovered how members of the public overestimated others' concern over traffic congestion. Whereas only 15% of Dutch people ostensibly endure traffic jams each week and a mere 5% of the population perceive them as personal a problem, 35% believe traffic congestion to be a social problem (Krabbenborg et al., 2020).

To further investigate the distribution of transportation values, aspirations, beliefs, and political and social action across the study population, the team carried out a latent class analysis. This type of analysis drew upon participants' transportation values, travel mode aspirations and habits, as well as their satisfaction using their primary modes to discern unobserved variation and clustering among participants. This procedure assigned participants to one of three classes: (1) *Convenience Enthusiasts* tended to be unemployed or retired older middle-aged adults who are satisfied with driving everywhere they need and want to go. They were also the least politically and socially engaged class when it comes to discussing transportation matters. (2) *Injury Emphasizers* were most often younger and employed adults, who also tended to be mildly modally dissatisfied pedestrians and transit users for the majority of their trips. Injury Emphasizers were collectively the most politically engaged class. Finally, (3) *Aspiring Multimodalists* were often younger middle-aged multimodalists who are satisfied with their usual travel mode, and the most socially engaged class when it came to discussing transportation issues with others.

It is interesting to consider how the present study's latent classes align with earlier, cycling-focused work by Dill and McNeil (2016):

- The present study's Class 1 (*Convenience Enthusiasts*) map onto the "no way, no how" in Dill and McNeil (2016);
- Class 2 (*Injury Emphasizers*) are positioned closer to the "strong, fearless, enthused and confident" end of Dill and McNeil's (2016) spectrum; and
- Class 3 (*Aspiring Multimodalists*) could be considered "interested, but concerned."

However, the present latent classes are not limited to cycling. Instead, they encompass general travel mode habits, aspirations, and transportation-related values. Thus, the present study, rather than promoting a single travel mode, orients policy solutions toward viable modal choice for the purposes of protecting road users

from harm, rendering these choices comfortable and convenient, and affording people the ability to align their travel behaviors with their social and environmental values—indeed, Class 3 (*Aspiring Multimodalists*) participants, constituting nearly half the sample—desired modal choice and to reduce their negative environmental impacts from travel. Further, Class 2 (*Injury Emphasizers*) participants often did not report fearlessness or even confidence; rather, many of them preferred active travel modes, yet were unhappy with their modal situation. This modal dissatisfaction may have been a motivating factor for many of these class members to be politically involved in transportation matters.

Pluralistic ignorance around valuing the avoidance of being stuck in traffic was not evenly distributed among the study sample. Convenience Enthusiasts, constituting about one-third of the study population, were the least politically and socially engaged class with respect to transportation issues. Even though deviance from the social norm was only perceived, it shows how potential isolation from the larger population can lead to larger differences between an individual's beliefs and the population's beliefs, contributing to the formation of pluralistic ignorance (Eveland & Shah, 2003). Conversely, Injury Emphasizers and Aspiring Multimodalists were both more likely than Convenience Enthusiasts to participate in social and political activity around transportation issues.

Complementing our examination of the study sample's transportation-related values, aspirations, habits, social beliefs, and behaviors, our team carried out a phronetic framing analysis of NCDOT's vision, mission, goals and values, North Carolina's Strategic Transportation Investment policy and NCDOT's Safety and Mobility Unit, which revealed two key insights. First, it appears that economic growth and efficient movement of motor vehicles and goods are the organizing goals of NCDOT. For example, the engineering countermeasures featured on the Mobility and Safety Unit's introductory webpage privilege efficient movement of vehicles through a location, rather than leveraging infrastructure to improve the safety and quality of life of those who reside and work in the area proximal to the countermeasures. Second, and in relation to North Carolina's STI process, it is evident that the state authority figures de-emphasize public perspectives and desires. Though state-owned roads run through most towns and cities in North Carolina, STI procedures require no public involvement for projects assigned to NCDOT's "Statewide Mobility" funding category. In fact, Statewide Mobility projects, which receive 40% of transportation revenues "are based 100 percent on data."[vii]

Though NCDOT does not seem to develop many of its prioritizations from the expressed will of the public, it could be that the agency's and North Carolina General Assembly's leaders adhere to an economic view of humanity (e.g., see Graeber, 2011). The notion that the complex, interacting costs and benefits of large capital road constructions—costs and benefits that unfold over different time scales and to varying degrees over time—can be summed up in a simple cost-benefit ratio, or that people generally choose actions that minimize their costs and expenditures of effort and maximize what they most want is in keeping with traditional economists' view of humans (Parks & Gowdy, 2013). Reality is far less rational and entirely more complex. People often wish to maximize pleasure and minimize pain, yes. They also seek to engage in self-directed behavior, to coordinate socially, and to pursue meaningful activities (Ryan & Deci, 2000; Bradshaw et al., 2021). This potential misread of human goals and motivations may partially explain the General Assembly's and NCDOT's privileging of congestion mitigation, travel efficiency, and investments in minimizing traveler delay. Nonetheless, when policies do not align with the values of the people impacted by the transportation system, this can indicate an imbalance of power in the decision-making process, which can erode trust in public institutions and government (Pridmore & Miola, 2011).

