Chapter Five

Gathering and analysing the data

5.1 INTRODUCTION

This chapter reports on the process of gathering and organising the data. Thereafter, the procedures used for analysing the data are described, and the results of the analyses are presented. These results include descriptive statistics (see 4.3.1), correlation coefficients (see 4.3.2), factor analysis (see 4.3.3), and comparisons of means via t-tests (see 4.3.4). Essentially, all of the tests were carried out to assess either the reliability or the validity of the SOC Scale; for example Cronbach's alpha (described in 4.3.2) is pertinent to reliability, while factor analysis (see 4.3.3) helps in assessing construct validity.

The wording of an individual SOC Scale item is presented in the text of this chapter whenever that item is being discussed in detail. When several items are mentioned together as a general observation, the wording of each item in the list is not given. In such cases, Appendix A, which presents the entire SOC Scale, may be referred to in order to view the content of the items in question.

5.2 DATA GATHERING AND ORGANISING

5.2.1 The sample

Two sample groups were used in this study, namely people with physical disabilities and undergraduate psychology students. To obtain the sample of people with disabilities, a number of institutions in the greater Johannesburg area were approached and written permission was obtained from four of these. One

was a college offering workplace training for disabled people and the rest were residential homes accommodating eight to thirty disabled residents each. These homes were run either on a self-help basis by the residents themselves, or along traditional institutional lines administered by staff members. All residential participants in this research were severely disabled and required full-time nursing care. In contrast, most of the disabled college students were self-sufficient in terms of personal care.

To obtain the undergraduate sample, the lecturer and relevant authorities from a local university were approached to request student participation during class time. Once permission was obtained, a date was arranged for the researcher to introduce the research and request participants at the end of a normal lecture period. Section 4.2.3 (Chapter 4) provides further detail on the sample groups.

5.2.2 Gathering the data

The researcher visited the college for disabled people on a day in late 2004, and introduced the research to the students and asked for participants. Questionnaires were handed out to groups of about fifteen students at a time and the researcher remained present while students filled them out. All students were able to complete their own questionnaires without physical assistance. Completed questionnaires were placed into a sealed box which remained with the researcher.

The researcher visited the largest residential home several times in late 2004 and early 2005, and met with between three and five residents on each visit. The questionnaire was verbally administered to participants individually in the privacy of their own rooms. Most participants were unable to write and the researcher did so on their behalf, although a few asked a friend or family member to record their answers instead.

The third and final subgroup of disabled participants was accessed via self-help residential centres. The researcher made several visits to these homes in late 2004 and early 2005 (two visits per site). On the initial visit the blank questionnaires

were delivered and the researcher met with the residents to explain the research. A sealed collection box was left at each home. She then visited the home again later to collect the box. Most residents were able to complete the questionnaires themselves using assistive writing devices, but some did ask an assistant or friend to help.

For the undergraduate sample, the researcher visited the university during a psychology lecture by prior arrangement. Questionnaires were handed out to all students present on the day, and the research topic was introduced. The researcher remained present while students completed the questionnaires, and a sealed collection box was placed at the front of the classroom. Only one student was unable to complete the questionnaire herself due to disability, and this student's responses were recorded by a classmate.

5.2.3 Data input and missing values

Completed questionnaires were data-captured in Microsoft Excel[1]. The data were accessed and manipulated using SAS (Version 9.1) and Enterprise Guide® (Version 2)[2]. Every sixth or seventh questionnaire (a total of 25 respondents) was re-captured to check the quality of the data capture, and only one very minor discrepancy was found. On the basis of this, a second data capture was not undertaken.

For the SOC Scale, where a participant had omitted fewer than 5% of the 45 items (namely one or two items), that person's average item score was inserted for the missing value/s. Responses from eleven disabled and three undergraduate participants were modified in this manner. SOC Scale questionnaires with more than two omitted items were excluded from data analysis. Most omitted items were omitted once (i.e. by one participant only). Five items (items 5, 8, 19, 20 and 29) were left out by two different participants in the composite group. Items 37 and 39 (the researcher's additions) were also each omitted twice.

[1] Excel is a registered trademark of the Microsoft corporation

[2] SAS and Enterprise Guide are registered trademarks of the SAS Institute

For the PSS, one disabled participant had a missing item and that person's average item score was inserted for the missing value. The questionnaires of another disabled participant and three undergraduate participants were excluded from the PSS analysis due to their having omitted four or more items.

Participants who completed one of the questionnaires but not the other one were included in the data analysis for the relevant completed questionnaire, but were excluded from the analysis of SOC/PSS correlation. A total of 169 SOC Scale questionnaires were captured, 103 from disabled participants and 66 from undergraduates. A total of 167 PSS questionnaires were captured, 102 from disabled participants and 65 from undergraduates.

5.2.4 Data analysis

Each participant's total scores for the SOC Scale-29, the SOC Scale-45 (the researcher's expanded version) and the PSS were calculated, as well as component scores for the three SOC subscales. Summary statistics were calculated and analyses performed for each subgroup of the disabled sample, prior to merging these groups for final data analysis. Descriptive statistics (means, medians, modes and standard deviations) were calculated for the SOC Scale and PSS, as were Cronbach's alphas. T-tests, ANOVA, and factor analyses were conducted for the SOC Scale, as described below.

5.3 DESCRIPTIVE STATISTICS AND T-TESTS: SOC SCALE AND PSS

5.3.1 Sense of Coherence Scale (29-item original scale)

Some differences were observed in the mean scores and standard deviations (SDs) for the subgroups of the disabled sample. The college students (n = 67) obtained the lowest mean at 132.18 (SD 17.64), while the self-help centre residents (n = 17) had the highest mean at 142.29 (SD 28.32). The remaining residential participants (n = 19) obtained a mean of 134.53 (SD 31.88). The mean of the

combined residential sample (self-help plus traditional setting; n = 36) was 138.19, with an SD of 30.08.

For the three disabled subgroups (n = 103), Levene's test found a significant difference between subgroup variances in mean SOC scores ($F_{2,100} = 5.43$, $p = 0.0058$). Non-parametric[3] analysis of variance found no significant difference in mean SOC score (chi-square = 4.597; df = 2; $p > 0.1004$). When the undergraduate group was included, Levene's test found a difference in subgroup variance ($F_{3,165} = 5.10$; $p = 0.0021$), but non-parametric ANOVA again found no significant difference in mean SOC score (chi-square = 5.9787; df = 3; $p > 0.11$).

The range of SOC score for the entire disabled group was 59 to 186, with the ranges of the subgroups being as follows: college setting, 102 to 168; self-help centres, 59 to173; traditional residential setting, 69 to 186. The residential sample thus set the minimum and maximum points of the range of 59 to 186 for the entire disabled group.

