Purpose: Trip-based statistics suggest only a small minority of Americans walk, bicycle, or use public transport. However, statistics on intrapersonal variability indicate longer time periods of observation capture more variability in personal travel. Our analysis of intrapersonal variability in travel behavior utilizes data from the daily trip and person data files of the NHTS 2001 and 2009. We use the data to identify recent trends in multimodality in the USA at the day and week levels. We define: (1) monomodal car users who used a car for all trips; (2) multimodal car users who used a car and at least one other mode of transport; and (3) walk, bicycle, public transport only users who did not use a car. Our study makes a contribution by uniquely leveraging the NHTS 2001 and 2009 for the study of intrapersonal variability.

Literature Review

- Three main types of data are used to study intrapersonal variability in travel behavior: weekly, monthly, and multi-week travel surveys; (2) weekend travel surveys; and (3) one-day travel surveys with questions about travel during longer time periods. Most travel studies suggest that survey periods of one week tend to capture typical variability in everyday habitual travel behavior. Longer multi-week surveys periodically add occasional travel behavior. (4) Multi-week surveys tend to have comparatively smaller sample sizes. For example, the six week MobiDrive data set is based on 361 individuals in two German cities. Compared to single day travel surveys, multi-day data collection efforts face greater difficulty in recruitment, and suffer from a higher rate of participant drop out.

- Intrapersonal variability can also be studied using data from single day travel surveys that contain questions about habitual or occasional mode use. A limitation of this type of data is that reporting on travel behavior during the prior week is more prone to recall error, particularly for short trips, than data collected from travel diaries for a specific day.

- Our analyses of intrapersonal variability in travel behavior at the day and week levels rely on the NHTS trip and person files.

- We aggregated trip level data to the person level by counting the number of trips made by mode of transport for each respondent (i.e. collapsing trip counts by mode at the person level). We excluded trips by intercity rail and intercity bus, as well as air planes, in order to be consistent with the NHTS definition of public transport. For the study of intrapersonal variability in travel behavior, the person file utilizes data from the daily trip and person data files of the NHTS 2001 and 2009. We used the data to identify recent trends in multimodality in the USA at the day and week levels. We define: (1) monomodal car users who used a car for all trips; (2) multimodal car users who used a car and at least one other mode of transport; and (3) walk, bicycle, public transport only users who did not use a car. Our study makes a contribution by uniquely leveraging the NHTS 2001 and 2009 for the study of intrapersonal variability.

Results

- This poster focuses on the methods applied to perform an analysis of intrapersonal variability in travel behavior using the NHTS. Only 28% of Americans solely rely on a car during the week, and the majority of Americans are multimodal car users who drive and make at least one weekly walk, bike, or public transport trip. About one in four American car users make at least 3 trips by walking, cycling, or public transport during the week and the study of intrapersonal variability in travel behavior could be improved by more and better weekly travel data for the U.S. population.

- For the analysis, the NHTS could include specific questions about weekly car and public transport use. In addition, a multi-day or weeklong subsample would improve upon self-reporting of weekly travel through reduced recall error and provide higher quality data about habitual travel behavior. More information could be collected about trip purposes for weekly travel, and trip purpose categories could further distinguish recreation and utilitarian categories to allow for better analysis of the impact of trip purpose on multimodality.

Figure 3. Combinations of Modes of Transportation Used by Multimodal Car Users at Day and Week Levels in 2009.

In 2009, the vast majority of multimodal car users reported walking as an alternative to the car. Only 23.3% of multimodal car users made at least one weekly walk, bike, or public transport trip. About one in four American car users make at least 3 trips by walking, cycling, or public transport during the week. About one in four American car users make at least 3 trips by walking, cycling, or public transport during the week. About one in four American car users make at least 3 trips by walking, cycling, or public transport during the week. About one in four American car users make at least 3 trips by walking, cycling, or public transport during the week.

Figure 2. Trend in Share of Multimodal Car Users by Different Intensity Cut-Off Values at Day and Week Levels in the U.S., 2001-2009.

In 2009, at the week level 48.2% reported car use in combination with at least 3 trips without a car—compared to 64.9% who used a car and made at least 1 trip by an alternative to the car. Only 23.3% of multimodal car users reported car use in combination with at least 1 trip by another mode of transportation during the week. At the week level the population share of multimodal car users increased more significantly between 2001 and 2009 for those making 5+ and 7+ walk, bike, and/or public transport trips (22% vs. 23% for those making 1+ or 5+ trips by those modes).