

# Paradigm Inertia in the U.S. National Household Travel Survey (NHTS)

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“You see, transport assessments are largely built around a view of travel as stable and repetitive—the commuter who makes the same journey every day, the shopper doing the same journey every week. Without question, such patterns exist, and they dominate our perceptions of our own lives, and our interpretation of other people’s.”

– P.B. Goodwin, Inaugural Lecture for the Professorship of Transport Policy,  
University College, London, 23 October 1997.

The transport field, like many academic fields, and yet more industrial fields, is fundamentally torn between the need and desire to innovate, even introduce radical change, and the creeping dependence on its own methodologies and accommodating the data needs and expectations of stakeholders. A basic change to the National Household Travel Survey (NHTS) would disrupt not only the routines, rhythms, and expertise-need within the U.S. Department of Transportation (DOT) and the Federal Highway Administration (FHWA), but would send shocks throughout dependent government agencies, not to mention the Bureau of Transportation Statistics (BTS), and elicit an angry response from transport researchers demanding comparability and consistency across survey years. As a result, improvements in the quality and relevance of the survey are a fairly poor incentive for tampering with the inertia of the *status quo*. A more compelling reason given for switching the NHTS from a cross-sectional survey to a longitudinal survey, for instance, relates to the appealing potential within the DOT and FHWA to spread resources and expertise over time (longitudinally) rather than suffer a spike in costs and labor during the intense implementation year of the cross-sectional survey. In spite of this, the NHTS team is to be commended for their transparency, academic rigor, and responsiveness within the context of a constrained institution system characterized by high inertia. That being said, the author believes the goal of a transportation survey should be to assess opportunities for interdiction of mobility reform rather than facilitating the extension of time-series data of questionable value. Major shifts in technology, methodology, and expertise mark the history of the NHTS—yet researchers still find a way to measure across space and time. NHTS should, in the face of criticism, assume data users will welcome new methodologies and will also find a way to combat changes in methodology. To lower the anxiety of creating new methods, NHTS team members should commit to ongoing field trials and tests of new methodologies that can phase into the current NHTS. This paper will critically analyze the NHTS and its respective audience and stakeholders, while keeping in the background the alternative of panel surveys.

Before launching into the 32-year history of the Nationwide Personal Transportation Survey (NPTS) leading up to the transition to the NHTS for 2001,<sup>1</sup> it is important to sample counterpart transportation surveys outside of the United States. Firstly, it should be pointed out that the resources required to conduct such an expansive transportation survey (in the order of tens of thousands of households) requires resources that many countries are simply not willing to proffer.<sup>2</sup> As a result, the major transportation surveys largely take place in the most economically fit countries outside of the U.S, namely the Netherlands, Britain (a newcomer), Germany, and France.<sup>3</sup> None of these travel surveys are as old as the U.S. survey, and, without exception, they are all panel, rather than cross-sectional, surveys. The long history of the NPTS relative to its counterparts is at once a benefit and also a drawback. While it can, to some extent, be used to measure trends dating back to 1969, it has also gained an equaled level of inertia and bureaucratic stubbornness.

Conducted in 1969, 1977, 1983, 1990, and 1995, the Nationwide Personal Travel Survey has remained the predominant authoritative source for everyday personal transportation statistics in the United States. The uneven implementation of the NPTS throughout the years represents the fickle nature of transport priorities and intragovernmental agency funding.<sup>4</sup> However, with the emergence of the NHTS in 2001, and the continuing embeddedness of the national transport survey within industry and in the public and academic spheres, public financial guarantees and specific timing are becoming more consistent. The new NHTS will take place in 2007/8. As opposed to previous iterations of the NHTS, a future date survey time was set right away—a concrete planning action by the FHWA and DOT that indicates their desire for the current NHTS model to remain the predominant survey technique. This is borne out in the NHTS *User Guide* (2004), in which one of the functions of the NHTS is reported as the ability to “analyze changes in travel characteristics over time.” This type of goal can serve to lock in the innovation potential of the NHTS,

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<sup>1</sup> Since 1969, and after a long tenure as the eminent American travel survey, the Nationwide Personal Transportation Survey (NPTS) was augmented by the American Transportation Survey (ATS), and, to reflect the change, was renamed the National Household Travel Survey.

