

- Prevention, 42, 1839 – 1854.
25. Petroulias, T. (2014). Community attitudes to road safety – 2013 survey report. Retrieved from Department of Infrastructure and Transport website: [http://www.infrastructure.gov.au/roads/safety/publications/2013/pdf/community\\_att\\_13.pdf](http://www.infrastructure.gov.au/roads/safety/publications/2013/pdf/community_att_13.pdf)
  26. Sarbescu, P. (2012). Aggressive driving in Romania: Psychometric properties of the Driving Anger Expression Inventory. *Transportation Research Part F*, 15, 556 - 564.
  27. Schwebel, D., Severson, J., Ball, K., & Rizzo, M. (2006). Individual difference factors in risky driving: The roles of anger/hostility, conscientiousness, and sensation-seeking. *Accident Analysis and Prevention*, 38, 801 – 810.
  28. Svenson, O., & Patten C. (2005). Mobile phones and driving: A review of contemporary research. *Cogn Tech Work*,
  29. Tornros, J., & Bolling, A. (2005). Mobile phone use – effects of handheld and handsfree phones on driving performance. *Accident Analysis and Prevention*, 37, 902 – 909.
  30. Tornros, J. & Bolling, A. (2006). Mobile phone use – effects of conversation on mental workload and driving speed in rural and urban environments. *Transportation Research Part F*, 9, 298 – 306.
  31. Wickens, C. (2008). Multiple resources and mental workload. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 50, 449 – 455.
  32. Yannis, G., Papadimitriou, E., Karelka, X., & Kontodima, E. (2010). Mobile phone use by young drivers: Effects on traffic speed and headways. *Transportation Planning and Technology*, 33(4), 385 – 394.
  33. Young, R. (2013). Cell Phone Conversation and Automobile Crashes: Relative Risk is Near 1, not 4. Paper presented at the 3rd International Conference on Driver Distraction and Inattention, Gothenburg, Sweden.

# Contributed Articles

## Australia's Naturalistic Driving Study

By Raphael Grzebieta

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The Australian Naturalist Driving Study (ANDS) is being carried out by a Transport and Road Safety (TARS) team led by Professors Raphael Grzebieta and Ann Williamson. Drivers will be observed within and around their vehicles using the so-called Naturalistic Driving Study research method. The ANDS team will be instrumenting around 400 cars in Sydney and Melbourne to continuously record data from within and outside the vehicles on driver and road user behaviour, in normal and safety-critical situations. They will then analyse this data to develop new and novel countermeasures for reducing road deaths and serious injuries on Australian roads. This is the first study of this magnitude and sophistication being carried out in Australia.

### Researchers

The team comprises researchers from a number of areas including: co-Chief Investigators Associate Professor Teresa Senserrick from TARS; Professors Narelle Haworth and Andry Rakatonirainy from CARRSQ in Brisbane; and Professor Stevenson, Associate Professor Judith Charlton and Doctor Kristie Young from MUARC in Melbourne; and

Doctor Jeremy Woolley from CASR in Adelaide.

After successfully securing around \$3 million funding from the Australian Research Council and Partner Organisations, an Integrated Facility is being built and an extensive research project has been planned to carry out this ground breaking research to observe Australian drivers in New South Wales and Victoria. The Partner Investigators joining the team are Ben Barnes and John Wall from the New South Wales Centre for Road Safety (Transport for New South Wales); Samantha Cockfield from the Transport Accident Commission in Victoria; Antonietta Cavallo and David Healy from VicRoads; and Jack Haley from NRMA Limited in New South Wales. Other Partner Organisations and people involved are Iain Cameron from the Office of Road Safety from Main Roads Western Australia and Ben Tufnell from the Motor Accidents Commission of SA. The ANDS team will be partnering with the Virginia Tech Transportation Institute in the USA who will be assisting with the installation of the vehicle instrumentation and data capture.

The Integrated Facility will help underpin all future road safety research and become an essential pillar for the entire Australian road safety research community and regulatory authorities. The team of Chief Investigators and Partner Investigators assembled to manage and utilise this Integrated Facility includes the most eminent group of researchers, practitioners and regulators in road safety in Australia and internationally. It is expected that road safety policies and trauma mitigation strategies resulting from research outcomes using the facility, will likely yield fatality and serious injury reductions in the order of around 20-30% over the next decade; saving many hundreds of lives as well as eliminating many thousands of life-threatening serious injuries.

