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A SURVEY OF USERS OF THE STROKE DRIVER SCREENING ASSESSMENT

Version: Final

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CONTENTS

Executive summary	i
1 Introduction	1
2 Method	1
2.1 Postal survey	1
2.1.1 Survey sample	1
2.1.2 Questionnaire	2
2.2 Telephone interviews	2
2.2.1 Sample of interviewees	2
2.2.2 Interview guide	3
3 Results	3
3.1 Response rate	3
3.2 Use of the SDSA in the UK	3
3.2.1 Reasons for no longer using the SDSA	6
3.2.2 Training in and experience of SDSA administration	6
3.3 Ease of use	7
3.4 Difficulties using the SDSA	9
3.4.1 Difficulties encountered by clients completing the SDSA	11
3.5 Reliability of the SDSA	12
3.6 Validity of the SDSA	12
3.6.1 Predictive validity	12
3.6.2 Face validity	16
3.7 The referral process	17
3.8 Further issues raised during the telephone interviews	18
4 Discussion	18
5 Recommendations	21
6 Acknowledgements	22
7 References	22
Appendix 1: SDSA questionnaire	23
Appendix 2: SDSA telephone interview schedule	29

Executive summary

The Stroke Driver Screening Assessment (SDSA), developed by the Stroke Rehabilitation Unit at Nottingham University, is a tool which the developers claim is successful in predicting whether an individual is safe or unsafe to resume driving following a stroke. As part of this project investigating the validity and reliability of the SDSA TRL Limited and the University of Leeds undertook a survey of users in 2002.

The aims of the survey were to establish the extent to which the SDSA is currently being used across the United Kingdom, consider the accuracy of its use and the advice given based on the results of the test. 1095 self-completion questionnaires were sent to the members of the National Association of Neurological Occupational Therapists (NANOT) and the British Society of Rehabilitation Medicine (BSRM), the British Psychological Society and users known to the researchers and 213 (19.5%) were returned.

Sixty-three of the respondents were current users of the SDSA, which suggested that the tool was not widely used among the members of NANOT or BSRM. The majority of users who responded to the survey were Occupational Therapists, who used the SDSA to help assess people who had had a stroke or sustained a head injury. Some respondents also used it to assess clients with other medical conditions such as Multiple Sclerosis, Parkinson's disease or dementia.

Opinions on the use of the SDSA were restricted to the 62 respondents who used the tool to assess stroke clients. The four sub-tests of the SDSA were generally found to be easy to use. Common difficulties that were reported included problems explaining the instructions to the clients without compromising the status of the SDSA as a standardised test and clients' difficulty accepting the relevance of the SDSA as an assessment of driving ability (its face validity).

Generally, respondents felt that the SDSA was a useful indicator of driving ability but that on its own cannot be used to predict driving performance. However it is regarded as a good indicator of those clients that should definitely not persist in returning to drive and those who need to undergo a full driving assessment as the next phase of their attempting to return to driving.

Recommendations for improving the SDSA made by respondents included the provision of an acetate scoring sheet for the Dot Cancellation test to be included in the test kit and more comprehensive instructions. It was also recommended that more background information about the development of the SDSA could be provided in the instructions to help all users understand the theories upon which the SDSA is built, what it is designed to test for, and to help instil greater confidence in its use.

1 Introduction

A driver who is recovering from a stroke may have both physical and cognitive impairments, which could affect their ability to drive safely. Decisions regarding fitness to drive are the responsibility of the DVLA based upon medical reports, but there is evidence to suggest that GPs and consultants may be reluctant to give a view on a person's ability to drive (Gillespie and McMurdo (1999); Kelly et al. (1999)). A tool available to help determine fitness to drive is the Stroke Driver Screening Assessment (SDSA). The developers of the SDSA claim that this tool is successful in predicting who is safe and unsafe to resume driving (Nouri and Lincoln 1992). The SDSA is sold commercially by Nottingham Rehab Ltd and is used by a number of healthcare professionals to help assess fitness to drive following a stroke.

This report describes a survey of users of the SDSA, conducted as part of a project investigating the validity and reliability of the SDSA as a fitness to drive screening tool for people who have sustained a stroke. The aims of the survey were to:

- establish the extent to which the SDSA is currently being used across the United Kingdom;
- consider the ease of its use; and
- investigate the advice given based on the results of the test.

The survey was carried out in 2002.

2 Method

2.1 Postal survey

2.1.1 Survey sample

Resumption of driving is seen as an important milestone in recovery by people who have sustained a stroke. Occupational Therapists (OTs) and others working in rehabilitation services are therefore often asked by clients for advice about returning to drive. The SDSA was developed by Nottingham University to help healthcare professionals advise stroke clients about their fitness to drive.

To determine the extent to which the SDSA is currently being used in the United Kingdom it was necessary to approach a large number of healthcare professionals who were potential users of the SDSA.

A self-completion questionnaire developed by TRL and the University of Leeds was distributed by two professional organisations to their members. 750 questionnaires were issued by the National Association of Neurological Occupational Therapists (NANOT) and 325 by the British Society of Rehabilitation Medicine (BSRM). Twenty questionnaires were also sent to people known to the researchers to be using the SDSA. These people were recruited from a variety of sources including the British Psychological Society website, SAGE (“Safer driving with Age” mobility agency) and the Forum of Mobility Centres.

2.1.2 Questionnaire

The questionnaire was designed to elicit information about the methods used to assess fitness to drive of people following a stroke and more specifically about the use of the SDSA. The questionnaire (Appendix 1) covered the following issues:

- Identification of the range of tests used to assess the fitness to drive of people who have sustained a stroke;
- Who administers the SDSA and their level of training and experience;
- Ease of administering, scoring and interpretation of the SDSA tests;
- Users views on its validity and reliability;
- Comments received from clients about the SDSA (e.g. face validity issues);
- The extent to which the SDSA is used and relied upon in advising clients about driving;
- The advice given to clients regarding fitness to drive based on the SDSA score; and
- The assessment process (how stroke clients get referred for an assessment, who receives the advice and how it is acted upon).