Descriptive statistics (mean, median, SD, range) of all participants' total SOC Scale scores are given in Table 5.1.

Table 5.1: Measures of central tendency and variance for SOC Scale-29 (all participants)

Sample	**Mean**	**Median**	**SD**	**Range** **(min-max)**
Total disabled sample (n=103)	134.28	133	22.81	59-186
Undergraduate students (n=66)	130.23	131.5	17.88	80-167
All participants (n=169)	132.18	131	21.03	53-186

[3] Non-parametric procedures are less affected by the shape of a population distribution, and require fewer assumptions about the data to be made (McCall, 1990; Rosenthal & Rosnow, 1991).

One disabled participant had a total SOC score of 37, which was substantially lower than the others and outside of the usual range (Antonovsky, 1987, 1993). This person specifically requested counselling, and it appeared from her presentation that she may have been suffering from a severe depression. For this reason her score was excluded from the above analysis. However, to examine the effect of her score on the results, a second data set was analysed. Including her score reduced the self-help centre mean from 142.29 points to 136.44, and altered the SD from 28.32 to 37.03.

For the disabled group, inclusion of the depressed participant's score altered the results to the following: mean SOC score 133.35; SD 24.62; range 37 to 186. Thus, although the means were altered substantially according to whether or not her score was included, the general patterns remained unchanged. Most importantly, Cronbach's α was not dramatically altered (see 5.4.1). This participant's score was excluded in all further analyses.

It was noted that while the two lowest SOC scores were contributed by participants in self-help settings, the highest score came from the traditional residential setting. The second highest score was obtained by two disabled participants, one in a self-help setting and the other in traditional residential care.

A t-test was conducted to examine whether the mean SOC scores for the disabled group and the undergraduate group were significantly different. The test of equality of variance indicated a significant difference in the groups' variance ($F_{102, 65} = 1.63$, $p = 0.0355$). The t-test for groups with unequal variance (see 4.3.4) was then used, and indicated no significant difference between the groups' mean SOC scores ($t_{160} = 1.02$, $p = 0.3091$).

5.3.2 Perceived Stress Scale

As with the SOC Scale, for the PSS differences were again observed in the mean scores and SDs for the subgroups of the disabled sample. The college students (n = 67) obtained the highest mean at 24.69 (SD 6.48), while the self-help centre

residents (n = 16) had the lowest mean at 21.31 (SD 8.35). The remaining residential participants (n = 19) obtained a mean of 22.79 (SD 10.18). The mean of the combined residential sample (self-help plus traditional setting; n = 35) was 22.11, with an SD of 9.28.

The range of PSS score for the entire disabled group was 7 to 48, with the ranges of the subgroups being as follows: college setting, 8 to 41; self-help centres, 7 to 35; traditional residential setting, 8 to 48. The residential sample thus set the minimum and maximum points of the range of 7 to 48 for the disabled group. Descriptive statistics (mean, median, SD, and range) of all participants' PSS scores are given in Table 5.2.

Table 5.2: Measures of central tendency and variance for PSS (all participants)

Sample	**Mean**	**Median**	**SD**	**Range** **(min-max)**
Total disabled sample (n=102)	23.80	24.5	7.62	7-48
Undergraduate students (n=65)	26.49	26	7.49	10-43
All participants (n=167)	24.85	25	7.66	7-48

A t-test was conducted to examine whether the mean PSS scores for the disabled group and the undergraduate group were significantly different. The test of equality of variance was not significant ($F_{101, 64} = 1.03$, $p = 0.8977$). The standard t-test was then used and indicated a significant difference in mean PSS score for the two groups ($t_{165} = -2.24$, $p < 0.0265$). The undergraduate group had a higher mean PSS score, which indicated that participants in this group generally perceived a higher level of stress in their lives than did the disabled sample, at the time of the research.

5.4 RELIABILITY INDICES FOR THE SOC SCALE AND PSS

Cronbach's α for the SOC Scale and the PSS are given in this section. All alpha scores presented below or elsewhere in this thesis refer to the standardised scores.

5.4.1 The SOC Scale

Cronbach's α for the disabled college group was noticeably lower than the alpha scores of the other disabled subgroups as well as the university group. This raises questions about the usefulness of the SOC Scale with the disabled college group. However, this score (0.65, rounded) does just meet the criterion for acceptability in a research context (see 4.3.2). All other subgroup alphas were highly acceptable. Cronbach's alphas for the various subgroups as well as the composite sample are given in Table 5.3 below.

Table 5.3 Cronbach's alpha scores for SOC Scale-29

Disabled college students (A) (n = 67)	**Residential disabled (B) (n = 36)**	**Total disabled (A +B) (n = 103)**	**Undergraduates (n = 66)**	**Composite sample (n = 169)**
0.647173	0.909786	0.805638	0.807406	0.805374

Possible reasons for the college sample's low α score include the facts that English was not the group's first language, and that the participants in this group were from socio-economically disadvantaged backgrounds. Hence, their level of education may have been lower than that of participants in the other groups, and they also may not have been familiar with self-report instruments such as the SOC Scale. Chapter 6 (especially 6.3.4) discusses these points in more detail.

Including the score of the presumably depressed participant (see 5.3.1) increased Cronbach's α for the self-help centres from 0.914693 to 0.951784. The alpha score for the entire disabled group was increased from 0.805638 to 0.834189 when her score was included.

5.4.2 The Perceived Stress Scale

For the PSS, Cronbach's α for the college students again differed noticeably from the alpha scores of the other disabled subgroups. The results were as follows: college setting 0.513142; self-help centres 0.856349; traditional residential setting: 0.794815. The α score for the combined residential sample (self-help plus traditional setting) was 0.806406. For the total disabled sample (n = 102), Cronbach's α was 0.671116.

The undergraduate sample (n = 65) achieved an α of 0.804723. The alpha score for the PSS for the composite sample (n = 167, comprising people with disabilities plus undergraduates) was 0.723694. All of these alpha scores were acceptable, although the score for the disabled sample was on the low side due to the effect of the college group's result.

5.5 ANALYSIS OF SOC SCORES BY DEMOGRAPHIC CATEGORIES

5.5.1 Gender and language

To check whether there were any significant differences between mean SOC scores for groups representing gender (male and female) and language (English as a first or second language), further t-tests were carried out. No significant differences were found for either the disabled or undergraduate samples in terms of gender. Language was analysed for the undergraduate group only, since the relevant information was not available for the disabled group. The results are presented in Table 5.4.

