The Effect of Attitude on Mode Choice: Evidence from NHTS, 2009

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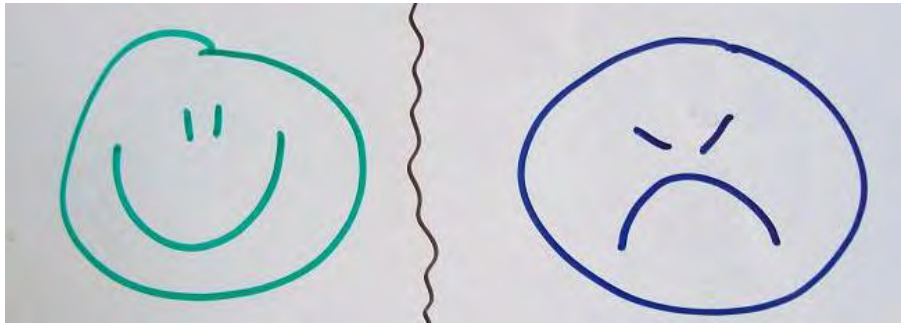
Outline

- Background
- Objectives
- Previous research
- Data
- Modeling results
- Conclusion and recommendations

Background

- Public attitude as a feedback to improve service quality.
- Travelers' attitude towards a transportation system as an important input in the planning process.
- Traditional choice models have been enriched with inclusion of attitude variables .



Previous researches

- Attitude and personality traits can affect individuals choice of transport and other actions of their everyday lives
- Considering latent variables in mode choice
- Quantifying the impact of attitudes on shift towards sustainable modes
- Attitude vs choice-well studied; the remaining question is:
  - could choice affect attitude?
  - What is the persuasive power of attitude on mode choice?

