Driving assessment procedures of occupational therapists: some results from a national survey of OT driver assessors

1. Introduction

In Victoria, on-road procedures for use by specialist Occupational Therapists (OTs) in assessing drivers with functional impairments were developed in the mid-1980s, leading to establishment of standard requirements and an associated curriculum for postgraduate specialist training of OTs. This was followed by the specification of a standard set of 'core competency' requirements for OT driver assessors, along with Victorian licensing authority guidelines for their service delivery and training (OT-Australia:Victoria, 1998; VicRoads, 1998). Such procedures are now applied nationally by OTs in assessing drivers with a wide range of health, disability or ageing-related issues.

This paper presents some of the results of a nationwide survey of OT driver assessors[1] to document details of current procedures. Focus groups to investigate and further explore some of the issues covered by the questionnaire were also conducted, but results of these are reported elsewhere (Di Stefano, 2007). This research was part of a larger project to develop improvements to the on-road assessment component of these procedures.

2. Method

2.2 Questionnaire development

A 50-item, self-completion questionnaire was formulated to gather information about the OTs themselves, their client profiles, details of their test routes, and the protocols they used during on-road assessments to document and evaluate driver performance. The questionnaire included items addressing the core assumptions that underpin standard assessment procedures (e.g. pertaining to definitions, goals), as well as items eliciting OT opinions regarding core versus optional item and the relative importance of different test items. Questionnaire item wording, layout, formatting and

[1] These OTs all have formal post-graduate qualifications in driver assessment and rehabilitation.

sequencing were based on the principles outlined by Frazer and Lawley (2000) and Dillman (2000). The questionnaire was initially trialled by six OTs.

2.2 Sampling and data analysis

A purposive sampling method was used (Minichiello, 2003), targeting OT driver assessors who were currently practising in Australia and contactable via professional and employment networks. A copy of the questionnaire was mailed to 163 individuals. Returned questionnaire responses were coded and entered into SPSS Version 14 (Green & Salkind, 2003). Response patterns were examined in relation to where the OT was trained as an assessor (Victoria or elsewhere); level of experience in the field; and urban versus rural assessment locations.

3. Results and Discussion

This paper reports a subset of questionnaire responses focusing particularly on client characteristics, and the goals, content and route design issues relevant to on road assessment.

3.1. Response rate and respondent characteristics

Of the 163 questionnaires distributed, 118 were returned, of which 18 were unopened due to the contact details no longer being current, and 12 were returned by individuals stating that they did not meet the inclusion criteria (mostly due to no longer working as a driver assessor, or being on maternity leave); the target population (OTs active in driver assessment for whom current details were available) was therefore reduced to 145, of whom 88 returned completed questionnaires – a response rate of 68.9% (100/145) which is considered adequate given the methodology employed (Dillman, 2000).

As required for inclusion, all 88 OTs had completed formal post-graduate training in driver assessment and rehabilitation, with the largest group (52%) having been trained in Victoria; others were trained in either New South Wales or Queensland. On average, they had practised as driver assessors for 6 years (range: 1–13), with almost 20% having 10 or more years of experience. None were full-time assessors, with 60% completing 1–5 assessments per month.

Over half the group worked primarily within urban/suburban locations (n = 65), with the remainder (n = 23) working in satellite towns, rural locations or throughout the state.

3.2. Client disability and diagnostic groups

Sixty nine percent of respondents reported that typical clients presented with mixed issues (equally physical and cognitive/behavioural); 23% stated *mostly* cognitive/behavioural; and 8% reported caseloads with mostly physical issues.

The OTs were asked to indicate a maximum of five of their most frequently encountered diagnoses, from a list of diagnostic groups derived from the International Classification of Diseases and Related Health Problems (World Health Organisation, 1992). Key results are presented in Table 5.1, where it can be seen that the largest client categories were those with stroke, closed head injury, dementia and neurological conditions of the central nervous system. There were no statistically significant differences between urban and rural locations in frequencies of these client categories, based on chi-square tests.

Table 1. Questionnaire respondents' most commonly reported driver caseload diagnoses: total n and percentage of total respondents for that category indicating that medical condition was ranked in the top 5 most frequently encountered (n = 88).

Condition	**Total n**	**%** (of n=88)
CVA / Stroke	63	72
Closed Head Injury	52	59
Dementia	37	42
Central Nervous System (e.g. Multiple Sclerosis)	29	33
Musculo-skeletal	25	28
Non psychotic mental disorders due to organic brain damage (e.g. senility, memory disturbance)	15	16
Spinal Cord Injury	14	16
Limb deficiencies	11	13
Chronic pain	11	13
Mental and behavioural disorders	9	10
Dislocations / fractures	9	10
Osteoarthritis / Rheumatoid arthritis	7	8

3.3. Definition and goals of the on-road assessment

Respondents were provided with a list of statements about the possible *purposes* of the on-road assessment and asked to indicate those applicable to them, or with which they agreed. Results are presented in Table 5.2.