Australia's past success in road safety has been due, in large part, to the development of road safety strategies with prioritised interventions with a very strong evidence base. To date, this evidence base has been derived primarily from crash data collected by police, in-depth crash investigations, Coroners' and hospital data and from data from surveys on driver exposures to risk. However, these data sources are limited in the depth and quality of information they provide about driver and road user behaviour, which are major contributing factors in most collisions. Such data can often only be inferred, if at all, from available evidence after a crash or from surveys with confounding unknown self-reported biases. Existing data collection methods in road safety in Australia rely on the limited post-crash accuracy and biases of driver and witness recall of events and on retrospective physical evidence from crash scenes - with little or no pre-crash information about other vehicles and road users involved.

The Naturalistic Driving Study (NDS) is a relatively new research method that has the potential to overcome many of these limitations. In a NDS, volunteer participants drive an instrumented vehicle (usually their own) for 6 to 12 months, or more, fitted with an unobtrusive Data Acquisition System (DAS) which continuously records their driving behaviour (e.g. where they are looking), the behaviour of their vehicle (e.g. speed, lane position) and the behaviour of other road users with whom they interact (e.g. other drivers, motorcyclists, cyclists and pedestrians) - in normal and safety-critical situations. Each DAS, depending on its capabilities, incorporates multiple sensors (video cameras, GPS, radar, accelerometers, etc.) - to provide a complete, second-by-second, picture of driver, vehicle and road user behaviour in all driving situations.

The importance of the NDS paradigm in overcoming the limitations of traditional methods of data collection and analysis in road safety is now well recognised by the international research community. The United States, for example, has undertaken several large-scale NDS projects. The first was the seminal "100-car naturalistic driving study", which explored factors leading to rear-end crashes, and the most recent (currently underway) is the United States Strategic Highway Research Program Phase 2 ("SHRP 2") NDS, which deployed around 3000 vehicles to explore and analyse a much wider range of road safety problems. Recently, Japan, Europe (the EC-funded

UDRIVE project), Canada and China have followed suit in ramping up their first large-scale NDS projects. To date, no large-scale studies of this kind and complexity have been undertaken in Australia.

So far around 40 studies utilising the NDS approach have been undertaken worldwide. Most have been small-scale studies. Several research issues have been examined, including factors leading to rear-end crashes; skill development in young drivers; skill loss in older drivers; young novice driver crash and incident types; distraction and inattention; fatigue; behaviour of drivers with dementia; interactions between light and heavy vehicle drivers; use of recorded data as feedback to improve driver safety [2]; understanding driver interactions with new vehicle safety technologies; and lane changing behaviour.

While previous NDS projects have yielded some valuable insights into driver and road user behaviour in general, their applicability to the Australian context is questionable for several reasons. First, besides driving on the right side of the road, they have not yet explored many of the high priority, and intractable, road safety problems identified in the Australian National Road Safety Strategy. Speed choice and vulnerable road user interactions, in different situations, and in urban versus regional areas, are good examples. Second, it is not clear how well the findings translate to Australian conditions. Differences in cultural and societal norms, road laws, enforcement strategies, vehicle fleets, road environments, distances travelled, environmental conditions and mix of road users may threaten the transferability of data across countries. Finally, much data from NDS projects undertaken overseas (especially video data) are not accessible to Australian researchers for analysis, for ethical, commercial and other reasons.

The Australian NDS, even on its own, will provide a massive "living" database of information that can be interrogated for many years to improve countermeasure development and enhance Australia's road safety performance. Further information concerning the study can be obtained from the ACRS Conference Database [1]. The ANDS team will be calling for volunteer drivers to sign up to the study sometime in April 2015. To make an enquiry or to register an interest in the study, contact Professor R Grzebieta on [r.grzebieta@unsw.edu.au](mailto:r.grzebieta@unsw.edu.au).

## References

1. Regan MA, Williamson A, Grzebieta R, and Tao L, *Naturalistic Driving Studies: Literature Review and Planning for the Australian Naturalistic Driving Study*, 2012.
2. Toledo, T., Musicant, O., & Lotan, T. In-vehicle data recorders for monitoring and feedback on drivers' behavior. *Transportation Research Part C: Emerging Technologies*, 16, 320-331, 2008. doi: 10.1016/j.trc.2008.01.001