

STAT 504 proposal

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Topic: Linking health and travel behaviors

Despite the wide known benefits of physical activities, “only half of Americans reported meeting guidelines for aerobic physical activity in 2017” (Le and Dannenberg, 2020). The health outcomes such as obesity associated with insufficient physical activities have brought huge economic burden in the US. And the obesity rate in the US has surpassed 42% in 2020 (Rhea Farberman, 2020). To promote physical activities, it’s recommended that adults conduct moderate-intensity physical activities of at least 150 minutes per week (HHS, 2018). Among many ways of stimulating physical activities, local governments and policy makers are increasingly interested in promoting transit use and reduce the use of private cars. Since transit is no door-to-door service, it requires a certain amount of walking or biking from and to the transit stations. Thus, it’s fun to investigate the role of transit and private cars in promoting physical activities and health!

The 2017 National household travel survey (NHTS) data¹ are selected in this project (FHWA, 2017). Collected by Federal Highway Administration (FHWA), “the NHTS is the authoritative source on the travel behavior of the American public”. This dataset has a great number of attributes about travel. Questions 1-3 are a series of questions that can be answered by using this dataset. For our course project, we can choose one or multiple questions; we can also target on particular population groups such as females, teenagers, elderly people, etc. Potential variables including health status, physical activities, travel characteristics, and socio-demographics are listed in (but not limited to) Table 1.

Question 1: Will transit use induce more physical activities?

Question 2: Will private car use reduce physical activities?

Question 2: Are more physical activities related to a healthier life?

For Questions 1 and 2, the dependent variables can be *Light/moderate physical activity* or *levels of physical activity*. Independent variables may include travel characteristics (e.g., transit use, private car use) and socio-demographics. For Question 3, the dependent variables can be opinion of health (or others). As for independent variables, we may include physical activities besides travel characteristics and socio-demographics. It’s also possible to find other related variables in the dataset.

¹ Only personal travel data are selected. For simplicity, household travel and vehicle data are excluded from this project.

The candidate models can be

- Multinomial logit regression model
- Logistic regression model if we recategorize the dependent variables into binary ones
- For Questions 1 and 2, we may also choose linear regressions

Table 1. Variable description

Variable name	Definition
<i>Health status</i>	
Opinion of health	If -9, not ascertained; if -8, I don't know; if -7, prefer not to answer; if 01, excellent; if 02, very good; if 03, good; if 04, fair; if 05, poor
<i>Physical activities</i>	
Light/moderate physical activity	Count of times of light or moderate physical activity in past week
Levels of physical activity	If -9, not ascertained; if -8, I don't know; if -7, prefer not to answer; if 01, rarely or never conduct any physical activities; if 2, some light or moderate physical activities; 3. Some vigorous physical activities
<i>Travel characteristics</i>	
Car use	Count of car trips to work
Car share use	Count of carshare program usage
Motorcycle use	Count of motorcycle or moped trips
Bike use	Count of bike trips
Walk use	Count of walk trips
Transit use	Count of transit trips
Rideshare use	Count of rideshare app usage
Trip rates	Count of person trips on a travel day
Primary activity in previous week	If -8, I don't know; if -7, prefer not to answer; if 1, working; if 2, temporarily absent from a job or business; if 3, looking for work/unemployed; if 4, a homemaker; if 5, going to school; if 6, retired
Medical condition results in limiting driving to daytime	If -9, not ascertained; if -1, prefer not to answer; If 1, yes; If 2, no.
Medical condition results in asking others for rides	If -9, not ascertained; if -1, prefer not to answer; If 1, yes; If 2, no.
Medical conditions in giving up driving	If -9, not ascertained; if -1, prefer not to answer; If 1, yes; If 2, no.
Alternative mode of transportation: public transit or Taxi	If -9, not ascertained; if -1, prefer not to answer; if 1, public transit (bus, subway, light rail, etc.); if 2, taxi (regular tax, Uber, Lyft, etc.); if 3, both public transit and taxi; if 4, neither item selected
Alternative mode of transportation: passenger	If -9, not ascertained; if -1, prefer not to answer; if 1, get a ride from a friend or family member; if 2, rental car (including Zipcar/Car2Go); if 3, both; if 4, neither item selected

to friend/family member or rental car	
Alternative mode of transportation: Bicycle or Walk	If -9, not ascertained; if -1, prefer not to answer; if 1, bicycle; if 2, walk; if 3, both; if 4, neither item selected
<i>Socio-demographics</i>	
Household car ownership	Number of household vehicles
Education	If -8, I don't know; if -7, prefer not to answer; if 1, appropriate skip; if 1, less than high school; if 2, high school graduate; if 3, college or associates degree; if 4, bachelor's degree; if 5, graduate degree or professional degree
Hispanic status of household respondent	If -8, I don't know; if -7, prefer not to answer; if 1, yes; if 2, no
Home location	If C, second city; if R, rural; if T, small town; if U, urban
Population density (persons per square mile) near home	If -9, I don't know; if 50, 0-99; if 300, 100-499; if 750, 500-999; if 1500, 1,000-1,999; if 3000, 2,000 to 3,999; if 7000, 4,000-9,999; if 17000, 10,000-24,999; if 30000, 25,000-999,999
Born in the US	If -9, not ascertained; if -1, prefer not to answer; If 1, yes; If 2, no.
Age	The age of the respondent, ranging from 5 to 92
Gender	If -8, I don't know; if -7, prefer not to answer; if 1, male; if 2, female
Work status	If -9, not ascertained; if -8, I don't know; if -7, prefer not to answer; if 1, full-time; if 2, part-time
Household income	If -9, not ascertained; if -8, I don't know; if -7, prefer not to answer; if 01, less than \$10,000; if 02, \$10,000 to \$14,999; if 03, \$15,000 to \$24,999; if 04, \$25,000 to \$34,999; if 05, \$35,000 to \$49,999; if 06, \$50,000 to \$74,999; if 07, \$75,000 to \$99,999; if 08, \$100,000 to \$124,999; if 09, \$125,000 to 149,999; if 10, \$150,000 to \$199,999; if 11, \$200,000 or more
Race	If -8, I don't know; if -7, prefer not to answer; if 1, white; if 2, Black or African American; if 3, Asian; if 4, American Indian or Alaska Native; if 5, Native Hawaiian or other Pacific Islander

Reference

- FHWA, 2017. National Household Travel Survey [WWW Document]. URL <https://nhts.ornl.gov/> (accessed 1.15.21).
- HHS, 2018. Physical Activity Guidelines for Americans, 2nd edition 118.
- Le, V.T., Dannenberg, A.L., 2020. Moving Toward Physical Activity Targets by Walking to Transit: National Household Transportation Survey, 2001–2017. *Am. J. Prev. Med.* 59, e115–e123. <https://doi.org/10.1016/j.amepre.2020.02.023>
- Rhea Farberman, 2020. The State of Obesity 2020: Better Policies for a Healthier America [WWW Document]. URL <https://www.tfah.org/report-details/state-of-obesity-2020/> (accessed 1.15.21).