2.2 Telephone interviews

2.2.1 Sample of interviewees

Twenty survey respondents were interviewed by telephone to gain more detail about key issues. The sample included:

- Users who used the SDSA as part of a test battery.
- Users who reported experiencing difficulties in administering the SDSA.
- Respondents who reported clients had difficulty completing and/or understanding the tests.
- Respondents who reported clients had difficulty accepting the result of the SDSA.

2.2.2 Interview guide

A semi-structured interview guide was used to investigate issues raised in the survey in more detail (see Appendix 2).

3 Results

3.1 Response rate

Of the 1095 questionnaires sent out 213 were returned, giving a response rate of 19.5%. However, it is difficult to estimate an accurate response rate because respondents were invited to copy and distribute the questionnaire to others, potentially increasing the number of questionnaires issued. It is also possible that some people were members of more than one of the professional organisations sampled and received multiple copies of the questionnaire.

The low response rate was not unexpected, as the questionnaire was unlikely to be completed by people who had not heard of the SDSA or did not use it.

3.2 Use of the SDSA in the UK

Nearly two-thirds (135) of the respondents reported that they had heard of the SDSA. Many knew about the test because it was or had been available in their workplace (see Table 1).

Table 1: How respondents heard of the SDSA

Source from which respondent heard about the SDSA	% of respondents (n=135)
SDSA was already available in workplace when started work	18
Had used SDSA in previous employment	13
Recommended by colleagues	13
Training course/conference	10
Journal paper/professional publication (e.g. "OT News")	9
Nottingham Rehab. Services Catalogue	3
Mobility Centre	3
NANOT	1.5
University course	1.5
Missing	29

Percentages subject to rounding error

Sixty-three respondents were currently using the SDSA and a further 24 had used it in the past.

If it is assumed that all the non-respondents are individuals not currently using the SDSA (and assuming no duplication of professional membership), the results suggest that approximately 6% of the members of NANOT and BSRM are currently using the tool in the UK.

Ninety-four per cent of current SDSA users were occupational therapists (59 respondents). Other users included four Consultants in rehabilitative medicine. Most respondents saw over 30 stroke clients per year (see Table 2).

Table 2: Number of stroke clients seen per year

Number of stroke clients seen per year	% of respondents (n=63)
1 to 10	5
11 to 20	18
21 to 30	11
31 to 40	8
41 to 50	16
Over 50	37
Missing	5

Respondents were asked for which type of clients they used the SDSA (n=63):

- 62 (98%) reported they used the SDSA for people who have sustained a stroke;
- 22 (35%) reported also using the SDSA for people with a head injury;
- 7 (11%) reported using the SDSA for other clients including those with Multiple Sclerosis, Parkinson's disease or dementia. One respondent also reported using the SDSA with clients who had had viral meningitis.

The proportion of stroke clients assessed for fitness to drive using the SDSA ranged from 1 per cent to 100 per cent. The mean was 32 per cent and the mode 5 per cent. However, these findings are unreliable as some respondents gave the percentage of all stroke clients seen, whilst others gave the proportion of stroke clients assessed for fitness to drive.

Thirty respondents reported that they used other tests as well as the SDSA as part of their assessment process for clients wanting to return to driving. The tests used are detailed in Table 3 below.

**Table 3: Tests used in conjunction with the SDSA
(multiple responses possible)**

Test used with SDSA	Number of respondents citing each test (n=30)
Chessington Occupational Therapy Neurological Assessment Battery	10
Rivermead Perceptual Assessment Battery	9
Behavioural Assessment of the Dysexecutive Syndrome	6
Rivermead Behavioural Memory Test	5
Middlesex Elderly Assessment of Mental State	5
Behavioural Inattention Test	3
Loewenstein Occupational Therapy Cognitive Assessment	2
Mini Mental State Examination	2
Cognitive Assessment of Minnesota	1

When a sub-sample of survey respondents were probed about this issue during the telephone interviews it was found that the SDSA was not being used as part of a strict assessment battery. The combination of tests used, either as screening tests before the SDSA or as additional tests alongside the SDSA, was entirely dependent on the individual client and down to the OT's judgement.

3.2.1 Reasons for no longer using the SDSA

Fourteen of the 24 respondents who no longer used the SDSA gave reasons why. The respondent having changed jobs and the SDSA not being available at their new workplace was the most common reason given for no longer using it (7 respondents). However, a small number of respondents indicated that they did not believe the tool to be reliable (4 respondents) or were concerned about the implications of providing advice based upon the results of the SDSA (2 respondents). One respondent stopped using the SDSA because they did not know who should be informed of the results.

3.2.2 Training in and experience of SDSA administration

All subsequent analyses are based on respondents who reported that they currently use the SDSA to assess people following a stroke (N=62). The results are therefore based upon a small sample size which, given that the total users is unknown, may not be representative.

Nearly a quarter of the respondents (15 respondents) had been trained in the use of the SDSA.

Table 4 shows the number of times the SDSA had been used by the respondents to assess clients. It indicates that the tool is used relatively infrequently. Few respondents had ever used the SDSA more than 30 times so had little experience of administering the test. Their limited use of it may therefore lead to less robust information being provided about its use.

Table 4: Level of experience of using the SDSA

Number of times used the SDSA	Number of respondents (n=62)
1 to 5	15
6 to 10	20
11 to 20	8
21 to 30	9
31 to 40	4
41 to 50	3
51 to 60	1
Missing	2

3.3 Ease of use

The SDSA consists of four sub-tests:

Dot Cancellation Test – the client has to identify groups of 4 dots on a sheet of paper with groups of 3, 4 and 5 dots.

Square Matrix Test – Directions – the client must place cards with pictures of a car and a lorry on a matrix board in a position that is in agreement with the corresponding directional arrows. This test is not used in the overall score of the SDSA.

Square Matrix Test – Compass – the client must place cards with pictures of two cars on a roundabout on a matrix board in a position that is in agreement with the corresponding directional compasses.

