# MANUAL FOR THE

# SYDNEY PSYCHOSOCIAL REINTEGRATION SCALE VERSION 2 (SPRS-2)


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## Contents



## Acknowledgements

In developing the Sydney Psychosocial Reintegration Scale (SPRS) I acknowledge the sustained and enthusiastic contributions of my colleagues from the Brain Injury Rehabilitation Unit at Liverpool Hospital in Sydney, Australia (formerly located at Lidcombe Hospital). In the early 1990's Dr Adeline Hodgkinson believed in the worth of a project to convert our clinical semi-structured follow-up interview into a standardised instrument and she provided initial seed funding to mount a preliminary study. She and Dr Ahamed Veerabangsa contributed to the initial item development and refinement process and the Motor Accidents Authority of New South Wales provided funding to enable a more comprehensive psychometric evaluation of the scale. More recently, Dr Grahame Simpson has provided me with the impetus to increase the clinical utility of the SPRS and Dr Cheryl Soo has taken up the challenge of developing a paediatric version of the scale. In all these endeavours, I have had excellent support initially from Silvia Maggiotto and Anne Pfaff and more recently from Dr Amanda Lane-Brown. I am grateful for the reception of the SPRS by my Australian colleagues in the states of New South Wales, Queensland and Victoria who have taken it up and used it in their own clinical and research programmes.

RLT

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# Background

### *Brief scale description*

The Sydney Psychosocial Reintegration Scale (SPRS) is a 12-item rating scale that measures participation in the community; specifically, the extent to which a person's lifestyle may have changed as a result of acquired brain impairment. It adopts an exteriorised frame of reference in measuring participation (i.e., an objective perspective as opposed to a subjective/client-centred perspective) and takes into account both quantitative and qualitative featurs of functioning. Items are grouped into three domains: occupational activity for work and leisure, interpersonal relationships and independent living skills. Each domain contains four items.

The SPRS was designed to be administered by health professionals working in a rehabilitation setting (clinician version), but it can also be completed by an informant who knows the person well (informant version). Additionally, it can be completed as a self-rating scale (self version), although this is not advised if the person experiences significant cognitive impairments (particularly those involving memory, insight and judgement) which may affect the validity of responses.

In addition to the clinician, informant and self-rating versions, the SPRS contains two forms which reflect different comparison standards: Form A measures 'change since injury' and Form B measures 'current status'. Each form uses the same 12 items, with appropriate variants in phrasing.

Items are rated on a 5-point scale (revised from the original 7-point scale), ranging from 'no change' to 'extreme change' for Form A, and 'very good' to 'extremely poor' for Form B. Scores range from 0 to 48 for the total score (and 0 to 16 for each of the domains), with higher scores reflecting better levels of functioning.

### *Development of the SPRS*

The SPRS, which evolved in a number of discrete stages over many years of clinical and research practice, was initially described in Tate, Hodgkinson, Veerabangsa and Maggiotto (1999). It had its origins in our clinical practice in the 1970's at Lidcombe Hospital in Sydney, Australia. The Brain Injury Rehabilitation Service, established by Professor Tony Broe in 1976 (and subsequently relocated to Liverpool Hospital in 1995), is described elsewhere (Broe, Lulham, Strettles, Tate, Walsh & Ross, 1982). Patients discharged from the inpatient unit were routinely followed up after discharge, and over time our clinical interviews targeted the specific areas of functioning where our clients encountered particular difficulties: occupational activities (including recreation as well as work), interpersonal relationships with family and friends, and functional independent living skills (including use of transport, accommodation and so forth). These areas of functioning are now well established in the clinical and research literature as representing the seminal areas of participation restriction after brain injury (Brooks, Campsie, Symington, Beattie & McKinlay, 1986; Dikmen, Machamer & Temkin, 1993; Engberg & Teasdale, 2004; Oddy,

Coughlan, Tyerman & Jenkins 1985; Olver, Ponsford & Curran, 1996; Thomsen, 1984; Willer, Rosenthal, Kreutzer, Gordon & Rempel, 1993).

Subsequently, in the mid 1980's our group conducted a study into the outcomes of a consecutive series of the first 100 patients admitted to the Lidcombe Service with traumatic brain injury (TBI). At that time there was no standardised scale available that captured the types of difficulties commonly experienced by people with TBI, and thus the areas of functioning used in our clinical interviews were then configured into a semi-structured interview. Results of the psychosocial component of the study were reported in Tate, Lulham, Broe, Strettles and Pfaff (1989). This nascent categorical version of the SPRS focused on three domains of functioning (occupational activity, interpersonal relationships and independent living skills). Interview data were classified into one of three levels of functioning (good, limited, poor) for each of the three domains, using consensus ratings.

A reliability study using the categorical version with an independent TBI sample (n=92), described in Tate, Hodgkinson, Veerabangsa and Maggiotto (1996), revealed adequate 6-week stability ($r_s$=0.87), but we considered that the inter-rater reliability was unacceptably low ($r_s$=0.76). The categorical scale was therefore radically revised, resulting in the SPRS.

The SPRS drew on the conceptual framework of handicap as described in the International Classification of Impairments, Disabilities and Handicaps (WHO, 1980), now referred to as participation restriction (see WHO, 2001). It was designed with a number of considerations in mind. Our ambit claim was to produce a scale that was (i) brief yet clinically meaningful and useful, (ii) sensitive yet simple to use so that it could be reliably administered by inexperienced clinicians, (iii) to have the capacity to distinguish at least between impairments and disabilities and secondary psychological effects of the injury, and (iv) to possess essential psychometric characteristics for reliability and validity. The three domains of the semi-structured interview were retained and a pool of 25 structured items was developed, trialled and refined. The final set of 12 items examined the extent of change since the injury, with ratings originally made on a 7-point scale from 'no change' to 'extreme change'.

The psychometric properties of the SPRS, described in detail on pages 20 to 28 of this manual, were found to be very good (Tate et al., 1999) – the SPRS has high internal consistency, evidence of responsiveness, and high intraclass correlation coefficients for inter-rater reliability and one-month stability. It shows concurrent validity with other pertinent scales and there is evidence for construct validity (including convergent and divergent, as well as discriminant validity). Appendix A provides a list of the psychometric studies conducted by our research team on the SPRS.

### *The comparison standard: Change since injury versus current status*

This original version of the SPRS (Form A) measures 'change since the injury', with three versions (clinician, informant and self – which contain identical items but are phrased appropriately for the respective respondent). In our 1999 paper, we drew attention to the distinction between change in functioning from the premorbid level versus capacity or competency of the current level of functioning. There are a number of circumstances,

where the focus on change per se may be neither pertinent nor appropriate (e.g., when a clinician has no knowledge of the person's preinjury level of functioning and there is no informant available, when the injury occurred many years previously accurate recall of preinjury level of functioning can be difficult, in program evaluation it may be more appropriate to simply document psychosocial functioning at a given point in time, without reference to some earlier state). A complementary scale (Form B), using the same set of 12 items and three versions, was therefore developed to measure 'current status'. It was compared with Form A, and its psychometric properties were equally as good (Tate, Pfaff, Veerabangsa & Hodgkinson, 2004) – see page 24 of this manual. Normative data for Form B were reported from 105 healthy community volunteers (Tate, Simpson, Soo & Lane-Brown, 2011).

### *Adolescent and paediatric versions of the SPRS*

An adolescent version of the scale has been developed (Newitt, 2002) and used in research studies (Anderson, Brown, Newitt & Hoile, 2009; Anderson, Brown & Newitt, 2010; Anderson, Brown, Newitt & Hoile, 2011; Muscara, Catroppa & Anderson, 2008). In further development it has been adapted for children (referred to as SPRS-C; Soo et al., in preparation). The SPRS-C is suitable for children between 5 and 16 years of age. The adaptation focused on Form B evaluating 'current status', using parent and self-report versions. A number of items were reconfigured to accommodate developmental stages in children (e.g., item 5 in the adult version "How do you rate your relationship with your spouse?" was replaced with "How do you rate your relationship with your parents/caregiver?"), and the rating scale also uses a developmental criterion, performance being compared with children of the same age. Normative data for the SPRS-C have been collected for the parent version of Form B in approximately 200 children aged between 5 and 14 years.

### *SPRS-2 on-line version*

The SPRS-2 has been further refined in order to improve its feasibility in a clinical setting – a custom-designed, electronic version was developed with more user-friendly formatting, capacity for on-line completion, automatic scoring features and charting facilities. It is available on the Rehabilitation Studies Unit website (www.rehab.med.usyd.edu.au).

### *Version 2 of the SPRS*

Recent developments of the SPRS have focused on efforts to improve user-characteristics, resulting in the SPRS-2. In order to improve administrator and respondent burden, the rating scale was reduced from a 7-point scale to a 5-point scale, for both Form A and Form B (see Appendix B for the revised scoring system). The psychometric data from previous studies were reanalysed with the 5-point scale, and the pattern of measurement properties remained equally as good (Tate et al., 2011).

Additionally, Rasch analyses were conducted with the 5-point versions of Forms A and B (Tate et al., 2011). Both forms were a good fit to the Rasch model, and the logit scores produced from the analyses were used to construct a conversion table for the SPRS raw scores, thereby providing interval-level data. The logit data were then used to calculate a

reliable change index, which is very helpful to determine whether change in an individual patient is reliable (see pp.15-18 for details).

Normative and TBI comparative data have also been compiled (see pp. 17-19 for details) enabling comparison of the individual with other groups (Tate et al., 2011).

### *Other neurological groups*

Finally, work has been conducted in examining the SPRS with neurological conditions other than TBI. Ownsworth and Shum (2008) have used the SPRS in a stroke population, and we have examined its psychometric properties in groups with primary brain tumour (Tate, Simpson, Lane-Brown, Soo, De Wolf & Whiting, in submission) and spinal cord injury (De Wolf, Lane-Brown, Tate, Middleton & Cameron, 2010), in which it also demonstrates very good psychometric properties.