<sup>2</sup> The actual costs of some surveys, in dollars from the named year.

| Survey    | Total Cost (\$) | No. of Households | Cost per Household (\$) |
|-----------|-----------------|-------------------|-------------------------|
| 1995 NPTS | 4,096,000       | 21,000            | 195                     |
| 1995 ATS  | 18,000,000      | 67,000            | 269                     |
| 2001 NHTS | 10,275,000      | 25,000            | 411                     |

**Source:** June 18<sup>th</sup> Letter Report of the Committee to Review the Bureau of Transportation Statistics’ Survey Programs, Joseph L. Schofer.

<sup>3</sup> Specifically, these are the German *Mobility Panel* (MOP), the Dutch *National Mobility Panel*, the U.K. *National Travel Survey*, and the French *Parc Auto Survey* (SOFRES-INRETS-ADEME).

<sup>4</sup> Fickle-nature of funding and timing of the national surveys is mentioned in the June 18<sup>th</sup> Letter Report of the Committee to Review the Bureau of Transportation Statistics’ Survey Programs, Joseph L. Schofer.

given that a major overhaul would likely harm survey comparability. Instead, the regime of modest aims adopted for each survey will likely continue. For the recent NHTS, these goals included reviewing: telecommuting, Internet usage, and expanding the capture period for transit, walk, and bike trips.

The intragovernmental team charged with administering, processing, and evaluating the NHTS 2001 results have maintained a very high level of integrity, transparency, and openness in the process. Researchers are clearly working hard to deliver the best available survey to satisfy the most important stakeholders and for this general level of conduct they should receive no criticism. As a user of the NHTS 2001 data with my own peculiar demands, I sympathize with the NHTS team's role trying to balance the often-irreconcilable needs of various constituents whilst working within a restricting government framework and being subject to the pressure of certain departments in the government. One unlikely example of this phenomenon is the Department of Energy's (DOE) dependency on the NHTS as a stable survey model to calculate fuel consumption and energy demands of the transport sector. The competing demands from governmental departments even closer to the field of transport are likely more demanding. Any routine behaviors, or inertia characteristics overall, of other governmental stakeholders pressures the NHTS to stay static. Add to this the scrutiny and varied claims coming from transport researchers, and one arrives at a design environment that is hardly flexible or sympathetic.

Parallel to the discussion of stakeholders is the matter of goals and agendas for the travel survey. Is the NHTS team strictly to provide data in as scientific manner as possible, conduct basic exploratory analysis, and allow data-users to take care of the rest? Does or should the NHTS team have a higher social agenda, such as creating statistics that truly help with pressing environmental and social needs of pollution reduction, transit advocacy, and structural congestion alleviation? A shift to this type of mentality might naturally bring about significant innovation in the national travel survey, but might overly politicize the role of a survey and make it susceptible to partisan tampering. It might simply be that the NHTS/NPTS style of survey exists because it has survived all of the bureaucratic hurdles and not because it is particularly useful in an absolute sense.

At least two ways become clear for navigating this situation. The first involves redefining the goal of the survey in a way that supports the capture and sampling of "mobility" rather than "transport." The survey can remain consistent in many respects, but should have the capacity and wiggle-room to encourage those looking to sample behavior of mobility pioneers or fringe mobility populations (younger people, hippies, populations in

areas with new transport policies, etc.). The objective of consistency could be maintained while allowing resources to flow toward data that might help reform transportation. The second option for working within the constraints involves a more dynamic inter-survey period, filled with experimental surveys and field techniques, and other creative endeavors of the survey team and perhaps of transport scholars. The current mode stresses preparing for one or two large field tests to work out bugs in the main survey system and does not give license to creative surveying. This type of process could, foremost, benefit the quality of the transport survey through the discovery better measurement methodology and, second, provide a platform for innovation and paradigm-shaking theories to surface. Some might say the national transportation survey team already does this to a certain extent. My argument is that, due to the incremental and diminutive “safe” changes between surveys, the NHTS has only accomplished the task of become a veritable jack-of-all-trades—unable to provide adequate data to sufficiently explore many burning issues while seeming to cover them all.