Road sign recognition Test – the client must match road signs to a road environment illustrated on test cards.

Respondents were asked to rate the ease of administering, scoring and interpreting each sub-test on a four-point scale, where 1= Very Difficult, and 4= Very Easy. Using these values a mean score was calculated for each sub-test. A higher mean score indicated the respondents found the test easier to administer, score or interpret. Table 5 gives the minimum, maximum, mode and mean score for each sub-test.

Table 5: Respondents' ease of use scores.

Test		Min.	Max.	Mode	Mean
Dot cancellation	Administer	2	4	3	3.46
	Score	1	4	3	2.93
	Interpret	1	4	3	2.93
Square Matrix Direction	Administer	1	4	3	2.85
	Score	2	4	3	2.92
	Interpret	1	4	3	2.69
Square Matrix Compass	Administer	1	4	3	2.61
	Score	1	4	3	2.77
	Interpret	1	4	3	2.58
Road Sign Recognition	Administer	1	4	3	3.13
	Score	1	4	3	3.03
	Interpret	1	4	3	2.93

Figure 1 compares the mean scores for each sub-test. It indicates that the Square Matrix Compass test was slightly more difficult to administer, score and interpret.

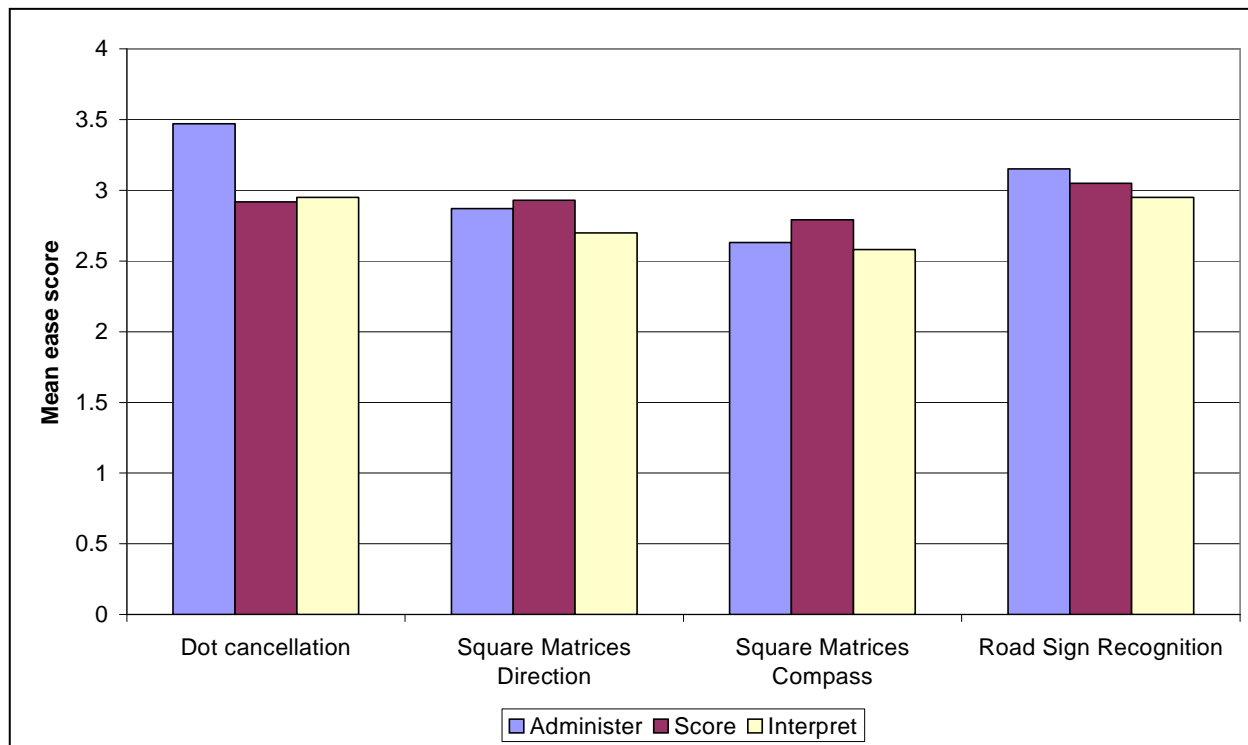


Figure 1: Ease of administering, scoring and interpreting the four sub- tests

There was no significant difference between respondents who had been trained in the use of the SDSA and those that had received no training in terms of how they rated ease of administering, scoring and interpreting each sub-test.

3.4 Difficulties using the SDSA

Respondents who answered “Difficult” or “Very Difficult” to any of the questions concerning ease of using the four sub-tests were asked to explain why. The issues highlighted by respondents were subsequently followed up during the telephone interviews. The findings from both sources are reported together below.

One of the most commonly reported problems was that clients did not understand the verbal instructions given to them by the person conducting the test. Respondents reported clients asking for clarification, for the instructions to be repeated or simply not understanding the instructions which resulted in impaired performance in the tasks. Some of the comments made are listed below:

“Instructions are not always clear, instructions given to client usually need clarification and sometimes the client does not seem to understand the task at all, which does not always relate to their functional ability in ‘real’ tasks”

“The square matrices are difficult to administer because the instructions don’t feel sufficient. The patient always asks for clarification”

“I have found that a lot of patients have difficulty understanding the task according to the verbal instructions given [even] when they do not have a cognitive/comprehension problem. Therefore interpreting the results can be difficult as the score might not necessarily reflect the patients abilities”

“[I] find patients have a lot of difficulty actually grasping the concept of what they are supposed to do from the instructions given. This tends to be a major problem.”

This left the individuals administering the tests having to further explaining the instructions so the patient understood what was required, or simply repeating the standardised instructions provided, as instructed in the SDSA manual.