Table 2: Agreement with proposed goals of an on-road assessment conducted on a standard route.

"Goals of on-road assessment are to determine …"	**n**	**%** (of 88)
overall standard of driving performance (safe/unsafe for independent driving) and therefore licence status (restrictions may be required)	85	97
disability factors that influence driving competencies	82	93
motivational factors which impact on driving competencies	30	34
whether/type of vehicle modifications required	81	92
potential for remediation of driving competencies	78	89
type of remediation required (e.g. number & type of driving lessons)	75	85
whether OT re-assessment/review will be required	71	81
status of other driving licences (e.g. motor bike, commercial)	31	35
licence conditions (e.g. geographical restrictions)*	63	72

* difference between training location and agreement significant at $p<.05$

There was greater than 80% agreement with six of the nine suggested goals. The low agreement with assessment of motivational factors as a goal was explained by the widespread opinion that these factors are better assessed during off-road screening tests, prior to the on-road assessment (based on comments elicited from respondents during associated focus groups). Agreement with the last two goals was also relatively low.

Relationships between these responses and OT characteristics (see 3.1) were investigated using chi-square tests. The only significant difference was in responses to the last of the above goals (licence conditions), where it was found that Victorian-trained OTs were more likely to agree that this was one of the goals of an OT assessment ($\chi^2 = 3.706$, df = 1, p =.045). This disparity probably reflects a difference between licensing jurisdictions; results from an OT assessment in Victoria usually 'stand alone' in determining the driver's future licence status (excluding consideration of medical or other licensing information), whereas in many other jurisdictions, 'pass' outcomes need to confirmed by the applicant also successfully undertaking a licensing authority test.

3.5. Standard features of on-road assessment

A number of questions sought opinions regarding test features that should be *mandatory* in all standard OT on-road assessments (except for novice drivers); results are shown in Table 3. It can be seen that a large majority of respondents agreed that the first nine of the eleven identified features should be mandatory, with smaller majorities supporting the last two. In the case of 'set observations at set points' (feature 3), 85% of OTs agreed with this, but many (n = 17) made qualifying comments concerning the desirability of retaining some flexibility, and being able to document performance at other locations also.

Chi-square tests were used to identify any differences in responses between OT sub-groups. Years of assessment experience (5 years or fewer versus 6 or more) was the only factor associated with such differences: OTs with longer experience as a driver assessor were much less likely to approve the mandatory inclusion of a test item to assess memory/planning (item 11 in Table 3; $\chi^2 = 9.221$, df = 1, $p < .002$).

Table 3: Agreement with proposed mandatory features for OT standard on-road routes: total number of respondents and % of sample.

No.	Feature	n	% (of 88)
1	Set route and documentation which identifies roads, intersections, route directions and traffic features which require negotiation	80	91
2	A checklist of key manoeuvres and observations to note and space to check these off	84	96
3	Documentation which assists in scoring set observations at set points along the route to ensure specific observations are made of driving behaviour at relevant route locations	75	85
4	A requirement for driver orientation to the vehicle prior to take off, including orientation to all controls, mirror and seat adjustments and identification of blind spots	82	93
5	Route directions to be provided by driving instructor, using standard instructions	79	90
6	Standard on-road test to take approximately 40 - 50 minutes.	79	90
7	Familiarisation period: 5 – 15 minutes (dependent on whether vehicle is familiar or modifications are needed)	83	94
8	"Core" route component: 20 – 40 minutes [duration dependent on items under c) below	82	93
9	Additional client specific disability components if required, approx: 10 - 15 minutes (e.g. non-core/standard items involving particular environments/manoeuvres which test specific disability/licence condition issues relevant to client e.g. for upper limb endurance with a spinner knob, including no's of (L) & (R) turns in quick succession):	81	92
10	A hazard perception component taking the form of pulling to the side of road to ask the driver to identify hazards in the driving environment ahead. This would occur once or twice before a shopping strip, complex intersection or other high demand driving environment. The driver should identify features e.g. pedestrians, cars parking, speed	58	66

	limits, other driver behaviour.		
11	A memory/planning component using standard instructions at the commencement of the drive with no further prompting during the drive. An example might take the form of asking the driver to pull into a petrol station at any point along the route when it is safe to do so. Drivers would be scored for remembering and for completing the manoeuvre safely.	60	68

3.6. Core test items versus disability-specific or optional items

OTs were asked whether each of a specified set of test items should be considered *core* (i.e. included in all standard tests) or *optional* (i.e. its inclusion depending on the presenting disability or licence condition issues). Some of these items were drawn from the document specifying 'core competency' requirements for OT driver assessors (OT-Australia:Victoria, 1998). In addition, respondents were invited to suggest additional test items and to offer more general comments.