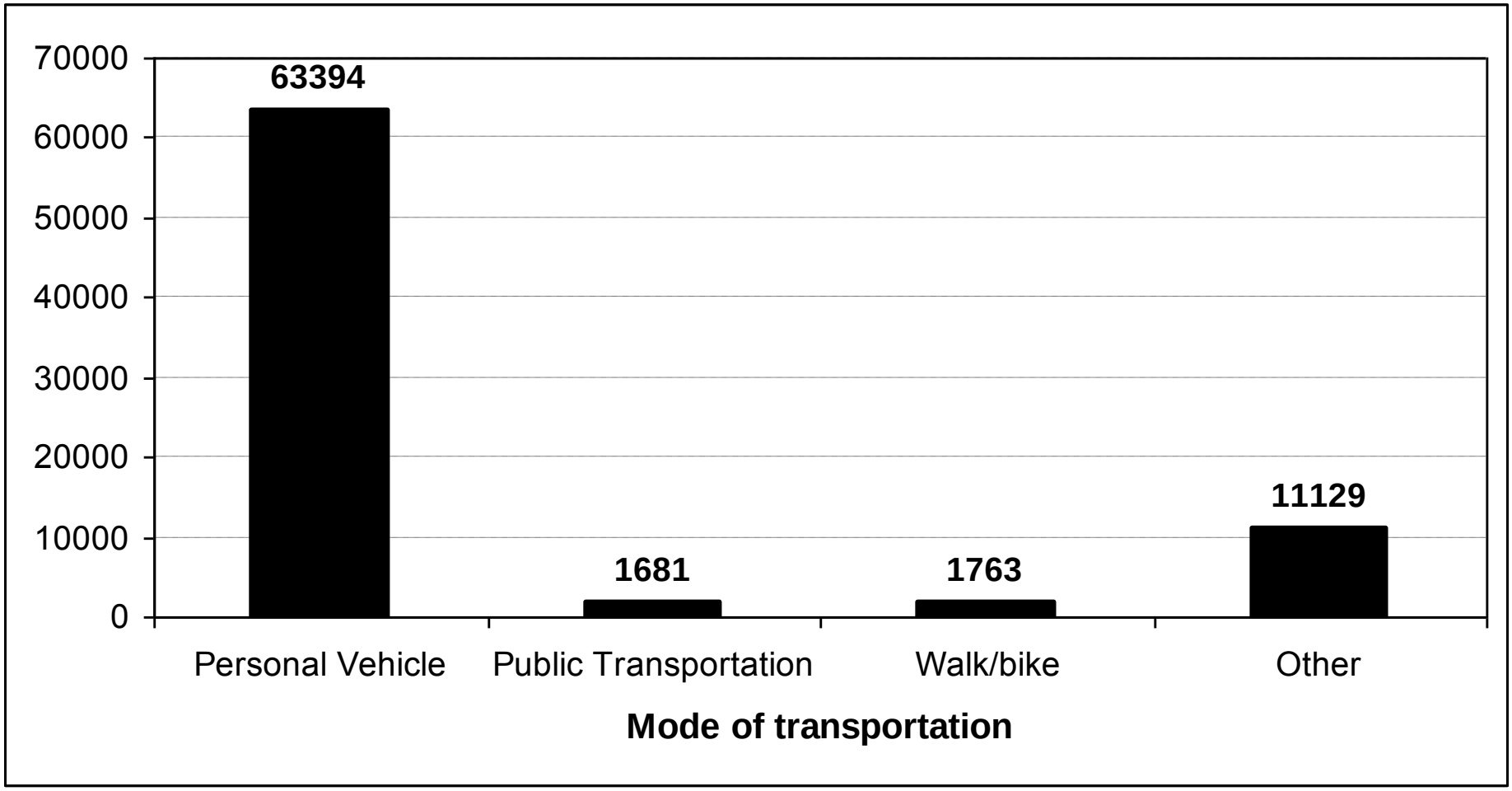
Objectives of the study

- Analyzing how American's view some attributes of the transportation system (using NHTS, 2009)
- Examining the effect of attitude on travel mode choice (or vice versa)
- Assessing whether attitude may persuade travelers to make adjustment in their mode preference

DATA

- NHTS 2009
- Home-based work trips
- Dependent Variable: mode choice
- Independent variables:
  - Attitude variables
  - HH-related variables
  - Personal info

DATA: Mode choice



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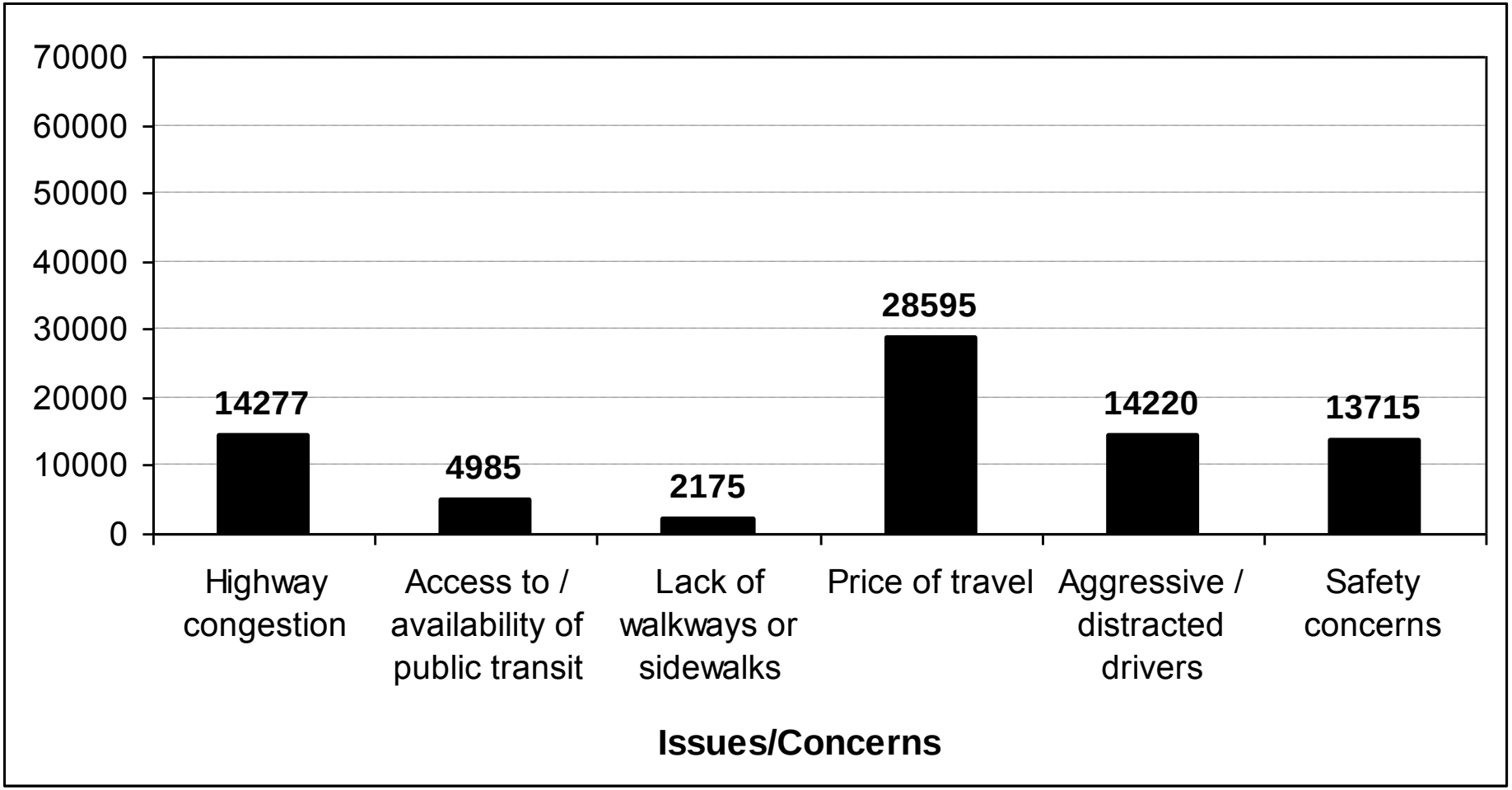
DATA: Attitude on issues

