

An examination of the psychometric properties of the Crown-Crisp Experiential Index¹

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The psychometric characteristics of the Crown-Crisp Experiential Index (CCEI) are discussed in relation to data collected during the course of two general health surveys conducted in 1975 and 1978. Some of the scales, notably that measuring obsessionality, are found to have low internal consistency suggesting that the items are highly heterogeneous. Examination of both the intercorrelations between scales and the correlation between this test and the results from other personality measures administered concurrently, suggest that some CCEI scales do not have encouraging discriminative validity.

The Crown-Crisp Experiential Index (CCEI) is a 48-item self-report questionnaire known originally (Crown & Crisp, 1966) as the Middlesex Hospital Questionnaire. The CCEI comprises six sub-scales designed to assess free-floating anxiety (FFA), phobic anxiety (PHO), obsessionality (OBS), somatic concomitant of anxiety (SOM), depression (DEP) and hysterical personality (HYS). There are eight items for each subtest and detailed descriptions of the sub-scale dimensions are provided in the test Manual (Crown & Crisp, 1979). The CCEI has found considerable favour in the United Kingdom as a measure of personality characteristics in correlational studies in the area of psychosomatic research (e.g., Bulpitt, Hoffbrand, &

Dollery, 1976), psychopathology (e.g., Cockett, 1969; McKerracher, Loughnane, & Watson, 1968), psychosocial adjustment in undergraduates (e.g., Howell, Crown, & Howell, 1973), and in a variety of other situations where a rapid assessment of neurotic personality features is required.

The purpose of the present paper is to evaluate critically the psychometric characteristics of this inventory using data from a large sample of New Zealand subjects who completed the CCEI. In May 1975 and again in May 1978, a general health survey was conducted in Milton, a rural community 54 km south of Dunedin. In the course of both surveys, data on an extensive range of medical, physical, and social variables were collected and a number of personality inventories administered. On both occasions the CCEI was amongst the measures used, and scores from over 1000 subjects were available for the analyses reported below.

Method

Subjects

In both surveys, all households within the

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boundaries of the Milton borough were approached, the number of persons aged 16 or over who generally lived there ascertained, and volunteers were asked to attend a health assessment session at the local high school. A total of 1208 subjects (591 males and 615 females) were tested in 1975, about 82% of the population of Milton in the required age range, while 1165 people completed the CCEI in 1978 (81% of population).

Procedure

The completion of the CCEI was supervised by trained medical students and the total assessment time for subjects in the survey extended over about two hours. In 1975 the CCEI was the only psychometric questionnaire administered; in 1978 subjects also completed the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Luchene, 1970) and the Self-Rating Depression Scale (SDS; Zung, 1965). The CCEI was administered and scored as directed in the Manual.

Results

Means and standard deviations on each scale were computed for the 1975 data and univariate F-tests revealed that on all scales except HYS females scored significantly more highly than males (in each case $p < .01$). On the HYS scale however, males scored more highly than females ($P < .01$). Correlations between scale scores and age for the 1975 data are presented as part of Table 1. In 1978 a total of 837 people were retested and the correlations between the scores collected with a three year retest interval are shown in Table 1. In addition, alpha coefficients were computed (Table 1) as a measure of the internal consistency of each of the six scales, using the 1978 data. To identify items with little potential for discriminating normal from deviant groups, the mean score on each item was calculated. Those items with large positive scores (indicating a high likelihood of the presence of the symptoms specified in the item amongst the general population) were examined. Items with an average score of .8 or greater (from a maximum of 2) are listed in Table 2. In all there were 10 items which had mean scores greater than .75, three on the obsessional scale, two on each of the three anxiety scales, and one on the depression scale.

Table 1: *Reliability coefficients and correlations between scale scores and age.*

	Alpha Coefficients ^a	Three Year Correlations	Age Correlations ^b
FFA	.75	.32	-.08
PHO	.63	.50	.04
OBS	.42	.10	.20
SOM	.61	.37	.31
DEP	.50	.59	.21
HYS	.51	.47	-.34

a Calculated using the 1978 sample

b Calculated using the 1975 sample

Finally, the present data allow some examination of the validity of the CCEI scales. Table 3 details the intercorrelations between scales for the 1975 data, providing an indication of the discriminative validity of these scales for a general population sample. For the 1978 data it was possible to correlate CCEI scale scores with results from the SDS and the STAI (see Table 4). All of the CCEI scales except OBS and HYS correlated significantly with the STAI scales. The correlations between the anxiety scales of the CCEI (FFA, PHO, and SOM) and the STAI scales are significant but their absolute values are not high. The SDS correlated most highly with DEP, but was also correlated significantly with the three CCEI anxiety scales.

Discussion

The reliability and validity statistics calculated for the CCEI in the present study raise some serious doubts about the usefulness of employing this measure to screen for psychoneurotic symptomatology in the general population. The test-retest reliabilities with a three year interval are uniformly low ranging from .10 to .59, substantially lower than the range of reliabilities reported after one year (from .68 to .77) by Crown, Duncan, and Howell (1970). This result is to be expected given that neurotic features are likely to be episodic and time limited in a general population sample. Of more concern however are the internal consistency statistics reported in this study (ranging from .42 to .75) which are similar to Crown et al.'s (1970) split half reliabilities (which range

Table 2: CCEI items with a mean score greater than 0.80.

	Mean
Are you happiest when working	1.49
Do you think that "cleanliness is next to godliness"	1.37
Do people ever say you are too conscientious?	.91
Do you worry unduly when relatives are late home	.85
Do you feel unduly tired and exhausted?	.82

Table 3: Intercorrelations between the CCEI scales for the 1975 sample.