Table 5.4: t-Tests for SOC scores analysed by gender and language (all participants)

Independent variable	**Equality of variance test**	**t-test**
Disabled sample: gender (n females = 42; n males = 61)	Not significant $F_{41,60} = 1.11$ p = 0.6991	Not significant $t_{101} = 0.50$ p = 0.6176
Undergraduate sample: gender (n females = 49; n males = 17)	Not significant $F_{48,16} = 1.44$ p = 0.3271	Not significant $t_{64} = 1.48$ p = 0.1450
Composite sample: gender (n females = 91; n males = 78)	Not significant $F_{90,77} = 1.25$ p = 0.3025	Not significant $t_{167} = 0.88$ p = 0.3828
Undergraduate sample: language (English first language n = 31; English non-first language n = 35)	Not significant $F_{30,34} = 1.26$ p = 0.5078	Not significant $t_{64} = -0.44$ p = 0.6618

5.5.2 Disability

During data gathering and sorting, eight umbrella categories of primary disability emerged from participants' responses. These were: acquired disability and/or chronic illness (n = 28); congenital disability (n = 11); head injury[4] (n = 5); limb amputation or injury (n = 10); spinal cord injury with some degree of independence, such as paraplegia (n = 15); spinal cord with no independence, such as quadriplegia (n = 18); speech, hearing and visual impairments (n = 7); and "other" (n = 8).

One-way ANOVA was performed for the entire disabled sample (n = 102) to test for possible effects of disability on SOC score. Levene's test found no significant differences in the groups' variances ($F_{7,94} = 0.65$, p = 0.7130), and standard ANOVA found no significant differences in mean SOC scores ($F_{7,94} = 1.64$, p = 0.1336). Mean SOC scores were as follows: acquired disability 128.32 (SD

[4] Comprising: head injury (n=1), hemiplegia (n=2), brain surgery (n=1), stroke (n=1)

22.49); congenital disability 135.27 (SD 17.37); head injury 134.20 (SD 12.54); limb amputation or injury 126 (SD 21.22); spinal cord injury with independence 135.2 (SD 16.22); spinal cord with no independence 148.94 (SD 29.11); speech, hearing and visual impairment 136.43 (SD 20.21); and "other" 130.50 (SD 26.44).

5.5.3 Age

Differences in SOC means between the age groups were analysed using one-way ANOVA. For the entire disabled sample (n = 102) age was measured in three ranges: eighteen to thirty, 31 to fifty, and 51 to seventy years. Levene's test found a significant difference between age group variances ($F_{2,99} = 3.82$, $p = 0.0253$). Non-parametric ANOVA found no significant difference in mean SOC scores (chi-square = 0.5457; df = 2; $p > 0.7612$). The undergraduate sample (n = 66) also showed no significant effects of age ($F_{1,64} = 0.32$, $p = 0.5723$; Levene's test $F_{1,64} = 0.03$, $p = 0.8619$). Most students (n = 53) were aged between eighteen and 21; only thirteen students were 22 years or older.

The undergraduate and disabled groups had means and SDs that were fairly similar and were also similar to other reported SOC statistics, so it was decided to merge the two groups together for a final ANOVA regarding the effect of age. The merged group (n = 168) comprised 113 participants aged eighteen to thirty years; 46 participants of 31 to fifty years; and nine of 51 to seventy years. Levene's test found significant differences in the subgroup variances ($F_{2,165} = 5.39$, $p = 0.0054$), but non-parametric ANOVA found no significant difference in mean SOC score across the age groups (chi-square = 1.6348; df = 2; $p > 0.4416$).

5.6 SUBSCALE SCORES OF THE SOC SCALE

Section 4.3.3 (Chapter 4) provides some theoretical background on the three subscales and the process of selecting possible new or modified items for the SOC Scale. This section reports on the empirical results obtained when investigating the (unmodified) subscales.

5.6.1 Summary statistics

The component (subscale) scores of each participant were obtained by summing the relevant item scores. It should be noted that the three subscale scores are not directly comparable with each other, due to the unequal number of items in each subscale. The scores were then summarised into group means as follows: comprehensibility 44.34 (SD 10.2); manageability 47.89 (SD 8.67); and meaningfulness 40.50 (SD 8.61). The means were then summed to obtain a hypothetical group average for total SOC score, namely 132.28—similar to the actual obtained mean of 132.18. Average item scores were calculated for each subscale, as follows: comprehensibility 4.03 (SD 0.93); manageability 4.79 (SD 0.87); and meaningfulness 5.06 (SD 1.08). None of these results indicated any unexpected or unusual patterns regarding the subscale scores.

5.6.2 Correlations between the subscales

Section 4.3.2 indicates that, ideally, for each pair of subscales measuring different dimensions of the same construct, a Pearson's correlation coefficient (r) of about 0.30 to 0.50 should be obtained. Pearson's r was calculated for every pair of subscales, for the composite sample and for each subgroup. The results are presented in Table 5.5.

Table 5.5: Correlations (Pearson's r) between subscales

Sample group	**meaning/manag**	**meaning/compre**	**manag/compre**
Disabled college (A)	0.66 (p<0.0001)	-0.08 (p=0.54)	0.03 (p=0.81)
Residential disabled (B)	0.72 (p<0.0001)	0.36 (p=0.03)	0.68 (p<0.0001)
Entire disabled (A + B)	0.68 (p<0.0001)	0.14 (p=0.16)	0.37 (p<0.0001)
Undergraduates	0.49 (p<0.0001)	0.40 (p=0.0009)	0.31 (p=0.013)
Composite sample	**0.63 (p<0.0001)**	**0.21 (p=0.0064)**	**0.34 (p<0.0001)**

The correlation between the **meaningfulness and manageability** subscales was high all for subgroups except the undergraduates, and it was also high for the composite sample. In general it appeared that the correlation was too strong,

which would suggest some conflation between the constructs of meaningfulness and manageability.

The **meaningfulness and comprehensibility** subscales had a more modest correlation except in the case of the disabled college group, where there was actually an inverse relationship between the scales, such that a person scoring high on the meaningfulness subscale could be expected to score poorly on the comprehensibility subscale. This pattern was not expected according to SOC theory, since component strengths are assumed to co-vary such that one would consistently score either strongly or poorly on all subscales (Antonovsky, 1987; see 4.4.3). The disabled college results skewed the overall results to the extent that while the composite group did demonstrate a positive relationship between the meaningfulness and comprehensibility subscales, the relationship between these subscales appeared extremely weak.

The **manageability and comprehensibility** subscales presented a similar picture, where the disabled college group's data did not show any significant relationship between the subscales. In contrast, the relationship for the residential sample was extremely high. These two results cancelled each other out, which meant that the correlation for the entire disabled sample as well as for the undergraduates appeared moderate. The correlation for the undergraduate group was also moderate. Thus, the composite sample demonstrated a moderate degree of intercorrelation between the manageability and comprehensibility subscales.

