USE OF THE SHIPLEY INSTITUTE OF LIVING SCALE AND THE RAVEN'S STANDARD PROGRESSIVE MATRICES WITH UNEMPLOYED POPULATIONS

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Abstract

A total sample of 366 unemployed people completed general ability assessments. Three hundred and twenty nine completed the Shipley Institute of Living Scale (SILS). A cohort of 231 of this group also completed the Raven's Standard Progressive Matrices (SPM) (10-minute timed administration) on the same occasion; and a second cohort of 95 also completed the SPM (20-minute timed administration) on the same occasion. Normative data are provided for the SILS and the SPM (10- and 20- minute administrations). Relationships between the SILS and SPM are examined. The unemployed sample did not differ from population normative data on Total SILS scores, but scored lower on SILS Vocabulary, and higher on SILS Abstraction scores. The unemployed sample performed poorer on SPM (10-minute administration) than the non-unemployed population normative data. No sex differences were identified. Older unemployed subjects performed better on SILS Vocabulary, but scored more poorly on the SPM.

The Wechsler Adult Intelligence Scale - Revised (WAIS-R; Wechsler, 1981) is the most widely used test of adult intellectual functioning (Kaufman, 1990). In some circumstances however, where, for example, time restrictions apply or the numbers to be assessed are too numerous, brief tests of intelligence have commonly been utilised.

Two brief tests of general intellectual ability which have been used widely, often together, as screening devices with unemployed people in Australia, are the Shipley Institute of Living Scale (SILS) (Shipley, 1940) and the Standard Progressive Matrices (SPM) (Raven, 1938). Both tests have the advantages of being easily administered either individually or in group settings, of having short completion times, and of providing reliable estimations of general intellectual functioning. The SILS correlates highly with the SPM, and as evidence for validity for the tests, both correlate well with most standard intelligence tests (O'Leary, Rusch & Guastello, 1991; Zachary, Paulson & Gorsuch, 1985).

The Shipley Institute of Living Scale (SILS) was designed to assess general intellectual functioning in adults and adolescents, and to aid in detecting cognitive impairment in individuals with normal original intelligence (Zachary, 1986). The SILS takes a maximum of 20 minutes to complete, and yields three major summary scores: Vocabulary, Abstraction, and combined Total scores. The Vocabulary sub-scale consists of forty multiple choice verbal reasoning questions, and primarily tap crystallized intelligence. The Abstraction sub-scale includes 20 series completion items of inductive reasoning that tap fluid ability.

Criticisms of the SILS have been that much of the normative data published have been taken from clinical populations, and where normal subjects have been used they have been children, university students, or on localized populations (e.g., nurses) (Harnish, Beatty, Nixon & Parsons, 1986). Some of the normative data published have not included Vocabulary and Abstraction scores in such a way to be usable to clinicians (Mason &

Ganzler, 1966). Further, no normative data have been produced using Australian subjects, and no normative data have been published for unemployed samples anywhere.

The Standard Progressive Matrices (SPM) is primarily a non-verbal test which uses analogous problem solving. It is largely culturally and academically free, and is regarded as a good measure of fluid intelligence and of *Spearman's g* (Llabre, 1985; McKenna, 1984; Raven, Court & Raven, 1983). The SPM is usually administered as untimed, or using a 20-minute time limit. However, a shortened 10-minute time limited administration has been reported (Felvus, 1989; King, Ross & Symons, 1986), and is advantageous where time availability is a particular problem.

Like the SILS, the SPM has also been criticized for the lack of normative studies reported (O'Leary, Rusch & Guastello, 1991). Australian norms were first developed by the Australian Army in the 1940s based on 20-minute and untimed administrations. An Australian manual reporting these was produced in 1955 (ACER, 1955). The test was restandardized in 1986, with new norms for both 20-minute timed and untimed administrations based on students drawn from primary and secondary schools being provided. Adult samples were not included in the norming process (de Lemos, 1989). The normative data that are available for adults are based on samples of adult males (Raven, Court & Raven, 1988; Simpson,1980). King, Ross and Symons (1986) published a range of scores based on a 10-minure administration of the test, and Felvus (1989) has reported norms using the 10-minute time limit. No normative data for unemployed samples are available.

In the present study, SILS, SPM (20-minute timed) and SPM (10-minute timed) data are provided for unemployed Australian subjects.

