

Impact of voice variation in speech-based in-vehicle systems on attitude and driving behaviour

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Abstract

Automobile manufacturers are making information systems available in all vehicles. Most systems are screen based, but increasingly systems are either hybrids (screen/speech) or speech based. Speech systems in vehicles may have advantages over screen based in-vehicle systems; literature suggests that speech can be less distracting than screen-based interactions. But voices carry socio-economic cues including indicators of gender, age, personality, emotional state, ethnicity, education and social status, which in turn influence the perception and uptake of the message. This is true also if the voice is from a computer or other technical device. In previous research on social responses to media using voice technology, it has been shown that people tend to react to them as if they were real people. This suggests that these factors are also important to consider when designing in-vehicle speech systems. In this paper we first present the basic research paradigm, and then present three experimental studies of how variations in speech based information systems in cars influence both attitude towards the information presented and driving performance in a driving simulator.

Voices and speech-based in-vehicle systems

Most cars today are fitted with interactive information systems including high quality audio/video systems, satellite navigation systems, hands-free telephony, and control over climate and car behaviour (Floudas, et al., 2004). Even though most in-vehicle systems are screen-based, speech interactions are becoming more commonly used by in-vehicle systems. There is limited space on steering wheel and dashboard for buttons and controls. Furthermore, the use of speech would also enable drivers to keep their hands on the steering wheel and their eyes on the road during interactions with the system.

Speech and driving safety

A driver's primary task is safe driving; any other activity performed while driving is regarded as a secondary task. The single most important aspect of any system to be used in a vehicle is its impact on driving safety.

In D. de Waard, A. Axelsson, M. Berglund, B. Peters, and C. Weikert (Eds.) (2010). *Human Factors: A system view of human, technology and organisation* (pp. 395 - 408). Maastricht, the Netherlands: Shaker Publishing.