Per group, the undergraduate sample showed a pattern of all subscales being ideally correlated, while the subscales tended to correlate too highly for the residential disabled group and too poorly for the disabled college group. For the entire disabled sample, the meaningfulness/manageability relationship was generally far stronger than the theory would suggest, while the meaningfulness/ comprehensibility relationship was weaker than expected.

5.6.3 Reliabilities of the subscales

To test the reliabilities of the subscales of the SOC Scale (meaningfulness, manageability and comprehensibility), Cronbach's α was calculated excluding each component in turn. The procedure was repeated for each sample subgroup. The results once again indicated a problem with the college subgroup. The comprehensibility subscale, in particular, was problematic for use with the disabled college students, since the overall SOC Scale α for this group increased from 0.65 to 0.73 when the entire comprehensibility subscale was excluded. (For the same group, excluding the meaningfulness subscale resulted in an α of 0.497999, while excluding the manageability subscale resulted in an α of 0.476973). For all other subgroups, excluding each subscale in turn did not substantially alter α.

Intrascale reliabilities were then calculated for each subscale, per subgroup. The subscale reliabilities for the disabled college sample were all unacceptably low (0.59 or below), while subscale α's for the undergraduate group were also on the low side but only that of manageability was unacceptably so. All three subscale alphas for the residential disabled group were highly acceptable.

For the composite sample, the meaninfulness and comprehensibility subscale alphas were acceptable, but the manageability subscale's α score was on the low side. The results of all the reliability tests for the original SOC Scale are presented in Table 5.6.

Table 5.6: Cronbach's α (standardised) for the sample groups; SOC Scale-29

Group α	Disabled college students (A) (n = 67)	Residential disabled (B) (n = 36)	Total disabled (A +B) (n = 103)	University students (n = 66)	Composite sample (n = 169)
Total SOC score	0.647173	0.909786	0.805638	0.807406	0.805374
Meaningfulness subscale α	0.591339	0.852638	0.709559	0.729603	0.712884
Manageability subscale α	0.509583	0.761690	0.626124	0.597633	0.616076
Comprehensibility subscale α	0.502187	0.851558	0.693994	0.681578	0.699999

5.7 PERFORMANCES OF ITEMS OF THE SOC SCALE

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5.7.1 Descriptive statistics

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Descriptive statistics were calculated for each item of the SOC Scale-29 (composite sample) and no unusual or problematic patterns emerged. Item means ranged from 3.05 (item 10) to 5.76 (item 22), and the range for all items was 1 to 7. Table 5.7 presents the mean and standard deviation of each item (Note: a full listing of the wording of individual SOC Scale items is presented in Appendix A).

Table 5.7: Summary statistics for individual items of the SOC Scale-29 (composite group).

Item	Mean	SD	Item	Mean	SD	Item	Mean	SD	Item	Mean	SD
1	4.81	1.74	**9**	4.49	1.89	**17**	3.90	1.93	**25**	3.93	1.73
2	4.82	1.95	**10**	3.05	1.90	**18**	5.17	1.88	**26**	4.00	1.76
3	4.43	1.78	**11**	5.39	1.74	**19**	3.98	1.92	**27**	5.43	1.61
4	4.66	2.19	**12**	4.63	1.81	**20**	5.00	1.96	**28**	4.48	1.82
5	3.93	2.06	**13**	5.72	1.65	**21**	3.76	1.95	**29**	4.55	1.84
6	3.56	1.78	**14**	5.00	2.14	**22**	5.76	1.53			
7	4.94	2.10	**15**	3.92	1.65	**23**	5.23	2.04			
8	5.23	1.74	**16**	5.05	1.67	**24**	3.94	1.89			

5.7.2 Impact on reliability of existing items

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To assess the individual performances of items of the SOC Scale-29, Cronbach's alpha was determined on removal of each item. For the composite sample, two items (items 10, 2) detracted from the scale's reliability, while a third (item 26) contributed very little variance.

To examine which items were problematic for each subgroup, separate item analyses were performed. Items which reduced α for the disabled college group were items 10, 15, 25, 17, 21, 6 and 19 (ranked from most negative impact on reliability to least). Item 10 detracted from the α of the residential disabled group, while items 7, 16, 18, 21 and 26 contributed very poorly. Items which detracted from α for the entire disabled sample were 10 and 21. For the undergraduate group, items 2, 26, 5, 3, 27, and 23 were problematic (ranked from most negative impact to least).

5.8 FACTOR ANALYSIS OF THE SOC SCALE

5.8.1 Sample size and subgroups

The two samples, disabled and undergraduate, were pooled in order to obtain a sample sufficiently large (n = 169) to factor analyse the 29 items of the SOC Scale (see 4.3.3). Although Cronbach's α for the disabled college sample was considerably lower than alphas of the other groups, it was nonetheless acceptable (see 4.3.2 and Table 5.2). Also, when this group's results were combined with those of the other disabled subgroups, the resulting α was 0.81, which was almost identical to the undergraduate group's alpha. Means and SDs of the two samples (disabled and undergraduate) were also very similar, which provided further justification for treating the combined sample as a homogeneous group for the purpose of factor analysis.

To check the soundness of the above decision, preliminary factor analyses were conducted using two separate sample groups: firstly, undergraduate students plus

the residential disabled group ($\alpha \geq 0.80$); and secondly, the disabled college group ($\alpha = 0.65$). The small sizes of these groups were less than ideal for factor analysis, but given their divergent alphas it was necessary to ascertain a factor pattern for each group individually. A three-factor solution was selected in each case, since both scree plots showed a levelling off after three factors. Also, a three-factor solution fitted best with Antonovsky's (1987) theory about the three components of SOC.

Exploratory factor analyses were conducted using the principal components extraction method and orthogonal Varimax rotation. In general, the factor patterns for the two groups appeared similar, with a preponderance of items loading on the first two factors (loadings ≥ 0.30). In each group at least six items loaded on more than one factor, while for the college group two items failed to load on any of the three factors at ≥ 0.30.

The individual factor analyses for the subgroups showed that for several items, the loadings or their valences (i.e. positive or negative loadings) differed markedly between subgroups. These items are shown in Table 6.2 in Chapter 6, and are discussed in that chapter.

5.8.2 Composite sample: three-factor solution

The factor pattern for the composite sample was similar to those of the above groups, but provided far greater factorial purity. The principal components extraction method was used, with orthogonal Varimax rotation. A three-factor solution was again selected, since the scree plot showed a levelling off after three factors (see Figure 5.1; see Table 5.9 for eigenvalues). In addition, a three-factor solution fitted best with Antonovsky's (1987) theory.

The variance explained by the three factors (rotated) was 33.4% (Factor 1 = 14,6%; Factor 2 = 11,8%; Factor 3 = 7%). The results of the three-factor solution (after Varimax rotation) are shown in Table 5.8 below, with loadings of |0.35| or more indicated in bold font.