Given the conservative context in which the travel survey designers find themselves, it is no wonder change comes hesitantly. Even the fairly moderate changes made to the travel survey in this period have, in the best cases, come as acceptable, and in the worst cases, been condemned for muddling the data. Transport academics at the fairly progressive National Center for Transit Research (NCTR) in Florida, for instance, welcomed the addition of a verbal probe for walking trips for its effect in capturing more walking trips, but seem reticent about the influence this might have on their data comparability (Ausman 2004). In some cases, it seems that the changes have come as such a nuisance, that, even though precision is sacrificed, the researchers cannot help but frame conclusions forcefully:

Recognizing that the mode share is slightly lower overall in 2001 as a result of several factors including modal definition, the inclusion of children under 5 and the increase in walk trips, the difference between the findings appear to generally be consistent with the overall differences with a few exceptions (Ausman 2004 )

By this, the authors essentially admit that they cannot give up their aggregating methods, and couch their conclusions in safety words such as “appear to generally be consistent” despite the fact that the NHTS team made it very clear that significant changes in the survey make comparisons of these elements across time undesirable.

The NHTS team, however, is cognizant of the desire for data comparable over time and has even taken steps to ensure consistency that might raise the eyebrow of a savvy

statistician or economist. The language of the *NHTS User Guide* is indicative of the type of dilemma before the survey designers:

Although these improvements [in the 1995 NPTS survey] enhance the completeness and accuracy of trip reporting, they *prevent any direct comparisons between the 1990 and 1995 travel data*. Any travel changes observed between the 1990 and 1995 surveys now reflect not only actual changes in travel during the period but also *artifacts of differences in survey methodology*. That is, any changes observed between the 1990 and 1995 travel data are presumably attributable to: (1) actual changes in travel behavior, (2) use of travel diaries, (3) use of household rostering, and (4) other improvements in the 1995 survey method such as a better coding scheme to decipher trip purposes. (**Appendix 3: Adjustment of 1990 Travel Data**, emphasis added)

Some of these “artifacts” are of particularly significant proportions. The *User Guide* points out that the number of trip purposes defined as “Other” in the 1990 declined by 64% to 1995. In order to make the survey material comparable, the NHTS team documents (very transparently, I might add) their methodology for a fairly significant “adjustment” of the 1990 data in the *NHTS User Guide*. The treatment they give the data can best be described using the survey team’s own words:

To more accurately reflect travel trends, the 1990 travel data were adjusted to account for two major changes in survey methodology: (1) travel diary, and (2) household rostering. In essence, the 1990 travel data were adjusted in such a way as if a travel diary and household rostering were used in the 1990 survey. The theory is that more trips would have been recorded in the 1990 survey if travel diaries were used.

In order to apply it to the data, the NHTS team essentially normalized the 1990 data to fit against the 1995 data using information from “non-accompany” (lone) trips as an overriding ratio, under the larger assumption that differences between 1990 and 1995 were primarily due to diary use and household rostering. This is akin to saying, “don’t worry, we know which trips you forgot to mention in 1990.” The idea that this can be overcome by a statistical maneuver at all is questionable...designing that maneuver is yet a more tenuous task. But once again, the motivation for this adjustment must be considered. The NHTS team decided that a good use of their survey interim would be to carry out an adjustment to assuage data users’ fears that a trend comparison was precluded by improvements to the survey methodology. But in any case, what are the functional results of this change? If the U.S. Department of Energy uses adjusted 1990 data to assess

Other serious considerations to the survey are routinely ignored, spoken about candidly as a commonly accepted problem with the methodology, or merely mentioned in passing, such as the oft cited, but rarely acted-upon fact that September 11 and the Anthrax scares in the United States took place within the survey sampling period. In this context, sampling issues are a pervasive problem with the NHTS. Foremost is the significantly low response rate (28.6% to 41%, depending on specification), even in the face of aggressive refusal conversation efforts. Given that the German Mobility Panel has recently reached response rates of 59%, even as a panel survey with a heavier burden and expectedly high attrition rate, the fairly low response rate (28.6% - 41%) for the NHTS is concerning.<sup>5</sup> Disqualified surveys were a major source of this poor response rate: of over 106,598 households interviewed with the 2004 release of the data, 36,781 were thrown out as not useable. In addition, the NHTS suffers from some non-trivial sampling problems mentioned in the NHTS *User Guide* and summarized by the author here:

