

Factor Structure, Validity, and Reliability of the Fear Questionnaire in a Hong Kong Chinese Population

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Accepted: August 8, 1994

This study examined the factor structure, validity, and reliability of the Fear Questionnaire in Hong Kong. The sample consisted of 226 college students who were ethnic Chinese and they came from different parts of Hong Kong. Exploratory factor analysis produced three meaningful factors. Confirmatory factor analysis supported the three-factor model of Marks and Mathews (1979) in the present sample of subjects. Findings also showed that the Fear Questionnaire was both reliable and valid. Limitations of the study and implications for future research in this area were discussed. In particular, the need to assess the cross-cultural application of the Fear Questionnaire was stressed.

KEY WORDS: fear questionnaire; factor structure; validity; reliability; anxiety assessment.

INTRODUCTION

Among anxiety disorders, phobias occupy an important position and are evident in the clinical research of maladaptive behaviors (e.g., Barlow, 1988). Phobias have been found to be the most common mental disorder in the United States. The estimated lifetime prevalence rate is 12.53% (Compton *et al.*, 1991), with more than 15 million individuals affected at any given time (National Institute of Mental Health, 1985). In a large-scale community mental health survey conducted in Hong Kong (Chen *et al.*,

This research project was supported by the Research and Conference Grants of the University of Hong Kong.

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1993), anxiety disorders, next to tobacco dependence, are found to be the most common psychiatric disorders, with an overall life prevalence rate of 8–11%. Among anxiety disorders, all phobias show a lifetime prevalence of 6.54% for young adult females, compared to 1.13% for young adults males. Given the prevalence of phobic disorders, the development of a reliable and valid instrument for phobia measurement is both clinically useful and necessary (Oei, Moyland, & Evans, 1991).

During the past three decades, a number of scales have been developed to assess phobic disorders. One popular measure is the Fear Survey Schedule (Wolpe & Lang, 1964). However, the scale seems to reflect mainly negative affective responses to thoughts of the occurrence of specific fearful events rather than assessing fearful behaviors per se. Another popular measure is the 25-item Fear Questionnaire (FQ; Marks & Mathews, 1979; Moyland & Oei, 1992), a short self-rating form used to assess and monitor changes in the phobic patients. The FQ was considered to be the most frequently used standardized, self-report instrument in a recent survey of outcome studies of behavioral treatment for agoraphobia (Trull, Neitzel, & Main, 1988).

The FQ is appealing because of its brevity, inclusion of agoraphobia items (underrepresented in other similar measures), exclusion of rarely encountered items, and emphasis on agoraphobia and social fears (as opposed to simple phobias), which are usually the main reasons for patients to seek treatment. It is also easy to score and has been found to have a good reliability (Marks & Mathews, 1979; Michelson & Mavissakalian, 1983; Arrindell, Emmelkamp, & Van Der Ende, 1984) and validity (Mavissakalian, 1986; Oei, Moylan, & Evans, 1991). Normative data have also been reported for both normals (Mizes & Crawford, 1986) and anxiety-disorder patients (Oei, Moyland, & Evans, 1991). In addition, the FQ has been translated into French (Cottraux, Bouvard, & Messy, 1987), Italian (Saviotti, Grandi, Canestrari, & Fava, 1989), Spanish (Tejero, Avila, San, & Torrubia, 1989), and Dutch (Arrindell & Zwaan, 1982) and found to be of cross-cultural application (Arrindell *et al.*, 1984; Moyland & Oei, 1992).

Despite the popularity of the FQ in the West, no research on the scale has been conducted in the East as yet. In Hong Kong, where anxiety and phobia are considered a widespread problem, Western developed behavioral therapy procedures are sometimes employed to treat phobia-related problems. However, a reliable and valid measure for the investigation of anxiety and phobia here is lacking. In view of the effectiveness of the FQ in phobia assessment in the West, it will be important to demonstrate its appropriateness for use among the Chinese in Hong Kong. The present study was undertaken to evaluate the psychometric property, validity and utility of the FQ in a sample of college students. Specifically, the study

was undertaken to investigate the factor structure, internal consistency and validity of the FQ within a Hong Kong Chinese context.

METHOD

Subjects

The sample consisted of 226 first- to third-year undergraduate students (32 males and 194 females) from the University of Hong Kong. They ranged in age from 18 to 31 years ($M = 19.72$, $SD = 1.26$) and came from various academic departments, including arts, social sciences, business administration, science, and law. All of the participants are ethnic Chinese whose first language is Chinese. They participated in the study on a voluntary basis and indicated that they had not received previous treatment for a phobic condition before. The sample could be considered heterogeneous, as students came from different socioeconomic backgrounds and districts of Hong Kong.

