The impact of a naturalistic hands-free cellular phone task on heart rate and simulated driving performance in two age groups

Bryan Reimer *, Bruce Mehler, Joseph F. Coughlin, Nick Roy, Jeffery A. Dusek

Massachusetts Institute of Technology AgeLab and New England University Transportation Center, 77 Massachusetts Avenue, E40-291, Cambridge, MA 02139-4307, USA

ARTICLE INFO

Article history:
Received 14 October 2009
Received in revised form 30 March 2010
Accepted 6 September 2010

Keywords:
Cell phones
Cognitive distraction
Driving performance
Workload
Physiology
Age

ABSTRACT

Heart rate and driving performance were assessed while late middle age (51–66) and younger adults (19–23) engaged in a naturalistic hands free phone task that was designed to place objectively equivalent cognitive demands on all participants. Although heart rate measures have been used in evaluating driver workload, prior studies had not compared responses in late middle age and younger adults with samples of sufficient size to begin to explore possible age relationships. In an evaluation of 37 participants, the two age groups displayed equivalent performance on the cellular telephone task and concurrent decrements in speed control (SD velocity). It was observed that the late middle age subjects drove more slowly overall and, as a group, did not demonstrate heart rate acceleration in response to the phone conversation that was seen in younger drivers. The possibility that age group differences in heart rate response are related to individual differences in attentional focus is raised. While there are significant reasons to discourage all individuals from engaging in phone conversations and other distracting tasks while driving, late middle age adults appeared as capable as young adults of managing the additional workload of a low to moderately demanding cognitive task of the type assessed. The tendency of individuals to adopt self-regulatory behaviors, such as a lower overall driving speed, as a function of age/experience may account for the equivalence in overt performance.