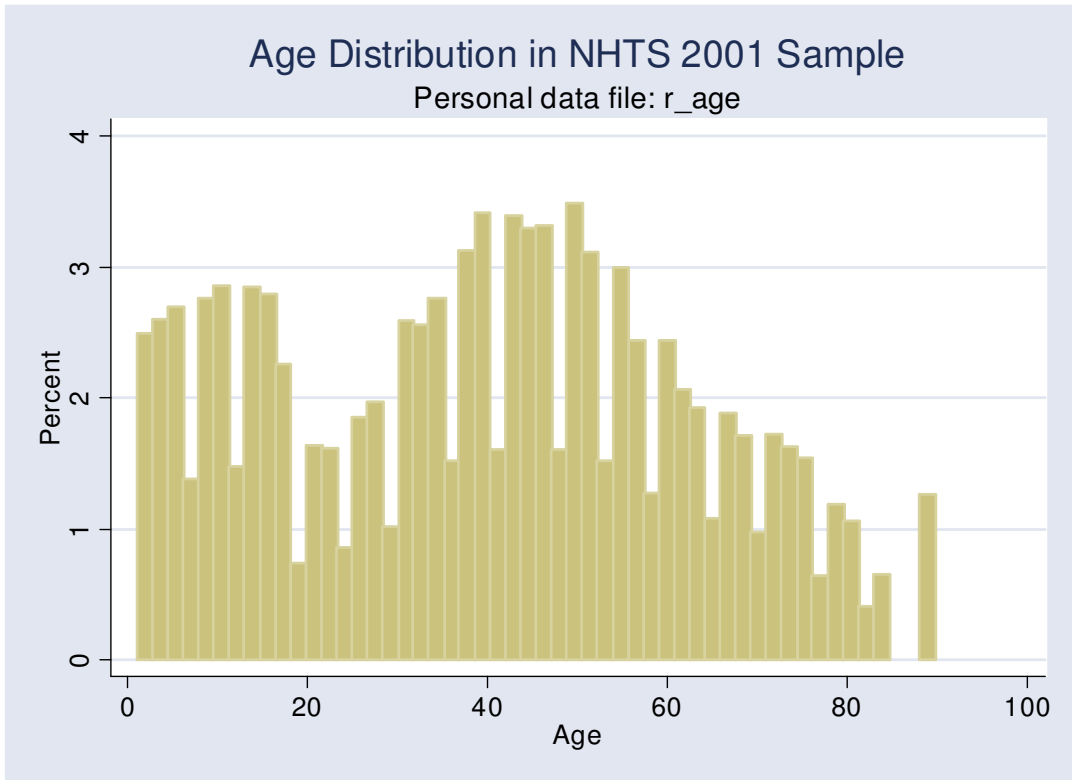
1. **Cell phone households.** By one study, cell phone households comprise approximately 6% of the total households, many of them single person households, central city residents, and renters, or precisely the populations one expects to be more progressive in their mobility (Tuckle 2003)
2. **Certain types of emancipated households.** Individuals above the age of 18 living together must be 100% rostered and interviewed in order to consider the household useable, which is unlikely given the nature of emancipated households. Additionally, college dormitories, fraternities, and sororities are only included if the residents number 10 or below. This effectively ignores most such communities.
3. **Minority undersampling.** Hispanics undersampled due to language barriers, distrust of the government, privacy, and high survey burden due to large family sizes. Blacks are less likely to respond. (Sharp & Murakami 200?)

These particular sample biases (from a much larger list) are focused because it inadequately samples minorities and (particularly meaningful for the author, as a young adult) those in their early to mid 20's; these are precisely the subgroups that are expected, and have shown,

