

MarTREC UTC Project Information Form USDOT Tier 1 University Transportation Center Agency ID or Contract Number DTRT13-G-UTC50

Project Title: Roadway Sign Recognition During Computer Testing versus Driving Simulator Performance for Stroke and Stroke with Aphasia Groups

Project Abstract (Brief Description): Stroke is one of the most prevalent disabling diseases in the United States. It is the #4 cause of death and the leading cause of adult disability (American Heart Association, 2014). Each year, 795,000 Americans suffer a stroke resulting in \$73.7 billion stroke-related healthcare and rehabilitation cost in 2010 (AHA, 2014). Louisianians live in one of the 11 states that make up the "stroke belt" where there is a 10% higher rate of stroke than the rest of the country (National Heart, Lung, and Blood Institute, 2009).Driving is "an essential activity of daily life...and a strong symbol of independence..." (p.89) (Kay, Bundy, Clemson, Cheal, & Glendenning, 2012). In Louisiana, the ability to drive is essential for removing oneself from harm's way during impending hurricanes. The literature has shown that stroke may impact pre-requisite skills needed to drive including physical mobility, sensorimotor, cognition, communication, visual perception, and visual processing (Akinwuntan, Wachtel, & Rosen, 2012; Donovan et al., 2008 ; Korner-Bitensky, 2012).

Describe Implementation of Research Outcomes (or why not implemented) Driving is essential to maintaining independence. For most Americans preserving personal mobility is a key element to retaining jobs, friends, activities and the basic necessities to maintain a household. This is particularly true for older people. However, as the general age of the US increases, more and more people are becoming at greater risk for neurologic diseases such as stroke. Brain damage from stroke can affect physical mobility, sensorimotor, cognition, communication, visual perception, and visual processing which are all critical processes needed for driving. Currently, there is no consistent way to determine when a person can return to driving poststroke. Most driving studies exclude people with poststroke aphasia (PWA). However, aphasia may result in the inability to recognize and interpret the words, symbols, and gestures on road signs, which will impact safe driving. The results showed that aphasia significantly impacted accuracy and response time of road sign interpretation. More importantly, however, as language and symbol complexity increased on road signs, the aphasia-affected drivers performed with less accuracy and required more time. Although poststroke aphasia has not been taken into account in most strokerelated driving research, these findings suggest further research is warranted and may have implications for the design of road signs and healthcare professionals who make decisions about when a PWA may safely return to driving.

Impacts/Benefits of Implementation (actual, not anticipated)

Research results show that post stroke aphasia significantly impacted accuracy and response time of road sign interpretation, and as language and symbol complexity increased on road signs, the aphasia-affected drivers performed with less accuracy and required more time indicating that designers of road signs and healthcare professionals should consider this when making decisions related to when those impacted to safely return to driving.

Web Links: http://evaccenter.lsu.edu

Budget (Funding) Amounts & Source(s) (US DOT +Match(s) =Total Costs): Budget \$37,311 Match \$56,013 (salary and unrecovered F&A) = a total cost of \$93,324

Project Start and End Dates: 10/01/13 – 09/30/14. A no cost extension to 06/30/15. Project complete.

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