Table 5.8: Factor analysis of SOC Scale-29 (composite sample).

Meaningfulness items			
Item	**Factor 1**	**Factor 2**	**Factor 3**
4	**0.39171**	-0.03809	0.23052
7	**0.54198**	-0.10222	0.14850
8	**0.35692**	**0.40071**	-0.18384
11	**0.71695**	-0.08186	-0.08710
14	**0.59230**	0.17037	0.29659
16	**0.49640**	-0.02521	0.06344
22	**0.66771**	0.18170	-0.06697
28	0.25041	**0.42713**	0.26359

Comprehensibility items			
Item	**Factor 1**	**Factor 2**	**Factor 3**
1	0.26422	0.20410	0.11584
3	0.14324	0.33452	-0.04653
5	0.03640	0.07206	**0.65207**
10	**-0.36638**	**0.51581**	0.23195
12	0.18968	**0.66294**	0.02134
15	-0.12113	**0.56572**	0.19293
17	-0.08779	**0.57468**	0.02643
19	0.05528	**0.65727**	0.03108
21	-0.11080	**0.52659**	0.12321
24	0.02116	**0.58611**	0.31497
26	0.16034	0.30912	-0.22217

Manageability items			
Item	**Factor 1**	**Factor 2**	**Factor 3**
2	0.23130	0.01408	0.06953
6	0.07860	0.00337	**0.72954**
9	0.21374	0.17111	**0.42128**
13	**0.73096**	-0.04470	0.01434
18	0.23590	0.16944	0.00318
20	**0.48170**	0.18046	0.09302
23	**0.48588**	0.04032	0.10257
25	0.12199	0.24664	**0.51757**
27	**0.65641**	0.08893	-0.17267
29	0.32395	**0.40958**	0.15067

Table 5.9 reports the eigenvalues obtained during the factor analysis (three-factor solution). It is necessary to briefly explain the term "eigenvalue" at this point. An eigenvalue reflects the amount of variance accounted for by one factor or variable, before rotation[5] (Rosenthal & Rosnow, 1991). Technically, eigenvalues are obtained by squaring the factor loadings and then summing them (ibid.).

An eigenvalue can be divided by the number of factors that are potentially being analysed (in this case, SOC Scale questionnaire items). This simple calculation yields the percentage of variance accounted for by each factor. For example, Table 5.9 shows that the first factor had an eigenvalue of 4.85 (rounded). There are potentially 29 factors being analysed or extracted, since there are 29 items or variables in the SOC Scale. Thus the calculation reads $4.85 \div 29 = 16.7\%$. This means that the first factor to be extracted accounted for 16.7% of the total variance in SOC score. This value is given under the column headed "Proportion" in Table 5.9 (Rosenthal & Rosnow, 1991).

Each subsequent factor will of necessity account for less variance than the preceding factors, since it will have been extracted from the residuals left after extracting the previous factors. The aim is to maximise the amount of variance accounted for, but in the fewest possible number of factors (Kerlinger, 1986). Tables of eigenvalues such as Table 5.9, and scree plots (Figure 5.1), provide a good indication of the most suitable number of factors to extract (Kerlinger, 1986; Rosenthal & Rosnow, 1991). It can be seen from Table 5.9 and Figure 5.1 that a three-factor solution was suitable for the current SOC Scale data.

The column in Table 5.9 entitled "Cumulative" reflects the total amount of variance accounted for, collectively, by the factors included in the analysis to that point. For example, the third factor shows a value of 0.334 in the "Cumulative" column. This means that for a three-factor solution, 33.4% of the variance was

[5] Rotation can be defined as a procedure that maximises the difference between factors so as to make them easier to interpret. The procedure involves shifting or rotating the axes on which the variables are positioned, in a three-dimensional hypothetical space (Kerlinger, 1986; Rosenthal & Rosnow, 1991).

accounted for. Because eigenvalues refer to unrotated data (Rosenthal & Rosnow, 1991), there may be small discrepancies between the variances based on the eigenvalues, on the one hand, and, on the other, variances calculated after rotation. The opening paragraph of this section reports the rotated results, with Factor 2 accounting for 11,8% of the variance and Factor 3 for 7%. Table 5.9 reports the same values, unrotated, as 11.1% and 6% (rounded) respectively.

Table 5.9: Eigenvalues for SOC Scale-29 (Composite sample).

Eigenvalues of the Correlation Matrix: Total = 29 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	4.84685918	1.63678721	0.1671	0.1671
2	3.21007198	1.58011337	0.1107	0.2778
3	1.62995861	0.10838902	0.0562	0.3340
4	1.52156959	0.08234208	0.0525	0.3865
5	1.43922751	0.20177492	0.0496	0.4361
6	1.23745258	0.04353228	0.0427	0.4788
7	1.19392031	0.02549563	0.0412	0.5200
8	1.16842468	0.08327054	0.0403	0.5603
9	1.08515414	0.06666756	0.0374	0.5977
10	1.01848658	0.06969927	0.0351	0.6328
11	0.94878732	0.02341466	0.0327	0.6655
12	0.92537266	0.09757851	0.0319	0.6974
13	0.82779414	0.04612473	0.0285	0.7260
14	0.78166942	0.06848585	0.0270	0.7529
15	0.71318357	0.01921931	0.0246	0.7775
16	0.69396426	0.01746193	0.0239	0.8014
17	0.67650233	0.02315793	0.0233	0.8248
18	0.65334440	0.05482598	0.0225	0.8473
19	0.59851843	0.04292272	0.0206	0.8679
20	0.55559571	0.06532785	0.0192	0.8871
21	0.49026786	0.03201347	0.0169	0.9040
22	0.45825439	0.02055902	0.0158	0.9198
23	0.43769536	0.05498693	0.0151	0.9349
24	0.38270843	0.01942318	0.0132	0.9481
25	0.36328525	0.00894667	0.0125	0.9606
26	0.35433858	0.03938794	0.0122	0.9728
27	0.31495064	0.06891545	0.0109	0.9837
28	0.24603520	0.01942831	0.0085	0.9922
29	0.22660689		0.0078	1.0000

insert fig 5.1

It can be seen from Table 5.8 that all items except six had loadings of 0.40 or more on one factor only. The six exceptions failed to load at $\geq$ 0.40 on any factor. Nine items loaded at $\geq$ of |0.40| on Factor 1, and according to Antonovsky's theory, five of these tapped meaningfulness (items 7, 11, 14, 16, 22) and four tapped manageability (13, 20, 23, 27). In general, the meaningfulness items had the highest loadings on Factor 1, although items 13 and 27 also loaded very highly (0.73 and 0.66 respectively). On reviewing the content of the four relevant manageability items, it was found that all of them seemed to include a meaningfulness dimension, since they failed to represent any specific, practical or concrete aspects of manageability. This point is discussed in more detail in 6.3.3 (Chapter 6) and 7.4.5 (Chapter 7).