### *In summary*

Since our initial publication of the categorical version of the SPRS in 1989, there have been many scales of psychosocial functioning developed for people with TBI (see reviews in Tate, 2010; Tate, in press).

An advantage of the SPRS in comparison with other scales is that it explicitly measures change from the preinjury level. This rating format is the method of choice in many situations, both for clinical practice, as well as research, and directly addresses handicap or participation restriction. Respondents, such as family members, can readily relate to the response format and scores are easily interpreted. The individual with TBI thus becomes his or her own control, and this bypasses the need for normative data required to validly interpret scores on some scales. Moreover, scales reliant upon normative data are only able to provide information about the individual relative to the general population, and are not able to indicate whether there has been any change in an individual's level of functioning from an earlier (viz. premorbid) time. As we previously concluded, "having two versions of the scale with comparable item content and scoring format, but with a different focus (change from the premorbid level and current competency), gives the SPRS a distinct advantage over other scales that do not have this feature" (Tate et al., 2004, p.543).

The SPRS is frequently used in clinical and research studies, particularly in Australia. Appendix C lists publications by our research team using the SPRS. Appendix D lists studies by independent research groups that have used the SPRS. This includes its application in the following ways:

(i) an outcome measure (Draper, Ponsford, & Schönberger 2007; Ownsworth, Turpin, Carlson & Brennan 2004; Ownsworth, Fleming, Strong, Radel, Chan & Clare, 2007, Ownsworth & Shum, 2008; Fleming, Kennedy, Fisher, Gill, Gullo & Shum, 2009)

(ii) in intervention research (Bornhofen & McDonald, 2008a, 2008b; Fleming, Shum, Strong, & Lightbody, 2005; Fleming, Kuipers, Foster, Smith, & Doig 2009)

(iii) in predictive and correlational studies (Gould, Ponsford, Johnston & Schönberger, 2011; Kervick & Kaemingk, 2005; Ownsworth & Fleming, 2005; Whelan-Goodson, Ponsford & Schönberger, 2008; Winkler, Unsworth & Sloan, 2006; Wise, Ownsworth & Fleming, 2008).

## Scale description

The SPRS commences with a 15-item background interview, which is designed to collect factual information regarding occupational activities, interpersonal relationships and living circumstances. The interview items, described on p.9, are not scored.

### *Domains of the Scale*

The 12 items of the Scale are organised in three categories: Occupational Activities, Interpersonal Relationships and Independent Living Skills.

### Forms of the Scale

The SPRS has two forms:

(i) Form A examines changes that have occurred since the injury. The items are described on p.10;

(ii) Form B examines current status of functioning. Items are described on p.11.

Selection of Form A or Form B will usually be determined by the reason for collecting the information. There are no hard and fast rules, but Form A may be appropriate in circumstances when a comparison with the person's premorbid lifestyle is required, particularly in the early to medium term after the injury. Alternatively, Form B may be more appropriate in circumstances where the injury occurred a long time ago and so comparison with the premorbid lifestyle is not so relevant. Rather, it may be more helpful to have information regarding the current level of functioning. Additionally, in situations such as program evaluation, it may also be more appropriate to take measures of 'current status' as provided by Form B at two independent points in time.

### Response formats for the Scale

Three response formats of each form of the SPRS are available:

(i) Self ratings – designed for self-administration by the injured person;

(ii) Informant ratings – designed for administration to someone who knew the person well both before and after the injury, such as a close relative; and

(iii) Clinician ratings – designed for ratings to be made by a clinician.

## 15-Item Background Interview

1. Current occupation:
2. Work duties at present:

3. Occupation at the time of the injury:
4. Work duties in that job:

5. Number of jobs since the injury (not including work trials or voluntary work):

6. and 7. Leisure interests, recreation, hobbies, and club membership, at time of injury and at present:

| 6. AT TIME OF INJURY | 7. AT PRESENT |
|---|---|
| | |

8. and 9. Weekly program of work, leisure/recreational activities at time of injury and at present:

| 8. AT TIME OF INJURY | 9. AT PRESENT |
|---|---|
| | |

10. Marital status at present:
11. Marital status at the time of the injury:
12. Who was in the circle of close friends at time of injury?:

13. Who is in the circle of close friends at present?:

14. Who lived with at time of injury?:

15. Who lives with at present?:

## Form A (Change since Injury)[1]

All items answered on a 5-point scale, as follows:

4 = No change: same as before or better

3 = A little

2 = Moderate

1 = A lot

0 = Extreme

The recording form provides behavioural descriptors for the lower four categories of response.

### *Part A: Work and Leisure*

1. Current work: Have hours of work (studies) or type of work (studies) changed because of the injury?
2. Work skills: Have the work skills (studies) changed because of the injury?
3. Leisure: Has there been any change in the number of leisure activities or a change in types of leisure activities that are done because of the injury?
4. Organising activities: Has there been any change in the way work and leisure are organised because of the injury?

### *Part B: Interpersonal Relationships*

5. Spouse or Partner: Has the relationship with partner changed because of the injury?
6. Family: Have relationships with any other family members (except partner) changed because of the injury?
7. Friends and other people: Have relationships with other people outside family (such as close friends, work mates, neighbours) changed because of the injury?
8. Communication: Have communication skills (ie. talk with other people and understand what they say) changed because of the injury?

### *Part C: Living skills*

9. Social skills: Have social skills and behaviour in public changed because of the injury?
10. Personal habits: Have personal habits (eg. care in cleanliness, dressing and tidiness) changed because of the injury?
11. Community travel: Has use of transport and travel around the community changed because of the injury?
12. Accommodation: Has the living situation changed due to the injury?

[1] Refer to Appendix E for the complete record form for the informant version

## Form B (Current Status)[2]

All items answered on a 5-point scale, as follows:

4 = Very good

3 = A little difficulty

2 = Definite difficulty

1 = A lot of difficulty

0 = Extremely poor

The recording form provides behavioural descriptors for the lower four categories of response.

### *Part A: Work and Leisure*

1. Current work: How do you rate current work (study): Hours of work and type of work?
2. Work skills: How do you rate work skills (studies)?
3. Leisure: How do you rate the type and number of leisure activities or interests?
4. Organising activities: How do you rate the way work and leisure is organised?

### *Part B: Interpersonal Relationships*

5. Spouse or Partner: How do you rate the relationship with partner or spouse?
6. Family: How do you rate relationships with other family members (except partner)?
7. Friends and other people: How do you rate relationships with other people outside family (such as close friends, work mates, neighbours)?
8. Communication: How do you rate communication skills (ie. talk with other people and understand what they say)?

### *Part C: Living skills*

9. Social skills: How do you rate the social skills and behaviour in public?
10. Personal habits: How do you rate the personal habits (eg. care in cleanliness, dressing and tidiness)?
11. Community travel: How do you rate use of transport and travel around the community?
12. Accommodation: How do you rate the living situation?

[2] Refer to Appendix F for the complete record form for the informant/clinician version

## Administration procedures

The SPRS is most appropriate for people with acquired brain impairment who are living in the community, although it can be used at any stage post-trauma, including in the earlier post-acute stages of recovery (e.g., inpatient rehabilitation). In the post-acute stages, however, some of the items may be difficult to rate because of lack of opportunity (e.g., item 11: travel around the community). Nonetheless, early administration can provide a comparison standard against which functioning at a later stage can be compared (and in such a case Form B (current status) may be more appropriate than Form A (change since injury)).

Administration is generally conducted by a clinician in a face-to-face interview with an informant/patient. Alternatively, clinicians can make ratings based on their knowledge of the patient. The SPRS can also be independently completed by informants or patients, although as previously noted it is not suitable for people with significant degrees of cognitive impairment affecting memory, judgement or awareness.

SPRS administration is very straight forward. It takes about 15-20 minutes when administered to a relative of a person with TBI, and about the same amount of time for a person with such an injury. Sometimes some of the items may prompt a person to talk about issues surrounding the particular item, and in this case administration time may be longer; sometimes respondents need to be redirected back to the questionnaire. When clinicians use the SPRS to rate individuals they know well, without direct interview, the scale takes less than 5 minutes to complete.

Generally, respondents take a few items to catch onto the administration format of the SPRS, but quicken as they get used to the response format, which is the same for every item. The clinician usually works through the SPRS with the respondent, so that they can answer any questions, or can be helped if they seem to be getting stuck. In administering the SPRS, however, it is important that it is the respondent who selects the answer that most closely corresponds to their situation. One assists the respondent in completing the SPRS when necessary by rephrasing the question, or helping them to narrow down the alternative responses, but not by suggesting a response for them.

Like all test instruments, it is important that rapport is established with the respondent before commencing administration. And also, that rapport is maintained. Very occasionally, a respondent may become distressed. If this occurs, it is best to stop and check out how they are feeling. You may say something like: “I can see that this question is making you upset. Do you want to talk about it more?” Or it could be appropriate to suggest something along the lines of: “It seems that there are a lot of issues arising from these questions. Perhaps when we are finished this task we can discuss these further or work out a plan of action” and so forth. In other words, it is important to use clinical judgement in administering the SPRS and acknowledge and meet the respondent’s needs. In the vast majority of instances, however, people complete the SPRS without difficulty or distress.

## Instructions for administration

In administering the SPRS, the brief introductory comments on the recording sheet are usually sufficient. These may be expanded, if necessary, by the following for the Form A (Change since Injury) format:

"This Scale is about the effects of a traumatic brain injury. It asks about how much change there has been in *[insert name]* life since the injury. The Scale asks questions about 12 aspects of living. There are three main areas: work and recreational activities, relationships with family and friends, and living in the community. For some people, a lot of change has occurred and for others, not very much at all. Again, some people show changes in all 12 areas, other people show changes on quite a few of the 12 areas, and still others show changes in only one or two areas. By getting you to complete this Scale we will be able to tell how much change there has been in *[insert name]* life.

