

Perceived Control

Age Cohorts	Mid-age
Surveys	Survey 3
Derived Variable	PERCON
Definition	6-item, summed scale measuring Perceived Control
Source Items (Index Numbers)	PERCON1, 2, 3, 5, 6, 8 & 11 (LCTL-001, 002, -003, -005, -006-, 008 & -011)
Statistical form	Continuous variable
Index Number	LCTL 007
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Background¹

There is strong evidence linking level of job control to various indicators of cardiovascular health, as well as to mental health, absenteeism, and other indicators of coping. For example, Marmot et al¹ showed low job control to be associated cross-sectionally and prospectively with risk of cardiovascular disease among both male and female participants of the Whitehall II study. Most research on job control uses the Karasek Job Content Questionnaire, first developed in 1984². Use of this measure of control was considered inappropriate for ALSWH because the majority of Mid-age participants are not full-time in the workplace. More recently, Bobak et al³ developed the Life Control Scale which is designed to measure the extent to which an individual believes that he or she has control over all aspects of life. Perceived control has been used in major longitudinal epidemiological projects in eastern Europe, and has been shown to contribute to the socioeconomic gradient in health in Russia³ and to mediate the effects of material deprivation on health in post-communist countries⁴.

Source items

This six item scale was first used in the full version of the third survey of the Mid-age cohort. Two of the items, a and c, were positively phrased (positive items), while 4, items b, d, e and f, were negatively phrased (negative items). Items and scoring is shown over the page; negative items were reverse scored.

How much do you agree or disagree with each of the following statements?

PERCON1	a	At home I feel I have control over what happens in most situations ^a
PERCON2	b	I feel that what happens in my life is often determined by factors beyond my control ^b
PERCON3	c	Over the next 5-10 years I expect to have more positive than negative experiences ^a
PERCON4	d	I often have the feeling that I am being treated unfairly ^b
PERCON5	e	In the past 10 years my life has been full of changes without my knowing what will happen next ^b
PERCON6	f	I gave up trying to make big improvements or changes in my life a long time ago ^b

^a Positive item

^b Negative item

Code	Positive Item Score	Negative Item Score	Response
1	1	6	Strongly disagree
2	2	5	Disagree
3	3	4	Disagree slightly
4	4	3	Agree slightly
5	5	2	Agree
6	6	1	Strongly agree

Scale Evaluation

Item Responses

The distribution of responses for Mid-age women completing the full version of Survey 3 is shown in Table 1.

Internal reliability

Inter-item correlations are mostly low, with a maximum of 0.39 (Table 2).

Table 2 Pearson Correlations for 6 Perceived Control items

Item	b	c	d	e	f
a	0.23	0.34	0.34	0.17	0.25
b		0.21	0.37	0.37	0.33
c			0.26	0.16	0.32
d				0.34	0.39
e					0.31

Table 1 Distribution (%), mean (SD) and percent missing of responses to the 6 Perceived Control items (n = 11 196)

	How much do you agree or disagree with each of the following statements?	Percent				Mean (SD)	Number (percent) missing		
		Strongly disagree	Disagree	Slightly disagree	Slightly agree			Strongly agree	
Positive items									
a	At home I feel I have control over what happens in most situations	1.0	3.2	4.3	10.7	60.2	20.5	4.9 (1.0)	0.7
c	Over the next 5-10 years I expect to have more positive than negative experiences	0.7	3.0	4.0	15.6	59.8	17.0	4.8 (0.9)	1.4
Negative items¹									
b	I feel that what happens in my life is often determined by factors beyond my control	6.1	28.2	10.7	26.8	24.4	4.0	3.5 (1.4)	1.5
d	I often have the feeling that I am being treated unfairly	14.3	46.2	10.7	19.0	7.9	2.0	4.3 (1.3)	1.1
e	In the past 10 years my life has been full of changes without my knowing what will happen next	6.4	28.7	9.2	22.7	25.1	7.9	3.5 (1.5)	1.1
f	I gave up trying to make big improvements or changes in my life a long time ago	18.8	43.0	10.2	14.1	11.6	2.4	4.4 (1.4)	1.3

¹Codes reversed for calculation of means

Cronbach's alpha for the 6 items was 0.71, meeting the ALSWH criteria (Table 3). Internal reliability did not increase when individual items were deleted from the factor. Five of six item-to-total correlations do not meet the ALSWH evaluation criteria of 0.5.

Table 3 Correlation with item-total and Cronbach's alpha and item-total correlation for standardised variables with deletion of individual items.