The question remains about whether and to what extent economic growth and efficient movement of people and goods should serve as an organizing principle of any state's transportation planning and investment. In their exploration of demand-side policies to facilitate population-level shifts toward low- and zero-carbon lifestyles—thus complementing the more popular supply-side climate policy solutions (e.g., establish binding international agreements, dedicate monetary compensation for nonextraction of fossil fuels)—Creutzig and colleagues (2022) argue that instead of basing transportation investment decisions on observed use of travel modes and distances, policymakers and practitioners should use measures of high-quality and equitable

accessibility to essential services as a foundation for transportation planning. We see this as a worthier and more population-aligned purpose for a state's transportation system.

Study Limitations

Despite the discovery of potentially policy-relevant findings from this study, it possesses several shortcomings. First, our study relied on a cross-sectional survey design, which is limited to illustrating associations among variables, rather than contributors to change. Further, our dependent variable only assessed whether participants contacted politicians or government officials about transportation issues. Our study did not identify what those issues may have been, nor did it capture other forms of political engagement, such as letters to the editor, protesting, demonstrating, petitioning, etc. (Jenkins et al., 2003). Further, we did not include other potentially powerful constructs, such as social norms, political orientations, or racial resentment, all of which have the potential to shape political and social involvement in transportation matters (e.g., Morris & LeCount, 2020; Lister, 2007).

Moreover, our findings are not likely generalizable outside of North Carolina. Also, an insufficient number of valid zip codes prevented the team from conducting sub-state comparative analyses, such as examining values and aspirations across diverse geographies and under distinct socio-political conditions. Not only that, but there are also likely superior ways to discern public agencies' values and priorities. Examples include corpus analysis of public documents, municipal proceedings, online discussions, etc., which could reveal people's explicit and implicit transportation mindsets, ideologies, social norms, values, interests, and myriad complementary perspectives (e.g., Joss et al., 2019).

Practical Implications

It is our hope that these findings are useful to those invested in elevating public discourse around transportation values and priorities, and that state governments and agencies receive valuable information about what their constituencies most desire from their transportation system. We also hope that researchers, advocates, and policymakers in North Carolina and other U.S. states find our questionnaire useful in determining their constituencies' transportation-related values and travel mode aspirations. Additionally, transportation demand management and behaviorally oriented transportation and public health professionals could benefit from leveraging the identified values, aspirations, and demographics of our study's latent classes. For example, members of the largest latent class, the Aspiring Multimodalists, might respond favorably to campaigns that emphasize the benefits of mobility choices and the capacity to align travel behaviors with pro-social and environmental values. More broadly, expanding mobility options could be framed as providing road users with greater freedom in choosing how and when they get around.

Fortunately, providing compelling, representative information to the public and policymakers about the realities of people's transportation priorities can play a vital role in improving the political feasibility of implementing Complete Streets and Safe System principles, as has been the case with racial desegregation (O'Gorman, 1975), water conservation (Monin & Norton, 2003), addressing gender stereotypes among children (Prentice & Miller, 1996) and alcohol consumption on college campuses (Schroeder & Prentice, 1998), as well as increasing social action on climate change (Geiger & Swim, 2016; Jacobs, 2019). Ideally, correcting mistaken beliefs around others' transportation values can provide a start to aligning community desires and governmental investments.

Conclusion

The purpose of this study was to uncover the values and travel mode aspirations of adults living in North Carolina, to assess their beliefs about others' values and travel mode aspirations, to discern discrepancies in these self-other beliefs, to assess whether and to what extent self-other belief discrepancies (i.e., pluralistic ignorance) inform participants' engagement in political activity around transportation issues, and to discern the degree of alignment of participants' values and travel mode aspirations with the North Carolina General Assembly's and NCDOT's evident priorities. We found participants most value freedom in choosing when and where they travel, being comfortable, and avoiding injury. They also aspired to drive places, but also to walk

and take transit to get around. We also discovered that nearly 44% of the study sample overestimated the value others place on avoiding traffic jams, and about 25% overestimated others' aspirations to ride bicycles or use transit. These indications of pluralistic ignorance were concentrated among latent classes of older participants who favored driving and were politically and socially disengaged from transportation matters. Despite the stated values and aspirations of the study participants, the evident policies and practices of the North Carolina General Assembly and Department of Transportation are aligned with an estimated third of the study sample, i.e., they are oriented toward efficient motor vehicle travel, and minimization of driver delay). An estimated two-thirds of the study sample are presently not being afforded the safety and travel mode choices they desire. Our hope is that state and local transportation agencies prioritize the acquisition of a deeper understanding and appreciation of their constituencies' transportation-related values and aspirations, and that they can bring their agencies' priorities into greater alignment with what the public values and desires.

References

Abdel-Monem, T., Herian, M. N., Hoppe, R., PytlikZillig, L. M., & Tomkins, A. J. (2016). Policymakers' perceptions of the benefits of citizen-budgeting activities. *Public Performance & Management Review, 39*(4), 835-863. https://doi.org/10.1080/15309576.2015.1137774.

Ajzen, I. (2020). The theory of planned behavior: Frequently asked questions. *Human Behavior and Emerging Technologies, 2*(4), 314-324. https://doi.org/10.1002/hbe2.195.

Bösehans, G., & Walker, I. (2020). Do supra-modal traveller types exist? A travel behaviour market segmentation using goal framing theory. *Transportation (Dordrecht), 47*(1), 243-273. https://doi.org/10.1007/s11116-018-9874-7.

Bradshaw, E. L., Sahdra, B. K., Ciarrochi, J., Parker, P. D., Martos, T., & Ryan, R. M. (2021). A configural approach to aspirations: The social breadth of aspiration profiles predicts well-being over and above the intrinsic and extrinsic aspirations that comprise the profiles. J*ournal of personality and social psychology, 120*(1), 226-256. https://doi.org/10.1037/pspp0000374.