Measures

Fear Questionnaire (FQ; Marks & Mathews, 1979). Subjects responded to the 15-item FQ and their scores ranged from 0 to 120, yielding a "Total Phobia" score. The questions on the main target phobia, and five associated anxiety-depression symptom items, were excluded for this essentially normal college population. Since these items are not the central parts of the FQ, and they have been shown to be separate from the main 15-item questionnaire, the exclusion of these items was considered appropriate (Oei *et al.*, 1991; Moyland & Oei, 1992). The 15 items measure agoraphobia, blood injury and social phobia.

State-Trait Anxiety Inventory (STAI Form Y; Spielberger, Vagg, Barker, Donham, & Westberry, 1980). The revised STAI was used in this study. Alpha coefficients for State-Anxiety (S-A) and Trait-Anxiety (T-A) scales in the normative samples are .92 and .90 respectively, and those in the present sample are .94 and .90 respectively. STAI Form Y is highly correlated with Form X [$r = .96$ to $.98$ for college students (Spielberger, 1983)], an older version. Form X was widely researched and has been shown to be a reliable and valid measure for normal and anxiety patients (Oei, Evans, & Crook, 1990), as well as for secondary school students in Hong Kong (Shek, 1988).

Modified Catastrophic Cognition Questionnaire (CCQ-M). The original 50-item CCQ was developed by Khawaja and Oei (1992). Later a modified,

shorter, 21-item version of the scale was developed by the same authors (Khawaja, Oei, & Bagilioni, 1994). This short form could be used to measure catastrophic cognitions in panic disorder patients and nonclinical populations. The scale was found to be internally consistent (ranging from .83 to .91), with a good test-retest reliability ($r = .63$) and concurrent validity. For the present sample, the alpha coefficient was moderately high ($r = .86$).

Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986). The scale was developed to measure anxiety sensitivity, which was believed to be related to the development of anxiety disorders. The scale was shown to have sound psychometric properties for two samples of college students. The test-retest reliability coefficient was .75, and the alpha coefficient was .84 for the present sample. In addition, the criterion validity of the index was demonstrated by its ability to discriminate between patients with agoraphobia and other anxiety disorders as well as between anxiety-disorder patients and college students.

All items were translated into Chinese and back-translated into English by two experienced bilingual Ph.D. clinical psychologists. The Chinese versions were refined on the basis of the results from a pilot study conducted on 10 students (5 undergraduate and 5 graduate students).

Procedure

The Chinese translated versions of FQ, STAI, CCQ-M, and ASI were administered to groups of 30–40 subjects at any one time. Subjects participated in the study on a voluntary basis and were told that they could discontinue the testing at any time. Confidentiality was assured and information obtained was used for research only. Although no time limit was set, subjects generally completed the questionnaires in 20–25 min.

RESULTS

Internal Consistency

Table I presents the means and item-total correlations of the FQ items. The mean ratings ranged from .68 to 3.15. The ranges of item-total correlations were from .15 to .59 with a mean item-total correlation of .45. The resulting coefficient alpha was .83 for the FQ questionnaire.

Table I. Item Means and Item-Total Corrections of the FQ Items

| Item | Mean | (SD) | Item-total correlation |
|---------------------------------|------|--------|------------------------|
| Injections/minor surgery | 2.89 | (2.18) | .42 |
| Eating/drinking with others | 0.68 | (1.25) | .15 |
| Hospitals | 2.10 | (2.03) | .46 |
| Traveling alone by bus or coach | 1.24 | (1.76) | .51 |
| Walking alone in busy streets | 1.05 | (1.49) | .48 |
| Being watched or stared at | 3.01 | (1.92) | .49 |
| Going into crowded shops | 2.71 | (1.96) | .32 |
| Talking to people in authority | 2.86 | (1.78) | .55 |
| Sight of blood | 2.16 | (2.11) | .47 |
| Being criticized | 3.10 | (1.94) | .49 |
| Going alone far from home | 2.65 | (2.28) | .59 |
| Thought of injury or illness | 2.28 | (1.83) | .49 |
| Speaking/acting to an audience | 3.15 | (2.04) | .44 |
| Large open spaces | 1.31 | (1.72) | .46 |
| Going to the dentist | 2.08 | (2.13) | .48 |

Exploratory Factor Analysis of the FQ

The FQ item responses of 226 respondents were intercorrelated and the resulting matrix was factored by exploratory maximum-likelihood factor analysis. Both orthogonal and oblique rotations showed three clear factors with almost-identical factor loading matrices. An examination of the relationship of the factors showed moderately high correlations for the oblique rotation between each pair of factors: Factors 1 and 2, .54; Factors 1 and 3, .40; and Factors 2 and 3, .38. Due to a degree of overlap between several factors and similar factor loading matrices for the orthogonal and oblique rotations, the oblique factor solution was retained.