Deleted item	Correlation with total	Cronbach's Alpha
None		0.71
a	0.40	0.69
b	0.46	0.67
c	0.39	0.69
d	0.53	0.65
e	0.40	0.69
f	0.49	0.66

Factor Analysis

Factor analysis using principal components estimation was performed on responses from women completing all 6 items (n=10 863). The eigenvalues-greater-than-one rule, parallel analysis and Velicer's MAP test all suggest one factor. That factor explained approximately 41% of the variance (Table 4). Loadings (un-rotated) on the first factor from the principal components solution were moderate for all items (> 0.57, Table 5) and exceed ALSWH evaluation criteria. Communalities for the one factor solution were between 0.33 and 0.53 for all items and do not meet ALSWH criteria.

Table 4 Results of factor analysis of 6 Perceived Control items

Factor	Eigenvalu e	Difference	Proportion	Simulated Eigenvalue ^a		Average ^b Squared Correlation
				Mean	95 th Percentile	
1	2.47	1.50	0.41	1.03	1.05	0.09
2	0.98	0.26	0.16	1.02	1.03	0.05
3	0.72	0.07	0.12	1.01	1.01	0.11
4	0.65	0.02	0.11	0.99	1.00	0.22
5	0.63	0.07	0.11	0.98	0.99	0.46
6	0.56		0.09	0.97	0.98	1.00

^a Parallel Analysis

^b Velicer's MAP test

Table 5 Factor loadings and communality estimates from un-rotated factor analyses of 6 Perceived Control items.

Item	Factor loading	Communality Estimate	Scoring coefficient
a	0.59	0.34	0.237
b	0.66	0.44	0.267
c	0.57	0.33	0.231
d	0.72	0.52	0.293
e	0.60	0.36	0.244
f	0.69	0.48	0.279

As a number of ALSWH criteria were not met (low item-total correlations and low communalities), scores for perceived control were compared for a variety of characteristics to determine whether or not scores operated as expected. An assessment of appropriate scoring was first conducted.

Derived Variable

Scores

A summed score was calculated as the unweighted mean of scores for the 6 items. Mean substitution for up to two missing values was allowed. Scores ranged from 1 to 6; with higher scores indicating more perceived control. The distribution of missing data for perceived control items are shown in Table 6.

A factor score was calculated as the total of the 6 item scores, weighted by the standardised scoring coefficients from the factor analysis for women with complete data for all 6 items (Table 5). Distributional properties of the sum and factor scores are shown in Table 7. All scores were approximately normally distributed.

Table 6 Number and percent of Perceived Control items missing (n = 11 196)

Number of items	Number	Percent	Cumulative percent
0	10863	97.0	97.0
1	188	1.7	98.7
2	43	0.4	99.1
3	15	0.1	99.2
4	15	0.1	99.3
5	17	0.2	99.5
6	55	0.5	100.0

Table 7 Distributional properties of sum and factor scores for Perceived Control

Score	Mean (SD)	Median	Skewness	Range
Sum score	4.23 (0.79)	4.33	-0.29	1.17-6.0
Factor score	5.00 (1.25)	5.12	-0.30	0.2-7.8

Since the correlation between the summed score and factor score was very high (0.99; n = 10 863) the use of summed scores is preferred.

Construct Validity

The mean of summed scores was compared for a variety of socio-demographic variables among women completing the full version of surveys 2 and 3 and all 6 items from the perceived control scale (Table 8). Generally the scores performed as expected.

Table 8 Mean (95% CI) of summed score from 6 perceived control items within categories for various socio- demographic characteristics; number and percent with each characteristic (n = 10 316)

	Mean (95%CI)	F-statistic (p-value)	Number	Percent
CESD				
Depressed	3.6 (3.6-3.6)	2353.95	2 108	21.3
Not depressed	4.4 (4.4-4.4)	(<.0001)	7 798	78.7
Occupation				
No paid job	4.1 (4.1-4.1)	80.19	2 425	25.5
Intermediate production/ transport/elementary clerical/labourer	4.2 (4.1-4.2)	(<.0001)	1 231	13.0
Trades/intermediate or advanced clerical/Sales	4.2 (4.2-4.3)		2 434	25.6
Manager/Professional/asso ciate professional	4.4 (4.4-4.4)		3 410	35.9
Qualifications				
No formal/year 10	4.1 (4.1-4.2)	74.17	4 917	48.0
Year 12	4.3 (4.2-4.3)	(<.0001)	1 712	16.7
Trade/Certificate	4.3 (4.3-4.3)		2 073	20.2
University degree	4.5 (4.4-4.5)		1 538	15.0
Work				
Full time	4.3 (4.3-4.3)	32.43	3 652	35.4
Part time/casual	4.3 (4.2-4.3)	(<.0001)	3 133	30.4
Home duties	4.1 (4.1-4.2)		3 242	31.4
Other	4.2 (4.1-4.3)		289	2.8
Marital Status				
Married or de facto	4.3 (4.2-4.3)	53.04	8 627	83.8
Other	4.1 (4.1-4.1)	(<.0001)	1 670	16.2
Area of Residence				
Urban	4.3 (4.2-4.3)	1.50	3 820	37.6
Large Rural	4.2 (4.2-4.3)	(0.2124)	1 418	13.9
Small Rural	4.2 (4.2-4.2)		4 401	43.3
Remote	4.3 (4.2-4.3)		532	5.2
<i>Continued next page</i>				
Language group				
English	4.2 (4.2-4.3)	16.35	9 711	95.7
Other	4.1 (4.1-4.2)	(<.0001)	432	4.3
Country of birth				
Australian born	4.2 (4.2-4.3)	3.11	7 936	77.8
Other country of English- speaking background	4.3 (4.3-4.3)	(0.0144)	1 390	13.6