Common Cause Foundation. (2016). *Perceptions matter: The Common Cause UK values survey*. https://valuesandframes.org/resources/CCF_survey_perceptions_matter_full_report.pdf.

Conrad, F. G., & Blair, J. (2009). Sources of error in cognitive interviews. *Public Opinion Quarterly, 73*(1), 32-55. https://doi.org/10.1093/poq/nfp013

Cradock, A. L., Barrett, J. L., Chriqui, J. F., Evenson, K. R., Goins, K. V., Gustat, J., Heinrich, K. M., Perry, C. K., Scanze, M., Schmid, T. L., Tabak, R. G., Umstattd Meyer, M. R., & Valko, C. (2018). Driven to support: Individual- and county-level factors associated with public support for active transportation policies. *American Journal of Health Promotion, 32*(3), 657-666. doi:10.1177/0890117117738758.

Creutzig, F., Niamir, L., Bai, X., Callaghan, M., Cullen, J., Díaz-José, J., Figueroa, M., Grubler, A., Lamb, W. F., Leip, A., Masanet, E., Mata, É., Mattach, L., Minx, J. C., Mirasgedis, S., Mulugetta, Y., Nugroho, S. B., Pathak, M., Perkins, P., …Ürge-Vorsatz, D. (2022). Demand-side solutions to climate change mitigation consistent with high levels of well-being. *Nature Climate Change, 12*(1), 36-46. https://doi.org/10.1038/s41558-021-01219-y.

DeGood, K. (2022). *North Carolina's strategic transportation investments law is a barrier to progressive transportation.* Center for American Progress. https://www.americanprogress.org/article/north-carolinas-strategic-transportation-investments-law-is-a-barrier-to-progressive-transportation/.

Dill, J., & McNeil, N. (2016). Revisiting the four types of cyclists: Findings from a national survey. *Transportation Research Record, 2587*(1), 90-99. https://doi.org/10.3141/2587-11

Downs, A. (2005). *Still stuck in traffic: coping with peak-hour traffic congestion*. Brookings Institution Press.

Edwards, M., & Gutierrez, M. (2023). The incidence burden of unreported pedestrian crashes in Illinois. *Traffic Injury Prevention, 24*(1), 82-88.

Eveland Jr, W. P., & Shah, D. V. (2003). The impact of individual and interpersonal factors on perceived news media bias. *Political psychology, 24*(1), 101-117.

Flyvbjerg, B. (2002). *Making social science matter.* New York, NY: Cambridge University Press.

Foley, K., Ward, P., & McNaughton, D. (2019). Innovating qualitative framing analysis for purposes of media analysis within public health inquiry. *Qualitative Health Research, 29*(12), 1810-1822. https://doi.org/10.1177/1049732319826559

Gase, L. N., Barragan, N. C., Simon, P. A., Jackson, R. J., & Kuo, T. (2015). Public awareness of and support for infrastructure changes designed to increase walking and biking in Los Angeles county. *Preventive Medicine, 72*, 70-75. doi:10.1016/j.ypmed.2014.12.033.

Geiger, N., & Swim, J. K. (2016). Climate of silence: Pluralistic ignorance as a barrier to climate change discussion. *Journal of Environmental Psychology, 47*, 79-90. doi:10.1016/j.jenvp.2016.05.002.

Goren, P., Schoen, H., Reifler, J., Scotto, T., & Chittick, W. (2016). A unified theory of value-based reasoning and US public opinion. *Political Behavior, 38*(4), 977-997. https://doi.org/10.1007/s11109-016-9344-x.

Graeber, D. (2011). Value, politics and democracy in the United States. *Current Sociology, 59*(2), 186-199. https://doi.org/10.1177/0011392110391151

Halbesleben, J. R. B. (2009). The role of pluralistic ignorance in the reporting of sexual harassment. Basic and *Applied Social Psychology, 31*(3), 210-217. doi:10.1080/01973530903058284.

Hancock, K., Heiny, S., Saleem, T., LaJeunesse, S., Blank, K., Agans, R., & O'Brien, S. W. (2020). *Public phone survey measures, methods, and results* (Final Report RP 2020-53; Watch for Me NC). North Carolina Department of Transportation. https://www.watchformenc.org/about/

Jacobs, J. R. (2019). Pluralistic ignorance and social action on climate change. *EMBO Reports, 20*(3). doi:10.15252/embr.201847426.

Jenkins, K., Andolina, M., Keeter, S., & Zukin, C. (2003, April). *Is civic behavior political? Exploring the multidimensional nature of political participation*. In annual conference of the Midwest Political Science Association, Chicago.

Johnston, H. (2013). *A methodology for frame analysis: From discourse to cognitive schemata. In Social movements and culture* (pp. 217-246). Routledge.

Joss, S., Sengers, F., Schraven, D., Caprotti, F., & Dayot, Y. (2019). The smart city as global discourse: Storylines and critical junctures across 27 cities. *Journal of urban technology, 26*(1), 3-34.

Kasser, T., & Ryan, R. M. (1996). Further examining the American dream: Differential correlates of intrinsic and extrinsic goals. *Personality & Social Psychology Bulletin, 22*(3), 280-287. https://doi.org/10.1177/0146167296223006.

