

0-7054: Integration of Stated Preference and Revealed Preference Methods in Regional Travel Survey Programs

Background

Revealed preference (RP) questions seek information on observed activity-travel characteristics of respondents in the context of currently available travel options. While RP questions provide researchers with important information, they do not provide information for a future that may substantially differ from today, in terms of emerging travel technologies or options, new travel policies, or large-scale infrastructure projects. It is important to incorporate stated preference (SP) questions within travel surveys so that developing and future transportation plans account for the inevitable introduction of new technologies, policies, and projects. SP questions record the decisions respondents make in the context of hypothetical scenarios that have not yet materialized, providing essential information for determining impacts, cost-benefit analysis, and social acceptance of future transportation plans. This need to integrate SP questions alongside RP questions in travel surveys is increasingly being recognized by the transportation demand practitioner community, especially as the world continues into the unprecedented future following the COVID-19 pandemic.

As part of this project, the researchers developed guidelines for SP survey data collection and implemented this work in a survey that examined the COVID-19 pandemic's effects on current and future activity-travel patterns.

This project's two objectives were:

1) Exemplify state-of-the-art SP techniques and recommend the addition of SP experiments to existing surveys to enhance their use for long-term travel forecasts.

2) Provide proof of concept and applicable travel behavior results through the design, deployment, and analysis of an RP-SP survey that concentrated on employed Texans' workplace location (WPL) choices as the effects of the pandemic begin to wane.

What the Researchers Did

To accomplish their objectives, the researchers did the following:

- Assessed existing RP-SP surveys to identify the advantages and limitations of techniques already in practice.
- Developed a methodology for designing an RP-SP travel survey in the form of a guidebook.
- Exemplified the methodology established in the guidebook by implementing an SP experiment (on WPL choices) in an RP survey.
- Made recommendations to both (1) guide planners in designing SP experiments to represent specific policy scenarios, and (2) provide contextualized results concerning WPL choices that can supplement TxDOT's current

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analysis methods used in traditional travel demand modeling (TDM) strategies.

What They Found

To address objective one, the researchers determined that RP-SP data and SP experiment data are valuable to TxDOT when modeling future travel demand. These question types can be streamlined to focus on specific issues of concern for each metropolitan planning organization (MPO). Further, surveys across different MPOs can be combined to obtain a larger picture of the future of travel for Texas as a whole.

Regarding objective two, the researchers demonstrated the benefits of SP-style surveys to planners as they begin forecasting changing behaviors in response to the COVID-19 pandemic. This was done through the WPL preferences of Texas employees, revealed through responses to an RP-SP survey that posed hypothetical scenarios covering different time frames before, during, and after the pandemic.

Results from the RP-SP survey and WPL SP experiment indicate that single young women with young children, those with long, “intolerable” commutes to the work office, individuals with a private study in their homes, self-employed workers, and those in non-essential service occupations have the highest preference for working from home. Conversely, older men, individuals from low income households, those residing in rural areas, and workers in essential service occupations have the

highest preference for the work office. The model developed from the RP-SP survey results allows for the prediction of how and where an employee of a certain gendered lifecycle group, age group, income level, and occupation type will divide their WPL choices over a month. These splits can be mediated further by changing WPL geographic and environmental attributes and COVID threat characteristics.

The results reveal that work hybridization will be the norm as the job market adjusts to employee WPL preferences. Thus, it is imperative that work hybridization be accounted for in TDMs to avoid the ecological fallacy originating from ignoring the effects of WPL heterogeneity on broader activity-travel patterns.

What This Means

The researchers performed an extensive evaluation of the benefits of integrating SP questions with traditional RP questions to improve TDM forecasts. They also created a guidebook to lead planners step-by-step through conceptualizing, designing, deploying, and analyzing an RP-SP survey and SP experiment of their own. An example of the process is provided through the survey of Texans’ WPL preferences as the impacts of the COVID-19 pandemic begin to wane. Though originally developed as a proof of concept, the results from the WPL analysis provide an improved understanding of post-pandemic work hybridization and its effect on activity-travel behavior, which can be considered in future TDMs.

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