	Mean (95%CI)	F-statistic (p-value)	Number	Percent
Europe	4.3 (4.1-4.3)		596	5.8
Asia	4.2 (4.1-4.3)		208	2.0
Other	4.1 (3.9-4.3)		77	0.8
SES class				
Upper class	4.5 (4.3-4.6)	126.74	102	1.0
Middle class	4.4 (4.4-4.4)	(<.0001)	5 171	50.9
Lower class	4.1 (4.1-4.1)		4 401	43.4
Don't know	4.1 (4.0-4.2)		479	4.7
Health care card				
Yes	4.0 (3.9-4.0)	278.01	1 961	19.1
No	4.3 (4.3-4.3)	(<.0001)	8 285	80.9
Manage on income				
Impossible/difficult all of the time	3.7 (3.6-3.7)	419.47	1 101	10.8
Difficult some of the time	4.1 (4.0-4.1)	(<.0001)	2 750	26.9
Not too bad	4.4 (4.3-4.4)		4 476	43.8
Easy	4.6 (4.5-4.6)		1 883	18.4
Income				
None-\$119 per week	4.1 (4.1-4.2)	39.98	1 014	12.6
\$120-\$299 per week	4.1 (4.0-4.1)	(<.0001)	1 505	18.7
\$300-\$499 per week	4.2 (4.2-4.2)		1 542	19.2
\$500-\$699 per week	4.3 (4.2-4.3)		1 232	15.3
\$700-\$999 per week	4.4 (4.4-4.5)		1 040	12.9
\$1000+ per week	4.5 (4.5-4.6)		771	9.6
Don't know/don't want to answer	4.2 (4.2-4.3)		944	11.7
Household income				
None-\$299 per week	3.9 (3.8-3.9)	85.94	886	8.8
\$300-\$499 per week	4.0 (4.0-4.1)	(<.0001)	1 373	13.7
\$500-\$699 per week	4.2 (4.1-4.2)		1 546	15.4
\$700-\$999 per week	4.3 (4.3-4.3)		1 676	16.7
\$1000-\$1499 per week	4.4 (4.3-4.4)		1 742	17.4
\$1500 + per week	4.5 (4.5-4.5)		1 422	14.2
Don't know/don't want to answer	4.2 (4.2-4.2)		1 384	13.8

*Numbers may vary due to missing values

Interpretation

Thus, the 6 items form scores referred to as “Perceived Control scores”. Higher scores indicate greater perceived control over one’s life.

Recommendation for usage

The approximate normality of the score suggests use as a continuous measure in statistical analysis is appropriate.

The SAS code defining perceived control is:

```
/* re-scale codes 1 to 6 ==> 0 to 5 **/;  
PC1 = m3q83a -1 ;  
PC3 = m3q83c -1 ;  
  
/*reverse code negative items AND  
re-scale codes 1 to 6 ==> 0 to 5 ***/;  
PC2 = 6-m3q83b;  
PC4 = 6-m3q83d;  
PC5 = 6-m3q83e;  
PC6 = 6-m3q83f;  
  
/*create summed score for perceived control*/;  
array PC{6} PC1 PC2 PC3 PC4 PC5 PC6 ;  
  
M3PerCon = . ;  
if m3survey = 1 and nmiss(of PC{*}) in (0,1,2) then do;  
  M3PerCon = sum(of PC{*}) + (nmiss(of PC{*})*mean(of PC{*})) ;  
end;
```

References

1. Marmot MG, Bosma H, Hemingway H, Brunner E, Stansfeld S. Contribution of job control and other risk factors to social variations in coronary heart disease incidence. *Lancet* 1997 July 26;350 (9073):235-9
2. Karasek R. Department of Work Environment, University of Massachusetts Lowell. Available at <http://www.uml.edu/Dept/WE/research/jcq/jcq.htm> [Accessed 6 April 2004]
3. Bobak M, Pikhart H, Hertzman C, Rose R, Marmot M. Socioeconomic factors, perceived control and self-reported health in Russia. A cross-sectional survey. *Social Science and Medicine* 1998;47(2):269-279.
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