Another issue raised was the inability of patients, and in some cases the assessor, to understand the relevance of the SDSA to practical driving ability:

“Square Matrices Direction [is] easy to administer if [the] person understands fairly abstract concept involved”

“Concept of test and instructions are complex, difficult to understand relevance/abstract – patients unclear what it has to do with driving”

“I’m not entirely sure of purpose of assessment, how this relates to someone’s driving ability”

The pictures of roundabouts in the Square Matrix Compass Test were described by one interviewee as “unrealistic” as they had eight junctions and this had caused confusion amongst her patients. Other interviewees had difficulty administering this test because only half of each compass point was shaded, whilst they were completely shaded in the instruction manual. A card pointing “East” could be read as pointing “East North East” because of the 3D shading effect. This confused some clients and due to the nature of standardised testing it has been difficult for the individuals administering the test to explain this to patients. One interviewee recommended that the direction arrows for the Square Matrices tests should be attached to the board with Velcro so that patients cannot accidentally knock them during the test.

Respondents were asked whether the instructions written for administering the SDSA were clear. Fifteen respondents (24%) indicated that they thought the instructions were not clear and two of the comments made are listed below:

“The background for dot cancellation not given... Poor guidance for administering i.e....can instructions be repeated?”

“Not enough detail is given.”

Respondents reported various problems in scoring the tests. A few interviewees were unsure as to the mathematical basis behind the scoring technique. The Road Sign Recognition Test was sometimes found difficult to score because there were no details as to the correct

answers and it therefore relied on the knowledge of the person administering the test.

“There is no guidance as to correct or incorrect for road signs and relies on therapist’s knowledge of road signs.”

Other respondents encountered difficulties scoring the dot cancellation test:

“Dot cancellation is a nightmare to score. I am constantly being consulted by junior staff to re-confirm their scores and re calculate results to ensure they do it correctly.”

One comment made by an interviewee suggested that a scoring template for the Dot Cancellation task would be useful.

A problem highlighted with the scoring was due to the fact that some of the tests have to be marked in front of the client. This requires the client to wait whilst the marking takes place, and may give the client a premature and incorrect view into their performance.

“The scoring is difficult because you have to leave it all laid out to score, therefore cannot do it afterwards when patient has gone.”

All of the users interviewed used the SDSA as a complete test and reported that after a little practice, scoring the SDSA was straightforward.

3.4.1 Difficulties encountered by clients completing the SDSA

Interviewees explained that clients who encountered difficulties completing the Road Sign Recognition Test claimed that they only drove locally and were therefore not familiar with many of signs included. It was also reported that patients often had difficulties differentiating between the front and the back of vehicles in the Square Matrix Direction test.

One interviewee suggested that there might be a “cultural bias” in the SDSA. Their patients tended to be elderly people from mining communities in South Wales. Many had left school at 14 to work as miners and had not taken a “Pen and Paper” test for many years. The interviewee suggested that this might put them at a disadvantage.

3.5 Reliability of the SDSA

Respondents were asked whether the results of the SDSA were generally consistent when administered by different people (inter-rater reliability) or when administered to the same client on more than one occasion (test-retest reliability). The results are given in Table 6 below.

Table 6: SDSA reliability¹

Does the SDSA have...	Yes	No	Don't know
	No. of respondents (%)	No. of respondents (%)	No. of respondents (%)
Good inter-rater reliability?	23 (37)	2 (3)	37 (60)
Good test-retest reliability?	20 (33)	8 (13)	33 (54)

Whilst the majority of respondents did not know whether the results of the SDSA were generally consistent, very few respondents responded negatively. Their answers may reflect their lack of use – it would be difficult to answer this question given the frequency with which they've used it.

The interviews highlighted that most SDSA users seemed aware that a client must wait 3 months before being re-assessed.

3.6 Validity of the SDSA

3.6.1 Predictive validity

The respondents were asked to rate how useful on a 5-point scale the SDSA was in *assessing* and *predicting* stroke clients' fitness to drive. The responses are illustrated in Figures 2 and 3 below.

¹ The labels in the table are not the same as the question wording used in the questionnaire

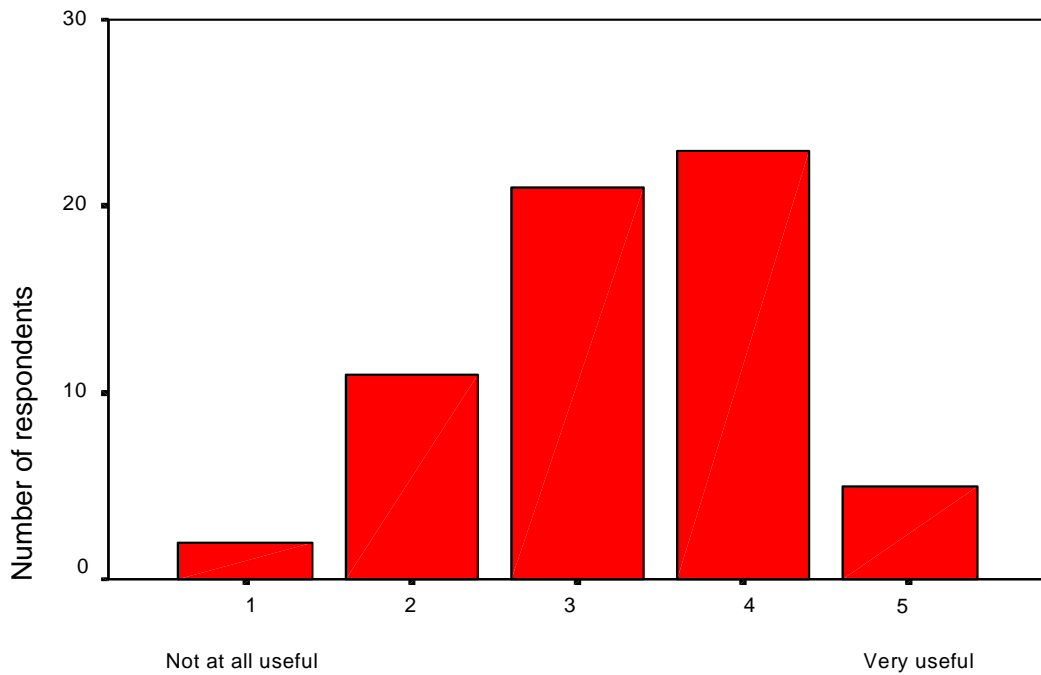


Figure 2: How useful is the SDSA in helping you to assess a stroke clients’ fitness to drive?