Kasser, T., & Sheldon, K. M. (2009). Time affluence as a path toward personal happiness and ethical business practice: Empirical evidence from four studies. *Journal of Business Ethics, 84*(Suppl 2), 243-255. https://doi.org/10.1007/s10551-008-9696-1.

Klein, N. J., Ralph, K., Thigpen, C., & Brown, A. (2022). Political partisanship and transportation reform. *Journal of the American Planning Association, 88*(2), 163-178. https://doi.org/10.1080/01944363.2021.1965495.

Krabbenborg, L., Mouter, N., Molin, E., Annema, J. A., & van Wee, B. (2020). Exploring public perceptions of tradable credits for congestion management in urban areas. Cities, 107, 102877.

LaJeunesse, S., Austin, L., Heiny, S., Kumfer, W., Pullen-Seufert, N., Morin, L., Nicolla, S., & Tackett, T. (2021). *Factors and frames that shape public discourse around road user safety* (No. CSCRS-R29). Collaborative Sciences Center for Road Safety.

LaJeunesse, S., & Rodríguez, D. A. (2012). Mindfulness, time affluence, and journey-based affect: Exploring relationships. *Transportation Research. Part F, Traffic Psychology and Behaviour, 15*(2), 196-205. https://doi.org/10.1016/j.trf.2011.12.010

Lister, M. (2007). Institutions, inequality and social norms: Explaining variations in participation. *The British Journal of Politics and International Relations, 9*(1), 20-35.

Lorah, J. A. (2020). Interpretation of main effects in the presence of non-significant interaction effects. *Tutorials in Quantitative Methods for Psychology, 16*(1), 33 -45. https://doi.org/10.20982/tqmp.16.1.p033.

Mastroianni, A. M., & Gilbert, D. T. (2023). The illusion of moral decline. *Nature*, 1-8. https://doi.org/10.1038/s41586-023-06137-x.

Miyajima, T., & Yamaguchi, H. (2017). I want to but I won't: Pluralistic ignorance inhibits intentions to take paternity leave in Japan. *Frontiers in Psychology, 8*, 1508-1508. doi:10.3389/fpsyg.2017.01508.

Monin, B., & Norton, M.I. (2003). Perceptions of a fluid consensus: Uniqueness bias, false consensus, false polarization, and pluralistic ignorance in a water conservation crisis. *Personality and Social Psychology Bulletin, 29*(5), 559-567.

Morris, R. C., & LeCount, R. J. (2020). The value of social control: Racial resentment, punitiveness, and white support for spending on law enforcement. *Sociological Perspectives, 63*(5), 697-718.

North Carolina Department of Transportation (NCDOT). (2019). *Uses of 2020-21 NCDOT appropriations.* https://connect.ncdot.gov/projects/planning/MPORPODocuments/P6.0%20Scoring%20Overview%20for%20BOT%206-6-2019.pdf.

NCDOT. (2021). *North Carolina Department of Transportation strategic plan: 2021 – 2023*. https://www.ncdot.gov/about-us/our-mission/Performance/Documents/StrategicPlan_2021_2023Biennium.pdf.

NCDOT. (2023a). *State Transportation Improvement Program: Prologue.* https://connect.ncdot.gov/projects/planning/STIPDocuments1/2024-2033%20STIP%20Prologue.pdf.

NCDOT. (2023b). *Safety & mobility.* https://www.ncdot.gov/initiatives-policies/Transportation/safety-mobility/Pages/default.aspx.

North Carolina Office of State Budget and Management. (2020). *Is North Carolina rural or urban?* https://www.osbm.nc.gov/blog/2020/11/19/north-carolina-rural-or-urban.

O'Gorman, H.J. (1975). Pluralistic ignorance and white estimates of white support for racial segregation. *Public Opinion Quarterly, 39*(3), 313-330.

Parks, S., & Gowdy, J. (2013). What have economists learned about valuing nature? A review essay. *Ecosystem Services, 3*, e1-e10. https://doi.org/10.1016/j.ecoser.2012.12.002.

Prentice, D. A., & Miller, D. T. (1996). Pluralistic ignorance and alcohol use on campus: Some consequences of misperceiving the social norm. *Journal of Personality and Social Psychology, 64*(2), 243–256. Https://doi.org/10.1037/0022-3514.64.2.243.

Pridmore, A., & Miola, A. (2011). *Public acceptability of sustainable transport measures: A review of the literature.* OECD Publishing. https://doi.org/10.1787/5kg9mq56dfs8-en.

Reuning, K., & Plutzer, E. (2020). Valid vs. invalid straightlining: The complex relationship between straightlining and data quality. *Survey Research Methods, 14*(5), 439-459. https://doi.org/10.18148/srm/2020.v14i5.7641

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78.

Sandt, L. S., Proescholdbell, S. K., Evenson, K. R., Robinson, W. R., Rodriguez, D. A., Harmon, K. J., & Marshall, S. W. (2020). Comparative analysis of pedestrian injuries using police, emergency department, and death certificate data sources in North Carolina, US, 2007–2012. *Transportation Research Record, 2674*(9), 687-700.

Santos, G., Behrendt, H., & Teytelboym, A. (2010). Part II: Policy instruments for sustainable road transport. *Research in Transportation Economics, 28*(1), 46-91.

Saris, W. E., Revilla, M., Krosnick, J. A., & Shaeffer, E. M. (2010). Comparing questions with agree/disagree response options to questions with item-specific response options. *Survey Research Methods, 4*(1), 45-59. https://doi.org/10.18148/srm/2010.v4i1.2682.