Of the following issues, please tell me which one is the most important to you. Would you say…
(ISSUE)

a. highway congestion,	**1**
b access to or availability of public transit,	2
c. lack of walkways or sidewalks,	3
d. the price of travel including things like transit fees, tolls and the cost of gasoline,	4
e. aggressive or distracted drivers, {or}	5
f. safety concerns, like worrying about being in a traffic accident?	6
REFUSED	-7
DON'T KNOW	-8

DATA: Attitude on issues



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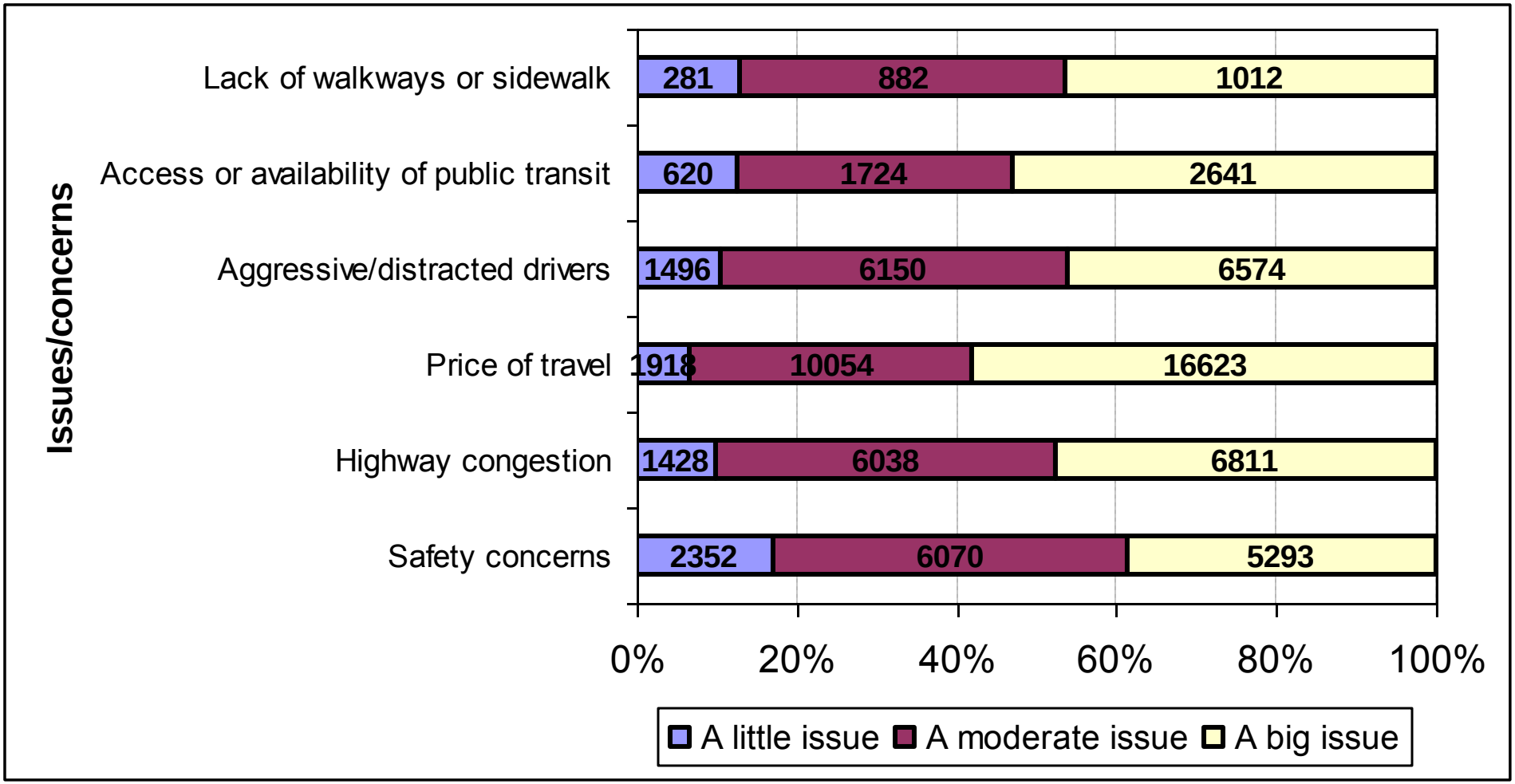
DATA: Attitude on issues

