PERCEPTION AND JUDGMENT PROCESSES IN TRAVELER DECISIONS UNDER REAL-TIME TRAFFIC INFORMATION

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1 INTRODUCTION
This study aims to model perception effects in route choice decisions under information, and users judgment of information quality under alternative information strategies. The first objective is to propose models of perceived trip time in the context of tripmaker decisions under real-time information. The proposed perception model investigates the influence of a) imperfect information, and b) the role of partial or incomplete experience on the perception process. Two sources of information imperfection are studied: inaccurate/erroneous information, (reported trip times deviate from experienced trip times systematically) and, partial/differential information (real-time information not available on certain routes on certain days). The relationship between partial experience and imperfect information is also explored. Further, this objective also examines the influence of the following factors on the perception process, including the role of congestion, route choice decision location, variability in system travel times, and socio-demographic attributes of tripmakers (e.g., age and gender).

The second objective examines the related issue of users’ judgment of quality of real-time traffic information under various information strategies. The following substantive issues are examined under this objective. Can users discern and distinguish differences in information quality across various information strategies? How do key information attributes (e.g., nature - prescriptive/descriptive and type of information - prevailing, perturbed etc.) influence the judgment decisions of tripmakers? Do tripmaker characteristics and traffic experience influence the judgment of information? Are users’ judgment decisions correlated over time across strategies? These questions have important implications for the
design of favorable information strategies, and increased compliance with information, investment into alternative information technologies.

2 METHODOLOGY
These objectives are addressed by developing models of perception and judgment using data from a set of interactive travel behavior experiments. In these experiments, route and departure time decisions of actual commuters were observed in a simulated commuting environment for a series of days under various information strategies. Since the perception process is latent, it is modeled indirectly by examining the effect of reported trip times and experienced trip times on route choice decisions under various imperfect information and incomplete experience. In contrast, the judgment model is based on information quality ratings reported by users. A longitudinal route choice model is used to analyze the perception process, and a continuous time-series cross-sectional analysis is used in the judgment model.

3 CONCLUSIONS
The results of the trip time perception model indicate that the perceived trip time varies with the extent of information (complete/partial), experience of users (full or partial experience on alternative routes), and information type. Further, the relative weights placed on reported and experienced trip times also vary depending on information accuracy and availability, and experience. The perception of reported trip time varies across decision-makers based on past traffic experience, anticipated congestion, and commute characteristics. Thus, the perceived value of trip time varies dynamically within-day and from day-to-day. These findings call into question the behavioral assumptions invoked in deterministic and stochastic equilibrium assignment models, for instance, perfect information, trip time minimizing path choice rules, fixed and homogeneous perception parameters, and have important implications for dynamic network performance models.

The results of the information quality judgment model suggest that users rate highly accurate (predicted) information positively, and highly inaccurate (random) information negatively. However, users do not appear to distinguish between other information types (prevailing, perturbed, and differential information), in terms of quality ratings. The results also show that users’ ratings of information are closely linked to their own traffic experience. For instance, users with adverse schedule delay or congestion experience tend to
rate the information quality poorly, compared to other users. Thus, there appears to be a confounding between users’ perception of information quality, and their perception of and experience with traffic conditions. Further, the results also suggest that the judgment process exhibits significant unobserved variability (84%) not captured by systematic variables in the proposed model.