Schroeder, C. M., & Prentice, D. A. (1998). Exposing pluralistic ignorance to reduce alcohol use among college students. *Journal of Applied Social Psychology, 28*(23), 2150-2180.

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? J*ournal of social issues, 50*(4), 19-45. https://doi.org/10.1111/j.1540-4560.1994.tb01196.x.

Schwartz, S. H., Melech, G., Lehmann, A., Burgess, S., Harris, M., & Owens, V. (2016). Extending the cross-cultural validity of the theory of basic human values with a different method of measurement. *Journal of Cross-Cultural Psychology, 32*(5), 519-542. doi:10.1177/0022022101032005001.

Stark, J., & Hössinger, R. (2018). Attitudes and mode choice: Measurement and evaluation of interrelation. *Transportation Research Procedia, 32*, 501-512. https://doi.org/10.1016/j.trpro.2018.10.038

Thompson, J. (2013, July). *North Carolina steps boldly out of its comfort zone.* Public Roads: Federal Highway Administration. https://highways.dot.gov/public-roads/julyaugust-2013/north-carolina-steps-boldly-out-its-comfort-zone.

United States Census Bureau. (2021). *American Community Survey: SO201 selected population profile in the United States.* https://data.census.gov/table?q=North+Carolina&d=ACS+1-Year+Estimates+Selected+Population+Profiles&tid=ACSSPP1Y2021.S0201.

United States Department of Transportation (USDOT) & Federal Highway Administration (FHWA). (2020). *Summary of estimated total FY 2016 – 2020 apportionments under the Fixing America's Surface Transportation (FAST) Act.* https://www.fhwa.dot.gov/fastact/estfy20162020apports.pdf.

Vandello, J. A., Ransom, S., Hettinger, V. E., & Askew, K. (2009). Men's misperceptions about the acceptability and attractiveness of aggression. *Journal of Experimental Social Psychology, 45*(6), 1209-1219. doi:10.1016/j.jesp.2009.08.006.

Verplanken, B., & Orbell, S. (2003). Reflections on past behavior: A self-report index of habit strength. *Journal of Applied Social Psychology, 33*(6), 1313-1330. https://doi.org/10.1111/j.1559-1816.2003.tb01951.x.

Appendix A. Glossary of Key Terms

Agency priorities
The evident and relative importance agencies assign to a judgment criterion, method, project, program, or policy.

Cognitive interview
A procedure which elicits depictions of meanings and mental processes used by respondents to respond to questions. Cognitive interviews probe specific cognitive processes, such as comprehension of key terms and concepts, recall, judgment, and mental steps involved in the selection of answers. Findings from cognitive interviews derive from narratives on how respondents answered questions and provide insight into how respondents interpret questions and develop responses. These interviews are designed to enhance the legibility and quality of a questionnaire instrument.

Latent class analysis
A probabilistic measurement model employed to group individuals or entities together based on their pattern of responses to a set of categorical variables.

Pluralistic ignorance
A social psychological phenomenon that unfolds when individual members of a group (e.g., a school, team, workplace, or community) privately believe one thing and mistakenly assume most others believe the opposite. A common example involves college students who mistakenly believe underage drinking norms are stronger than they are, which places social pressure for some students to engage in underage drinking themselves despite their personal views of the practice.

Travel mode aspirations
A strong desire to use a certain travel mode in the future, as reflected in the degree of importance people ascribe to a particular travel mode.

Values
Evaluations of behavioral standards and what truly matters in life.

Appendix B. Questionnaire Record

Do you live in North Carolina?
- o Yes, I live in North Carolina
- o No, I do not live in North Carolina

Do you consider where you live a town or city, or out in the country?
- o Town/City
- o Country/Rural area
- o Don't know

How many vehicles (cars, vans, SUVs, trucks, and motorcycles) are kept at home for you to use?
- o 0
- o 1
- o 2
- o 3
- o 4
- o 5 or more

What is your age?
- o Under 18
- o 18 - 24
- o 25 - 34
- o 35 - 44
- o 45 - 54
- o 55 - 64
- o 65 - 74
- o 75 - 84
- o 85 or older

What gender do you identify as?
- o Male
- o Female
- o Non-binary / third gender
- o Prefer not to say

Which of the following best describes you?
- o American Indian or Alaska Native
- o Asian
- o Black or African American
- o Hispanic or Latinx
- o Native Hawaiian or Pacific Islander
- o White
- o Multiracial or Biracial
- o Other
- o Prefer not to say

What is your highest level of education?
- o Less than high school
- o High school graduate
- o Some college
- o 2 year degree

- 4 year degree
- Masters or professional degree
- Doctorate

What is your employment status?
- Employed full time
- Employed part time
- Unemployed looking for work
- Unemployed not looking for work
- Student
- Student and employed
- Retired
- Disabled

Please indicate your total household income before taxes.
- Less than $10,000
- $10,000 - $19,999
- $20,000 - $29,999
- $30,000 - $39,999
- $40,000 - $49,999
- $50,000 - $59,999
- $60,000 - $69,999
- $70,000 - $79,999
- $80,000 - $89,999
- $90,000 - $99,999
- $100,000 - $149,999
- $150,000 - $199,999
- $200,000 or more

Please enter the total number of people, including yourself, in your household. Enter a whole number (for example: 4):

How many children under the age of 18 are in your household? Enter a whole number (for example: 4):

How long have you lived at your current residence?
- 0 to 5 years
- 6 to 10 years
- 10 to 15 years
- More than 15 years

What is your zip code?