Three meaningful factors with eigenvalues greater than 1.00 emerged (see Table II), accounting for 37.3% of the variance. Factor 1 contained five items with a predominant theme of agoraphobic fears, including walking alone in busy streets and going into crowded shops and large open spaces. This factor is labeled Agoraphobia (AG). Factor 2 consisted of four items which suggested fears of speaking or acting in public and being watched or criticized. This factor is termed Social Phobia (SP). Factor 3 (five items) was characterized by salient loadings on fears of blood, illness, and injury and is called Blood-Injury Phobia (B-I). The items of these three factors were identical to that of the three-factor model of Marks and Mathews (1979), except for item 3, "Eating or drinking with other people." This item was not included in the Social Phobia Factor because its factor loading was well below the .30 criterion for inclusion.

Table II. Summary of the Oblimin Rotated Three-Factor Structure of the FQ

| | Factor 1 ($\alpha = .74$) | Factor 2 ($\alpha = .75$) | Factor 3 ($\alpha = .74$) |
|--|--------------------------------|--------------------------------|--------------------------------|
| Walking alone in busy streets (5) | .75 | | |
| Traveling alone by bus or coach (4) | .65 | | |
| Going alone far from home (11) | .53 | | |
| Going into crowded shops (7) | .51 | | |
| Large open spaces (14) | .33 | | |
| Speaking or acting to an audience (13) | | .84 | |
| Talking to people in authority (8) | | .81 | |
| Being criticized (10) | | .38 | |
| Being watched or stared at (6) | | .32 | |
| Injections or minor surgery (1) | | | .73 |
| Hospitals (3) | | | .64 |
| Going to the dentist (15) | | | .58 |
| Sight of blood (9) | | | .48 |
| Thought of injury or illness (12) | | | .40 |

Note. Item numbers corresponding to the original scale are in parentheses. The FQ items are ordered and loadings of magnitude below .30 are not shown.

Confirmatory Factor Analysis of the FQ

To validate the three-factor model of Marks and Mathews (1979), confirmatory factor analysis was employed, using the present data obtained from a sample of college students. Lisrel 7 was used to run the analysis. The assessment of model fit was based on multiple criteria, including the chi-square ratio, the goodness-of fit index (GFI), and the root mean square of the residual (RMSR).

The chi-square ratio tests whether a model fits the data and the model can be confirmed if the chi-square ratio is statistically nonsignificant. However, as the chi-square statistic is sensitive to both the sample size and the violation of normality in distribution, the chi-square likelihood function was provided in this study for descriptive purposes only and two other indices of fit were also examined. While the GFI is commonly used for assessing the model (Jöreskog & Sörbom, 1984), the RMSR is a direct measure of the average of the residual correlations.

Results from the confirmatory factor analysis suggested that the three-factor model of Marks and Mathews (1979) was confirmed for this college sample. According to the criteria given for interpreting fit indices, it appeared that the factor structure of the FQ provided an adequate fit for the present sample. The chi-square value was 167.21 ($df = 84$, $p < .001$), resulting in a chi-square degree-of-freedom ratio of less than 2 (i.e.,

1.99). The GFI was .91 and the adjusted GFI was .88, a value acceptable for a well-fitting model. In addition, the RMSR was .039, which was sufficiently small for the model.

Validity of the FQ

The correlations of FQ, CCQ-M, STAI, and ASI were examined. Moderate correlations were found between the FQ, on the one hand, and all of the other measures, on the other. The correlation coefficients were .25 (S-A), .27 (T-A), .32 (CCQ-M), and .44 (ASI) ($p < .001$).

Discriminant analysis was used to assess the discriminant validity of the FQ. Two groups with high and low anxiety were selected from the 226 subjects by using their scores on the FQ. All those who scored one standard deviation above or below the mean on the FQ fell into the high-anxiety group ($n = 37$) and the low-anxiety group ($n = 32$), respectively. The item scores of the CCQ-M were used for predicting membership in the two groups. The CCQ-M was used as it purports to measure constructs considered important in the development of any anxiety disorders, especially panic disorders. Moreover, the scale has a significant and moderate correlation with the FQ. Discriminant analysis yielded a discriminant function $\chi^2(1, N = 69) = 42.27$, $p = .001$, with a canonical correlation of .71. Overall, the percentage of "grouped" cases correctly classified was 81.16%.