The second factor appeared to represent comprehensibility. Ten items loaded on this factor at $\geq$ |0.40| and seven were comprehensibility items (items 10, 12, 15, 17, 19, 21, 24) according to the theory (Antonovsky, 1987). Of the remaining three items, two tapped meaningfulness (items 8, 28) and one (item 29) tapped manageability; these three items had the lowest loadings. Again it was possible to identify where the three anomalous items might have tapped a comprehensibility dimension rather than purely meaningfulness or manageability (see 6.3.3).

Four items (items 5, 6, 9, 25) loaded on the third and final factor, and all represented manageability except for one (item 5), whichwas supposed to tap comprehensibility. Again it was conceivable that this item was partly measuring manageability, and it had the second-highest loading on this factor (see 6.3.3).

5.8.3 Composite sample: one- and two-factor solutions

Another factor analysis was conducted, requesting one factor. This was done to check the fit of the empirical data to the hypothesis that a single global score is the most appropriate way of measuring SOC. This hypothesis has resulted from numerous studies which have failed to find a three-factor pattern (see 3.3.1).

Antonovsky himself (1987, 1993) suggested using the total score only and not the three subscale scores.

While a single measurement index (total SOC score) does not necessarily imply a one-factor solution (see 6.2.1), a one-factor solution may be acceptable given Antonovsky's emphasis on the global measure. However, any scale is expected to provide some evidence of the postulated constructs underpinning it. It would therefore be reasonable to expect that, for the SOC Scale, a three-factor solution would be more satisfactory than a one-factor solution. Should a one-factor solution be found to be more appropriate, it is possible that the three components are either poorly measured by the SOC Scale, or that the components (and thus the subscales) should in fact be conceptually distinct constructs. In this case, the SOC Scale development would be faulty, since it attempts to link the components together.

The variance in SOC score explained by the single factor was 16.7%. In terms of Antonovsky's classification, meaningfulness items loading on the factor (at $\geq$ 0.40) were items 7, 8, 11, 14 and 28. Manageability items loading on the factor were items 13, 20, 23, 27 and 29, while comprehensibility items were items 12, 19 and 24. Only two items loaded at $\geq$ 0.60 (items 14 and 22) and both of these were meaningfulness items. Six items had loadings between 0.50 and 0.60 (items 12, 13, 20, 27, 28, 29) and these represented all three subscales. Thus there was no clear relationship between subscales and the single factor, and relatively little variance was accounted for.

Because of the relatively poor loadings on the third factor in the three-factor solution (see Table 5.8), a two-factor solution was requested. The results were less satisfactory than for the three-factor solution, with the first factor explaining 16,7% of the variance and the second factor accounting for 11%, a total of 27,7%. In terms of the theory, a two-factor solution was also less desirable than either a one- or a three-factor solution.

5.9 COMPARISON OF PSS AND SOC SCORES

A correlational analysis was performed to test the relationship between participants' SOC and PSS scores. For the composite group (n = 165) , a Pearson correlation coefficient of -0.58546 was obtained ($p < 0.0001$), indicating a statistically significant inverse correlation. Thus higher SOC scores, indicating a stronger SOC, correlated with lower PSS scores, indicating less perceived stress, while a weaker SOC was associated with greater perceived stress.

On the same test, the combined disabled sample (all subgroups, n = 102) obtained a Pearson coefficient of -0.62621 ($p < 0.0001$) for the covariance of SOC and PSS scores. This indicates a statistically significant inverse relationship. The disabled college group achieved a much lower correlation ($r = -0.37649$; $p = 0.0017$) than that of the residential group ($r = -0.81627$; $p < 0.0001$), although both indices were statistically significant, thus indicating a relationship that was not due to chance. The undergraduate sample (n = 63) obtained a Pearson coefficient of -0.52030 ($p = < 0.0001$), again indicating a statistically significant inverse relationship between SOC and PSS scores. All of these results indicated that participants with high SOC scores tended to obtain lower PSS scores and vice versa, which was as expected in terms of the theory.

5.10 TOWARDS A MODIFIED SCALE

The results of the factor analyses were examined together with the reliability indices. Data manipulation and testing were then carried out in an attempt to devise a modified SOC scale which had both an improved factor structure as well as improved reliability, both for the subscales and for the whole scale.

Initially, items were tentatively reclassified according to the results of the factor analysis. All items which loaded on Factor 1 were classified as meaningfulness items; all items loading on Factor 2 were classified under comprehensibility, and

all items loading on Factor 3 were classified as manageability items. The new subscale groupings were tested by examining the new intrascale reliabilities.

For the disabled college group, the meaningfulness subscale's α score had increased from 0.60 to 0.83 (rounded), while for the residential group it remained at 0.85 (see Table 5.6). For the undergraduates, however, the meaningfulness subscale α had decreased from 0.73 to 0.66. The composite sample had an α of 0.80 (instead of the original 0.71) for the meaningfulness subscale. These are all highly acceptable alphas, with the exception of that of the undergraduate group, which was fairly low.

For the comprehensibility subscale, α for the disabled college group had increased from 0.50 to 0.62 (rounded), while it had increased from 0.85 to 0.86 for the residential group, and from 0.68 to 0.78 for undergraduates. The composite sample α for the comprehensibility subscale had increased from 0.70 to 0.76. Thus, for the comprehensibility subscale, only the disabled college sample achieved an unacceptably low alpha score.

The new manageability subscale's alphas remained unacceptably low (college group 0.55; residential group 0.61; undergraduates 0.58; composite sample 0.57). This indicates a probable conceptual problem with this subscale. This point is discussed further in 6.3.3 and 6.4.2 of Chapter 6, and in 7.4.5 of Chapter 7. It was noted that modifying the subscales by reclassifying some items had actually decreased the α score for the manageability subscale. This was a matter for some concern, since this subscale's performance had initially been the poorest of the three.

The new subscales were also reviewed per sample group. For the disabled college group, one of three subscale alphas was unacceptably low, while the second subscale α was also on the low side, and the third was highly acceptable. The residential group had only one unacceptable subscale α. The undergraduate group had one acceptable subscale α, one fairly low α and one unacceptably low α.

The relatively poor reliabilities for the university and college groups raised questions about the conceptual validity and the reliability of the subscales. These problems were evident both before and after the attempt at reclassifying Antonovsky's original items so as to restructure the subscales.

