

Categorisation of streets by drivers and associated expectancies: a cognitive analysis of driving activity for safer urban design

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Abstract

Driving activity requires processing a huge amount of visual information in a limited time. Accident analyses have underlined the important role that malfunctions in information selection and diagnosis play in accident processes. A way to improve traffic safety is to make drivers' information processing easier, faster and more efficient. To process information, drivers make use of previous knowledge, acquired through training and experience. According to cognitive psychology models and research on mental categorisation, human knowledge and particularly knowledge related to driving situations is organised into categories. Drivers refer to categories of roads when they analyse the roads and environments they are driving on. They also associate to such categories of roads certain specific expectancies related to the events they may encounter on such roads. By so doing, they are able to better anticipate these expected events and they can then make appropriate driving decisions. One challenge for the engineers is to take drivers' categories into account when designing roads in such a way that drivers' information processing and decision making will be more appropriate to the situations encountered. This paper presents results from experimental research focused on urban streets. It is aimed at identifying drivers' categories of urban streets and their related expectancies. The material was made up of 65 photographs of urban streets. The procedure involved experienced drivers and consisted in asking them to classify streets and then to explain the events they expected to encounter in the different classes of streets they had constructed. Some implications of the results are discussed from the point of view of urban design.

Keywords - Categorisation, anticipation, street design, urban planning, cognitive psychology, road safety

1. Introduction

The analysis of human's behaviour in his environment requires the use of general psychology models, while taking into account the specificity of the activity being studied. Thus, the situated cognition current [3] argues in favour of "ecological" psychology [23] which reintroduces its investigations into the contexts of performing "natural" practices. Above and beyond the motivational aspects underlying the performance of everyday activities, a certain number of contextual "constraints" govern the conditions for implementing the subject's actions. Research work examining the environment influences on behaviour [17] has given rise to the notion that human behaviour is determined by the physical characteristics of the environment as much as by