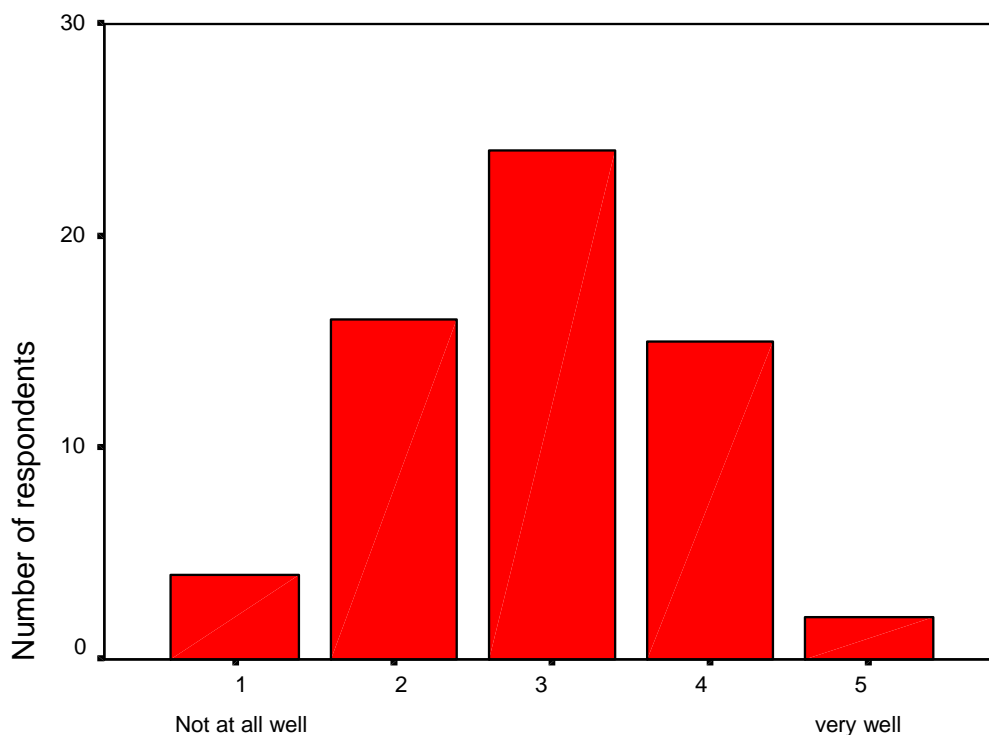


Figure 3: How well does the SDSA predict stroke clients’ fitness to drive?

Figures 2 and 3 show a difference between the reported usefulness of the SDSA in assessing and how well it predicts a stroke client's fitness to drive. The mean score for how well it assesses fitness to drive was 3.33, whilst the mean score for predictive ability was 2.95. This difference was found to be statistically significant².

The following comments indicate why some respondents did not rate the predictive ability of the SDSA highly:

"[I] don't feel it picks up reaction time and problem solving type problems that affect driving."

"Limited in scope – doesn't measure other key areas such as vision, response times, physical ability, safety awareness."

"Gives an indication of problems, but does not always relate to clients' functional level in real tasks. As much of driving is a well learned skill, abstract tests can only give indication of some aspects."

"Often gives fail readings due to functional problems such as hemiplegia, difficult for them to complete in time."

"Driving does not require conscious effort it is in automatic processing. Assessment is more cognitively at conscious level and does not look at physical elements."

Other comments gave some indication as to why the test was considered useful for assessing clients' fitness to drive:

"Useful if a pass is obtained because GP or medical practitioner finds it easier to advise [the] patient. However in a fail situation [the] client can be unhappy with [the] result and [the] test is not robust enough to stand up to scrutiny. It also is questionably valid for ethnic minority groups."

"I find it a useful indicator for further assessment. I don't feel its thorough enough to be absolute."

"It enables us to help the person see any problems."

² T-test (59) = 4.6, p<0.001

“Personally [I] find it helpful to aid a person’s insight or to confirm [the] team view.”

“Needs to be a fuller assessment taking into account perception/cognition/physical. Edinburgh Driving Assessment service don’t recognise results and do their own assessment. We use it to screen only.”

“Very useful when used alongside/ with other assessments.”

“It gives part of the picture. It does not substitute for an in car test but may screen out patients who should not attempt a return to driving.”

Generally, the SDSA was regarded as a good indicator of those clients that should definitely not persist in returning to drive and those who need to undergo a full driving assessment as the next phase of their attempting to return to driving.

Respondents were asked whether the SDSA score alone could be used to assess a stroke client’s fitness to drive. Ninety-seven percent (n=62) of respondents indicated that they would not use it. This seems a reasonable response as rehabilitation practitioners use a range of methods for assessing clients.

Forty-two percent of these respondents, reasonably, stated that a physical assessment of ability would be required in addition to the SDSA. Some of their comments are given below:

“Need to take physical disability into consideration. Which is why, even if patients pass, I still recommend a physical assessment.”

“Driving is a learned process. The assessment cannot consider experience when scoring. Most drivers would struggle to remember road signs. Assessments need to be more functional.”

Four respondents suggested that the SDSA was not assessing some cognitive areas sufficiently:

“Patients with receptive dysphasia are unable to be assessed. People with perceptual problems sometimes find the concept of the assessment difficult to understand.”

“I do not believe it involves enough of the cognitive stresses involved in driving, especially multi-tasking, self regulation and monitoring.”

The SDSA instruction manual acknowledges that clients who ‘pass’ should still undergo further physical and mental assessment by a medical practitioner or driving assessment centre.

3.6.2 Face validity

Over two-thirds of respondents (43 respondents) reported encountering problems with their clients accepting the results of the SDSA in their assessment of their fitness to drive. The most commonly reported problems were that clients could either not see the relevance of the test to driving ability or they had not understood the instructions and thought that it was an unfair measure of their driving ability.