So for these 12 questions I will ask you to rate the amount of change that you have observed, from 4 (no change at all) to 0 (extreme change). This same rating scale is used for each of the 12 questions. I would like you to read through the range of responses and then choose the one that is closest to *[insert name]* situation. This will take us about 15 minutes. Do you have any questions? If you do not feel that you can answer any of the questions, just let me know. Here, let me work through some of the questions with you.

This first question asks 'have the hours of work or the type of work *[insert name]* does changed because of the injury?'. And here we have a range of 5 responses: Not at all (work hours or type of work are the same as before (or almost the same) or better); A little change (works less hours per week, OR work duties have changed for easier/lighter ones) *[continue reading out the response alternatives for Item 1]…* or Extreme change (is almost unable (or is unable) to work at present). Now which of these statements most closely describes *[insert name]* situation at the moment?"

## Scoring procedures

In the past, the traditional method of scoring the SPRS has used the summation of raw scores. This method, however, is subject to the limitations of ordinal data, which is the level of measurement produced by many instruments in the behavioural sciences, particularly those using likert-type rating scales, as in the SPRS. Our recent work has used logit scores derived from Rasch analysis (Tate et al., 2011). An advantage of logit scores is that they provide data at the interval level of measurement, and interval level data are appropriate for use in parametric statistics. Thus we would advise that when using the SPRS total score, the raw scores are converted to logit scores using Table 1 below.

Table 1: Conversion of SPRS total raw scores to Rasch logit scores scaled from 0-100

| Form A | | | | Form B | | | |
|---|---|---|---|---|---|---|---|
| raw score | logit | raw score | logit | raw score | logit | raw score | logit |
| 0 | 0 | | | 0 | 0 | | |
| 1 | 11.02 | 25 | 48.64 | 1 | 11.56 | 25 | 48.23 |
| 2 | 17.76 | 26 | 49.52 | 2 | 18.15 | 26 | 49.09 |
| 3 | 21.96 | 27 | 50.39 | 3 | 22.16 | 27 | 50.05 |
| 4 | 25.02 | 28 | 51.18 | 4 | 24.92 | 28 | 50.91 |
| 5 | 27.38 | 29 | 52.06 | 5 | 27.22 | 29 | 51.77 |
| 6 | 29.40 | 30 | 53.02 | 6 | 29.04 | 30 | 52.72 |
| 7 | 31.15 | 31 | 53.89 | 7 | 30.66 | 31 | 53.68 |
| 8 | 32.63 | 32 | 54.86 | 8 | 32.09 | 32 | 54.63 |
| 9 | 34.03 | 33 | 55.91 | 9 | 33.33 | 33 | 55.68 |
| 10 | 35.26 | 34 | 56.96 | 10 | 34.57 | 34 | 56.73 |
| 11 | 36.40 | 35 | 58.01 | 11 | 35.72 | 35 | 57.88 |
| 12 | 37.45 | 36 | 59.14 | 12 | 36.77 | 36 | 59.03 |
| 13 | 38.50 | 37 | 60.37 | 13 | 37.73 | 37 | 60.27 |
| 14 | 39.37 | 38 | 61.77 | 14 | 38.68 | 38 | 61.51 |
| 15 | 40.33 | 39 | 63.25 | 15 | 39.64 | 39 | 62.94 |
| 16 | 41.21 | 40 | 64.83 | 16 | 40.59 | 40 | 64.47 |
| 17 | 42.08 | 41 | 66.67 | 17 | 41.45 | 41 | 66.19 |
| 18 | 42.96 | 42 | 68.68 | 18 | 42.31 | 42 | 68.10 |
| 19 | 43.74 | 43 | 71.04 | 19 | 43.17 | 43 | 70.30 |
| 20 | 44.62 | 44 | 73.84 | 20 | 44.03 | 44 | 72.97 |
| 21 | 45.41 | 45 | 77.25 | 21 | 44.89 | 45 | 76.23 |
| 22 | 46.19 | 46 | 81.71 | 22 | 45.75 | 46 | 80.71 |
| 23 | 47.07 | 47 | 88.80 | 23 | 46.61 | 47 | 87.91 |
| 24 | 47.86 | 48 | 100 | 24 | 47.37 | 48 | 100 |

In the published literature on the SPRS, three types of scores have been used and these may be useful for comparability purposes:

1. **Summation of scores:** The most common method of scoring the SPRS uses the simple summation of scores (even though this transgresses assumptions for ordinal-level data). Items are summed to obtain a total SPRS score (range 0-48), and the four items for the individual domain scores for occupational activity, interpersonal relationships, and independent living skills (range 0-16 for each domain). Higher scores reflect better levels of functioning. As noted, total scores can be converted to Rasch logit scores which provide interval-level measurement (see Table 1 above).

2. **Mean scores:** In clinical practice, the total and domain scores can be anchored back to the original descriptors by dividing the total score by 12 and each of the domain scores by 4. The resulting score will then range from 0 to 4 and correspond to the rating scale (0=extreme change/extremely poor to 4=no change/very good).

This procedure enables the SPRS score to be readily interpreted in relation to the rating scale, and is the procedure that Kervick and Kaemingk (2005) used with the SPRS. For example, Patient A has a total SPRS-2 score of 28/48, corresponding to a mean score of 2.3/4 on the rating scale, which falls between 'a little' and 'a moderate' degree of change.

3. **Score bands:** In our previous clinical and research work with Form A (Lammi, Smith, Tate & Taylor, 2005) we have also grouped the total and domain scores into three broad bands. Using the SPRS-2, these groupings correspond to the following: average scores 0 to 1 = major change/poor outcome, average scores 2 to 3 = some change/limited outcome, and average score 4 = no significant change/good outcome [3]. Thus, Patient A's mean score of 2.3/4 on the SPRS-2 is equivalent to 'some change' or 'a limited outcome'.

4. **Reliable change index:** When a person is assessed on multiple occasions, use of the reliable change index provides a rigorous test of whether a change in scores is reliably different. Logit scores derived from the Rasch analysis on Form A were used to calculate the minimum difference (in logit scores) required to determine whether a change in scores in an individual patient/client (either improvement or deterioration) was statistically significant. Calculation of the reliable change index for Form A (change since injury) is described in detail in Tate et al. (2011). The reliable change index formula [4] of Ley (1972; see Perdices, 2005 for review of reliable change index formulae) was applied to the Rasch-derived logit scores for the SPRS-2. The minimum difference of 8.23 logit scores is required to establish whether a change in scores is reliable. We use the logit score of 8.23 for both Form A and Form B.

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[3] In the original 7-point scale these bands correspond to the following scores: average scores 0 to 2 = major change (or poor outcome), average scores 3 to 4 = some change (or limited outcome), and average scores 5 to 6 = no significant change (or good outcome).

[4] Reliable change index formula: $MD=z_{MD}\sqrt{2x\sigma^2(1-r_{xy})}$, where $z_{MD}$ is the z score associated with a change in logit scores of magnitude MD between data collection occasions, $\sigma$ is the standard deviation at Time 1, and $r_{xy}$ is the test-retest reliability coefficient (ICC=0.92).

The procedure is very easy to apply: first convert the Time 1 SPRS-2 total raw score to a logit value, using Table 1 and add the constant of 8.23. This new logit score is the minimum score required to determine whether the change in score is reliable. Then convert the Time 2 SPRS-2 total raw score to a logit value, using Table 1. If the Time 2 score exceeds the minimum difference score (i.e., Time 1 score + 8.23), then the change in score is significant.

The following two examples demonstrate the application of the procedure:

**Example 1:** At Time 1, Patient A has a SPRS-2 total score of 28. Consulting the table, a SPRS-2 raw score of 28 corresponds to 51.18 logits. When assessed on the SPRS-2 at Time 2, Patient A scored 35, corresponding to 58.01 logits. The required minimum score, however, is 59.41 logits (i.e., 51.18 + 8.23), and thus we conclude that the SPRS-2 improvement of 7 points was not a reliable change.

**Example 2:** At Time 1, Patient B has a SPRS-2 total score of 45, corresponding to 77.25 logits. At Time 2, Patient B scored 47, corresponding to 88.8 logits. The required minimum difference is 85.48 logits (i.e., 77.25 + 8.23), and thus we conclude that the improvement of 2 points was a reliable change.

These two examples demonstrate the importance of using logit scores which provide an interval level of measurement – at the extremes of the scale a smaller minimum difference of raw scores is required to demonstrate reliable change than in the mid ranges of the scale. Patient B who scored highly on the SPRS-2 at Time 1, with a raw score of 45 (out of a possible 48), required a change of only 2 SPRS-2 raw score points to meet requirements for reliable change, but Patient A who scored in the mid range of the scale at Time 1, with a raw score of 28, required a change of 9 SPRS-2 raw scores to meet requirements. Thus Patient B's SPRS-2 raw score change of 2 was reliable, yet Patient A, who had a numerically higher SPRS-2 raw score change of 7 points, did not demonstrate reliable change.

## Score interpretation normative and comparative data

Normative data for Form B and comparative TBI data for Form A and Form B are presented in Tate et al. (2011). Normative data for Form B were derived from 105 healthy community volunteers who were part of another study. They had a relatively even sex ratio, mean age was 39.7 years (SD=16.68, range 16-76 years) and years of education was M=13.52 years (SD=2.80; range 6-22). The data for the clinical samples for Form A and Form B were collated from previous published and unpublished research studies using a clinician-rated SPRS and their characteristics are presented in Table 2, which is reproduced from Tate et al. (2011).

