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The Spielberger Anger Expression Scale: Some psychometric data

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Some general population norms for the Spielberger, Johnson *et al.* (1984) Anger Expression Scale (AX) are reported for a sample of over 1000 adults tested in a general health survey of a New Zealand community. Factor analysis confirmed the independence of the Anger/In and Anger/Out subscales, and the measure was found to have satisfactory levels of reliability.

Style of anger expression has frequently been related to the development of chronic health problems, in particular, coronary heart disease (CHD) and essential hypertension. One obstacle to the progress of research in this area has been the absence of a well-founded procedure for assessing anger expression. In response to this, Spielberger and his associates have developed the Anger Expression Scale (AX; Spielberger *et al.* 1984). The AX is a 20-item scale, with eight items measuring Anger/In (AXI), eight items measuring Anger/Out (AXO), and four items tentatively measuring a third construct, Anger/Control (AXCON). The AXI scale assesses the tendency to suppress anger, AXO the disposition to display anger overtly, and the total scale score (AXEXP; Anger Expression), the tendency to respond to angry feelings by the overt or covert expression of anger. The aim of the present report is to provide further normative, reliability, and validity data for the AX.

The AX was administered to 1120 subjects over the age of 15 (78 per cent of the total population within the age range), during the course of a health survey of the rural town of Milton, a community 54 km from Dunedin, New Zealand. The method of recruiting subjects, the occupation rates of the male subjects, and the procedures used, have been described elsewhere for the previous three-yearly surveys of Milton (Knight, Waal-Manning & Spears, 1983; Knight, Paulin & Waal-Manning, 1987). A total of 96 per cent of the sample identified themselves as European in ethnic origin, 2 per cent as Maori, and 2 per cent Chinese. The AX was scored according to the scoring guide prepared by Spielberger (1985). The AXI score comprised the sum of scores on items 3, 5, 6, 10, 12, 14, 15 and 18; the AXO score was the sum of scores on items 2, 7, 9, 11, 13, 19, and 20; the AXCON score the sum of items 1, 8, and 6; and AXEXP was the sum of scores on the AXI, AXO, and item 4, plus a constant of 15, minus the AXCON score.

Results from subjects who left blank any of the items on the AX scale were omitted, leaving a total of 1023 subjects (506 males, 517 females) who responded to all 20 items. The means and standard deviations of the AXI, AXO, and AXEXP scales, and the number of subjects in each age range and of each sex are presented in Table 1. It was decided to omit data from the AXCON scale which is currently being revised and has only three items. In Table 1, higher scores reflect higher levels of anger-in, anger-out, or anger expression. A series of independent *t* tests for each age revealed that there was

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Table 1. Means and standard deviations (in parentheses) of the AX scale scores

Age	*n*	AXI	AXO	AXEXP
Male				
16–19	37	15.32 (3.33)	16.59 (3.92)	43.22 (5.54)
20–29	98	15.14 (3.49)	14.59 (2.97)	41.11 (4.82)
30–39	132	14.85 (3.29)	13.49 (2.91)	40.18 (4.40)
40–49	87	15.48 (3.74)	13.26 (3.02)	40.83 (5.25)
50–59	67	14.75 (3.18)	13.75 (3.14)	40.43 (5.41)
60–69	57	14.81 (3.01)	13.07 (2.91)	39.88 (4.85)
70–79	25	14.20 (2.61)	13.11 (2.40)	39.52 (4.07)
80–89	3	14.33 (5.03)	12.75 (2.97)	40.67 (7.50)
Female				
16–19	24	16.46 (4.38)	16.12 (3.28)	44.42 (4.90)
20–29	116	15.09 (3.48)	14.42 (3.33)	41.20 (5.40)
30–39	138	14.64 (3.33)	14.03 (3.16)	40.60 (5.45)
40–49	70	15.34 (3.85)	12.65 (3.37)	40.16 (5.67)
50–59	74	14.88 (3.22)	12.69 (2.79)	39.31 (5.10)
60–69	59	16.22 (3.70)	12.80 (2.96)	40.90 (5.30)
70–79	32	14.97 (3.10)	11.86 (2.24)	38.74 (4.63)
80–89	3	14.00 (1.00)	9.67 (1.53)	35.33 (0.58)

no significant difference between males and females on the AXI, AXO, or AXEXP. Age was significantly correlated with AXO scores ($r = -0.14$, $P < 0.01$ for males, $r = -0.18$, $P < 0.01$ for females) but not with either the AXI or AXEXP scores. The correlation between AXI and AXO, although significant for both men ($r = 0.13$, $P < 0.001$) and women ($r = 0.17$, $P < 0.001$), was small in magnitude. Coefficient alpha for the AXO scale was 0.73, equivalent to the alpha coefficients reported by Spielberger. The alpha coefficient of 0.70 for the AXI scale was somewhat lower than those reported by Spielberger *et al.* (0.84 and 0.81 for males and females, respectively). Item–total correlations for the AXI ranged from 0.22 to 0.48 in the present study, also somewhat lower than the range reported by Spielberger *et al.* The range of item–total correlations for the AXO, 0.33 to 0.52, was comparable to the range Spielberger reported.

As a further check on the validity of the AX, the factor analytic procedures used by Spielberger *et al.* (1984) were replicated. Factors were extracted using the principal axis method with squared multiple correlations used as estimates of the communalities, and rotated to simple structure using the Kaiser varimax procedure. It was found initially that four factors had latent roots greater than 1.00, and successive rotations of the 4, 3 and 2 factor solutions were then carried out. The two factor solution was found to have the best approximation to simple structure and to provide the most psychologically meaningful construction of the data. AXO items had high loadings on Factor 1 while AXI items loaded on Factor 2. AXCON items also loaded highly on Factor 1 and did not feature as a coherent group of items on either the 3 or 4 factor solutions. The pattern of results which emerged was similar to that of Spielberger *et al.* The only substantial discrepancies between the present results and those of Spielberger were on item 3 ('I keep things in'), which in our study had a high loading on Factor 1, and item 5, which loaded on both factors in our study. Item 5 ('I pout or sulk') may be somewhat ambiguous with respect to anger expression, given that it comprises two distinct behaviours.

There has been considerable confusion in the past about the measurement of such concepts as anger, hostility, and aggression. The new AX scale complements Spielberger's trait anger inventories and assesses style of anger expression in a plausible and unambiguous manner. There is good evidence fom the present study to suggest that the AX subscales are valid, and that AXI and AXO measure two relatively independent dimensions. Further refinements of the AX scale are necessary; in particular, the

validity and meaning of the AXCON items need to be clearly established. The number of items on this scale needs to be increased, and the status of the scale with respect to anger-in and anger-out needs to be clarified.

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