Some of the comments concerning these issues are listed below:

“Some patients can’t see the relevance to the test to the practicalities of driving”

“People find test too complex, causes them stress when taking part in test”

“Client cannot see the relevance except for road sign recognition”

“Not understanding, due to a poor level of insight, the relevance of the higher executive functions related to driving skills “

“Administered to British Asian who failed who then questioned test validity for cultural differences.”

“Not all hospitals in the Trust use the test ‘my friend never had this’ and ‘what about people not admitted to hospital’ are common questions”

“Patients refuse to accept [the] test is valid and that as it is not a legal requirement they can ignore results if they choose”

Interviewees explained that, because the SDSA was specifically linked to driving, patients expected more driving orientated tasks. Clients more readily accepted the results of other cognitive tests because they were

explained to the client as simply testing the functioning of a certain area of the brain rather than an entire skill such as driving. One interviewee reported that their patients sometimes felt there was no incentive to perform well on the SDSA because it was viewed as being unrelated to real driving.

One interviewee commented that a standardised explanation sheet would be useful so that the individual administering the SDSA could explain the purpose of the test and the research background behind the tests to their patients without potentially biasing any results.

Other clients had difficulty accepting the results of the SDSA if it conflicted with the opinion of the patient's GP. Interviewees reported that the GP's opinion was often the factor given the most credence by patients and that GPs could choose to ignore the results of the SDSA if they chose to. If the GP thought the patient was ready to resume driving then the patient would pay little regard to the results of the SDSA.

3.7 The referral process

The main concern for interviewees assessing fitness to drive was the referral process between the patient, occupational therapists, GPs, consultants and the DVLA.

Generally, the SDSA is administered to patients by out-patient Occupational Therapists after a referral from a GP, Stroke Unit Consultant or in-patient Occupational Therapist. The results of the SDSA are then passed, via whoever initially referred the patient and to the patient's GP. It is usually the GP who advises the patient about whether they should resume driving. Some interviewees said the SDSA score provided useful empirical evidence to back up their opinion on a patient's fitness to drive when advising GPs. However, if the patient requested for the SDSA to be administered there were inconsistencies as to whether their therapist then informed the patient's GP of the results. One interviewee stated that, in this situation, they would only inform the GP of the results if the patient had passed. Other therapists correctly inform their patients that the test is not a legal obligation and that they would inform the GP of the results.

A number of interviewees reported that they would use the SDSA as a screening tool before referring the patient to a Mobility Centre. One interviewee stated that this was not due to any procedural protocol but

because they did not think that the SDSA was accurate enough to base a decision on a patient's fitness to drive.

Some interviewees reported that, if a GP knew very little about the SDSA, they would often disregard the results of the test and base their decision about a patient's fitness to drive on their own "physical" assessment of the patient. Interviewees were concerned that this could lead to significant cognitive problems being overlooked.

One interviewee was concerned that patients who had had a mild stroke would never be assessed because they would never have been admitted as an in-patient to a stroke unit. This interviewee was concerned that such patients could well have impairments caused by these mild strokes that would impair driving ability but would not be picked up by the referral process as it stands.

3.8 Further issues raised during the telephone interviews

Interviewees were given the opportunity at the end of the telephone interviews to express any views, concerns or recommendations concerning the SDSA that had not so far been covered.

Some interviewees stated that they would like to know more about the SDSA. Information concerning the background research, reasoning and theory behind the SDSA and its scoring would all be useful and relevant as it would help them to better understand the test. Information about how applicable the SDSA is as a screening test for patients other than stroke patients was also regarded as being of potential benefit by several interviewees.

4 Discussion

Identifying users of the SDSA proved problematic and a low response rate was achieved from distributing questionnaires to the two largest professional organisations most likely to contain potential users of the SDSA and the advert placed upon the British Psychological Society's website identified few users. This suggests that the SDSA is not widely used and those healthcare professionals who are currently using the SDSA do so infrequently and not routinely with all patients.

In terms of administering, interpreting and scoring of the component tests, the 'square matrix compass' test was considered the most difficult to use and the 'dot cancellation' test was seen as the easiest to administer and interpret. Scoring this latter test was difficult but the

problem could be easily solved by producing a scoring overlay. Many of the SDSA users have done this themselves.

A difficulty was reported with the compass cards on the 'square matrix compass' test, in that only half of the compass point is shaded, which is inconsistent with the pictures in the instruction manual. This shading confuses clients and users about the compass heading it is supposed to depict. Several comments were made about the unrealistic nature of the roundabout cards in this test as it is shown to have 8 exits. Although this may be unrealistic it would appear necessary for the purpose of this test and the format and working of a roundabout should be familiar to the clients regardless of the number of exits.

It was reported by SDSA users that with the 'square matrices' tests there were so many different cards on the board they were easily knocked out of position by mistake and this could alter the direction of the arrow or compass. It was suggested that the cards could be fixed to the square matrix board with 'Velcro' to prevent this happening.

It was also reported that there were no scoring criteria for the 'road sign recognition' test and the SDSA user had to use their own knowledge to score the clients' responses. This implies that all SDSA users are driving licence holders and/or have a good knowledge of the Highway Code, which is apparently not always the case. Providing a scoring guide in the instruction manual could easily rectify this.

A number of comments were made about the types of difficulty clients encountered using the test such as unfamiliarity with the road signs in the 'road sign recognition' test or differentiating between the depiction of the front and rear view of a car in 'square matrix direction' test. Until Phase 2 of the current project³ is completed it is not known whether these clients would pass a driving assessment despite the SDSA outcome.

Some respondents felt there was a need for more information to be included in the manual such as an explanation of the formulae used, the theory and research behind the tests and more detailed instructions.