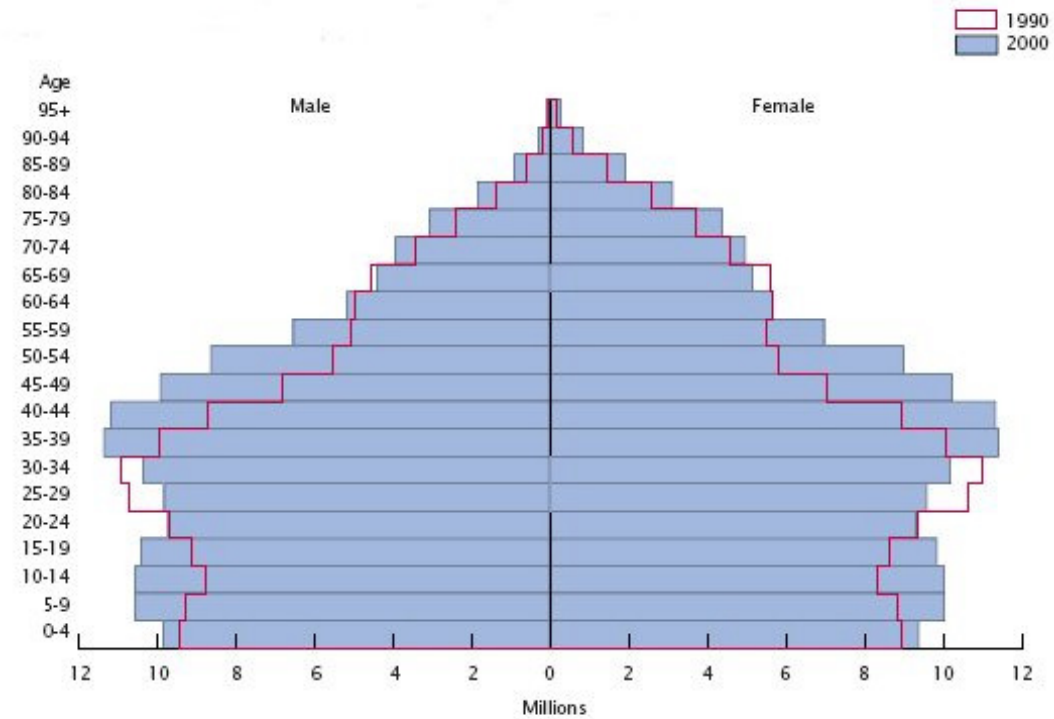
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<sup>5</sup> To the chagrin of the NHTS team, an internal critique reported that “the response rate [for the NHTS] was considerably lower than what is commonly expected in a Federal statistical survey and the survey was only reluctantly approved by the Office of Management and Budget (OMB)” (Sharp & Murakami 200?)

to be more creative and perhaps pioneering in meeting their transportation demands. No amount of weighting can adjust for a deep systematic sampling bias of this degree. In any case, the case of the young adults bears out visually in the statistics: those in their 20's are underrepresented in the NHTS (see the following page for density distributions of age in the NHTS and in the 2000 Census).



### Population by Age and Sex: 1990 and 2000



Source: U.S. Census Bureau, Census 2000 Summary File 1; 1990 Census of Population, General Population Characteristics, United States (1990 CP-1-1).

## **INSTITUTIONAL RESPONSE TO THE NHTS DATA**

Under the notion that “it takes two to tango,” it would be unfair to scrutinize the data providers without surveying the data users. How various government departments, real estate firms, transit organizations, transport scholars, and others use the data testifies to the usefulness of what is provided and gives an indication of why certain pressures for a static survey might be mounting. Many reports, for example, do focus on the issue of transit, but surprisingly seem satisfied with travel surveys they are given to use. The National Center for Transit Research report, for example, rarely calls for changes in the survey design, although it is there are many places where they find (or do not find) an issue that has additional demands on the survey. The overall reticence in changing the national travel survey is in contrast to institutions in Europe, for example, that exuberantly criticize national surveys, compare them to others, and mount pressure for change. In the context of the United States, it can often be useful to examine the little things that have defined the evolution of the national travel survey.

### *Young Adult Sampling*

Given that the subpopulation of 20-30 year-olds is undersampled for a variety of reasons, one would expect the issue to be mentioned and addressed in some manner. Intuition would lead us to believe that this age group is perhaps the most mobile or *potentially mobile* of the entire population. These are the college students with high ideals, the risk-taking high-school graduates, new entrants to the workplace, and those still dreaming up creative lifestyles; more specifically, these are individuals who, relative to their elders, have not completely been absorbed into the mainstream transportation paradigm. A forward-looking institution might even consider oversampling this subpopulation separate from the main survey material to study how this age group has managed to deal with their transport needs.

It appears that this sampling deficiency is not only ignored by the official data exploration, but also glossed over by independent institutions and researchers. In some cases, it seems that the issue is purposefully hidden or diluted. The Center for Urban Transportation

Research (CUTR), for example, simply lumped 21-40 year-olds in the same category in a set of graphs widely distributed in the field. Analysis completed by the U.S. DOT has narrowed this a little by using a 21-35 age category. Researchers often come to the conclusion that, yes, while transit ridership includes those with all socioeconomic and demographic characteristics, ridership is still mostly represented by “captive travelers,” or those inhibited by economic, physical, or other conditions that make auto travel less available (Ausman 2004). Young adults who use transit are carefully wiped away by a double whammy: first their existence is diluted by older people in their age category, and second, researchers are hesitant to disrupt their gloomy assumption that transit ridership is due to some sort of handicap. In fact, a landmark report of the British, German, and German transportation statistics (panel surveys) reveals that demotorization is most common among the youngest age group (Dargay et al. 2003). This dual assertion manages to both rephrase the well-known dominance of autos and diminishes the role of those progressively choosing to ride transit (perhaps just the subgroup being discussed here).