Items 10 and 2, the most problematic items for the composite group (see 5.7.2), were deleted and a correlation matrix for the resulting "SOC Scale-27" was calculated. The new α was used as a baseline to assess the impact on reliability of each of the 16 modified or new items. Items 35 and 45 impacted most positively on the reliability, and were thus used to replace the two deleted original items. This replacement procedure was repeated several times, each time removing the poorest-performing original item and replacing it with whichever new item added the most to the alpha score.

In this manner a modified 29-item scale was devised. This scale was based purely on reliability indices and did not take validity or the factor structure into account. It included 18 original items (1, 7, 8, 9, 11, 12, 13, 14, 16, 19, 20, 22, 23, 24, 25, 27, 28, 29) and 11 new ones (30, 32, 34, 35, 36, 37, 38, 41, 42, 43, 45). Manageability and meaningfulness items appeared to be the most important determinants of variance, since they had generally higher reliability rankings and occurred most frequently.

In the second stage of modifying the SOC Scale, items which impacted negatively on the scale's reliability were deleted and replaced with better-performing items (see 5.7.2). Numerous factor analyses were then conducted in order to identify which of the original items loaded weakly or on more than one factor, and these items were deleted and replaced by new ones with more meaningful loadings. During this process of working with factor analyses, constant reference was also made back to the effect of each item on the scale's reliability as each item was deleted or added.

A 23-item scale resulted, with three factors. Items were required to load at ≥ 0.46 on one factor only in order to be retained. Items 7, 11, 13, 14, 16, 20, 22, 23, 27, 41 and 42 (11 items) loaded on the first factor; items 12, 15, 17, 19, 24, 28 and 45 (7 items) loaded on the second factor; items 5, 6, 25, 30 and 35 (5 items) loaded on the third factor, although item 35 was noted to load quite highly on the first factor as well. Factor 1 accounted for 18.5% of the variance, Factor 2 for 12.8% and Factor 3 for 9.7%; a total of 41% (composite group). This was a marked improvement over the original 33.4%. The first, second and third factors were taken to represent the subscales of meaningfulness, comprehensibility and manageability respectively. The results of factor analysis with the "SOC Scale-23" are shown in Table 5.10. Loadings of $\geq |0.46|$ are indicated in bold font.

Table 5.10: Principal components factor analysis of SOC Scale-23 (composite sample).

Meaningfulness items			
Item	**Factor 1**	**Factor 2**	**Factor 3**
7	**0.51749**	-0.07795	0.00827
11	**0.74801**	-0.08086	-0.02597
13	**0.75581**	-0.04801	0.08342
14	**0.60004**	0.22564	0.18944
16	**0.48820**	-0.01614	0.06949
20	**0.48270**	0.18995	0.11977
22	**0.58716**	0.25524	-0.10102
23	**0.46795**	0.06793	0.08723
27	**0.69224**	0.10027	0.03636
41	**0.46763**	0.23518	0.25404
42	**0.60711**	-0.00789	0.00770

Table 5.10: Principal components factor analysis of SOC Scale-23 (composite sample). – *continued*

Comprehensibility items			
Item	**Factor 1**	**Factor 2**	**Factor 3**
12	0.15750	**0.66393**	0.12300
15	-0.13425	**0.63098**	0.15600
17	-0.06456	**0.57079**	-0.09096
19	0.04330	**0.69384**	0.05891
24	-0.02100	**0.56614**	0.29269
28	0.20532	**0.54467**	0.04704
45	0.25213	**0.55066**	0.02984

Manageability items			
Item	**Factor 1**	**Factor 2**	**Factor 3**
5	-0.01808	0.11872	**0.72632**
6	-0.01826	-0.01858	**0.79427**
25	0.08447	0.28914	**0.48768**
30	0.15812	-0.00292	**0.52403**
35	0.45284	0.20031	**0.51539**

It was noted that items 22 and 27 had low standard deviations (see Table 5.6). Their elimination resulted in a 21-item scale, and the amount of variance accounted for increased to 43.4% (with the three factors accounting for 17.8%, 14.6% and 11% respectively). However, Cronbach's α for the meaningfulness subscale (Factor 1) decreased for all subgroups, and reached an unacceptably low level (0.60) for the undergraduates. For the composite sample, the α score of the meaningfulness subscale dropped from 0.82 (see Table 5.11 below) to 0.78, while α for the total SOC Scale dropped from 0.82 to 0.80. Thus items 22 and 27 were retained.

Item 17, which was noted by Antonovsky (1993) to be potentially problematic, detracted from the α of the comprehensibility subscale and the overall α of the SOC Scale. However, when it was eliminated several other items took on dubious loadings and were noted to impact negatively on the scale's reliability. The SD of

item 17 was noted to be satisfactory, and thus item 17 was retained. Item 10, which was also noted by Antonovsky as potentially problematic, was not retained, as it did not appear to contribute to either the reliability or the validity of the scale (see 3.4.1 and 4.4.1 for details regarding the problem with items 10 and 17).

Working on the assumption that Factors 1, 2 and 3 represented meaningfulness, comprehensibility and manageability respectively, Cronbach's α scores for the composite sample had improved slightly compared with those obtained with the original SOC Scale. (Note: α scores reported here are rounded to two decimal places, and are compared with the original scores, which are shown in Table 5.6.) The α score for Factor 1 (meaningfulness) was 0.82, which was considerably higher than the previous 0.71. Cronbach's α for Factor 2 (comprehensibility) was 0.73, which was slightly higher than the previous 0.70. The α score for Factor 3 (manageability) was 0.66, which again was quite a lot higher than the previous 0.62, although it was still on the low side.

The total SOC Scale-23 attained a Cronbach's α of 0.823670, for the composite sample. This represented a marginal improvement over the α score of 0.805374 for the original SOC Scale-29. Most importantly, reliability had not been sacrificed in the attempt to improve the SOC Scale's validity.

The properties of the final modified SOC Scale-23 are shown in Table 5.11 on the following page. The alpha scores which were obtained with the original scale (see Table 5.6), as well as the amount of variance originally accounted for by each factor (see 5.8.2), are provided in brackets and italicised for ease of comparison.

Table 5.11: Properties of the modified SOC Scale-23
(SOC Scale-29 properties are given in brackets, italicised)

Sample group	Cronbach's α				Variance accounted for (after rotation)			
	F1 (meaning)	F2 (compre)	F3 (manag)	Total SOC Scale	F1	F2	F3	Total
Disabled college	0.86 *(0.59)*	0.64 *(0.50)*	0.59 *(0.51)*	0.75 *(0.65)*	22.3%	11.1%	9.5%	42.9%
Residential disabled	0.86 *(0.85)*	0.87 *(0.85)*	0.77 *(0.76)*	0.92 *(0.91)*	22%	19.7%	16.3%	58%
Undergraduate sample	0.67 *(0.73)*	0.68 *(0.68)*	0.67 *(0.60)*	0.79 *(0.81)*	14.9%	12.3%	11.4%	38.6%
Composite group	**0.82** ***(0.71)***	**0.73** ***(0.70)***	**0.66** ***(0.62)***	**0.82** ***(0.81)***	**18.5%** ***(14.6%)***	**12.8%** ***(11.8%)***	**9.7%** ***(7%)***	**41%** ***(33.4%)***

The assumption that Factor 1 represented meaningfulness, Factor 2 represented comprehensibility and Factor 3 represented manageability was supported by an examination of the content of the items which loaded on each of the three factors. The items of the SOC Scale-23 are shown below, with their loadings (rounded) for the composite sample. Both Antonovsky's (1987) original items, and new or modified items which were developed during the current research, are shown.