Table 2: Sample characteristics

| | *Form A: Rehabilitation Discharge* | *Form A: Community* | *Form B: Rehabilitation Discharge* | *Form B: Community* | *Healthy Volunteers* |
|---|---|---|---|---|---|
| Total N | 104 | 201 | 55 | 150 | 105 |
| Age: 15-25 | 28 | 53 | 13 | 41 | 29 |
| 26-50 | 60 | 108 | 32 | 72 | 44 |
| 51-75 | 16 | 40 | 10 | 37 | 32 |
| Sex: Males | 76 | 163 | 37 | 116 | 51 |
| Females | 28 | 38 | 18 | 34 | 54 |
| PTA (n=469): | (n=81) | (n=199) | (n=39) | (n=150) | |
| < 30 days | 30 | 90 | 14 | 60 | |
| 31-90 days | 39 | 62 | 21 | 56 | NA |
| > 90 days | 12 | 47 | 4 | 34 | |
| Time post-trauma: | | | | | |
| < 2 years | 104 | 133 | 55 | 54 | |
| 2-10 years | 0 | 58 | 0 | 76 | NA |
| > 10 years | 0 | 10 | 0 | 20 | |

SPRS descriptive data are provided in Table 3, which is reproduced from Tate et al. (2011).

Table 3: Descriptive data for SPRS-2 for Control group, along with Form A (Rehabilitation Discharge and Community samples) and Form B (Rehabilitation Discharge and Community samples)

| | *Form B: Control group (n=105)* | *Form A: Rehabilitation Discharge (n=104)* | *Form A: Community (n=201)* | *Form B: Rehabilitation Discharge (n=55)* | *Form B: Community (n=150)* |
|---|---|---|---|---|---|
| Total score | | | | | |
| Mean (SD) | 35.88 (3.09) | 19.54 (10.02) | 26.18 (12.87) | 21.92 (9.18) | 26.57 (12.45) |
| Median (IQR) | 36.00 (4.00) | 20.00 (14.00) | 25.00 (21.00) | 22.13 (13.00) | 20.00 (20.00) |
| Occupational Activities | | | | | |
| Mean (SD) | 11.28 (1.34) | 3.56 (2.94) | 6.54 (4.95) | 4.09 (3.00) | 6.49 (4.62) |
| Median (IQR) | 10.00 (1.00) | 4.00 (4.00) | 5.00 (9.00) | 4.00 (4.00) | 6.00 (8.00) |
| Relationships | | | | | |
| Mean (SD) | 11.94 (1.46) | 9.16 (3.83) | 9.37 (4.31) | 9.96 (3.40) | 9.41 (4.43) |
| Median (IQR) | 12.00 (2.00) | 10.00 (5.00) | 10.00 (7.00) | 11.00 (4.00) | 10.00 (7.00) |
| Living Skills | | | | | |
| Mean (SD) | 12.66 (1.52) | 6.82 (4.22) | 10.28 (4.62) | 7.62 (4.13) | 10.68 (4.59) |
| Median (IQR) | 12.00 (2.00) | 7.00 (7.00) | 11.00 (6.00) | 7.00 (6.00) | 12.00 (6.00) |

Statistically significant differences were found among the TBI subgroups with different levels of injury severity, as measured by duration of post-traumatic amnesia (PTA), and Table 4, reproduced from Tate et al. (2011), provides descriptive SPRS data, stratified by PTA duration.

Table 4: Descriptive data for SPRS-2 from clinical samples stratified by PTA duration

| | | *Form A: Rehabilitation Discharge (n=104)* | *Form A: Community (n=201)* | *Form B: Rehabilitation Discharge (n=55)* | *Form B: Community (n=150)* |
|---|---|---|---|---|---|
| PTA subgroup | | Mean (SD) | Mean (SD) | Mean (SD) | Mean (SD) |
| < 30 days | Total | 24.93 (8.31) | 32.98 (11.22) | 31.07 (4.50) | 33.27 (9.62) |
| | OA | 4.57 (2.22) | 8.97 (4.98) | 6.67 (2.32) | 8.58 (4.64) |
| | IR | 10.93 (3.67) | 11.24 (3.91) | 12.60 (1.88) | 11.37 (3.53) |
| | LS | 9.43 (3.63) | 12.77 (3.20) | 11.47 (2.07) | 13.32 (2.73) |
| 31-90 days | Total | 20.62 (9.07) | 25.48 (10.55) | 21.33 (5.77) | 27.05 (11.28) |
| | OA | 4.00 (3.15) | 6.03 (3.98) | 4.18 (2.72) | 6.64 (4.11) |
| | IR | 9.44 (3.25) | 8.87 (3.96) | 10.09 (2.43) | 9.50 (4.33) |
| | LS | 7.18 (3.63) | 10.58 (3.69) | 7.82 (3.02) | 10.93 (3.97) |
| >91 days | Total | 12.92 (6.26) | 14.70 (9.47) | 12.50 (5.92) | 13.97 (8.80) |
| | OA | 1.50 (1.57) | 2.70 (3.14) | 1.40 (1.67) | 2.53 (2.38) |
| | IR | 7.67 (2.15) | 6.66 (3.73) | 7.80 (1.79) | 5.82 (3.87) |
| | LS | 3.75 (3.36) | 5.34 (3.93) | 3.40 (2.30) | 5.62 (4.07) |

PTA=posttraumatic amnesia, OA =Occupational Activities domain, IR =Interpersonal Relationships domain, LS =Independent Living Skills domain

## Psychometric properties of the SPRS in traumatic brain injury

Initial studies to date, using the 7-point rating scale and seven independent samples from multiple centres in Australia, indicate that the SPRS has very good psychometric properties. Results from Samples 1 and 2 are reported in Tate et al. (1999). Results from Sample 3 are reported in Tate et al. (2004), from Sample 4 in Tate et al. (2011), from Sample 5 in Simpson, Secheny, Lane-Brown, Strettles, Ferry and Phillips (2004), from Sample 6 in Kuipers, Kendall, Fleming and Tate (2004), and from Sample 7 in Tate, Cameron, Winstanley, Myles and Harris (2004).

Psychometric properties in other neurological groups are reported in De Wolf, Lane-Brown, Tate, Middleton & Cameron (2010) for spinal cord injury and in Tate, Simpson, Lane-Brown, Soo, De Wolf and Whiting (in submission) for primary brain tumour.

Sample 1 examined Form A (Change since Injury), using clinician interviews of 40 close relatives of people with TBI recruited from Liverpool Hospital and who were living in the community.

- Internal consistency was high, with Cronbach's alpha coefficient = 0.90; although internal consistency of the individual domains was more variable: Occupational Activity $\alpha$=0.89, Interpersonal Relationships $\alpha$=0.69, Living Skills $\alpha$=0.77

- Ratings from different clinicians showed high inter-rater agreement, both for the total score (ICC=0.95), as well as the three domains ranging from ICC=0.86 for Interpersonal Relationships to ICC=0.94 for Living Skills

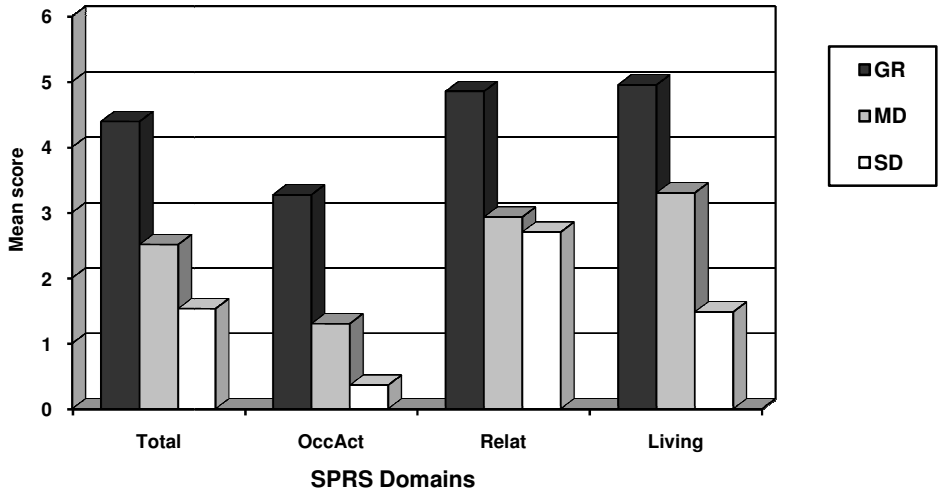
- Temporal stability over a one-month period was high, both for the total score (ICC=0.90), as well as the three domains ranging from ICC=0.77 for Interpersonal Relationships to ICC=0.93 for Occupational Activities

- Concurrent validity was established with standard instruments, for example,
  - $r_s$= -0.77 with the 8-level Glasgow Outcome Scale (Jennett et al., 1981)
  - $r_s$= -0.85 with the London Handicap Scale (Harwood et al., 1994)
  - $r_s$= 0.76 with the Katz Adjustment Scale – Form R2 (Katz & Lyerly, 1963
  - Kuipers et al. (2004) reported a correlation coefficient of r=0.60 between the SPRS and Community Integration Questionnaire (Willer et al., 1993)

- Construct validity was established with the Sickness Impact Profile (SIP) (Bergner et al., 1981). Convergent validity was demonstrated by high association between hypothesised similar constructs, such as the Psychosocial Dimension of the SIP and Interpersonal Relationships domain of the SPRS ($r_s$= -0.76, p<0.001). Divergent validity was demonstrated by low and non-significant association between hypothesised dissimilar constructs, such as the Physical Dimension of the SIP and Interpersonal Relationships domain of the SPRS ($r_s$= -0.23, p>0.05).

- Group differences were found among Glasgow Outcome Scale subgroups on the SPRS scores, both between Good Recovery and Moderate Disability subgroups (U = 28.0, p<0.001), as well as between Moderate Disability and Severe Disability Subgroups (U = 52.0, p<0.03). See Figure 1 below.