In fact, the Center for Transportation Research (Ausman 2004) paper points out rightly that it is not possible to using the NHTS to capture households choosing to forgo auto ownership without the typical financial, legal, physical, or mental problem. By including only negative or neutral descriptors for personal data, it is as if the NHTS is seeking to find a reason or “problem” to explain why someone does not own a car. This is made more worrisome by Ausman’s (2004) result from the NHTS data that transit share percent is not correlated with employment type. Managers are just as likely to use transit as sales/service people; this hints at the possibility that the progressive transit ridership share is not adequately being captured. Imagine this hypothetical scenario:

*During the 6-yearly NPTS, a sampled 16-year old high school student has hitherto been driven to school by her parents for a number of reasons, one of which is safety. She will probably continue riding with friends or otherwise find a way to reach school with a private automobile. In her twenties, she ideologically supports transit and advocates for transit within her immediate community, but she is also characterized by some of the financial and lifestyle characteristics that dispose her to ride transit. She is “undersampled” by the NPTS carried out when she is 23. Without her data, no policies are generated to build upon her willingness to support progressive transport. By the time she reaches her late 20's, she has become married, been employed, and, seeing no alternative, shifted back to car dependency. On her 30<sup>th</sup> birthday, she is “sampled” correctly. The NPTS determines that her life is characterized entirely by car dependency*

The implications of this type of sampling error are not all speculation. Despite the large sample size, transit data for various subsets of the population are very sparse. In fact, researchers found that the NHTS mode share trend between 1995 and 2001 does not corroborate with ridership calculated by the American Public Transport Association (APTA, using fare box counts) in a report amusingly entitled “Counting Transit So That Transit Counts” (2004).

### *Data Quirks*

While testing an improved software suite for inputting addresses for travel surveys, Michigan Department of Transportation engineers threw out 16% of their locations. In this case, 4% was thrown out because average speed fell above or below thresholds and 2.7% was geocoded incorrectly and the rest was a mixture of different types of reporting problems. This explained, for example, why certain commercial air flights reportedly only traveled an average speed of 4 MPH and certain bicycles traveled at 1,800 MPH. This also explained why the Michigan DOT and MORPACE (one of the contractors for the NHTS interviews) presented a report entitled “Improving Household Travel Survey Quality Through Time and Distance Data Checking” (2004).

While it is praiseworthy that the issue of distance and time checking is being recognized and thoroughly addressed for the next survey, it seemed appropriate to examine the NHTS 2001 for this. Using a rubric partially enumerated in the Michigan DOT and MORPACE article, speed thresholds were generated for each mode of transport and used to flag potential mistakes.<sup>6</sup> The end result is that 4.75% of speeds fall outside of reasonable thresholds (some are clearly mistakes). The question is, how does this affect average speed?

- Average bicycle speed drops 10%
- Average walking speed drops 9%
- All non-motorized modes drop 9%
- Car speed and speed for all privately operated vehicles goes up 1%
  - Car and POV speed only removing upper bounds: down 3%
- Transit speed increases 8%

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<sup>6</sup> Private car thresholds were explained in the Wargelin (2004) article, and using this overall guideline, the remaining thresholds were generated. These can be found in Appendix A.

- Transit speed removing only upper bounds: down 5%
- Other modes of travel not meaningfully affected

### *Survey Accessibility*

While it is clear that the personal vehicle dominates every aspect of what is presently called “travel,” and it might be realistic to wryly admit this in informal discussions, it is another to define “travel” as “car ridership.” Furthermore, traffic often becomes the central issue related to the study. And while traffic is perhaps the largest problem, is the NHTS sample population simply being enlisted to conduct a large traffic survey for the government? Clearly no, but is this how they feel while on their specified “Travel Day”? The invitation for participants to the Kentucky add-on for the NHTS arrived at potential participants doorsteps with this initial message: “Dear Kentucky Traveler: Are you concerned about the increase in traffic on Kentucky's roads?” How might a non-driver or infrequent driver respond to such a letter? The main NHTS invitation speaks similarly, asking, “Are you concerned about traffic?” and going on to talk about traffic increases.<sup>7</sup> While I understand that response rates were dismal for the survey, it is not clear whether this was justification for specifying traffic patterns as the key element to the study. The implication of always opening with the problem of traffic, is that the first mention of mode is cars, which is then followed by transit and non-motorized.