Method

Subjects

The total sample pool consisted of 366 unemployed adults (59% male; mean age 31 years; age range 15-60 years) who presented to the national employment agency in Australia for assessments related to occupational preparedness. The sample is not meant to constitute a representative sample, but the selection procedure did not reflect selecting for any particular sub-set of unemployed people.

Procedure

Tests were administered to all subjects under similar conditions by experienced occupational psychologists. Testing was conducted in groups of up to 15 participants. The SILS, together with the SPM (10-minute timed version), was administered on the same occasion to 231 of the total sample pool. The SILS, together with the SPM (20-minute timed version), was administered on the same occasion to 95 of the total sample pool. Thirty-seven subjects were administered the SPM-20 alone (without the SILS), and three subjects were administered the SILS alone (without an SPM), but were included in the analyses.

Results

The total number of subjects used in the sample was 366. Three hundred and twenty-nine subjects (age range 15-60 years) were administered the Shipley Institute of Living Scale (SILS). Of this group, 231 subjects (age range 16-60 years) were also administered the

Standard Progressive Matrices, 10-minute timed administration (SPM-10), on the same occasion they were administered the SILS. A further 95 subjects were administered the Standard Progressive Matrices, 20-minute timed administration (SPM-20) on the same occasion they were administered the SILS.

Table 1 presents demographic and SILS general ability summary data for the 329 subjects administered the SILS. No sex differences were identified for Vocabulary, $t(270) = 1.17$, $p = .24$, Abstraction, $t(270) = 0.99$, $p = .33$, or Total SILS scores, $t(270) = 1.15$, $p = .25$.

Table 1

Demographic and general ability data for Shipley Institute of Living Scale (SILS)

		Age		%	Vocabulary		Abstraction		Total Score	
	n	*M*	*SD*	Male	*M*	*SD*	*M*	*SD*	*M*	*SD*
SILS	329	31.22	11.45	57.70[1]	26.69	6.58	25.55	8.00	52.28	12.67

Note: [1] = 57 subjects did not specify sex

Table 2 presents summary demographic data for (i) the cohort of 231 subjects (age range 16-60 years) assessed using the SILS and the SPM-10, (ii) the cohort of 95 subjects (age range 15-56 years) assessed using the SILS and the SPM-20, (iii) the cohort of 37 (age range 15-51 years) assessed using the SPM-20 only, and (iv) the total cohort administered the SPM-20.

There was no significance difference between scores on the 20-minute timed SPM administered with the SILS and the 20-minute SPM administered without the SILS ($p > .05$). No meaningful normative group was available to allow comparisons with this unemployed sample on the 20-minute timed administration of the SPM. The unemployed

sample tested using the 10-minute timed administration, however, scored significantly lower, $t(480) = 2.56$, $p < .05$, than the norms provided by Felvus (1989) for adult Australians who presented at guidance and counselling clinics. No sex differences were identified for either the SPM 10-minute administration, $t(229) = 1.75$, $p = .08$, or the SPM 20-minute administration, $t(72) = 1.33$, $p = .19$.

Table 2

Demographic and general ability data for the Standard Progressive Matrices (SPM-10) ten-minute administration, for the Standard Progressive Matrices (SPM-20) twenty-minute administration, with and without SILS co-administration, and Total SPM-20

		Age		%	Total Score	
	n	*M*	*SD*	Male	*M*	*SD*
SPM-10 (+ SILS)	231	31.89	11.69	51.90	31.09	6.88
SPM-20 (+ SILS)	95	29.89	10.85	89.50[1]	39.73	8.86
SPM-20 (- SILS)	37	25.95	10.86	72.20[2]	35.81	11.74
SPM-20 (Total)	132	28.79	10.95	81.10[3]	38.63	9.86

Note: [1] = 57 subjects did not specify sex; [2] = 1 subject did not specify sex; [3] = 58 subjects did not specify sex

Table 3 presents correlations among the major variables. Correlations among age, SILS-Vocabulary, SILS-Abstraction, and SILS-Total for the sample of 329 are presented above the diagonal. The correlations among SPM-10, age, and the SILS scales for the 231 cohort, and among SPM-20, age, and the SILS scales for the 95 cohort, are presented below the diagonal.

For the sample of 329 subjects, there was a strong ($r > .30$) positive correlation between age and SILS-Vocabulary, with being older being associated with better verbal based performances. A weaker ($r < .30$) positive correlation was identified between age and SILS-Total, and a weak negative association was identified between age and SPM-10. In

summary, being older unemployed was associated with verbal strengths, being younger unemployed was associated with stronger non-verbal performances.

