Chapter 5

FACTORS INFLUENCING DRIVING PERFORMANCE

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1. INTRODUCTION

The act of driving is a highly complex endeavor, partly due to time constraints for detecting, perceiving, and processing information before making a decision and reacting on a road environment full of unpredictable events. It is the driver who has the sole responsibility for how actions are carried out, and reactions to incidents depend wholly on his/her capacity to manage the situation.

An important part of the driving task includes play or fun activities. In the book, *Les jeux et les hommes – The Games and the Men*, Cailliois (1958) underlined that the excitement is a “voluptuous panic... typical from industrial societies” which make available for people machines able to increase tenfold the pleasure leading to “a destructive madness.” These principles, contributing to the driving activity in a more or less important manner according to the personality of the driver, are clearly in contradiction with the concept of a pragmatic and sensible way of running an efficient performance. Nevertheless, according to Cailliois (1958), the game “makes [one] discover […] life in general by increasing the ability to overcome obstacles and to face difficulties.” This point of view evokes the principle of learning the driving task on a driving simulator, where the risk of a poor performance has no consequences.
These activities are mainly based on visual perception of the dynamic environment, the relative position of the vehicle, and the instruments on board.

Some part of the driving task might be automated through practice, that is to say the level of attentional demand to run this activity is quite low. Most of these sub-tasks belong to the operational level of the driving task, involved in the general control of the vehicle, consisting of shifting gears for example. The level of performance for these activities is quite independent from contextual events and is more connected with the level of the driver’s experience.

The tasks related to the tactical level usually require driver’s attention, at a level that can be very different according to the degree of complexity induced by external events, bringing about a global mental workload that can highly influence the driving performance.

The level of attention required for the strategical level, and, consequently, the level of performance to run the sub-tasks related to this stage, are more dependent upon the driver’s familiarity with the area, and the usability of guiding and navigation information available to run this activity related to orientation processes.

The concept of driving performance might be considered from several points of view: From a global point of view, efficiency in reaching a destination quickly; from a behavioral point of view, efficiency in controlling a vehicle comfortably; from a safety point of view, ability to avoid road accidents...

The evaluation of driving performance can be conducted by using subjective and objective criteria and/or by recording any dysfunctional driving activity.

In the first case, various criteria can be taken into account: Evaluation of the driver’s knowledge concerning driving regulations; evaluation of the level of his past experience in the driving activity through questionnaires; quantification of the amount of transgressions to road regulations; observation of the driver’s behavior in order to quantify the reaction speed to detect critical situations, the correct control of the vehicle trajectory, the efficiency in perceiving relevant information from the external environment, and so forth.

In the second case, the evaluation of the driving performance can be made through the record of accidents, with several difficulties raised by this approach: Firstly, a road accident is fortunately considered as a very rare event in terms of statistics; secondly, there might be a bias linked to the type of source used such as police or assurance record; and finally, an accident does not necessarily happen because of deficiencies of the driver and can be due to technical problems of the vehicle, or uncontrolled external reasons.

The factors influencing the driver’s performance might be distinguished according to their origins: