The Lane Change Test: United Kingdom results from a multi-laboratory calibration study

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Abstract

Dual task scenarios have long been used to evaluate the demands imposed by secondary in-vehicle information systems. International effort has been expended to develop standardised methodologies for valid, reliable, and efficient system assessment. The 'Lane Change Test' is an example of one of these protocols. A multi-laboratory coordinated data calibration exercise was undertaken to explore the utility of the Lane Change Test. This paper reports on UK data which contributed to this exercise. The Lane Change Test encompasses a primary task representative of some control aspects of the driving task. It was evaluated in the context of several secondary tasks, with easy and difficult variations. These tasks were an auditory one, a visual one and an integrated audio, visual and manual route guidance task. Results indicate broadly the same directionality of findings for all laboratories. For example, mean lane deviations were found to be smallest for the auditory tasks, followed by the visual only tasks, with the integrated tasks being most disruptive of primary task lane deviation. However, some laboratory-specific findings were identified.

Introduction

The analysis and evaluation of task difficulty may be undertaken by pushing users to the point at which the performance fails. For example, Wickens & Hollands (2000) discuss the use of performance resource functions to characterise the relationship between effort and performance. However, when secondary or additional tertiary tasks are undertaken to achieve a goal, performance on the additional, typically secondary task, may provide insight into both the individual's capabilities, and potential performance in the primary and secondary tasks. There has been an ongoing debate (Salvucci & Taatgen, 2008) as to whether task execution is distributed (Wickens, 2002) or unified in the imposed cognitive demands (Tombu, et al., 2011). In many applied contexts, regardless of the processing mechanism, it is pertinent to understand the functional performance relationship between tasks. For example, it has been suggested (Wickens & Hollands, 2000) that for a primary task with a relatively constant level of difficulty, an increasingly difficult secondary task may 'mop up' spare cognitive capacity, until performance on it or the primary task begins to degrade (setting aside any limits in the availability of data, rather than resources, for the tasks).

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