

## The psychometric cross-cultural validation of the impact of event scale

*Abstract: Data is presented from a sample drawn from the general Fiji population to standardise the Impact of Events Scale (IES) and to prepare percentile tables from which validating comparisons could be made with the scores of two target groups from a previous Fiji study. Detailed statistical analyses gave strong support for a general factor and marginal support for the two specified subscale/ factors of the measure. Comparisons of group mean scores, and others using the percentile tables, gave confidence that the full IES rating scale was appropriate for the purpose for which it was used, and indicate that clinicians in Fiji might use the IES confidently to validate the judgments of traumatic stress they make from their interviews - presently they have no such psychometric tool available. (Pacific Health Dialog 2003, Vol. 10 (2); Pg 66-70)*

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### Introduction

By now it is a truism that clinical concepts developed in one country and psychometric measures to support them must be used with hesitation elsewhere until they have been validated, because different attitudes to test-taking, the relevance of test-items, and the cultural significance of signs observed and symptoms reported have to be taken into account when making diagnoses (Marsalla, Friedman, Gerrity, & Scurfield, 1996). Also as De Girolamo and McFarlane (1996) point out, 'the differences between cultural patterns, social structures, and coping behaviours of developed and developing countries may significantly influence the incidence, severity, and psychosocial outcome'.

Yet in practice the necessary validation is often difficult to make because there is often a shortage of local clinicians in host countries to give guidance in such matters, and sometimes a sense of urgency precludes a preliminary appraisal of the cross-cultural properties of the measures that it might seem appropriate to use. For these reasons when a project on the stress of hostages and their families was undertaken at short notice in Fiji (Taylor, Nailatikau, & Walkey, 2002), standard rating scales were used on a provisional basis until their psychometric, properties could be confirmed cross-culturally with a normative sample of Fiji nationals

that was known not to have been subject to the same critical stress as the target groups. The first of such scales was the 20 item General Health Questionnaire (GHQ) (Siegert, McCormick, Taylor, & Walkey, 1987), and it was standardised with participants drawn from Fiji School of Medicine and the staff of the Colonial Hospital in Suva (Taylor, Aghanwa, & Walkey, unpublished). The second was the 15 item Impact of Event Scale (IES) (Horowitz, Wilner, & Alvarez, 1979), the results of which are to be detailed below.

By way of explanation, the IES developed from a concern for the measurement of subjective stress (Horowitz, 1976). Subsequently it became central in the diagnosis of posttraumatic stress disorder (Zilberg, Weiss, & Horowitz, 1982), and was found useful in the assessment of soldiers suffering combat stress (Schwarzwald, Solomon, Weisenberg, & Mikulincer, 1987) and of disaster stress casualties in general (Green, 1991; Amir, Kaplan, & Kotler, 1996). It has also been used cross-culturally, apparently without standardisation (Sack, Clarke, Him, Dickason, Goff, Lanham, & Kinzie, 1993; Savin, Sack, Clarke, Richart, & Meas, 1996). The original form consisted of 8 items relating to the symptom cluster of Avoidance, and 7 items relating to that of Intrusion, and it was used in the present study. There is a revised version (Weiss & Marmar, 1997) that includes items relating to hyperarousal and uses a slightly different scoring system, but according to Foa and Meadows (1997) it has produced mixed results.

### Method

The first author administered the original IES to a normative sample of 197 hospital staff and medical students in Fiji, none of which was a clinical patient or regarded as being in need of psychological treatment, and none was directly related to the hostages and their families involved in the earlier clinical study. But like other members of the wider Fijian community at the time, all were likely to have been affected to some degree by the prolonged economic and social repercussions of the political coup that had taken place in their country

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(Sharma, 2001), and it made sense to ask them to respond to the impact of that particular event when completing the IES.

The data set was processed with the SPSS10.0.0 Package (9), and the subsequent confirmatory factor analyses with Amos 4.0 (Arbuckle & Wothke, 1999). An initial single component analysis of responses to the measure overall was made to identify items that might have evoked responses atypical of psychological dysfunction in the Fiji population.