	PHO	OBS	SOM	DEP	HYS
FFA	.53**	.41**	.47**	.53**	.19**
PHO		.34**	.34**	.41**	.02
OBS			.33**	.38**	.11**
SOM				.50**	.00
DEP					.12**

** p<.01

from .43 to .60), and which indicate a disturbing degree of heterogeneity amongst the items of each scale. The low internal consistency scores are probably the combined result of the small number of items per scale, and the apparent heterogeneity of the items. The OBS scale for example has the lowest alpha coefficient and contains three items on which normal subjects on the average scored highly. This mixture of high and low scoring items for normals contributes in large part to make the scale heterogeneous and unreliable. The test authors responded to the low estimates of reliability that they calculated by questioning the "underlying rationale of 'reliability', as it is understood in formal psychometrics" (Crown & Crisp, 1979; p. 921). Their argument may be valid in some clinical situations—for example low retest reliabilities may help establish that a particular scale is likely to be sensitive to changes in patient symptom levels over time. It is however also the case that measurement

error in any test will attenuate the correlation between that test and any other variable (Nunnally, 1967; p. 203-204). Using the CCEI to uncover associations between personality traits and other mental or physical health factors will possibly be less productive than using measures with more stable psychometric characteristics.

The intercorrelations between the scales of the CCEI are all high and significant except for the correlations between HYS and the other five scales. At issue here is the discriminative validity of the scales and the extent to which scores on the CCEI can be used to distinguish between different disorders. Highly homogeneous scales with low intercorrelations are most desirable in a diagnostic instrument. In this case only the HYS scale can be distinguished from the other scale in terms of the magnitude of the correlations. Without supporting evidence for the construct validity of the HYS scale, this result is difficult to interpret unequivocally. It does provide preliminary evidence however, that the discrimination between hysterical personality and other neurotic personality types can be made more efficiently than any other possible discrimination between personality types measured by the CCEI scales. The CCEI scale intercorrelations reported in the manual also tend to be high, which reinforces these concerns. While it may be the case—as the authors argue in the Manual—that a broad spectrum of neu-

Table 4: Correlations between the STAI A-State and A-Trait scales, the Zung SDS, and the scales of the CCEI.

	FFA	PHO	OBS	SOM	DEP	HYS
STAI A-State	.19***	.25***	-.01	.14***	.28***	.05
STAI A-Trait	.26***	.28***	.01	.20***	.39***	.06
Zung SDS	.27***	.29***	.04	.29***	.40***	.01

*** p<.001

rotic features tend to coexist in the symptom pattern of psychiatric outpatients, low discriminative validity undermines the credibility of the CCEI as a diagnostic instrument. The low correlations between the anxiety scales of the CCEI (FFA, PHO, and SOM) and the STAI scales suggest that CCEI scales measuring anxiety symptoms can not necessarily be used interchangeably with the STAI, which is a well substantiated measure of general and state anxiety level. The high correlation between the Zung depression measure and Depression scale of the CCEI is good evidence for the construct validity of the DEP scale. There is an obvious tendency in Table 3 and 4 for depression and anxiety scores to be correlated, which may be a result which challenges the validity of the scales used, or may reflect the tendency for low levels of anxiety and depression to covary in the general population. The extreme skewedness of the responses on many of the items precluded the possibility (suggested by Eysenck, 1978) of conducting a factor analysis, which would have permitted further investigation of the homogeneity and construct purity of the CCEI scales. Clearly however further studies with clinical populations to establish the ability of the CCEI scales to discriminate between different neurotic symptom patterns are urgently required if this test is to claim a position as a useful diagnostic screening inventory.

References

- Bulpitt, C. J., Hoffbrand, B. I., & Dollery, C. T. Psychological features of patients with hypertension attending hospital follow-up clinics. *Journal of Psychosomatic Research*, 1976, 20, 403-410.
- Cockett, R. A. short diagnostic self-rating scale in the preadult remand setting. *British Journal of Psychiatry*, 1969, 15, 1141-1150.
- Crown, C., & Crisp, A. H. A short clinical diagnostic self-rating scale for psychoneurotic patients. *British Journal of Psychiatry*, 1966, 112, 917-923.
- Crown, S., & Crisp, A. H. *Manual of the Crown-Crisp Experiential Index*, London: Hodder and Stoughton, 1979.
- Crown, S., Duncan, K. P., & Howell, R. W. Further evaluation of the Middlesex Hospital Questionnaire (MHQ). *British Journal of Psychiatry*, 1970, 116, 33-37.
- Eysenck, H. J. Middlesex Hospital Questionnaire. In O.K. Buros (ed.) *The Eighth Mental Measurements Yearbook*. Highland Park, New Jersey: The Gryphon Press, 1978.
- Howell, R., Crown, S., & Howell, R. W. Personality and psychosocial interactions in an undergraduate sample. *British Journal of Psychiatry*, 1973, 122, 699-701.
- McKerracher, D. W., Loughnane, T., & Watson, R. A. Self-mutilation in female psychopaths. *British Journal of Psychiatry*, 1968, 114, 829-832.
- Spielberger, C. D., Gorsuch, R. L. & Lushene, R. E. *Manual for the State-Trait Anxiety Inventory*. Palo Alto, California: Consulting Psychologists Press, 1970.
- Zung, W. W. K. A Self-Rating Depression Scale. *Archives of General Psychiatry*, 1965, 12, 63-70.