As would be expected, strong correlations were identified for the SILS scales between the Vocabulary and the Abstraction scales, between the Vocabulary scale and the SILS-Total, and between the Abstraction scale and the SILS-Total.

Weak but statistically significant correlations were identified between the SPM-10 and SILS-Vocabulary, and between SPM-20 and SILS-Vocabulary (r = .33). However, associations between SPM-10 and SILS-Abstraction, and between SPM-20 and SILS-Abstraction, were strongly correlated. The associations between the SPM-10 and SILS-Total, and between SPM-20 and SILS-Total, though significant, were lower correlations than between the SPM scores and the SILS-Abstraction scores.

Table 3

Correlations for age, SILS-Vocabulary, SILS-Abstraction, and SILS-Total are presented above the diagonal. Correlations for SPM-10 and SPM-20, and age, SILS-Vocabulary, SILS-Abstraction, and SILS-Total are presented below the diagonal.

Variable	1	2	3	4
1. Age	---	.53*** (n=329)	-.05 (n=329)	.24*** (n=329)
2. SILS (Voc)		---	.52*** (n=329)	.84*** (n=329)
3. SILS (Abs)			---	.89*** (n=329)
4. SILS (Total)				---
5. SPM-10	-.21** (n=231)	.18** (n=231)	.56*** (n=231)	.45*** (n=231)
6. SPM-20	-.09 (n=132)	.33** (n=95)	.68*** (n=95)	.59*** (n=95)

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$

Table 4 presents comparisons between the unemployed sample and the normative data supplied for the SILS (Zachary, 1986). Differences were identified between these two

samples on SILS-Vocabulary, on which the unemployed sample scored significantly lower, and on SILS-Abstraction, where the unemployed sample were superior. No significant difference emerged for SILS-Total.

Table 4

Comparisons between the unemployed sample and normative SILS data, 2-tailed test.

Subtest	Unemployed Sample (n =328[1]) *M*	*SD*	Normative Data (n = 290) *M*	*SD*	*t*	*p*
Voc	26.70	6.60	29.2	6.00	-4.90	< .05
Abs	25.55	8.01	22.0	10.10	4.86	< .05
Total	52.28	12.69	51.3	14.10	0.91	NS

Note: [1] = one subject aged 15 years was not included in this comparison

Data obtained from the unemployed sample has been converted to percentile rankings. Table 5 presents percentile norms for SILS. Table 6 presents percentile norms for SPM-10 and SPM-20.

Table 5

Percentile norms for SILS, (Vocabulary, Abstraction, Total)

SILS
(n = 329)

Raw Score	Voc %ile	Abs %ile	Total %ile	Raw Score	Voc %ile	Abs %ile	Total %ile	Raw Score	Voc %ile	Abs %ile	Total %ile
80				**53**			48-49	**26**	46-51	40-50	
79				**52**			45-47	**25**	41-45		2
78				**51**			43-44	**24**	34-40	31-39	
77				**50**			39-42	**23**	31-33		
76				**49**			38	**22**	24-30	25-30	
75				**48**			35-37	**21**	17-23		
74			99	**47**			33-34	**20**	14-16	20-24	
73				**46**			29-32	**19**	11-13		1
72			97-98	**45**			28	**18**	7-10	18-19	
71			94-96	**44**			26-27	**17**	6		
70			92-93	**43**			24-25	**16**	5	14-17	
69			90-91	**42**			21-23	**15**	4		
68			88-89	**41**			19-20	**14**	3	11-13	
67			86-87	**40**	40		17-18	**13**	2		
66			84-85	**39**	98		16	**12**		7-10	
65			82-83	**38**	96-97	97-99	15	**11**	1		
64			81	**37**	92-95		14	**10**		3-6	
63			77-80	**36**	90-91	91-96	12-13	**9**			
62			75-76	**35**	86-89		10-11	**8**			
61			71-74	**34**	82-85	83-90		**7**			
60			67-70	**33**	79-81		9	**6**		2	
59			64-66	**32**	76-78	72-82	7-8	**5**			
58			62-63	**31**	70-75		6	**4**		1	
57			60-61	**30**	64-69	63-71	5	**3**			
56			56-59	**29**	59-63		4	**2**			
55			53-55	**28**	56-58	51-62	3	**1**			
54			50-52	**27**	52-55						

Table 6

Percentile norms for SPM-10 and SPM-20.

