

Safe, risky, cautious then chaotic: profiling driver performance in dementia, naturally.

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Dementia impairs cognitive, visuo-spatial abilities and judgement required for safe driving. When task demand exceeds capacity driving failure occurs, yet performance risk thresholds are not absolute. Some drivers remain capable for number of years, while others decline more rapidly. Drivers in the very early stages appear to perform as well as age matched controls, and research has established that drivers in the moderate stages drive unsafely. Prospective studies show limitations when defining performance of those with early (mild) dementia, as driving capacity varies widely in this group. The early dementia group are therefore of most concern, as in this stage the transition from safe to unsafe driving is most likely to occur. Assessment of driving for licensing purposes is conducted via a set on-road assessment process, often criticised for its snapshot nature. The face validity of on-road assessment is comforting to drivers, but some claim the circumstances are not sufficiently like normal driving; and studies have shown lack of familiarity with test vehicles, instructor cueing and anxiety may alter performance.

Despite methodology limitations, observational prospective research has identified the driver errors of people with dementia and the environmental demands likely to be most problematic. This prospective on-road study of 117 drivers with dementia found 14 error types, further categorized as high-frequency with low-severity (habit-based) or low-frequency with high-severity (hazardous or critical). The people with dementia were recruited from a memory clinic and tested via occupational therapy on-road assessment. Half the drivers were in mild dementia range (56%), the mean age was 75 years, with 78% men. The on-road route was 60 minutes duration and graded up in task complexity and consisted of 110 pre-programmed observations at key locations. Two observers rated the driver on a range of pre-determined driving skills at each task, and on conclusion each was given a global rating of pass or fail. There was a 56% fail outcome for whole group. Eighty-seven route task locations discriminated between pass and fail driver performance when compared to 14 errors types identified in the data. Correlation and principal component factor analysis (PCA) of errors revealed unique patterns of driver error, related to dementia severity. The factors suggest the driver with very early dementia has common poor habits, and later becomes impaired by the addition of breakdown of interrelated scan, speed, and turn skills. The driver can also be either overtly risky or overly-cautious before becoming the chaotic and confused driver. Critical errors are precursor to driving instructor intervention in on-road assessment studies. It is proposed that the variables of interest in naturalistic data studies of drivers with dementia are based upon the empirical evidence collected in prospective studies.

Naturalistic driving studies are a relatively new phenomenon in dementia and driving research, but offer five important future improvements. First, data collected in people's own cars and while they perform their daily routines enables us to ascertain if performance alters with the daily fluctuations of cognitive capacity common to dementia. Second, naturalistic data collection may determine if the types of errors observed in controlled on-road assessment circumstances are sufficiently comparative to the patterns in daily driving. Third, naturalistic data should determine the extent to which awareness and self-correction of error occurs in the dementia population and fourth, should improve our understanding of performance parameters in the early (mild) dementia group. Fifth, cumulative profiles of driver error patterns measured naturally and over time should then inform our understanding of overall risk thresholds, and ultimately when the person with dementia should cease driving. This poster suggests conceptual connecting points where the data derived from a traditional on-road assessment study may be used to inform future naturalistic data studies of drivers with dementia.

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