### *Churn*

The issue of *churn* is rarely discussed in the context of the U.S. national travel survey because the lack of a longitudinal element to the survey negates a fair assessment of this effect. Critics of the churn philosophy might point out that looking at the “equilibrium responses” of different age groups effectively captures the life cycle effect in the population. Proponents would retort by mentioning that is the conditions at the time of decision that are more important to analyze. Philip Goodwin (2005) remarks that, “Churn is the vital, ignored, dimension in behavioural change. This happens anyway all the time, for reasons other than transport policy, but is not captured in conventional travel surveys.” As an example using the previous discussion on young adult undersampling: if a subpopulation of twenty-year-olds

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<sup>7</sup> Baltimore Metropolitan Council also issued an invitation letter opening “Are you concerned about congestion? Traffic delays?”

drives to work because the conditions for reaching their workplace preclude other modes, but inwardly wish they could ride a bike, a simple cross-sectional sample analysis might conclude that twenty-year-olds *prefer* cars. A churn assessment might catch these twenty-year-olds selling their cars after a move to a more transit accessible area, and thereby coming to a much different conclusion.

Demotorization is one aspect of churn that has received a lot of attention in the European transport community. A survey of churn results from travel surveys in France, Britain, and Germany quickly show the benefits and possibilities of employing panel surveys. Dargay (2003) reports, for instance, that moving houses doubles the chance for demotorization, changing employment or place of education encourages demotorization, and, more obviously, demotorization occurs when access to public transit is improved and the parking situation deteriorates. Perceptions can also be measured and assessed over time—in France, the preference for public transit has been increasing since 1999, paralleling the preference for cycling. Capturing preferences using a panel survey is superior to a cross-sectional sampling because it keeps the individual constant and therefore measures changes in condition in a scientifically controlled manner.

The type of question often asked, and left unanswered in a scientific way, is, in the case of transit, the lack of quality or service or the preference for cars that is driving change? Sometimes this can be answered indirectly by a cross-sectional analysis; Ausman (2004) points out that vehicle owners have faster transit speeds—meaning they choose higher quality services when they do use transit. The resulting answer from the NHTS: only service of a certain quality will attract people away from their cars, but we cannot know what the threshold of that quality is. One way to answer this question would be to look speeds, or to take another example, rates of transferring on transit using a panel survey. Many transit scholars agree that poor transferring conditions (too long or too exposed) is a big deterrent for transit. A panel survey would detect precisely under which transferring conditions one chooses start using or discontinues using transit.

The newly established American Community Survey (ACS) is a move in the direction of a panel survey, although it remains a cross-sectional snapshot of socioeconomic factors. Instead of sampling every 10 years, it samples each year. Although individuals remain uncontrolled, it gives the results a more specific idea of how changes in conditions in the community affected perceptions and behavior. It does not give an idea of how changes in personal situation or lifestyle affect decisions. But the forces that coaxed the U.S. Bureau of the Census to shift to the ACS is a sign that there is a growing demand for this type of

information. Unfortunately, the transit data users community is surprisingly empty of suggestions for a move to panel survey. One reason for this might be the concern that the response rate is so low, it would be a disaster to move to a system characterized by more survey burden and survey fatigue. However, one argument against this mentality is that the response rate simply cannot get much lower!

In retrospect, the need for such a survey in the past decade was absolutely critical. As the Ausman (2004) reports, average travel speed has begun to slow for the first time. The report continues with a series of hypotheticals, many of which could have been borne out by a panel survey:

This may suggest the end of the opportunities to continue to increase travel speeds via shifts in travel time, mode, and route. The multi decade period of travel demand outpacing capacity expansion may have created sufficient congestion on the roadway network that adaptations that previously enabled travelers to increase travel speeds may no longer be available. Alternative travel paths, times and modes may no longer be available to enable travelers to avoid congestion [...] As roadways have become more congested the travel time reliability has deteriorated and created a longer perceived travel time (as travelers need to plan more time for time sensitive travel such as work in order to ensure on-time arrivals given the probability of incidents resulting in delays on a regular basis).

Being able to assess drivers' personal responses (or adaptations) to the worsening of road conditions would be a solid foundation from which to explore policy options.