Then with such adjustments being made as seemed appropriate, the plan was to make both two-factor structure and single general factor analyses were made of the responses to be sure that the actual observations were not unacceptably different from that which might be expected from the prescribed factor models. In turn, each analysis involved a cluster of the four highly correlated indicators commonly used to examine the relationship between the response data and the model under scrutiny - i.e. the Chi square, Chi square to degrees of freedom ratio, Goodness of Fit Index GFI, and the Root Mean Square of Approximation (RMSEA).

It has to be noted that in using such indicators,

1. Contrary to the normal manner in which the results of chi square analyses are interpreted, confirmatory factor analysis involves a search for differences between the theoretical model and the observed data that are too small to be statistically significant.

2. Because there is no specific statistical test to determine the significance of the chi square to degrees of freedom ratio, (nor for that matter of the two indices of fit referred to in the following two paragraphs), the convention was adopted that set the acceptable ratio at a level of less than 2.00.

3. For the same reason the convention was adopted that set the acceptable GFI approaching 1.00, the adequate GFI at 0.95, and 'marginally adequate' GFI close to the latter criterion.

4. The RMSEA gives an index of the *inadequacy* of the model. It follows that if the converse were true and the model was adequate, the RMSEA index should be close to zero, but because in practice an approximation of 0.08 or less meets

with general acceptance the same option was adopted here.

5. Following Kishton and Widaman (1994), two strategies were used to minimise the effects of error variance. The first was based on the analyses of responses of 120 randomly selected respondents, and second based on factor-parcels of items rather than on individual items.

Then the confirmatory factor analyses were followed by calculations of the means, standard deviations, and estimates of the reliability of each of the two subscales and the full scale. Finally, a table of percentile norms was created from the responses of this community sample against which in future the scores from groups under more direct traumatic stress from specified critical events in their lives might be compared.

As a validation of the measure, comparisons were made between the responses of members of this present relatively unstressed normative group and those given previously by the participants in the earlier hostage study that had been assigned on the basis of a clinical assessment into either an acutely stressed or a relatively unstressed group.

**Res u Its**

1. The initial unrotated principal component loadings ranged from 0.58 to 0.82, and suggested a strong general factor beneath the responses that required confirmatory factor analysis.

**Table 1: Norms: Summary Statistics and Reliabilities of the Two Sub-scales and of the full Fifteen Item Impact of Events Scale**

Percentile	Intrusion Subscale	Avoidance Subscale	Full Scale
1-10	0-1	0	0-2
11-20	<b>2-3</b>	<b>1-4</b>	3-10
21-30	<b>4-5</b>	<b>5-7</b>	11-14
<b>31-40</b>	<b>6-7</b>	<b>8-9</b>	15-17
41 -50	<b>8 - 9</b>	10	18 - 20
51 - <b>60</b>	10	11 -12	21 - 22
<b>61 -70</b>	11	13	23 - 24
71 -80	12 - 13	14	25 - 27
81 -90	14	15 - 18	28 - 31
91 - 95	15 - 16	19 - 20	32 - 34
<b>96 - 100</b>	17 - 35	21 -40	35 - 75
Mean	<b>8.72</b>	10.32	19.08
Standard Deviation	5.09	5.97	10.04
Alpha	0.84	0.84	0.90
Split Half	<b>0.76</b>	0.80	0.83

2. The subsequent psychometric evaluation of the 15 item IES Scale are set out fully in Table 1 together with the decile grouping of the responses to the separate subscales of Intrusion and Avoidance and the combined Full Scale. In more detail:

**Confirmatory Factor Analyses**

a) The statistical evaluation using four factor based groups of items, showed the two-factor structure to be only marginally adequate, with a Chi square value of 5.76, df=1, p<.02, a Chi square to df ratio also 5.76 and hence considerably above the rule of thumb maximum of 2.00. The GFI could be regarded as quite adequate at 0.98, whereas the RMSEA could only be considered marginally so at 0.20. The confirmatory analysis between the two subscales gave an estimated correlation of 0.79.

b) The evaluation of the general factor underlying the measure yielded somewhat more positive results, with a Chi square value of 3.27, df=2, p<0.20 giving a stronger result than the two-factor solution. The corresponding Chi square to df ratio of 1.64 was acceptable, while the GFI level of 0.99 was quite adequate, and the RMSEA level of 0.05 was perfectly acceptable.