- Attitude variables

  How much of an issue (previous slide) to you? Would you say…

  - A little issue (not a problem)=1
  - A moderate issue (a little problem)=2
  - A big issue (somewhat of a problem)=3

Issues



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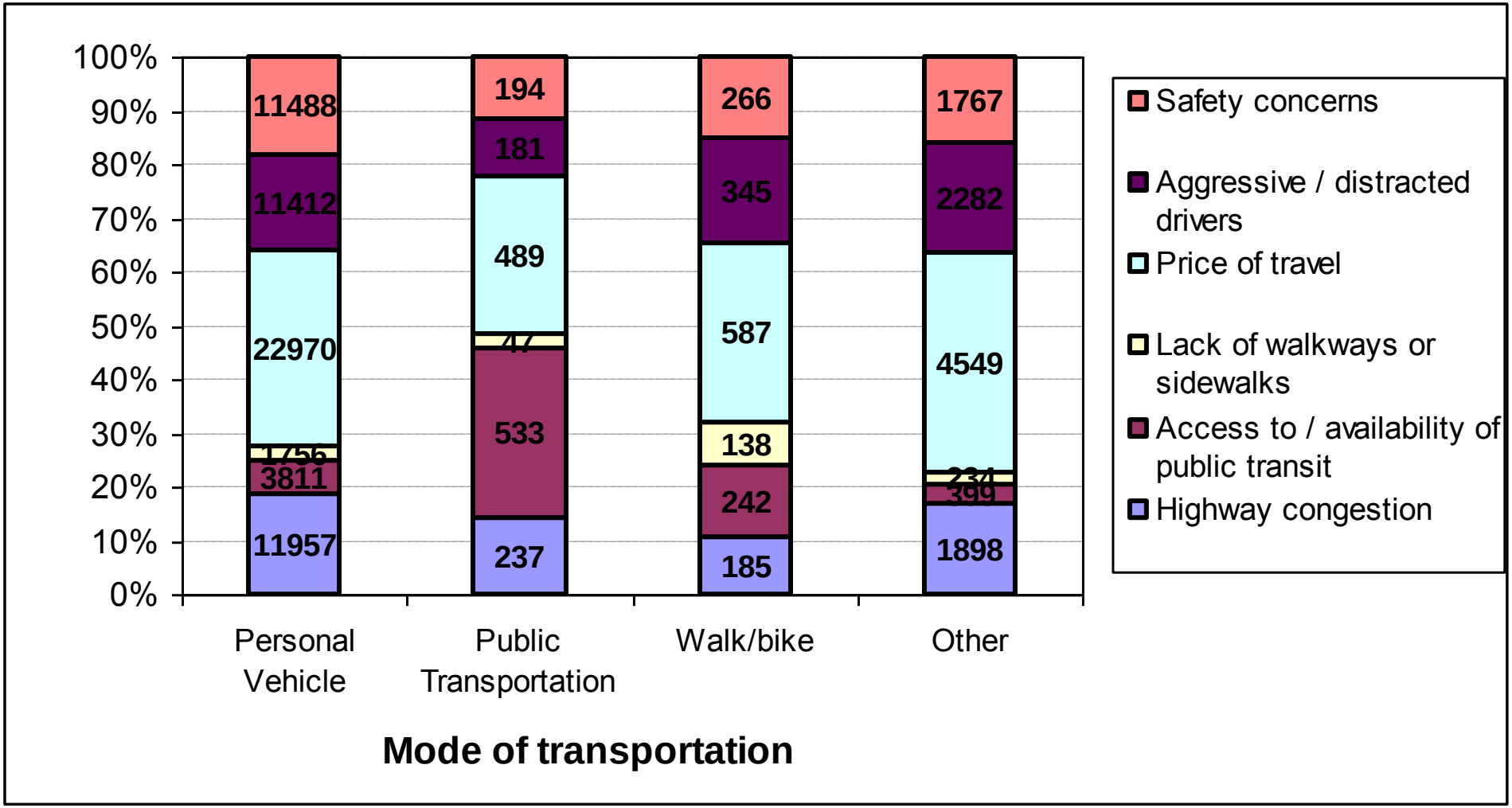
Mode choice vs attitude towards an issue