## **CONCLUSION**

A radical change in NHTS methodology might imply the beginnings of a feared technological regime shift in the entire auto industry. A travel survey is an integral part of the 4<sup>th</sup> aspect of a technological regime, as defined by Hoogma et al. (2002), influencing how perceptions and expectations of the current technology shift or stay the same. The issues and problems inherent to the NHTS are therefore those of the NHTS survey team, as well as demand preferences of its major stakeholders (the USDOT and USFHWA, perhaps USDoE), and its minor stakeholders (data users, scientists, organizations). But the overarching theme of this article is the valuation of the “mobility or transport” paradigm. Are we measuring traffic or transport—transport or mobility? Unfortunately, there are fundamental conflicts

with data consistency and survey innovation that are compounded by an unclear set of demands from stakeholders, that is preventing the NHTS from innovating.

The desire to stay consistent is most easily shown by the austere and perhaps unjustifiable measure taken to reconcile 1990 data with that of 1995. The reason for this behavior is clear—the demand for consistency is driven by most stakeholders all the way from government down to the individual data users. Even stakeholders focusing on public transportation lament losses in inconsistency, when it is clear that significant innovation in the survey design could give a much clearer (if not fairer) picture of transit in the United States. The examination of panel surveys from Britain, Germany, and France showed that many of the most common complaints and data demands of the current NHTS would be satisfied by a panel survey. In addition, a panel survey (perhaps run concurrently) could help diagnose problems in the cross-sectional data, and vice versa.

With the demand for consistency so clear, the most wiggle room available for the NHTS survey team was to “improve” the survey, by fixing or expanding upon small issues and adding new sections. But at the same time, we see the aspiration for survey quality causing 20-year-olds and minorities, some of the most mobility-rich people, being squeezed out of the sample. The demand for consistency, subsequently, can lull data users and the NHTS team themselves into a harmful routine of “same-analysis-different-year,” and inevitable conclusions of the “car-car-car” variety. The invitation letters for the NHTS, which seem to enlist participants into a national traffic survey, is a clear example of how the transport community has become inextricably engorged on the personal vehicle.

But the advent of governmental support for new analysis systems, namely the American Community Survey and the American Time Use Survey, show that there is a movement to capture some alternative behavioral patterns. During the last couple of decades, travel behavior researchers have become increasingly focused on activity-based travel survey approaches. This is due in part to the desire to understand people's travel in the context of their daily activities and allows analysts to bring this context into travel analysis and modeling (Harvey 2003).

Short of shifting to a panel survey, the USDOT and USFHWA have the opportunity to use the survey interim period to focus on experimental analysis types and examinations of fringe mobility groups. This might, over time, give the NHTS team the ideas, theoretical backing, and experimental justification for introducing more creative innovations.

## Appendix A

### Speed Thresholds for Modes of Transportation

| Mode   | Threshold limits  |
|--|-------------------|
| <b>Less Than 30 Trip Miles</b>                       |                   |
| Private car  | 65 < Speed < 5    |
| SUV  | 65 < Speed < 5    |
| Van  | 65 < Speed < 5    |
| Pickup truck   | 65 < Speed < 5    |
| Other truck  | 65 < Speed < 5    |
| RV   | 65 < Speed < 5    |
| Motorcycle   | 65 < Speed < 5    |
| Taxicab  | 65 < Speed < 5    |
| Limousine  | 65 < Speed < 5    |
| Hotel/airport shuttle                                | 65 < Speed < 5    |
| <b>More Than 30 Trip Miles</b>                       |                   |
| Private car  | 80 < Speed < 5    |
| SUV  | 80 < Speed < 5    |
| Van  | 80 < Speed < 5    |
| Pickup truck   | 80 < Speed < 5    |
| Other truck  | 80 < Speed < 5    |
| RV   | 80 < Speed < 5    |
| Motorcycle   | 80 < Speed < 5    |
| Taxicab  | 80 < Speed < 5    |
| Limousine  | 80 < Speed < 5    |
| Hotel/airport shuttle                                | 80 < Speed < 5    |
| <b>Other Modes</b>                                   |                   |
| Airplanes (commercial, private)                      | 600 < Speed < 100 |
| Transit buses  | 55 < Speed < 5    |
| Commuter buses                                       | 70 < Speed < 5    |
| Commuter / Distance Trains                           | 70 < Speed < 5    |
| Subway / Trolley                                     | 40 < Speed < 5    |
| Walking  | 10 < Speed        |
| Bicycle  | 10 < Speed        |
| <b>Nonsampled:</b> Sailboat, motorboat, yacht; Other |                   |

## References:

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