Second Day Response Rates: Implications for CMAP's Travel Tracker Survey

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Introduction

Why would MPOs implement 2-day travel surveys in the first place, given the strong likelihood that respondent fatigue may bias the results?

It is well established there is significant day-to-day variation in individual travel:

- major travel activities at the tour level,
- stop making (number of stops and duration of stop activity),
- adjustments to departure (and arrival time),
- mode shifts
- and route choice

Some researchers are convinced that 2-day surveys offer the best trade off for additional statistical insights at a lower cost than surveying twice as many household members (Pas 1986).

In the 2008Travel Tracker household survey conducted for the Chicago Metropolitan Agency for Planning (CMAP) roughly 45% of the households were asked about their travel activities over 2 days, with the remaining 55% being the of the more traditional one day travel diary type of survey.

One question about multi-day surveying is whether the respondent fatigue is such an issue that the resulting degradation in the data outweighs the advantage of instituting 2-day surveys in the first place.

Measuring Fatigue

There are few hard and fast rules regarding how to know with certainty if a respondent is suffering from fatigue. Provided the survey has been completed, it is possible (and indeed plausible) that stop activities are increasingly omitted the longer the survey takes to complete. Nonetheless, there are markers that might raise flags or minimize concern. In the Travel Tracker, the respondent actually indicates whether the data is being read off hard copies of a travel diary or reported from memory.

- Hypothesis #1 is that respondents reading from travel diaries will suffer less fatigue.
- Hypothesis #2 is that respondent fatigue will increase as the number of household members increase, although this only applies if the main respondent is reporting for all of them.

As far as the content of the surveys, we might expect that respondents will recall the work tours (or simply report that this activity was the same as the previous day) but will not report all stop activities or potentially would omit maintenance or leisure activities on the second day.

- The related hypothesis (#3) is that respondent fatigue will decrease the number of recorded stops on mandatory tours on the second day, as well as reduce the non-mandatory tour rates on the second day.

Correcting Resp. Fatigue

Depending on the severity of the problem, there are a variety of options:

- Discarding the entire record (for respondents who prove to be particularly unreliable and/or are missing a great many data items);
- Discarding the second day information and treating the first day as if it were one-day data;
- Reweighting either the second day or both days to discount this information in general tabulations (note that these weights might vary depending on the attribute of interest – tour rates vs. stop making);
- Adjusting the existing data with respect to VMT or activity duration;
- Synthesizing missing information.

Household-level Results

Table 1. Household Level Trip Reporting across the Days of the 2-Day Survey

Responded to both Days	
Households Reported Fewer Trips in the Second day	1,349
Households Reported More Trips in the Second day	1,122
Households Reported Same Number of Trips in the Second day	640
Total	3,111

Table 2. Household Level Trip Rates by Survey Type and Day of the Survey

Analysis Variable : hhtrips					
Survey Type	Day	N Obs	Sum	Mean	Std Dev
1-Day	1	7,652	69,996	9.147	6.933
2-Day	1	3,263	28,857	8.844	6.713
2-Day	2	3,196	27,567	8.625	6.666

Individual-level Results

Table 3 Person Level Trip Reporting across the Days of the 2-Day Survey

Responded to both Days	
Persons Reported Fewer Trips in the Second day	2175
Persons Reported More Trips in the Second day	1991
Persons Reported Same Number of Trips in the Second day	2067
Total	6233

Table 4. Person Level Trip Rates by Survey Type and Day of the Survey

Analysis Variable : pertrips					
Survey Type	Day	N Obs	Sum	Mean	Std Dev
1-Day	1	16,033	69,996	4.366	2.602
2-Day	1	6,778	28,857	4.257	2.510
2-Day	2	6,588	27,567	4.184	2.444

Conclusions

The general finding is that less travel is reported on the second day of travel. More specifically, mandatory travel seems to be just as prevalent on the first as on second day of travel but stop making is not taking place (or at least is not being recorded) at the same rate. Less stop making is observed on the 2nd day of the survey, which is consistent with Hypothesis #3.

Next Steps

The next steps include pushing further into data analysis of the Travel Tracker, specifically looking at the variation by household size and the use of previously recorded travel diaries versus respondent recall. The analysis of trip rates will be repeated at the tour-level. If, as seems likely, respondent fatigue is prevalent in the Travel Tracker survey, we will undertake an analysis to identify routines that would allow specific records to be flagged.

Next Steps (cont.)

The treatment of these records will depend upon the severity of the respondent fatigue, as well as the intended use of the Travel Tracker data. As identified in the paper, a number of options are available to the modeler, ranging from eliminating suspect data, reweighting data or even synthesizing missing data. However, our general belief is that the more advanced the structure of the desired model, the fewer the options available to the modeler.

Sources

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For further information

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