Results are summarised in Table 4. Responses are shown separately for those located in urban (n=65) versus rural (n=23) locations, since urban/rural differences in the road traffic environment may affect the practicability of *always* including some of the items listed.

Nine of the nineteen listed items received more than two-thirds majority support for inclusion as core (indicated by asterisks in the table). No statistically significant differences between any OT sub-groups were identified by chi-square analyses.

Table 4. OT opinions regarding item categories: core or additional 'disability-specific.

On-road assessment items (total number of respondents for that specific item)	**CORE**		**OPTIONAL**	
	Urban OTs %	**Rural OTs %**	**Urban OTs %**	**Rural OTs %**
seeking specific street sign and name in order to follow directions (e.g. turn left at Cooper Street) (n = 81)*	33	36	20	11
navigational task in familiar area (e.g. "take us back to your home") (n = 80)	21	28	29	22
locating a vacant parking bay in a parking area (e.g. shopping centre) (n = 84)*	46	37	5	12
emergency stop at the command of the instructor/therapist (with prior warning at the beginning of the drive) (n = 82)	32	30	21	17
following a two step instruction command (n = 86)*	46	43	6	5
high speed driving (more than 70km e.g. freeway or highway) (n = 83)	34	30	17	19
follow a route by following road signs (e.g. getting onto the freeway) (n = 83)	33	30	19	18

driving and/or parking in underground carpark to check visual skills under low illumination levels (n= 82)	10	13	42	35
following road markings on-road to check visual skills (e.g. carpark traffic flow arrows) (n = 84)*	48	40	5	7
locating particular landmarks in order to follow instructions (e.g. turn left after the church on the next corner) (n = 81)	27	33	22	18
3-point turn or U turn (n = 84)*	37	43	15	5
hand brake start on an incline (n = 83)	24	28	26	22
following directions at an intersection where there is alot of signage ("filtering out" task) (n = 84)*	42	42	9	7
driving over different road surfaces e.g. gravel, dirt roads (n = 80)	8	7	44	41
commentary drive for part of assessment (client describes driving actions/issues whilst driving) (n = 81)	4	6	47	43
devising & following a route using street directory (n = 83)	1	0	51	48
right hand turns at multi-laned round-abouts (n =85)*	41	46	11	2
right hand turns at signalised intersections (n = 86)*	51	48	1	0
negotiating vehicle in slow moving, high density vehicle or pedestrian traffic precincts to check impulsivity / cognitive skills (n = 86)*	50	44	2	4

*More than 66% of the respondents to these items supported the inclusion of the item in the 'core' category.

3.7. Weighting of test items

In response to specific questions, the majority (76%) of OTs responded that it seems feasible to develop item weightings for use within a formal, quantitative scoring system. A large majority (88%) indicated that any such formal scoring system would need to take appropriate account of the driving context, and many OTs (almost one third) added comments, the most common of which were: all factors could be equally important (n = 7); such a process would necessarily be complex, with many variables (n = 5); the context was critically important (n = 5); and individual disability issues would need to be considered (n = 4).

4. Conclusions: Implications for further development of on-road assessment procedures.

This project appears to be the first to have investigated the opinions of expert OT driver assessors concerning details of on-road assessment practices and components to support standard on-road assessment procedures.

Firstly, the results have confirmed that the majority of Australian OTs active in driver assessment are working with significant numbers of drivers who have *both* physical and cognitive/perceptual impairments (Macdonald, 1996). Reported frequencies of clients' specific health conditions were also similar to those reported elsewhere, with the largest categories being those with CVA/Stroke, closed head injury, dementias and neurological conditions (Gourley, 2002; Klavora, Young & Heslegrave, 2000).

Diagnoses associated with significant cognitive-perceptual or behavioural limitations, such as the dementias and certain other types of chronic health conditions, have been identified as being associated with an elevated crash risk (Breen et al., 2007; Charlton et al., 2004). The reported high incidence of clients with such diagnoses highlights the importance of ensuring that the OT on-road assessment procedure includes the types and numbers of items needed to detect effects on performance of drivers' functional impairments of these types.