The nature of standardised testing demands that the instructions must be given as they are stated in the manual, are only repeated once and

³ Phase 2 of the current project will examine whether the SDSA correctly classifies drivers into *safe* and *unsafe* based on their performance on a road test.

cannot be elaborated upon. But many SDSA users reported that the instructions were not sufficient to explain the tasks to the client and it was believed that many were failing tasks because they simply did not understand what it was they were supposed to do. This actually caused some SDSA users to further explain the tasks involved thus deviating from the written instructions given in the manual and undermining the SDSA's status as a standardised test.

Users expressed concern that some of the tests have to be marked in front of the client. This requires the client to wait whilst the marking takes place, and may cause them some anxiety.

In terms of interpretation of the final scores, some SDSA users reported uneasiness about classifying scores as a 'pass' or 'fail', especially if the score was borderline. This was often the case when they felt that the score did not reflect the clients' true cognitive ability. It was suggested that advice be provided on a 'borderline' category. This problem was confounded by the fact that the SDSA users were normally referring clients back to their GPs who have little knowledge of the SDSA.

Some of these problems associated with the administering, interpreting and scoring the SDSA sub-tasks could be due to the very low number of SDSA users having actually received training in its use or their lack of experience in administering the tool. Generally, there is a lack of training for Occupational Therapists in psychometric testing.

The research has shown that most of the SDSA users feel it is more 'useful' in helping to assess a client's fitness to drive but that on its own cannot be used to predict driving performance. However it is regarded as a good indicator of those clients that should definitely not persist in returning to drive and those who need to undergo a full driving assessment as the next phase of their attempting to return to driving. There appears to be little or no consensus on the circumstances under which the SDSA should be used and this is an issue that needs to be addressed.

A finding from the questionnaire survey that was confirmed with the telephone interviews was that clients do not readily accept the relevance of the SDSA. This seems to be due to the abstract nature of the SDSA. Clients do not see the relevance of 'pen and paper' tests to driving. However, some SDSA users have found that if it is explained properly in terms of the skills it is testing and how these relate to driving then clients are more inclined to accept the result of their assessment. However

those that fail the SDSA are sometimes difficult to be convinced of its relevance when they themselves are certain they are fit to return to driving.

In summary, few people appear to use the SDSA and some changes could be made to increase its ease of use.

5 Recommendations

The following recommendations are made based upon the data available from this survey of users. Phase 2 of the project, which compares the results of the SDSA with those of an on-road assessment, will clarify the suitability of the SDSA to act as an aid in the decision making process regarding re-licensing following a stroke.

Instruction manual

- The instructions for the SDSA users needs to be made more comprehensive and the diagrams clearer to understand.
- The manual should include instructions on how to deal with clients who are unable to understand the instructions.
- An overview of the basis for the sub-tests used could be included in the manual to help all users understand the theories upon which the SDSA is built, what it is designed to test for, and to help instil greater confidence in its use.

Test Materials

- The compass cards for the 'square matrix compass' test must be shaded more clearly to reduce any confusion as to their intended compass heading.
- The compass cards and directional arrows used in the 'square matrix' tests could be fastened to the board by 'Velcro' to prevent the cards being moved around unintentionally and altering their directions.

Scoring

- Ways in which the 'square matrices' tests can be scored without the client present need to be explored (e.g. possibility of using 2 matrix boards) to shorten the overall testing period and avoid the client observing the process.
- A standard acetate sheet to help with scoring of the 'dot cancellation' test needs to be produced and included in the SDSA kit.

- A full set of correct answers needs to be provided in the instruction manual for the 'road sign recognition' test to remove any doubt over its scoring.
- A borderline scoring bracket could be created for when the 'pass' and 'fail' scores are very similar, in which it is advised the client should be referred for a fuller driving assessment.

Training

- It is advisable that all SDSA users undergo formal training in the use of the SDSA.

The 'Returning to drive' process

- Guidance should be issued for healthcare professionals such as Occupational Therapists on the process that should be followed when assessing a client's ability to return to driving.
- The assessment process should clarify what the result of the SDSA suggests for the next course of action.

6 Acknowledgements

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7 References

Gillespie, N.D. and McMurdo, M.E. (1999) "A survey of attitudes and knowledge of geriatricians to driving in elderly patients", *Age and Ageing*, Vol. 28, pp.53-57.

Kelly, R., Warke, T., Steele, I., (1999) "Medical restrictions to driving: the awareness of patients and doctors", *Postgraduate Medical Journal*, 75, pp.537-539.

Nouri, F. M. and N. B. Lincoln (1992) "Validation of a cognitive assessment: predicting driving performance after stroke". *Clinical Rehabilitation*, 6, 275-281.



A SURVEY OF STROKE DRIVER SCREENING ASSESSMENT USERS

Please complete this questionnaire by ticking the appropriate boxes and filling in the spaces as required. It will only take about 10 minutes to complete and not all questions may apply to you. Any information you provide will be treated in the strictest confidence and used for research purposes only.

If you are able to pass on this questionnaire to anyone who has used the SDSA please either photocopy this questionnaire or contact TRL on 01344 770665 for additional copies.

SECTION A: FAMILIARITY WITH THE SDSA

Q1 Approximately how many stroke clients do you see in a year?

_____ clients

Q2 Have you ever heard of the Stroke Driver Screening Assessment (SDSA)?
(Please tick one box only)

Yes ₁

No ₂ ⇒ Please go to Q21

Q3 How did you come to hear of the SDSA?

Q4 Have you ever used the SDSA?

(Please tick one box only)

Yes ₁

No ₂ ⇒ Please go to Q21

Q5 Do you currently use the SDSA?

(Please tick one box only)

Yes ₁

No ₂ ⇒ Please briefly describe why you no longer use the SDSA, and then go to Q21

SECTION B: USING THE SDSA

Q6 Approximately how many times have you used the SDSA?

(Please write in the number below)

_____ assessments

Q7 For which clients have you used the SDSA?

(Please tick all that apply)

Stroke ₁

Head injury ₂

Other (please specify) ₃ _____

IF YOU DO NOT USE THE SDSA FOR CLIENTS WHO HAVE SUSTAINED A STROKE PLEASE GO TO QUESTION 10

Q8 Roughly, what percentage of stroke clients do you use the SDSA to assess fitness to drive?