Before you turned 16 years old, what was the main way you got to school?
- Walked
- Bicycled
- Rode in a car, truck, or SUV
- Rode the school bus
- Rode public transit

Please complete the following statement.
"When I need to get somewhere, I usually get there by..."
- walking

- o riding a bicycle
- o taking transit
- o riding a motorcycle
- o driving a car, SUV, or truck
- o riding in a car, SUV, or truck as a passenger

During this past month, how often did you get around by [presented options drawn from response above]?

I got around by [presented options drawn from response above]:

- o for every trip.
- o for nearly every trip, but I occasionally got around by other means.
- o for about half of all trips, as I also got around by other means.
- o Other: I did not leave my house to go anywhere in the past month.

In general, how satisfied are you with the main way you get around these days?

- o Very dissatisfied
- o Dissatisfied
- o Neither satisfied nor dissatisfied
- o Satisfied
- o Very satisfied

Many people would like to get different places (e.g., work, shopping) in ways they may not today. In this section, you will see questions about how important **being able to** get places by foot, bike, transit, or car is to you.

How important is being able to get places using these different modes to you?

	Not important at all	Slightly important	Moderately important	Very important
walking	o	o	o	o
biking	o	o	o	o
taking transit	o	o	o	o
riding a motorcycle	o	o	o	o
taking a car	o	o	o	o

Please rank the following goals according to how important each is to you for your personal transportation (1 being the most important, and 7 being the least important). To rank each goal, click and drag it to where you think it belongs.

_____ Keeping travel costs low
_____ Not being stuck in traffic
_____ Being comfortable
_____ Having freedom in where and when I go
_____ Protecting other road users from getting injured
_____ Reducing my impact on the environment
_____ Not getting injured

In this section, questions will ask you to think about the travel habits and priorities of **other adults in your town, city, or area.**

In your opinion, how important is being able to get places using these different modes to **other adults** in your town, city, or area?

	Not important at all	Slightly important	Moderately important	Very important
walking	o	o	o	o
biking	o	o	o	o
taking transit	o	o	o	o
riding a motorcycle	o	o	o	o
taking a car	o	o	o	o

Please rank the following goals according to how important you think each is to **other adults** in your town, city, or area for their personal transportation (1 being the most important for other adults, and 7 being the least important for other adults). To rank each goal, click and drag it to where you think other adults would place it.

_____ Keeping their travel costs low
_____ Not being stuck in traffic
_____ Being comfortable
_____ Having freedom in where and when they go
_____ Protecting other road users from getting injured
_____ Reducing their impact on the environment
_____ Not getting injured

Which of the following actions, if any, have you taken **within the last month?**

Have discussed transportation issues with others.

- o Yes, I have discussed transportation issues with others.
- o No, I have not discussed safety transportation issues with others.

Have contacted elected officials about transportation issues.

- o Yes, I have contacted elected officials about transportation issues.
- o No, I have not contacted elected officials about transportation issues.

Have contacted local government staff about transportation issues.

- o Yes, I have contacted local government staff about transportation issues.
- o No, I have not contacted local government staff about transportation issues.

Please indicate how much or little you relate to the following questions about time.
At how leisurely a pace are you able to take life?

- o Not leisurely at all
- o Somewhat leisurely
- o Moderately leisurely
- o Very leisurely

How rushed do you feel your life is?

- o Not rushed at all
- o A little rushed
- o Moderately rushed
- o Very rushed

How hectic are things for you these days?

- o Not hectic at all
- o A little hectic
- o Moderately hectic
- o Very hectic

Please indicate how much or little you relate to the following questions about your travel behaviors.
How much effort would be required **not** to get places by [previously provided typical travel mode]:

- o No effort at all
- o A little effort
- o A moderate amount of effort
- o A great deal of effort

For how long have you been [previously provided typical travel mode] to get places?

- o Not long at all
- o A little while
- o A moderate amount of time
- o A very long time

To what extent does [previously provided typical travel mode] belong to your daily routine?

- o Not at all
- o To a small extent
- o To a moderate extent
- o To a great extent

Please indicate how much or little you relate to the following questions about transportation issues.
How confident are you in discussing transportation issues with others?

- o Not confident at all
- o A little confident
- o Moderately confident
- o Very confident

How willing are you to talk about needed changes in transportation?

- o Not willing at all
- o Somewhat willing
- o Moderately willing
- o Very willing

How much do you think that sharing your transportation concerns will lead to needed changes?

- o Not at all
- o A little bit
- o A moderate amount
- o A great deal

How confident are you that sharing your transportation ideas with others can lead to needed changes?

- o Not confident at all

- Somewhat confident
- Moderately confident
- Very confident

How ready are you to discuss needed transportation changes?

- Not ready at all
- Somewhat ready
- Moderately ready
- Very ready

Appendix C. Cognitive Interview Protocol

Cognitive interviews will follow this protocol:

1. Follow the script to introduce the survey.
    a. Read all normal text to the interviewee.
    b. Do not read text in ALL CAPS. These are instructions for you.
2. Provide a link to the survey. The interviewee will read each question and give their response.
3. Indicate their response.
    a. For multiple choice questions – format the answer selected in bold.
    b. For grid questions – type an X in the cell for each answer.
4. Note any questions, comments, anything else you observe as the interviewee reads and responds to each question.
5. For any questions where the interviewee needs clarification, first try to have the interviewee explain what that term or question means to them using probes such as:
    a. What does that mean to you as it is written?
    b. Is there another word you would use for that term?
    c. How would you word this question to make it easier to understand?
6. Note any ways that you clarified a question or a term for the interviewee.
7. Some questions include a follow-up probe. Read the probe question, filling in with details from the response where necessary, and note the interviewee's answers.
8. There is space for notes under each question, but you do not have to include notes for each. If the interviewee answers a question without comment and there is no scripted probe, in the interest of time, proceed to the next question.