**Figure 1: Mean scores on SPRS for Glasgow Outcome Scale subgroups**



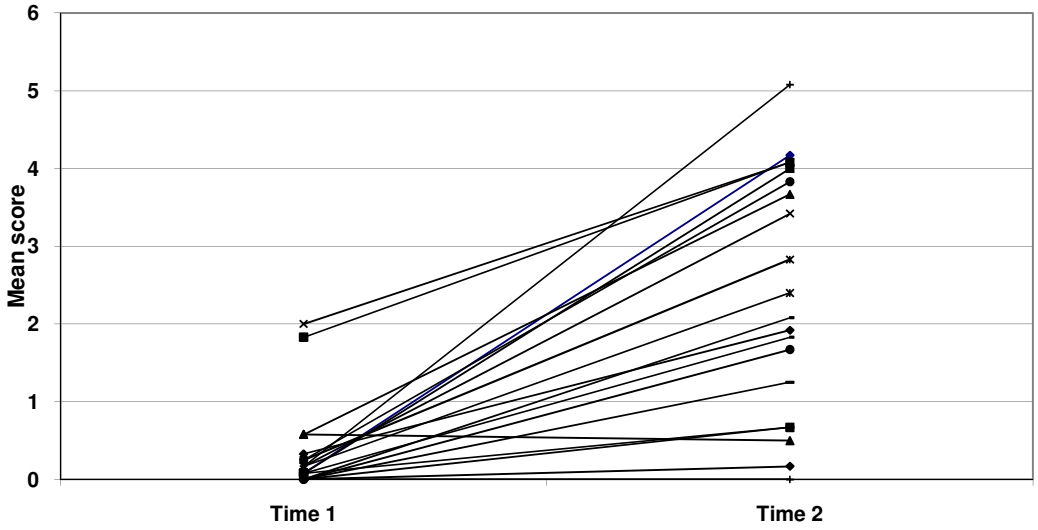

Note: SPRS=Sydney Psychosocial Reintegration Scale, GR=Good Recovery, MD=Moderate Disability, SD=Severe Disability, OccAct=Occupational Activities domain, Relat=Interpersonal Relationships domain, Living=Independent Living Skills domain

Original 7-point rating scale: 6=No change at all, 5=Very slight, 4=A little, 3=Moderate, 2=A lot, 1=Very much, 0=Extreme

Sample 2 examined Form A (Change since Injury), using clinician ratings of 20 patients at admission to and discharge from the Liverpool Hospital brain injury inpatient rehabilitation program.

- Responsiveness of the SPRS was demonstrated by significant improvement of the scores between admission and discharge ($z = -3.82$, $p<0.001$). See Figure 2 below.

**Figure 2: Mean item scores of 20 individual subjects from Sample 2 at Time 1 (admission) and Time 2 (discharge/3 month review)**




Original 7-point rating scale: 6=No change at all, 5=Very slight, 4=A little, 3=Moderate, 2=A lot, 1=Very much, 0=Extreme

Sample 3 examined the comparability between Form A (Change since Injury) and Form B (Current Status), using clinician ratings of 66 people being discharged from the Liverpool Hospital inpatient rehabilitation unit after brain injury. The psychometric properties of Form B were comparable to those reported for Form A using Sample 1. Additionally, the very good psychometric properties reported for Form A in Sample 1, were also replicated in Sample 3 using Form A. For Form B:

- Internal consistency was high, with Cronbach's alpha coefficient = 0.90
- Inter-rater reliability was high, both for the total score (ICC=0.84), as well as the three domains ranging from ICC=0.63 for Occupational Activities to ICC=0.82 for Living Skills
- Temporal stability over a one-week period was high, both for the total score (ICC=0.90), as well as the three domains ranging from ICC=0.76 for Interpersonal Relationships to ICC=0.93 for Living Skills
- Concurrent validity was established with relatives' ratings on the SPRS and London Handicap Scale ($r_s$= -0.71)
- Comparability with Form A was excellent (ICC=0.97)
- Comparability between relative and clinician ratings was good (ICC=0.67)

The similarly good psychometric properties reported for Form A in Sample 1 were documented in Sample 3, with:

- high internal consistency (Cronbach's alpha coefficient = 0.90)
- high interrater agreement (total score ICC=0.82)
- high stability over a one-week period (total score ICC=0.90)

Sample 4 examined group comparisons for Form B between healthy controls (n=105) and a TBI community sample (n=150) using the 5-point SPRS. Significant differences were found, with the mean scores indicating that the TBI group experienced more difficulty with psychosocial functioning than did the healthy controls. This was the case for the total score (z=-6.41, p=0.000), and each of the domains (Occupational Activity z=-8.48, p=0.000; Interpersonal Relationships z=-4.58, p=0.000; and Living Skills z=-2.18, p=0.03).

**Sample 5** comprised 50 people with TBI who were assessed before and after participation in the Liverpool Hospital transitional living program. Significant changes were observed on the total score and all domains, as shown in Table 5 below. The effect sizes were large ($d \geq 0.8$) for the total score and two of the three domains, providing further evidence of the responsiveness of the SPRS.

Table 5: Descriptive data for admission and discharge scores from a transitional living unit

| | *Admission M (SD)* | *Discharge M (SD)* | *z* | *d* |
|---|---|---|---|---|
| Occupational Activity | 6.56 (3.66) | 10.34 (4.66) | -5.66 | -1.0 |
| Interpersonal Relationships | 12.80 (3.71) | 14.44 (4.17) | -4.55 | -0.4 |
| Independent Living Skills | 13.09 (4.51) | 16.48 (5.07) | -5.25 | -0.8 |
| Total score | 32.45 (9.48) | 41.26 (12.36) | -5.87 | -0.9 |

**Sample 6** examined the underlying structure of the SPRS in a community sample resident in Queensland (n=91 people with acquired brain impairment and n=121 proxy respondents). Results of multidimensional scaling identified a two-dimensional solution. Items 1 to 5 and item 7 contributed to the dimension of Productivity versus Personal Life and items 6, and 8 to 12 contributed to the second dimension: Independent versus Dependent.

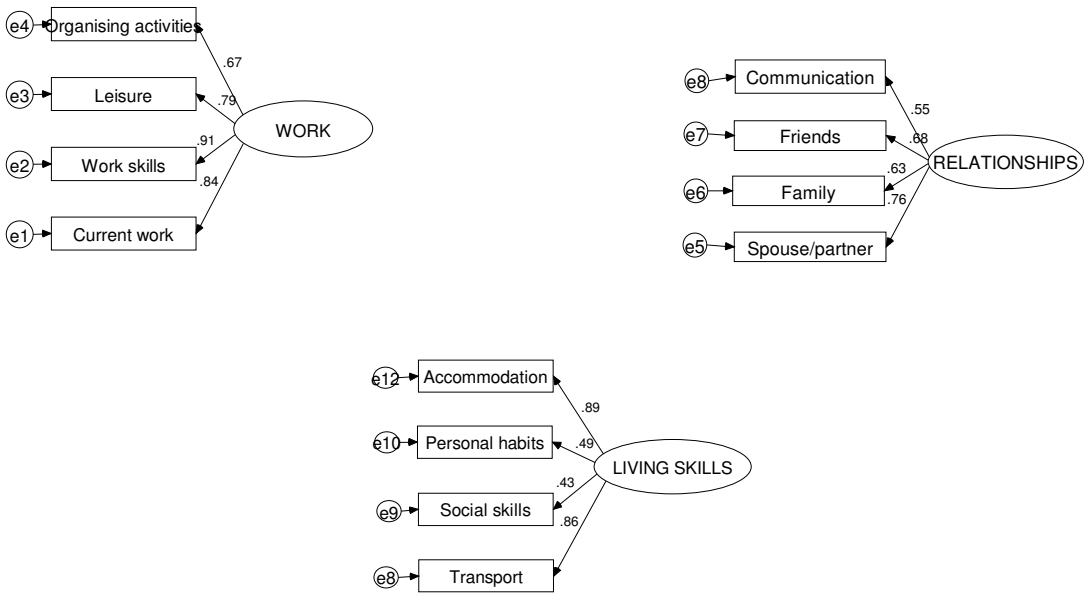
**Sample 7** examined the measurement model of the SPRS using path analysis with the AMOS statistical package[5]. Data were used from a state-wide, inception cohort of 144 people with TBI recruited from the 11 specialist adult brain injury rehabilitation units in New South Wales, and followed-up at 18 months post-trauma. Item analyses revealed that no items showed restriction of range and Cronbach alpha coefficients were high for the total score (0.90), and ranged from 0.76 to 0.87 for the domains. The measurement model for the three subscales produced very good fit statistics for the measurement models, as shown in Table 6 below:

[5] Statistical analysis for Sample 7 was conducted by Dr Julie Winstanley.

Table 6: Results of path analyses on the SPRS

| | *Occupational Activity* | *Interpersonal Relationships* | *Independent Living Skills* |
|---|---|---|---|
| Chi square ($\chi^2$) | 3.39 | 0.34 | 8.78 |
| Degrees of freedom | 2 | 2 | 2 |
| P | 0.18 | 0.85 | 0.01 |
| Goodness of Fit Index (GFI) | 0.996 | 0.999 | 0.968 |
| Adjusted GFI | 0.98 | 0.996 | 0.84 |
| RMSEA | 0.07 | 0.00 | 0.16 |
| Comparative Fit Index | 0.99 | 1.0 | 0.90 |

The model is depicted graphically in Figure 3 below:



### *Verision 2 of the SPRS*

Data from Samples 1 and 2 were re-coded to a 5-point scale for the SPRS-2, and psychometric analyses conducted. Results are reported in Tate et al. (2011) and demonstrate that the 5-point SPRS-2 retains very good psychometric properties. In particular, in combined samples from previously published and unpublished studies, there are no floor or ceiling effects, as shown in Table 7, which is reproduced from Tate et al. (2011).