_____ %

Q9 Please list any other tests you use to assess fitness to drive for people who have sustained a stroke?

(Please write in the box below)

Q10 In the table below please indicate how easy you find it to administer, score and interpret each sub-test of the SDSA

		Very difficult	Difficult	Easy	Very easy
How easy is the Dot cancellation task to:	Administer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Score	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Interpret	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How easy is the Square Matrix Direction test to:	Administer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Score	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Interpret	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How easy is the Square Matrix Compass test to:	Administer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Score	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Interpret	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How easy is the Road Sign Recognition test to:	Administer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Score	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Interpret	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IF YOU ANSWERED “DIFFICULT” OR “VERY DIFFICULT” TO ANY OF THE ABOVE PLEASE EXPLAIN WHY IN THE SPACE PROVIDED BELOW.

Q11 Are the instructions for using the SDSA clear?

Yes ₁

No ₂ ⇒ If “No” please explain why

Don't know ₃

Q12 Have you ever received training in the use of the SDSA?

Yes ₁ ⇒ If “Yes” please give details of the training below

No ₂

Q13 Have you found the results of the SDSA to be generally consistent when administered by different people?

Yes ₁

No ₂ ⇒ If “No” please explain why

Don't know ₃

Q14 Have you found the results of the SDSA to be generally consistent when it is administered to the same client on more than one occasion?

Yes ₁

No ₂ ⇒ If “No” please explain why

Don't know ₃

Q15 Please briefly describe in what circumstances the SDSA might be used by your organisation.

(Please write in the box below)

Q16 How are the results of the SDSA used by your organisation?

(Please write in the box below)

SECTION C: YOUR VIEWS OF THE SDSA – The following questions relate only to stroke clients. If you don't use the SDSA for stroke clients please go to Section D

**Q17 Overall, how useful is the SDSA in helping you assess a stroke client's fitness to drive?
(Please circle a number from 1 to 5, where 1 means "Not at all useful" and 5 means "Very useful")**

Not at all useful

Very useful

1

2

3

4

5

Please explain why

**Q18 How well do you think the SDSA predicts a stroke client's fitness to drive?
(Please circle a number from 1 to 5, where 1 means "Not at all well" and 5 means "Very well")**

Not at all well

Very well

1

2

3

4

5

Please explain why

Q19 Do you think an SDSA score alone could be used to judge a persons fitness to drive?

Yes ₁

No ₂ ⇒ If “No” please explain why

Q20 Have you encountered any problems with stroke clients accepting the use of the SDSA in their assessment of fitness to drive?

Yes ₁ ⇒ If “Yes” please give details below.

No ₂

SECTION D: ABOUT YOU

Q21 What is your job title?

Q22 What company/organisation do you work for?

Company/Organisation

Department

Q23 If you would be happy for the researchers to contact you for further information, please give your name and a contact telephone number here.

Thank you very much for your help. Please return this questionnaire as soon as possible in the pre-paid envelope provided.

Appendix 2: SDSA telephone interview schedule

Interview guide

Explain purpose of interview
Confidentiality

Ask All

General use questions:

- How many times have you administered the SDSA in the last 6 months (no of people tested on it)?
- In this cases did you routinely use all three parts of the SDSA test? If not, which part do you routinely use and when do you use all parts of the test?
- Do you use the test for all stroke patients or for a specific group of stroke patients? If the latter, what specific group of stroke patients do you use them for?
- Do you use SDSA for any other patients (not stroke)? If yes, what groups?

Scoring questions:

- How do you score the test? Some people use the number of mistakes, some use mathematical formula to calculate a score- which one of these, or what other method of scoring do you use?
- What scoring difficulties have you had?
- Do you have any suggestions on how this can be improved?

Clients problems:

In the survey, some SDSA users reported that their clients had difficulty relating the results of the SDSA to their driving ability. What has been your experience?

Probe:

- Which client's have difficulty accepting the relevance to the test? (ie. those that fail/level of impairment/everyone)
- Is this a general problem with neuropsychological tests you use or unique to the SDSA?

- Which other tests that you use have similar problems?
- Which tests have greater relevance to stroke clients?
- How do you explain the relevance of the SDSA to the client in determining fitness
- What part of your assessment of fitness to drive has the most influence on a client's awareness of their driving ability? (i.e. your professional judgement, GP opinion, driving assessment, SDSA results, other neurological tests etc.)

Group Specific Questions

Respondents who had difficulties administering the SDSA

On your questionnaire you said that you had had some difficulties administering the SDSA? Can you tell me a bit more about that?

Probe:

- What sort of difficulties did you have?
- How did you overcome them?
- What improvements could be made to make the SDSA easier to use?

Respondents who reported clients had difficulty using the tests

On your questionnaire you highlighted that some clients had difficulties completing/understanding the tests.

Probe:

- Which part of the test did they have difficulties with?
- Which tests did clients find confusing?
- What sort of difficulties did clients have?
- How did these difficulties interfere with their ability to complete the test?
- How did you help the client overcome these difficulties? (ie did they give additional instructions, if so what)
- How could these difficulties be minimised?
- Would written instructions for the client be appropriate?

Respondents who used the SDSA as part of a test battery

You said on your questionnaire that you used the SDSA as part of battery of tests.

Probe:

- What other tests do you use? What abilities do they test?
- Do you use set battery of tests to assess fitness to drive? If no, how does it vary?
- Why do you use other tests?
- What information do these tests provide in addition to the SDSA?
- In your opinion, which test(s) is most useful in predicting fitness to drive for stroke clients?
- What test results influence your clinical judgement most, for stroke patients? (ie a poor rating on one test outweigh another)
- Why do you/ don't you have confidence in the SDSA alone to predict fitness to drive?

Ask all

General assessment procedure questions to cover anything not included in their questionnaire. How are clients referred to them, who is given the results of SDSA.

Do they have any direct contact with the DVLA?

Do you have any further comments?