Meaningfulness items (Factor 1)

Item	*Loading*	*Wording of item*
7	0.52	Life is: Full of interest / Completely routine
11	0.75	Most of the things that you do in future will probably be: Completely fascinating / Deadly boring
13	0.76	What best describes how you see life: One can always find a solution to painful problems / There is no solution to painful things in life.
14	0.60	When you think about life, you very often: Feel how good it is to be alive / Ask yourself why you exist at all.

Meaningfulness items (Factor 1) – *continued*

Item	*Loading*	*Wording of item*
16	0.49	Doing things you do every day is: A source of deep pleasure and satisfaction / A source of pain and boredom.
20	0.48	When you do something that gives you a good feeling: It's certain that you'll go on feeling good / It's certain that something will happen to spoil the feeling.
22	0.59	You anticipate that your personal life in future will be: Totally without meaning or purpose / Full of meaning and purpose.
23	0.47	Do you think that there will always be people whom you'll be able to count on in the future? You're certain there will be / You doubt there will be.
27	0.69	When you think of difficulties you are likely to face in important aspects of your life, do you have the feeling that: You will always succeed in overcoming the difficulties / You won't succeed in overcoming the difficulties.
41	0.47	When unexpected problems happen, you: Always handle them very well / Always handle them very badly.
42	0.61	When you very much want to learn something that is new and very difficult to learn, you: Keep on trying, no matter how much time and effort it takes to learn / Give up fairly soon and move onto something that is more within your abilities.

Comprehensibility items (Factor 2)

Item	*Loading*	*Wording of item*
12	0.66	Do you have the feeling that you are in an unfamiliar situation and don't know what to do? Very often / Very seldom or never.
15	0.63	When you face a difficult problem the choice of a solution is: Always confusing and hard to find / Always completely clear.
17	0.57	Your life in the future will probably be: Full of changes without your knowing what will happen next / Completely consistent and clear.

Comprehensibility items (Factor 2) – *continued*

Item	*Loading*	*Wording of item*
19	0.69	Do you have very mixed up feelings and ideas? Very often / Very seldom or never.
24	0.57	Does it happen that you have the feeling that you don't know exactly what's about to happen? Very often / Very seldom or never.
28	0.55	How often do you have the feeling that there's little meaning in the things you do in your daily life? Very often / Very seldom or never.
45	0.55	Do you find it difficult to solve problems, make plans, learn new things, or make decisions? These things are very difficult for you / These things are quite easy for you.

Manageability items (Factor 3)

Item	*Loading*	*Wording of item*
5	0.73	Are you surprised by the behaviour of people whom you thought you knew well? Never / Always.
6	0.79	Has it happened that people whom you counted on have disappointed you? Never happened / Always happens.
25	0.49	Many people—even those with a strong character—sometimes feel like losers in certain situations. How often do you feel this way? Never / Very often.
30	0.52	How well do you understand the culture, behaviour and conversations of the people around you? You understand them very well / You are often confused by these things.
35	0.52	Are you in control of your thoughts, moods, behaviour and feelings? You are always in full control of yourself / You often feel you are going to lose control of yourself.

To test the validity of the new scale, scores obtained by the composite sample ($n = 169$) on the SOC Scale-23 were correlated with scores on the original SOC Scale-29. The analysis yielded a Pearson correlation coefficient of 0.92777 ($p < 0.0001$), indicating a highly statistically significant relationship.

Correlational tests were also performed to test the relationship between SOC Scale-23 and PSS scores (composite group). A Pearson *r* of -0.51690 was obtained ($p < 0.0001$), indicating a statistically significant inverse relationship. Thus higher SOC Scale-23 scores, indicating a stronger SOC, were correlated with lower PSS scores, indicating less perceived stress, while a weaker SOC was associated with greater perceived stress. This result was essentially the same as that obtained in the SOC Scale-29 / PSS correlational analysis (see 5.9 above), although the correlation was not quite as strong as it had been originally. The presence of this inverse relationship provides evidence for the validity of the SOC Scale (Frenz, Carey, & Jorgensen, 1993).

A factor analysis was conducted on the SOC Scale-23, requesting a single factor. This analysis yielded a factor that accounted for 21.8% of the variance, which was an improvement over the original 16.7% yielded by a 1-factor solution for the SOC Scale-29 (see 5.8.3).

The subscales of the SOC Scale-23 were correlated with each other and the results are shown in Table 5.12. These results should be compared with those obtained for the original scale, which are shown in Table 5.5.

Table 5.12: Correlations (Pearson's *r*) between subscales; modified SOC Scale-23

Sample group	**meaning/manag**	**meaning/compre**	**manag/compre**
Disabled college (A)	0.55 (p<0.0001)	0.29 (p=0.02)	0.09 (p=0.47)
Residential disabled (B)	0.73 (p<0.0001)	0.58 (p=0.0002)	0.57 (p=0.0003)
Entire disabled (A + B)	0.64 (p<0.0001)	0.42 (p<0.0001)	0.29 (p=0.0034)
Undergraduates	0.54 (p<0.0001)	0.73 (p<0.0001)	0.58 (p<0.0001)
Composite sample	**0.42 (p<0.0001)**	**0.37 (p<0.0001)**	**0.41 (p<0.0001)**

The modified subscales showed a more consistent and moderate pattern of intercorrelation than was the case with the original scale. However, for the disabled subgroups, the meaningfulness / manageability relationship was still

stronger than would be expected in terms of the theory. The comprehensibility subscale still appeared problematic for the disabled college group, since it had very low correlations with the other two subscales. In contrast, all subscale intercorrelations for the residential disabled sample were still on the high side.

For or the undergraduate group, the subscale correlations once again appeared to be fairly ideal. Using the composite sample (people with disabilities plus undergraduates) yielded a picture that was highly acceptable, with subscale correlations ranging between 0.37 and 0.42.

In general, the new scale appeared to be an improvement over the original one when used with the current South African samples. Both reliability and validity had been improved by deleting eleven of the 29 original items, and replacing five of these with new or modified items, with a resultant "SOC Scale-23".