Table 7: Floor and ceiling effects in the community samples for SPRS-2 Form A and Form B

| | *Form A (TBI n=210)* | | *Form B (TBI n=150)* | | *Form B (Controls n=105)* | |
|---|---|---|---|---|---|---|
| | Floor | Ceiling | Floor | Ceiling | Floor | Ceiling |
| Total | 0.0% | 2.5% | 1.3% | 1.3% | 0.0% | 0.0% |
| Occupational Activity | 9.0% | 5.0% | 10.0% | 2.7% | 0.0% | 0.0% |
| Interpersonal Relationships | 0.5% | 7.0% | 2.0% | 8.7% | 0.0% | 0.0% |
| Living Skills | 3.5% | 11.9% | 3.3% | 14.0% | 0.0% | 6.7% |

### *Rasch analysis of the SPRS*

As noted, our recent work (Tate et al., 2011) has conducted Rasch analyses on both Form A and Form B. Combined samples of previously published and unpublished studies were used (Form A, n=201; Form B, n=150), these being the same community samples used for the comparative data described on pp. 17-19 of this manual.

Both SPRS forms met standard criteria and showed good fit to a Rasch model, thus confirming the excellent reliability (internal consistency) and construct validity of the SPRS-2. For Form A, person separation was 3.36 (reliability 0.92) and item separation was 7.78 (reliability 0.98), with average infit statistics within the criterion range of 0.7 to 1.3 (persons 1.03; items 1.00). A single item (item 6 – family) showed misfit (1.53), which was due to two misfitting persons, thereby lessening the likelihood that the misfit was due to a defect in the item.

Results for Form B showed similar results with good person separation (3.03; reliability 0.90) and item separation (7.25; reliability 0.98), and average infit statistics in the criterion range (persons 1.04; items 1.02). Two Form B items showed serious misfit (item 4 – organising work and leisure, 0.57; item 6 – family, 1.88). For item 4, the misfit was explained by one or two outlying persons, although for item 6 the misfit for persons occurred across the latent variable. We opted to retain the misfitting items in the scale because of their clinical relevance.

The hierarchy of items for each SPRS form (see Figures 4a and 4b) was clinically meaningful, with work, leisure and interpersonal relationships being more difficult than items for everyday activity living skills.

Figure 4a

Form A

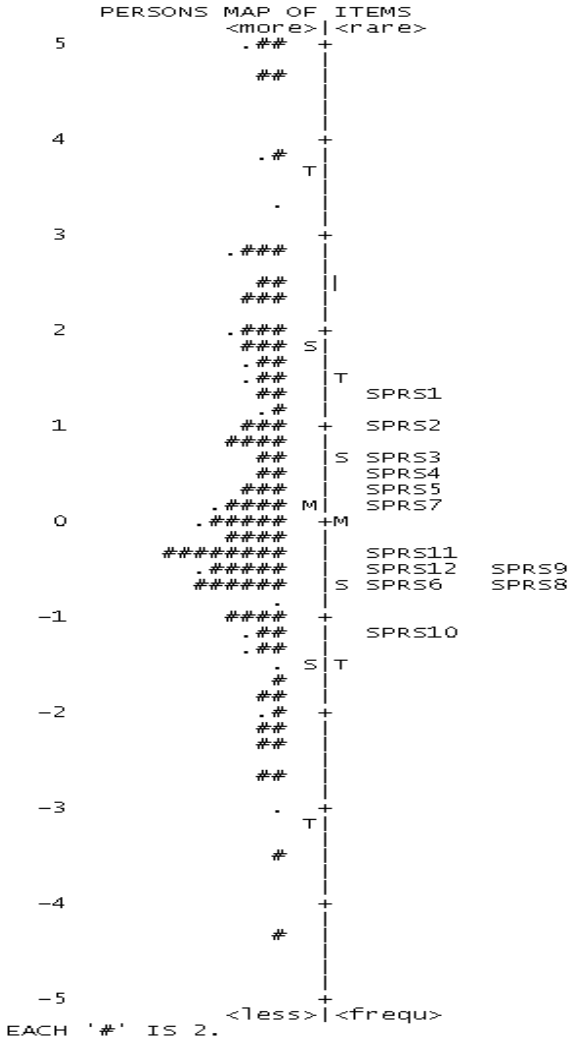
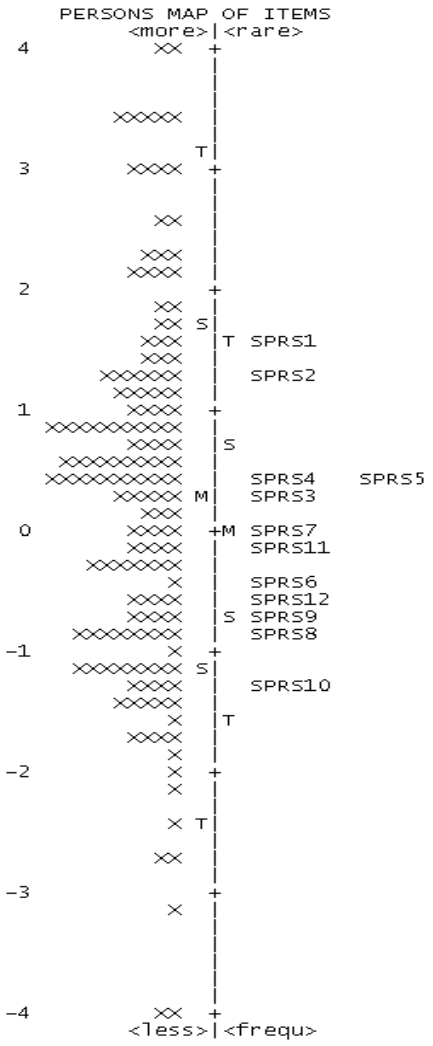



Figure 4b

Form B



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## Appendix A: Psychometric studies of the SPRS by our research team


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## Appendix B: Revised scoring system for the SPRS-2

The revisions for SPRS-2 refer exclusively to the response format, and the items have not changed. The amendments to the scoring system are as follows: the two end response categories ('no change' and 'extreme change') and the middle category ('moderate change') were retained and the intermediate categories were combined: (i) 'very slight change' with 'a little change' and (ii) 'a lot of change' with 'very much change'). A conversion index is available on our website (http://www.rehab.med.usyd.edu.au) as follows:

- original score 6 (no change) = revised score 4
- original score 5 (very slight change) = revised score 3
- original score 4 (a little change) = revised score 3
- original score 3 (moderate change) = revised score 2
- original score 2 (a lot of change) = revised score 1
- original score 1 (very much change) = revised score 1
- original score 0 (extreme change) = revised score 0

The response categories of the revised scale are as follows:

Form A:
4 = no change
3 = a little change
2 = a moderate amount
1 = a lot of change
0 = extreme change

Form B:
4 = very good
3 = a little difficulty
2 = definite difficulty
1 = a lot of difficulty
0 = extremely poor

## Appendix C: Clinical and outcome studies by our research team using the SPRS


1. Harradine P, Winstanley J, Tate RL, Cameron ID, Baguley IJ & Harris RD. (2004). Severe traumatic brain injury in New South Wales: Comparable outcomes for rural and urban residents. *Medical Journal of Australia, 181(3),* 130-134.

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15. Winstanley J, Simpson G, Tate R & Myles B. (2006). Early indicators and contributors to psychological distress in relatives during rehabilitation following severe traumatic brain injury: findings from the Brain Injury Outcomes Study. *Journal of Head Trauma Rehabilitation, 21(6),* 453-466.

## Appendix D: Use of the SPRS by independent research groups


1. Anderson V, Brown S, Newitt H & Hoile H. (2009). Educational, vocational, psychosocial, and quality-of-life outcomes for adult survivors of childhood traumatic brain injury. *The Journal of Head Trauma Rehabilitation, 24(5),* 303-312.

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## Appendix E: Form A ('change since injury') - Clinician version

SYDNEY PSYCHOSOCIAL REINTEGRATION SCALE – 2 (SPRS-2)
FORM A (CLINICIAN)

| | | |
|---|---|---|
| **Name:** | **Sex: f / m** | **ID:** |

| | | |
|---|---|---|
| **Date: / /** | **Date of injury: / /** | **DoB: / /** |

| | | |
|---|---|---|
| **Cause of injury:** | **Duration of coma:** | **Duration of PTA:** |

**BACKGROUND INTERVIEW**

1. What is the person's current occupation?:
2. What are his/her work duties at present?:

3. What was his/her job at the time of the injury?:
4. What were his/her work duties in that job?:

5. How many jobs has he/she had since the injury (not including work trials or voluntary work)?:

6 & 7. What are/were his/her leisure interests, recreation, hobbies, and club membership, at present and at time of injury?:

**6. AT TIME OF INJURY** **7. AT PRESENT**

8 & 9. What is/was his/her weekly program of work, leisure/recreational activities at present and at time of injury?:

**8. AT TIME OF INJURY** **9. AT PRESENT**

10. What was his/her marital status at time of injury?:
11. What is it at present?:
12. Who was in his/her circle of close friends at time of injury?:

13. Who is in his/her circle of close friends at present?:

14. Who did he/she live at time of injury?:

15. Who does he/she live with at present?:

WORK AND LEISURE

**1. Current work: HAVE THE HOURS OF WORK (OR STUDY), OR THE TYPE OF WORK (STUDY) CHANGED BECAUSE OF THE INJURY?**
(If your relative is a student, answer the question in this section in terms of changes in his/her studies)