Secondly, there was evidence of a high level of use of standard procedures and routes, indicating a generally consistent approach to driver assessment by Australian OT assessors. This is in contrast to the situation elsewhere. Recent surveys of 'mobility centres' in the UK (Brooks & Hawley, 2005) and of driver rehabilitation specialists in the USA and Canada (Korner-Bitensky, Bitensky, Sofer, Man-Son-Hing & Gelinas, 2006) have reported the widespread application of on-road assessment procedures by a range of professionals comparable to Australia's OT driver assessors, but the procedures used vary considerably. Korner-Bitensky and colleagues reported that in their survey of 114 clinicians in North America, 78% of respondents indicated they used a standard driving route but only 24% applied a standardized scoring system and less than 1% (two respondents) actually used standardized on-road tests documented in the literature. These researchers highlighted the need for guidelines to support standard on-road test features including specification of test duration and types of road traffic environment (e.g. highway driving; residential driving). In Australia, it is now evident that test development can advance beyond this to address the need for specification and testing of a proposed *national set* of core items, plus additional sets

of disability-specific items, to be included in all routes used by OTs for standard driver assessments.[2]

Thirdly, whilst clear support *in principle* was demonstrated for use of pre-specified test routes for drivers who wish to gain or retain an *un*restricted licence, in some circumstances this is not feasible. It is therefore important for OTs to develop a standard set of *core requirements* for all test routes.

Finally, there was also support for development of a more formal scoring system, which was seen as having the potential to enhance the reliability and validity of the overall procedure. However, it was emphasised that any kind of formalised item-weighting system would need to be flexible enough to incorporate consideration by the OT of individual driver behavioural characteristics, since these vary much more widely among the clients assessed by OTs than amongst the young driver population assessed by standard licence tests. They also emphasised the importance of having a system that would enable them to take appropriate account of contextual issues such as the varying levels of task demand associated with traffic movements and events.

Overall, the results documented here provide strong support for the further development and greater standardisation of existing OT driver assessment procedures. Currently, factors such as rural versus urban assessment environments tend to influence the procedures being followed. It will be important, in moving towards more highly standardised procedures, to retain sufficient flexibility to ensure that revised procedures can be applied consistently across Australia.

[2] It is not suggested that such specifications would apply to routes used in 'local area' assessments, on the basis of which drivers would be issued with a licence valid only for that local area.

References

Brooks, N., & Hawley, C. A. (2005). Return to driving after traumatic brain injury: a British perspective. *Brain Injury, 19*(3), 165-175.

Breen, D. A., Breen, D. P., Moore, J. W., Breen, P. A., & O'Neill, D. (2007). Driving and dementia. *British Medical Journal, 334*(June, 2007).

Charlton, J., Koppel, S., O'Hare, M., Andrea, D., Smith, G., Khodr, B., et al. (2004). *Influence of chronic illness on crash involvement of motor vehicle drivers* (Literature review No. 213). Melbourne: Monash University Accident Research Centre.

Dillman, D. (2000). *Mail and internet surveys : the tailored design method* (2nd ed.). New York: John Wiley.

Frazer, L., & Lawley, M. (2000). *Questionnaire design and administration : a practical guide.* Brisbane: John Wiley & Sons.

French, D., & Hanson, C. S. (1999). Survey of driver rehabilitation programs. *American Journal of Occupational Therapy, 53*(4), 394-397.

Gourley, M. (2002). Driver Rehabilitation: A Growing Practice Area for OTs. *OT Practice*(March 25), 15 - 20.

Green, B. S., & Salkind, N. J. (2003). *Using SPSS for Windows and Macintosh: Analyzing and Understanding Data* (3 ed.). New Jersey: Prentice Hall.

Klavora, P., Young, M., & Heslegrave, R. J. (2000). A Review of a Major Driver Rehabilitation Centre: A Ten-Year Client Profile. *Canadian Journal of Occupational Therapy, April, 2000*, 128 - 134.

Korner-Bitensky, N., Bitensky, J., Sofer, S., Man-Son-Hing, M., & Gelinas, I. (2006). Driving evaluation practices of clinicians working in the United States and Canada. *The American Journal of Occupational Therapy, 60*(4), 428-434.

OT-Australia:Victoria. (1998). *Competency standards for occupational therapy driver assessors.* Melbourne: Author.

Macdonald, W. (1996). *An Evaluation of Occupational Therapy Driver Assessment Protocols and Recommendations for a Reliable and Valid Standard Test: Report to VicRoads.* Melbourne: VicRoads.

Minichiello, V., Sullivan, G., Greenwood, K., & Axford, R. E. (2003). *Handbook of research methods for nursing and health science* (Vol. 2nd ed.). Frenchs Forest, N.S.W.: Prentice Hall Health.

VicRoads. (1998). *Resources and guidelines for OT driving assessors.* Melbourne, Australia: Roads Corporation.

World Health Organisation. (1992). *International Statistical Classification of Diseases and Related Health Problems* (10th ed. Vol. 1 - 3). Geneva: World Health Organization.