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Modeling

- Multinomial regression analysis
  - To investigate the effect of attitude on mode choice and/or the effect of mode choice on attitude

Description of data used for the analysis

N=77967

Variables	Minimum	Maximum	Mean	Std. Deviation
Mode of travel	1	4	1.50	1.07
Safety concerns	0	1	0.18	0.38
Highway congestion	0	1	0.18	0.39
Price of travel (fees, tolls and gas)	0	1	0.37	0.48
Aggressive/distracted drivers	0	1	0.18	0.39
Access or availability of public transit	0	1	0.06	0.24
Lack of walkways or sidewalks	0	1	0.03	0.16
HH race	1	7	1.33	1.11
Number of drivers in HH	0	9	2.16	0.78
Derived total HH income	1	18	13.45	4.77
Count of HH members	1	13	2.83	1.28
Count of HH vehicles	0	27	2.51	1.18
Number of workers in HH	1	6	1.75	0.71
MSA Heavy rail status for HH	1	2	1.82	0.39
Urban size	1	6	4.20	1.86
Count of travel day trips	0	27	4.50	2.71
Highest grade completed	1	5	3.35	1.12
occupation	1	4	2.87	1.25
Respondent's age	18	92	48.45	12.60
Respondent's gender-Male	1	2	1.52	0.50
Distance time ratio	0	750.00	0.55	2.73

Modeling results- attitude variables

Attitude variables	Personal car	Public transportation	Walk/ bike
Safety concerns	NA	-	-
Highway congestion	NA	-	-
Price of travel (fees, tolls and gas)	NA	NA	-
Aggressive/distracted drivers	NA	-	-
Access or availability of public transit	+	+	NA
Lack of walkways or sidewalks	-	-	NA

NA= statistically insignificant variables, + is a positive relationship, - is a negative relationship

- Respondents who said safety is an issue- Less PT, less walk/bike
- Respondents who said congestion is an issue- Less PT, less walk/bike
- Respondents who said price is an issue- Less PT
- Respondents who said aggressive drivers is an issue- Less PT, less walk/bike
- Respondents who said availability of PT is an issue- More drive, more PT
- Respondents who said lack of walkways is an issue- Less drive, less PT

Modeling results: attitude on mode choice or mode choice on attitude?

	Safety concerns	Highway congestion	Price of travel (fees,tolls and gas)	Aggressive /distracted drivers	Access or availability of public transit	Lack of walkways or sidewalks
Personal vehicle	+	+	-	-	+	+
Public transport	-	-	-	-	+	+
Walk/Bike	NA	-	-	NA	+	+

- Drivers- complained about every issue but price, distracted drivers
- PT users- complained about lack of PT and walkways
- Walkers/bikers- complained about lack of PT and walkways

Modeling results: attitude on mode choice or mode choice on attitude?

Attitude variables	Personal car	Public transportation	Walk/bike
Safety concerns	NA	-	-
Highway congestion	NA	-	-
Price of travel (fees, tolls and gas)	NA	NA	-
Aggressive/distracted drivers	NA	-	-
Access or availability of public transit	+	+	NA
Lack of walkways or sidewalks	-	-	NA

	Safety concerns	Highway congestion	Price of travel (fees,tolls and gas)	Aggressive /distracted drivers	Access or availability of public transit	Lack of walkways or sidewalks
Personal vehicle	+	+	-	-	+	+
Public transport	-	-	-	-	+	+
Walk/Bike	-	-	-	NA	+	+

Eg. respondents who think lack of transit is an issue still use car and probably their dependency on the car gave them that idea

Modeling results: attitude on mode choice or mode choice on attitude?

+, + (perception affect choice and choice affect perception-POSITIVELY)	-, - (perception affect choice and choice affect perception-NEGATIVELY)	+, - or -, + (perception and choice are not affecting each other)
2 cases	6 cases	2 cases

So we can conclude that…

Conclusion and recommendation

- As much as attitudes affect mode choice, the travel mode could also be a reason to develop attitude on some issues
- Latent variables are important for transportation demand analysis
- Car being main choice despite negative perception
- Complain about price didn't persuade car users to change mode
- Newly identified significant variables—indicators for planners to encourage walking and cycling as a sustainable means of transportation

Thank you for your attention