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or better | **4** |
| ❑ | **A little:** | Now works less hours per week, OR work duties (study) have changed for easier/lighter ones | **3** |
| ❑ | **Moderately:** | Works casually, OR has some help from others in doing some work (study) | **2** |
| ❑ | **A lot:** | Now unemployed, OR in rehabilitation, OR in a supported work program, OR does volunteer work, OR receives remedial assistance in studies | **1** |
| ❑ | **Extreme:** | Is almost unable to or is unable to work (study) at present | **0** |
| ❑ | **Unable to assess**: | Did not work before the injury and still does not work | **N/A** |

**2. Work skills: HAVE THE WORK (STUDY) SKILLS CHANGED BECAUSE OF THE INJURY?**

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or better | **4** |
| ❑ | **A little:** | Not quite as good, e.g. has to put in a lot of effort to get the same result, gets tired easily, loses concentration | **3** |
| ❑ | **Moderately:** | Definitely not as good, e.g. sometimes makes mistakes | **2** |
| ❑ | **A lot:** | Much worse, e.g. he or she is slower | **1** |
| ❑ | **Extreme:** | Very much worse, e.g. makes many mistakes, is very slow, work is of poor quality, needs constant supervision and/or reminders at present | **0** |

**3. Leisure: HAS THERE BEEN ANY CHANGE IN THE NUMBER OR TYPE OF LEISURE ACTIVITIES OR INTERESTS BECAUSE OF THE INJURY?**

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or more, and done as often | **4** |
| ❑ | **A little:** | Has most of the same activities and interests, OR has the same activities and interests but does them less often | **3** |
| ❑ | **Moderately:** | Definitely less, but may have developed new activities and interests | **2** |
| ❑ | **A lot:** | Only has some of the leisure activities and interests and has not developed new ones | **1** |
| ❑ | **Extreme:** | Almost none or no leisure activities or interests at present | **0** |
| ❑ | **Unable to assess:** | Did not have leisure activities before the injury and still does not have leisure activities | **N/A** |

**4. Organising activities: HAS THERE BEEN ANY CHANGE IN THE WAY YOUR RELATIVE ORGANISES WORK AND LEISURE ACTIVITIES BECAUSE OF THE INJURY?**

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or better | **4** |
| ❑ | **A little:** | Needs prompts or supports from others | **3** |
| ❑ | **Moderately:** | More dependent on other people to organise activities, e.g. others suggest what to do and how to go about it | **2** |
| ❑ | **A lot:** | Needs other people to do the organising, e.g. making arrangements, providing transport | **1** |
| ❑ | **Extreme:** | Almost completely or completely dependent on other people to suggest and organise activities at present | **0** |

RELATIONSHIPS

**5. Spouse or partner:** DOES YOUR RELATIVE HAVE A PARTNER OR SPOUSE? DID THEY HAVE ONE AT THE TIME OF THE INJURY?

**a)** IF YES, HAS THE RELATIONSHIP CHANGED BECAUSE OF THE INJURY? **If NO, GO TO part b) below**

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or better | **4** |
| ❑ | **A little:** | Not quite the same, but still able to get along | **3** |
| ❑ | **Moderately:** | Definitely not the same | **2** |
| ❑ | **A lot:** | A lot of changes, but he/she might have the skills to form a new relationship | **1** |
| ❑ | **Extreme:** | Nature of relationship has changed in a major way (e.g., partner takes on most responsibilities or is the primary caregiver) and he/she probably does not have the skills to form a new responsibility | **0** |

**b)** IF NO, HOW MUCH CHANGE IS THERE IN HIS/HER ABILITY TO FORM AND MAINTAIN SUCH A RELATIONSHIP COMPARED TO BEFORE?

| | | | |
|---|---|---|---|
| ❑ | **None at all:** | Same or better | **4** |
| ❑ | **A little:** | Not quite the same | **3** |
| ❑ | **Moderate:** | Definitely not the same | **2** |
| ❑ | **A lot:** | A lot of changes, but he/she might have the skills to form a new relationship | **1** |
| ❑ | **Extreme:** | Probably does not or does not have the skills to form a new relationship | **0** |

**6. Family:** HAVE YOUR RELATIVE'S RELATIONSHIPS WITH OTHER FAMILY MEMBERS CHANGED BECAUSE OF THE INJURY?

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or better | **4** |
| ❑ | **A little:** | Not quite the same | **3** |
| ❑ | **Moderately:** | Definitely not the same | **2** |
| ❑ | **A lot:** | A lot of changes in relationships with some family members | **1** |
| ❑ | **Extreme:** | Changed in a major way OR a breakdown of relationships with some family members due to effects of the injury | **0** |
| ❑ | **Unable to assess**: | Did not have contact with family before the injury | **N/A** |

**7. Friends and other people:** HAVE YOUR RELATIVE'S RELATIONSHIPS WITH OTHER PEOPLE OUTSIDE FAMILY (SUCH AS CLOSE FRIENDS, WORK MATES, NEIGHBOURS) CHANGED BECAUSE OF THE INJURY?

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or better | **4** |
| ❑ | **A little:** | Not quite the same, but still sees some friends weekly or more, makes new friends, and gets along with work mates and neighbours | **3** |
| ❑ | **Moderately:** | Definitely not the same, but still sees some friends once a month or more and can make new friends . | **2** |
| ❑ | **A lot:** | Only sees a few friends (or other people outside family), and does not make new friends easily | **1** |
| ❑ | **Extreme:** | Sees hardly any friends (or no friends at all) or other people outside the family | **0** |

**8. Communication:** HAVE YOUR RELATIVE'S COMMUNICATION SKILLS (THAT IS, TALK WITH OTHER PEOPLE AND UNDERSTAND WHAT OTHERS SAY) CHANGED BECAUSE OF THE INJURY?

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or better | **4** |
| ❑ | **A little:** | Has some changes, e.g., rambles and gets off the point, talk is sometimes inappropriate, has some trouble finding the words to express himself or herself | **3** |
| ❑ | **Moderately:** | Definite changes, e.g., difficulty thinking of things to say, joining in talk with groups of people, only talks about himself or herself | **2** |
| ❑ | **A lot:** | A lot of changes, e.g., having trouble understanding what people say | **1** |
| ❑ | **Extreme:** | Major changes, but can communicate basic needs, OR uses aids for communication OR communication is almost impossible | **0** |

LIVING SKILLS

**9. Social Skills:** HAVE YOUR RELATIVE'S SOCIAL SKILLS AND BEHAVIOUR IN PUBLIC CHANGED BECAUSE OF THE INJURY?

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or better | **4** |
| ❑ | **A little:** | Some changes, e.g. is awkward with other people, does not worry about what other people think or want | **3** |
| ❑ | **Moderately:** | Definite changes, e.g. can act in a silly way, is not as tactful or sensitive to other people's needs | **2** |
| ❑ | **A lot:** | A lot of changes, e.g. is more dependent on other people, is socially withdrawn | **1** |
| ❑ | **Extreme:** | Major changes, e.g. has difficulty interacting appropriately with other people, behaviour is unpredictable, has temper outbursts in public, requires supervision when with other people | **0** |

**10. Personal habits:** HAVE YOUR RELATIVE'S PERSONAL HABITS (E.G. HIS/HER CARE IN CLEANLINESS, DRESSING AND TIDINESS) CHANGED BECAUSE OF THE INJURY?

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or better | **4** |
| ❑ | **A little:** | Does not take as much care as before | **3** |
| ❑ | **Moderately:** | Attends to own hygiene, dress and tidiness, but has definitely changed in this area; needs supervision | **2** |
| ❑ | **A lot:** | Needs prompts, reminders or advice from others, but responds to these; needs stand-by assistance | **1** |
| ❑ | **Extreme:** | Needs prompts, reminders or advice from others, but responds to these only after repeated requests or is unwilling to respond to these; needs hand-on assistance; is totally dependent for assistance | **0** |

**11. Community travel:** HAS YOUR RELATIVE'S USE OF TRANSPORT AND TRAVEL AROUND THE COMMUNITY CHANGED DUE TO THE INJURY?

***NOTE:*** *Do not include the driver of transport, or other passengers using such transport, in rating whether a person can travel "alone" or "by himself/herself".*

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or better | **4** |
| ❑ | **A little:** | Unable to use some forms of transport (e.g. driving a car) but can still get around in the community by using other forms of transport without help | **3** |
| ❑ | **Moderately:** | Definite changes in use of transport, but after training can travel around the community on his/her own | **2** |
| ❑ | **A lot:** | Needs assistance to plan use of transport, but with such help can travel around the community on his/her own | **1** |
| ❑ | **Extreme:** | Very restricted in use of transport, but with supervision can make short, familiar journeys around the community on his/her own (e.g. going out to the local shop) OR is unable to go out into the community alone | **0** |

**12. Accommodation:** HAS YOUR RELATIVE'S LIVING SITUATION CHANGED DUE TO THE INJURY?

| | | | |
|---|---|---|---|
| ❑ | **Not at all:** | Same or better | **4** |
| ❑ | **A little:** | Lives in the community, but with emotional or social supports provided by other people, such as family, friends or neighbours. Could not be left alone without supports for a two-week period | **3** |
| ❑ | **Moderately:** | Definite changes and could not be left alone for a weekend unless someone was available to check everything was OK | **2** |
| ❑ | **A lot:** | Lives in the community but in supported accommodation, such as a group home, boarding house, transitional living unit, in family home but requires daily supervision or assistance | **1** |
| ❑ | **Extreme:** | Almost unable to live in the community, even with daily supervision or assistance OR needs care, which may be at home requiring extensive, daily supervision or other care, OR in an institution, such as a nursing home, residential service, rehabilitation unit | **0** |

## Appendix F: Form B ('current status') - Informant/Clinician version

SYDNEY PSYCHOSOCIAL REINTEGRATION SCALE – 2 (SPRS-2)
FORM B (CLINICIAN/RELATIVE)

| | | |
|---|---|---|
| **Name:** | **Sex: f / m** | **ID:** |
| **Date: / /** | **Date of injury: / /** | **DoB: / /** |
| **Cause of injury:** | **Duration of coma:** | **Duration of PTA:** |