SPM-10 (*n* = 231)						SPM-20 (*n* = 132)					
Raw Score	%ile	Raw Score	%ile	Raw Score	%ile	Raw Score	%ile	Raw Score	%ile	Raw Score	%ile
60		**40**	88-91	**20**	6	**60**		**40**	47-53	**20**	
59		**39**	86-87	**19**	5	**59**		**39**	44-46	**19**	5
58		**38**	83-85	**18**		**58**		**38**	42-43	**18**	4
57		**37**	77-82	**17**	4	**57**		**37**	38-41	**17**	
56		**36**	74-76	**16**	3	**56**	99	**36**	37	**16**	3
55		**35**	71-73	**15**	2	**55**		**35**	33-36	**15**	
54		**34**	66-70	**14**		**54**	98	**34**	28-32	**14**	
53		**33**	61-65	**13**		**53**	95-97	**33**	26-27	**13**	
52		**32**	55-60	**12**		**52**	93-94	**32**	21-25	**12**	
51		**31**	48-54	**11**		**51**	92	**31**	18-20	**11**	2
50		**30**	39-47	**10**	1	**50**	90-91	**30**	17	**10**	
49		**29**	33-38	**9**		**49**	87-89	**29**	14-16	**9**	
48		**28**	26-32	**8**		**48**	83-86	**28**	12-13	**8**	
47	99	**27**	21-25	**7**		**47**	77-82	**27**	11	**7**	
46		**26**	18-20	**6**		**46**	72-76	**26**	9-10	**6**	
45		**25**	14-17	**5**		**45**	67-71	**25**	8	**5**	1
44	98	**24**	12-13	**4**		**44**	63-66	**24**		**4**	
43	96-97	**23**	10-11	**3**		**43**		**23**	7	**3**	
42	95	**22**	9	**2**		**42**	59-62	**22**	6	**2**	
41	92-94	**21**	7-8	**1**		**41**	54-58	**21**		**1**	

Discussion

This unemployed sample did not differ from the normative sample on the Total mean scores for the Shipley Institute of Living Scale. However, the results here signifying no difference on the Total SILS scores masked a combined significantly lower mean score on the Vocabulary scale, and a significantly higher mean score on the Abstraction scale. On the Standard Progressive Matrices 10-minute timed administration, the unemployed sample scored significantly lower than the non-unemployed (Felvus, 1989) comparison group. Based on this evidence, unemployed samples differ from normal population samples on

ability levels. Practitioners working with unemployed people will find value in utilizing the norms generated by this study. Further, there are implications here for interventions for unemployed groups, where, for example, lower ability or lower verbal skills will need to be taken into account.

There were no significant differences identified in this study between males and females on either the SILS or the SPM 10- or 20-minute administration. Neither test appears to have a major sex bias as a measure of intelligence for this population. For the most part, sex differences have not been demonstrated on the SPM (Court & Kennedy, 1976) or the SILS (Zachary, 1986), and have not presented as an issue with this sample.

For this unemployed sample, there was a significant association between age and verbal intelligence, and age and total ability scores on the Shipley Institute of Living Scale. For unemployed people, being older was associated with having better verbal and higher general abilities. The explanation is likely to be found in the composition of unemployed populations, where younger unemployed are more likely to be less skilled, whereas older unemployed are more likely to more representative of the general population (Machin, 1989). Further research, however, is needed to confirm this.

On both the 10- and 20-minute administrations of the Standard Progressive Matrices, age was negatively correlated with ability scores (significantly correlated for the 10-minute administration), with being younger being associated with better non-verbal ability. This outcome is typically found on tests of ability where the influence of education is less marked, and has been identified in other samples (Templer, 1992).

As would be expected, strong correlations were recorded between both SILS sub-scales and the Total SILS scale. Significant correlations were also identified between the SILS sub-scales and total score with the Standard Progressive Matrices. Highest correlations here were identified between the SILS-Abstraction scores and SPM totals. Stronger correlations

were found between the SILS scores and the SPM 20-minute administration, rather than the 10-minute version. This argues that more confidence can be placed in the use of the full 20-minute version than the time shortened 10-minute administration as a measure of general ability. Nevertheless, where a quick estimate of general ability is required for adults, the norms supplied in this paper will supplement those of King, Ross and Symons (1986) and Felvus (1989). All normative data supplied will allow specific comparisons for jobless adults.

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