3) A summary of the test scores of the normative group and of the two groups assessed during the hostage crisis is given in Table 2. It shows that the mean score for the relatively unstressed group in the earlier hostage study did not differ significantly from that of the normative group on either of the two IES subscales or on the full scale, but the mean score of the acutely stressed group was markedly higher on all three - the Intrusion scale, t (223) = 16.24, p<.001, for the Avoidance scale, t (223) = 10.09, p<.001, and for the Full Scale, t (222) = 14.59, p<.001.

When the scores of the acutely stressed and the relatively unstressed groups were compared with the norms given in Table 1, it was found that while the mean scores of those clinically assessed as non-symptomatic lay between the 40<sup>th</sup> and 60<sup>h</sup> percentile levels on both the Avoidance and the Intrusion subscales and on the Full Scale, the mean scores of members of the stressed group on all scales lay within the top five percentile range in all three comparisons.

**Discussion**

The Full Scale IES results showed clear differences between the present normative group and a clinical group diagnosed previously as stressed, while showing no such differences in a comparison with a group diagnosed previously as relatively unstressed. However, confirmatory factor analysis of the subscales of the IES provided less than desirable endorsement for their use separately as markers of different symptoms of stress.

While the estimates of reliability of the separate subscales might be considered adequate for such brief measures, the confirmatory analysis warns that these indices may well be sustained within the subscales by the same general factor underlying both. In fact the correlation of 0.79 found between the two subscales could be regarded more as an indicator of parallel forms of the same measure than as an indication of distinguishable, independent variables, and it also compares more than adequately with the indicators of internal consistency found in the reliability analyses.

**Conclusions**

The Impact of Events Full Scale proved to be a psychometrically adequate measure for the cross-cultural purpose for which it was used in Fiji, with the caveat that scores on the individual subscales of Intrusion and

Avoidance appear not to provide reliable clinical indicators for samples of the population other than those that are in a clinical condition of acute stress. The validity of the IES for use in Fiji was strongly supported by the results of a psychometric examination of the responses of the normative group in relation to those of groups diagnosed in an earlier study the time of

the hostage crisis in Fiji as being either acutely stressed

**Table 2. Summaries of the test scores of the normative group and of the two groups identified as either acutely stressed or relatively unstressed during the hostage crisis**

Scale	Group	Mean	Standard Deviation.	N
Intrusion	Normative	<b>8.72</b>	5.09	197
	Non-symptomatic	<b>9.62</b>	<b>7.92</b>	13
	Symptomatic	<b>26.43</b>	<b>7.92</b>	<b>28</b>
Avoidance	Normative	10.32	5.97	197
	Non-symptomatic	8.38	10.92	13
	Symptomatic	23.21	8.46	28
Full Scale	Normative	19.08	10.04	197
	Non-symptomatic	18.00	15.36	13
	Symptomatic	49.64	12.44	28

or not. On both the individual subscales and the full Impact of Events Scale, the acutely stressed hostage group in the earlier study scored significantly higher than the other groups, but on the same scales there were no significant differences between the scores of the relatively non-stressed group in the earlier study and the group used in the present standardisation. The decile rankings of the mean IES scores of three groups gave further support to such findings.

In short, the psychometric evaluation endorsed the use of the full scale of the IES with a Fijian population in terms of factor structure, and demonstrated its validity in use with quite a different cultural population from that for which it was originally designed.

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I have myself spent nine years in a lunatic asylum and have never suffered from the obsession of wanting to kill myself; but I know that each conversation with a psychiatrist in the morning, made me want to hang myself because I know  
I could not strangle him  
Atonin Artaud (1896 - 1948)