Interview Script

Introduction

Thank you for your time today in helping us to evaluate our survey and make it better through clear wording and phrasing. I have shared with you a link to our survey. Please open this link to begin the survey. For each question, please read the question, either read aloud or to yourself. After reading the question, please tell me your response. If anything is unclear about the question or the response options, you are free to ask questions or describe to me what is not clear to you. For some questions, I will ask you about the question or your answers. If at any point you do not want to continue the interview, you are welcome to say so, and I will stop the interview. Do you have any questions before we begin?

Survey

Please click the link to open the survey and read the study information on the first page.

ALLOW INTERVIEWEE TO READ

WHEN FINISHED: Was anything unclear about this description? Do you have enough information to consent to taking the survey?

NOTES:

Please click continue to begin the survey.

FOR EACH QUESTION, FORMAT THE INTERVIEWEE'S SELECTED ANSWER IN **BOLD**

Do you consider where you live a town or city, or out in the country?

- *Town/city*
- *Country/rural area*

- *Don't know*

NOTES:

How many vehicles (cars, vans, SUVs, and trucks) are kept at home for you to use?

- *0*
- *1*
- *2*
- *3 or more*

NOTES:

*In a typical week this past month, how did you **get something to eat?***
I used a car...

- *for nearly every trip to get something to eat.*
- *for nearly every trip, but I also walked, biked, or rode transit to get something to eat.*
- *rarely or never, I primarily walked, biked, or rode transit to get something to eat.*
- *Other: I did not go out to get something to eat in the past month.*

PROBE: Can you tell me how you arrived at that answer?
NOTES:

*In a typical week this past month, how did you **purchase goods or services?***
I used a car...

- *for nearly every trip to purchase goods or services.*
- *for nearly every trip, but I also walked, biked, or rode transit to purchase goods or services.*
- *rarely or never, I primarily walked, biked, or rode transit to purchase goods or services.*
- *Other: I did not go out to purchase goods or services in the past month.*

NOTES:

*In a typical week this past month, how did you **take family or friends to appointments?***
I used a car...

- *for nearly every trip to take family or friends to appointments.*
- *for nearly every trip, but I also walked, biked, or rode transit to take family or friends to appointments.*
- *rarely or never, I primarily walked, biked, or rode transit to take family or friends to appointments.*
- *Other: I did not take family or friend to appointments in the past month.*

NOTES:

*In a typical week this past month, how did you **get to work?***
I used a car...

- *for nearly every trip to get to work.*
- *for nearly every trip, but I also walked, biked, or rode transit to get to work.*
- *rarely or never, I primarily walked, biked, or rode transit to get to work.*
- *Other: I did not leave my house to get to work in the past month.*

NOTES:

*In a typical week this past month, how did you **get to school?***
I used a car...

- *for nearly every trip to get to school.*
- *for nearly every trip, but I also walked, biked, or rode transit to get to school.*
- *rarely or never, I primarily walked, biked, or rode transit to get to school.*
- *Other: I did not go to school in the past month.*

NOTES:

*In a typical week this past month, how did you **visit friends or relatives?***
I used a car...

- *for nearly every trip to visit friends and relatives.*
- *for nearly every trip, but I also walked, biked, or rode transit to visit friends or relatives.*
- *rarely or never, I primarily walked, biked, or rode transit to visit friends or relatives.*
- *Other: I did not visit friends or relatives in the past month.*

NOTES:

For this next question, please respond what you would prefer to do ***in a perfect world or ideally.***

***Ideally, to get to most places**, I would prefer to*

PLACE AN **X** TO MARK RESPONSES

	a lot less than I do now	a little less than I do now	about the same as I do now	a little more than I do now	a lot more than I do now
walk					
ride a bicycle					
take transit					
drive a car, SUV, or truck					
ride in a car, SUV, or truck as a passenger					

PROBE: In your own words, can you describe what this question is asking?

NOTES:

Rate the following according to how important each is to you as a priority for your personal transportation.

PLACE AN **X** IN THE TABLE FOR EACH RESPONSE

	Not important	Important	Of supreme importance
Keeping travel costs low			
Not being delayed			
Being comfortable			
Using very little effort			
Choosing how I get around			
Having freedom in where and when I go			
Ensuring other road users are treated fairly			
Protecting other road users from getting injured			
Protecting the environment			
Reducing my impact on the environment			
Not getting injured			
Being safe and secure			

PROBES: Tell me how you thought about what is not important or of supreme importance? Were there any that you had difficulty rating? What made them difficult to rank?

NOTES:

*In this section, questions will ask you to think about the travel habits and priorities of **others in your community**.*

*When **others in your community** need to get somewhere, how do they usually get there?*

- *walk*
- *ride a bicycle*
- *take transit*
- *ride a motorcycle*
- *drive a car, SUV, or truck*
- *ride in a car, SUV, or truck as a passenger*

PROBE: When thinking about others in your community for this question, what or whom do you think about?

