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Understanding and modelling the passengers' behaviour in disturbed multimodal transport system

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Introduction

Research in transport has tackled much more the route choice of car drivers and the determinants of modal choice, than the route choice of public transport users. Our research is focused on the passengers' choice in disturbed situation. This research is part of a broader project dealing with mass transit system modelling. The scope includes four commercial lines of a French public operator (SNCF) in Paris suburban area. It aims at defining a behavioural matrix based on interviews and surveys of public transport users.

Method

The methodological protocol includes:

- 28 in-depth semi-structured interviews conducted with daily users, occasional users, and non-residents users (French and American tourists).

- A first revealed-preference questionnaire, completed by 185 users (10% return rate): It aimed at identifying the socio-demographic and personal characteristics of the respondent, and to know his/her mobility pattern in normal and disturbed situation.

- A second revealed-preference questionnaire, completed by 38 of the 185 users: This shorter questionnaire was filled each time the respondent faced a disruption on his/her route. 80 questionnaires were completed in 15 days.

Results

A typology of users facing major disruption

Results of the first questionnaire mainly allowed to build a typology of users with multiple correspondence analysis (MCA) and clustering methods. The analysis encompassed 9 active variables, relative to behavioural choices, and 7 illustrative (or supplementary) variables relative to individual characteristics. The analysis showed 3 axes: active/passive, motorised/non motorised, constraint/flexible. Then, the results of the MCA fostered a clustering analysis (with hierarchical ascendant classification) resulting in the identification of 8 different homogeneous groups of individuals in the sample.

Determinants for the behaviour

The results of the second questionnaire highlighted a link between some personal, situational, and informational variables and the behaviour. For example, shifting to car during major disruption appeared to be more frequent amongst older male users.

Implications

These results led to the development of a behavioural matrix. According to its group, each user has a specific behaviour (e.g. waiting time before shifting) varying upon 4 gravity

levels of disruption, from small disturbances to serious disruptions. This matrix is used in a multimodal transport modelling tool.