**BACKGROUND INTERVIEW**

1. What is the person's current occupation?:
2. What are his/her work duties at present?:

3. What was his/her job at the time of the injury?:
4. What were his/her work duties in that job?:

5. How many jobs has he/she had since the injury (not including work trials or voluntary work)?:

6 & 7. What are/were his/her leisure interests, recreation, hobbies, and club membership, at present and at time of injury?:

**6. AT TIME OF INJURY** **7. AT PRESENT**

8 & 9. What is/was his/her weekly program of work, leisure/recreational activities at present and at time of injury?:

**8. AT TIME OF INJURY** **9. AT PRESENT**

10. What was his/her marital status at time of injury?:
11. What is it at present?:
12. Who was in his/her circle of close friends at time of injury?:

13. Who is in his/her circle of close friends at present?:

14. Who did he/she live at time of injury?:

15. Who does he/she live with at present?:

WORK AND LEISURE

**1. Current work: How do you rate work (or study), or the type of work (study)?**

(If a student, answer the question in this section in terms of changes in studies)

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | | **4** |
| ❑ | **A little difficulty:** | Works (studies) less than average hours per week, OR works (studies) are easy/light ones | **3** |
| ❑ | **Definite difficulty:** | Works casually, OR has some help from others in doing some work (study) | **2** |
| ❑ | **A lot of difficulty:** | Unemployed, OR in rehabilitation, OR in a supported work program, OR do volunteer work, OR receives remedial assistance in studies | **1** |
| ❑ | **Extremely poor:** | Unable to work (study) at present | **0** |

**2. Work skills: How do you rate work (study) skills?**

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | | **4** |
| ❑ | **A little difficulty:** | Not quite as good, e.g. has to put in a lot of effort to get the same result, gets tired easily, loses concentration | **3** |
| ❑ | **Definite difficulty:** | For example, sometimes makes mistakes | **2** |
| ❑ | **A lot of difficulty:** | For example, he or she is slow, work is of poor quality | **1** |
| ❑ | **Extremely poor:** | For example, needs constant supervision and/or reminders | **0** |

**3. Leisure: How do you rate the number or type of leisure activities or interests?**

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | | **4** |
| ❑ | **A little difficulty:** | Has most of the same activities and interests but does not do them often | **3** |
| ❑ | **Definite difficulty:** | Definite difficulties in developing and doing leisure activities and interests | **2** |
| ❑ | **A lot of difficulty:** | A lot of difficulty developing and doing leisure activities and interests | **1** |
| ❑ | **Extremely poor:** | Does not have any leisure activities or interests at present | **0** |

**4. Organising activities: How do you rate the way he/she organises work and leisure activities?**

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | | **4** |
| ❑ | **A little difficulty:** | For example, needs prompt or supports from others | **3** |
| ❑ | **Definite difficulty:** | Fairly dependent on other people to organise activities, e.g. others suggest what to do and how to go about it | **2** |
| ❑ | **A lot of difficulty:** | Needs other people to do the organising, e.g. making arrangements, providing transport | **1** |
| ❑ | **Extremely poor:** | Almost completely or completely dependent on other people to suggest and organise activities at present | **0** |

RELATIONSHIPS

**5. Spouse or partner:** DOES HE/SHE HAVE A PARTNER OR SPOUSE?

**a)** IF YES, HOW DO YOU RATE THE RELATIONSHIP?

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | ..... | **4** |
| ❑ | **A little difficulty:** | Not good, but still able to get along together, and if it broke down has the skills to form new relationship ..... | **3** |
| ❑ | **Definite difficulty:** | Definitely difficulties, but has the skills to form and also probably maintain a new relationship ..... | **2** |
| ❑ | **A lot of difficulty:** | Might have the skills to form a new relationship..... | **1** |
| ❑ | **Extremely poor:** | Relationship is extremely limited (e.g., partner is the primary caretaker) and does not have the skills to form a new responsibility..... | **0** |

**b)** IF NO, HOW DO YOU RATE THE ABILITY TO FORM AND MAINTAIN SUCH A RELATIONSHIP?

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | ..... | **4** |
| ❑ | **A little difficulty:** | Has the skills to form and maintain a new relationship..... | **3** |
| ❑ | **Definite difficulty:** | Has the skills to form and also probably maintain a new relationship..... | **2** |
| ❑ | **A lot of difficulty:** | Might have the skills to form a new relationship..... | **1** |
| ❑ | **Extremely poor:** | Does not have the skills to form a new relationship..... | **0** |

**6. Family:** HOW DO YOU RATE THE RELATIONSHIPS WITH OTHER FAMILY MEMBERS?

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | ..... | **4** |
| ❑ | **A little difficulty:** | Not good, but still able to get along..... | **3** |
| ❑ | **Definite difficulty:** | Definite difficulties, but still sees the family..... | **2** |
| ❑ | **A lot of difficulty:** | A lot of difficulties getting along with some family members ..... | **1** |
| ❑ | **Extremely poor:** | Relationships is extremely limited and there has been breakdown ..... | **0** |

**7. Friends and other people:** HOW DO YOU RATE THE RELATIONSHIPS WITH OTHER PEOPLE OUTSIDE FAMILY (SUCH AS CLOSE FRIENDS, WORK MATES, NEIGHBOURS)?

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | ..... | **4** |
| ❑ | **A little difficulty:** | Not good, but has close friends, makes new friends, and gets along with work mates and neighbours..... | **3** |
| ❑ | **Definite difficulty:** | Definitely not the same, but still sees some friends once a month or more and can make new friends ..... | **2** |
| ❑ | **A lot of difficulty:** | Only sees a few friends (or other people outside family), and does not make new friends easily..... | **1** |
| ❑ | **Extremely poor:** | Does not see any friends (or other people outside the family) ..... | **0** |

**8. Communication:** HOW DO YOU RATE THE COMMUNICATION SKILLS (THAT IS, TALK WITH OTHER PEOPLE AND UNDERSTAND WHAT OTHERS SAY)?

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | ..... | **4** |
| ❑ | **A little difficulty:** | For example, rambles and get off the point, talk is sometimes inappropriate, has some trouble finding the words to express himself/herself ..... | **3** |
| ❑ | **Definite difficulty:** | For example, difficulty thinking of things to say, joining in talk with groups of people, only talks about himself/herself ..... | **2** |
| ❑ | **A lot of difficulty:** | For example, has trouble understanding what people say..... | **1** |
| ❑ | **Extremely poor:** | Communication is almost impossible ..... | **0** |

LIVING SKILLS

**9. Social Skills:** HOW DO YOU RATE YOUR RELATIVE'S SOCIAL SKILLS AND BEHAVIOUR IN PUBLIC?

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | ..... | **4** |
| ❑ | **A little difficulty:** | For example, is awkward with other people, does not worry about what other people think or want..... | **3** |
| ❑ | **Definite difficulty:** | For example, can act in a silly way, is not as tactful or sensitive to other people's needs ..... | **2** |
| ❑ | **A lot of difficulty:** | For example, is dependent on other people, is socially withdrawn, has difficulty interacting appropriately with other people..... | **1** |
| ❑ | **Extremely poor:** | For example, had temper outbursts in public, requires supervision when with other people..... | **0** |

**10. Personal habits:** HOW DO YOU RATE THE PERSONAL HABITS (E.G. HIS/HER CARE IN CLEANLINESS, DRESSING AND TIDINESS) ?

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | ..... | **4** |
| ❑ | **A little difficulty:** | For example, does not take as much care ..... | **3** |
| ❑ | **Definite difficulty:** | Attends to own hygiene, dress and tidiness, but has definite difficulties in this area; needs supervision..... | **2** |
| ❑ | **A lot of difficulty:** | Needs prompts, reminders or advice from others, but responds to these; needs stand-by assistance..... | **1** |
| ❑ | **Extremely poor:** | Needs prompts, reminders or advice from others, but is unwilling to respond to these; needs hand-on assistance ..... | **0** |

**11. Community travel:** HOW DO YOU RATE THE USE OF TRANSPORT AND TRAVEL AROUND THE COMMUNITY?

***NOTE:*** *Do not include the driver of transport, or other passengers using such transport, in rating whether a person can travel "on his/her own".*

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | ..... | **4** |
| ❑ | **A little difficulty:** | Unable to use some forms of transport (e.g. driving a car) but can still get around in the community by using other forms of transport without help ..... | **3** |
| ❑ | **Definite difficulty:** | Definite difficulty using of transport, but after training can travel around the community on his/her own..... | **2** |
| ❑ | **A lot of difficulty:** | Needs assistance to plan use of transport, but with such help can travel around the community on his/her own..... | **1** |
| ❑ | **Extremely poor:** | Is unable to go out into the community on his/her own ..... | **0** |

**12. Accommodation:** HOW DO YOU RATE THE LIVING SITUATION?

| | | | |
|---|---|---|---|
| ❑ | **Very good:** | ..... | **4** |
| ❑ | **A little difficulty:** | Lives in the community, but with emotional or social supports provided by other people, such as family, friends or neighbours.<br>Could not be left alone without supports for a two-week period ..... | **3** |
| ❑ | **Definite difficulty:** | Lives in the community, but could not be left alone for a weekend unless someone checked that everything was OK..... | **2** |
| ❑ | **A lot of difficulty:** | Lives in the community but in supported accommodation, such as a group home, boarding house, transitional living unit, in family home but requires daily supervision or assistance..... | **1** |
| ❑ | **Extremely poor:** | Needs care, which may be at home requiring extensive, daily supervision or other care OR in a facility, e.g. a nursing home, residential service, rehabilitation unit..... | **0** |