NOTES:

*When **others in my community** need to get most places, they would prefer to*

PLACE AN **X** TO MARK RESPONSES

	a lot less than they do now	a little less than they do now	about the same as they do now	a little more than they do now	a lot more than they do now
walk					
ride a bicycle					
take transit					
drive a car, SUV, or truck					
ride in a car, SUV, or truck as a passenger					

PROBE: Was this question easy or difficult to answer? What made it [easy/difficult]?

*Rate the following according to how important you believe each is to **others in your community** as a priority for their personal transportation.*

	Not important	Important	Of supreme importance
Keeping travel costs low			
Not being delayed			
Being comfortable			
Using very little effort			
Choosing how they get around			
Having freedom in where and when they go			
Ensuring all road users are treated fairly			
Protecting all road users from getting injured			
Protecting the environment			
Reducing their impact on the environment			
Not getting injured			
Being safe and secure			

NOTES:

***In the last month**, have you taken any of the following actions? (select all that apply)*

Discussed transportation ideas with others in my community

Contacted elected officials about transportation issues

Contacted local government staff about transportation issues

Contacted law enforcement concerning transportation issues

NOTES:

When you need to get somewhere, how do you usually get there?

- *Walk*
- *Ride a bicycle*
- *Take transit*
- *Ride a motorcycle*
- *Drive a car, SUV, or truck*
- *Ride in a car, SUV, or truck as a passenger*

NOTES:

In general, how satisfied are you with the main way you get around these days?

- *Very dissatisfied*
- *Dissatisfied*
- *Neither satisfied nor dissatisfied*
- *Satisfied*
- *Very satisfied*

PROBE: Can you describe for me how you came to that answer?

NOTES:

Over the past month *to what extent have you felt the following?*

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I have had enough time to do what I need to do.					
My life has been too rushed.					
I have had plenty of spare time.					
I have been racing from here to there.					
I have been able to get my point across to others about transportation issues.					
I have been confident in discussing transportation issues.					
I have been willing to talk about needed changes in transportation.					
I have felt prepared to discuss needed transportation changes.					
I have believed that local officials will act upon my transportation concerns.					
I have felt that my ideas about transportation can lead to needed changes.					

NOTES:

When I leave my home and [the typical travel mode question] it's something...

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I start doing before I realize I'm doing it.					
I do without thinking.					
I feel weird if I do not do it.					
that requires effort not to do.					
I have been doing for a long time.					

NOTES:

What is your age?

- *Under 18*
- *18 - 24*
- *25 - 34*
- *35 - 44*
- *45 - 54*
- *55 - 64*
- *65 - 74*
- *75 - 84*
- *85 or older*

NOTES:

What gender do you identify as?

- *Male*
- *Female*
- *Non-binary / third gender*
- *Prefer not to say*

NOTES:

Which of the following best describes you?

- *American Indian or Alaska Native*
- *Asian*
- *Black or African American*
- *Hispanic or Latino*
- *Native Hawaiian or Pacific Islander*
- *White*
- *Multiracial or Biracial*
- *Other*
- *Prefer not to say*

NOTES:

What is your highest level of education?

- *Less than high school*
- *High school graduate*
- *Some college*
- *2 year degree*
- *4 year degree*
- *Masters or professional degree*
- *Doctorate*

NOTES:

What is your employment status?

- *Employed full time*
- *Employed part time*
- *Unemployed looking for work*
- *Unemployed not looking for work*
- *Retired*
- *Student*
- *Disabled*

NOTES:

Please indicate your total before-tax income.

- *Less than $10,000*
- *$10,000 - $19,999*
- *$20,000 - $29,999*
- *$30,000 - $39,999*
- *$40,000 - $49,999*
- *$50,000 - $59,999*
- *$60,000 - $69,999*
- *$70,000 - $79,999*
- *$80,000 - $89,999*
- *$90,000 - $99,999*
- *$100,000 - $149,999*
- *$150,000 - $199,999*
- *$200,000 or more*

NOTES:

Please enter the total number of people, including yourself, in your household.

Response:

NOTES:

How many children under the age of 18 are in your household?

Response:

NOTES:

How long have you lived at your current residence?

- *0 to 5 years*
- *6 to 10 years*
- *10 to 15 years*
- *More than 15 years*

NOTES:

What is your zip code?

Response:

NOTES:

Before you turned 16 years old, what was the main way you got to school?

- *Walked*
- *Bicycled*
- *Rode in a car, truck, or SUV*
- *Rode the school bus*
- *Rode public transit*

NOTES:

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[i] For more information of Qualtric's Panels platform, visit https://www.qualtrics.com/research-services/online-sample/.
[ii] North Carolina Department of Transportation (NCDOT). (n.d.). *Our mission.* https://www.ncdot.gov/about-us/our-mission/Pages/goals-vision.aspx.
[iii] NCDOT. (2021). *Strategic transportation investments*. https://www.ncdot.gov/initiatives-policies/Transportation/stip/Pages/strategic-transportation-investments.aspx.
[iv] NCDOT. (2022). *Safety & mobility.* https://www.ncdot.gov/initiatives-policies/Transportation/safety-mobility/Pages/default.aspx.
[v] NCDOT. (2018). *Goals & vision.* https://www.ncdot.gov/about-us/our-mission/Pages/goals-vision.aspx.
[vi] As an aside, the title of the Unit's page reads "Safety and Mobility", while the Unit's quote references the "Mobility and Safety Unit."
[vii] NCDOT. (2020). *Strategic mobility formula*. https://www.ncdot.gov/initiatives-policies/Transportation/stip/Pages/strategic-mobility-formula.aspx.