Gender Differences on FQ Subscale Scores

Three t tests were employed to assess gender differences on the FQ-Agoraphobia, FQ-Blood-Injury, and FQ-Social subscales. Table III shows the means and standard deviations for the genders on the three subscales. No gender differences were found in any of the subscales. In view of the unequal sex ratio in the present sample, 32 cases were randomly selected

Table III. Means and Standard Deviations for the Genders on the Three FQ Subscales

| Subscale ^a | Mean (SD) | | | | F | p |
|-----------------------|-----------|--------|--------|--------|------|-----|
| | Male | | Female | | | |
| AG | 8.59 | (6.02) | 9.02 | (6.57) | 1.19 | .58 |
| B-I | 10.53 | (6.76) | 11.72 | (7.26) | 1.16 | .65 |
| SP | 12.09 | (5.55) | 12.13 | (5.87) | 1.12 | .78 |

^aAG, Agoraphobia; B-I, Blood-Injury Phobia; SP, Social Phobia.

from the female group and *t* tests were again conducted to assess gender differences between the 32 males and 32 females on the three subscales of the FQ. Similar results were obtained (i.e., no gender differences were found in any of the subscales). In addition, the nonparametric Mann-Whitney *U* Test was performed and again no gender differences were found.

DISCUSSION

The present study examined the usefulness of the FQ (Marks & Mathews, 1979) in a Hong Kong Chinese context. In general, the questionnaire was found to be of adequate reliability and validity. The three-factor structure of the FQ was supported, with each factor showing a moderately high degree of internal consistency. This finding is consistent with that of previous studies on the FQ, using clinical samples (e.g., Arrindell *et al.*, 1984; Marks & Mathews, 1979; Oei, Moyland, & Evans, 1991) but different from the Trull and Hillerbrand study (1990), which failed to confirm the three-factor model of Marks and Mathews (1979) with their nonclinical college subjects.

Compared with the normative data from the collegiate sample of Trull and Hillerbrand (1990), the Hong Kong college sample scored higher on two of the subscales of the FQ. One possible explanation of these different findings is the regional and cultural differences between the present sample and its American counterparts. For example, the present study sampled subjects from a densely populated (over 6 million people) metropolis, whereas Trull and Hillerbrand's subjects came from communities with much smaller populations. The higher agoraphobic scores of the Hong Kong college subjects (Mean = 8.96 vs. Mean = 5.37 for American subjects) appear to reflect more of a general concern over their safety when traveling alone or going into crowded places in Hong Kong rather than a higher degree of agoraphobia per se. Indeed, the crime rate has increased in recent years, and concern over crimes was found to be among the top 10 worries of a sample of college students in Hong Kong (Liang, 1992).

Gender differences on agoraphobia were not found in this study. In fact, no gender difference was found across any of the subscales. This finding is different from that of the Trull and Hillerbrand study (1990) which showed that agoraphobic symptoms were more serious in women than in men in their nonclinical sample. Perhaps the present subjects, regardless of gender, shared similar concerns and fears and their common educational

background has resulted in their experiencing a more or less similar level of disturbance in their anxieties as a group. It is noted that the sex ratio in this study was uneven, and although this unequal sex ratio was taken into consideration during data analyses, related findings may still need to be interpreted with some caution.

In the present study, the FQ subscales were all significantly intercorrelated, suggesting that the three phobias tended to increase or decrease in a more or less consistent fashion. This result is consistent with that of the Trull and Hillerbrand study (1990), but contrary to the findings of other researchers who report that these subscales were relatively independent in clinical samples (e.g., Mavissakalian, 1986). A possible explanation is that the independence of FQ subscales may be somewhat less clear-cut among nonclinical, younger and more highly educated subjects.

The finding that the item "eating or drinking with other people" was endorsed the least frequently, had the lowest item-total correlation value, and was not included in the Social Phobic factor from the initial exploratory factor analysis deserves some discussion. Perhaps the present subjects perceived that eating or drinking with other people could not be easily avoided in a densely populated place such as Hong Kong. Moreover, the Hong Kong people, old and young, are probably used to eating or drinking when surrounded by others, be it in the home or a restaurant, as this is a routine family and group event. Sharing food and drinks is an important and culturally endorsed activity. Thus, it may not be easy for the subjects to interpret this activity as one which is fear-evoking and therefore should be avoided as much as possible.

In sum, the FQ is generally found to be a reliable and valid scale for a Hong Kong Chinese student sample and its structure fits the three-factor model proposed by Marks and Mathews (1979). It is noted, however, that the present findings may not be generalized to other normal community adult or clinical populations. Specifically, the unequal gender ratio in this sample is a limitation in generalizing the results or forming wider interpretations. Future studies may do well to cross-validate the results on other samples (with a more even sex ratio), in particular, patients with known diagnoses of anxiety and phobic disorders. This is important because it is only through accurate assessment (with high hit rates) that appropriate treatment interventions can be implemented. In addition, while the cross-cultural utility of the FQ has been studied in a number of countries, it awaits future investigation to confirm the cross-cultural applicability of the FQ in the Far East. This approach is being undertaken by the present investigators.

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