

## ORIGINAL PAPER

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# Do the Chinese somatize depression?

## A cross-cultural study

Accepted: 25 January 2001

**Abstract** *Background:* A large literature argues for the Chinese – whether in mainland China or elsewhere – being highly likely to express depression somatically, leading to predictable detection and diagnostic difficulties. If true, detection might be assisted if a set of somatic proxies of depression were identified, and this was the principal initial objective in mounting this study. *Methods:* We studied two sets of depressed outpatients, one of Malaysian Chinese and the other of Australian Caucasians, matched by age and sex. We identified the prime symptom nominated by them when they first sought assistance, and required them to complete an inventory of both somatic and cognitive symptoms, and rank the three items they judged as most capturing their distress. *Results:* The Chinese were distinctly more likely to nominate a somatic symptom as their presenting complaint (60% vs 13%), while the Australian subjects were more likely to nominate depressed mood, cognitive and anxiety items. Responses to the inventory established that the Chinese did score somewhat higher on a somatic set of items, but differed far more distinctly in being less likely to affirm cognitive items of depression, resulting in significantly lower total inventory scores. Variation across the contrast samples in acknowledging the presence of symptoms did not relate simply to the prevalences of those symptoms. *Conclusions:* Our failure to identify a culture-specific somatic factor as a proxy of depression, together with establishing a high rate of somatic and related items (e. g. insomnia) in both samples,

may largely reflect the phenomenon of ‘corporization’, whereby depressed patients irrespective of culture are more likely to experience and report in response to a ‘somatic sensory amplification’ influence.

### Introduction

*Males can shed blood but not tears*  
(Old Chinese saying)

It is commonly held that the Chinese express depression somatically, which then leads seemingly to ‘denial’, low detection, failure to diagnose and misdiagnosis. Any such trend for depression to be expressed and experienced somatically, which is usually contrasted with a ‘Western’ focus on so-called cognitive features (such as depressed mood, pessimism, decrease in self-esteem), is clearly not unique to the Chinese (Isaac et al. 1996; Kirmayer et al. 1998). However, the issue has probably been researched more extensively and in greater depth in Chinese populations (whether studied in mainland China or elsewhere), allowing some determinants of ‘somatization’ to be described. Such research ascribes any tendency for Chinese subjects to ‘somatise’ their depression as somewhat less reflecting denial and as more reflecting a culturally acceptable ‘style’ for expressing distress.

The emphasis on offering somatic symptoms has nevertheless led to clear detection and diagnostic difficulties. For example, Kleinman’s early study (1986) of those attending a psychiatric outpatient clinic in China established that only 1% were diagnosed as having ‘depression’ as against 30% being diagnosed as having neurasthenia. That latter diagnosis [or its Chinese expression ‘shenjing shuairuo’ (SJSR)] is commonly applied to encompass a wide variety of somatic symptoms (e. g. insomnia, fatigue, dizziness, nervousness, emotionality), in addition to encompassing any identified depressive symptoms.

A number of empirical studies have confirmed a characteristic Chinese weighting to somatisation, whether studied in Asian or Western regions. For in-

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stance, Tsoi (1985) had anxious and depressed patients attending a Singapore general hospital psychiatric outpatient clinic complete a checklist of symptoms. The most commonly reported symptom was 'general discomfort', followed by 'pain' and 'insomnia', with such features exceeding the rates of checking 'anxiety' and 'depression' items. In a North American study, Chang (1985) had white and black American college students as well as overseas Chinese students complete the Zung depression scale. The white students tended to affirm cognitive items, the black subjects affirmed a mix of affective and somatic items, while the responses by the Chinese students were weighted to affirming somatic items.

Any greater likelihood of 'somatisation' by depressed Chinese patients is likely to reflect a number of determinants (see Parker et al., in press), including idiomatic reporting and illness behaviour factors reflecting the Chinese epistemology of disease – the Chinese emotional language being linked to metaphors and physical symbolization – differences in 'psychological mindedness', greater stigma associated with illness and a view of any 'emotionality' as being weak-willed, and the expression and reporting of distress in line with the cultural popularity of neurasthenia and SJSR – with the last sanctioning attention, care and sympathy. Such explanations assume that the nomination of somatic symptoms is an expression of emotional distress rather than being a symptom of a true physical condition. However, depressed patients (particularly those with melancholic and psychotic expressions) in Western countries may also frequently report somatic features (e.g. pain, headaches, chest sensations, muscle weakness) and this 'corporisation' component (Schneider 1920) has long been recognised. Schneider introduced the term 'vital depression' to describe a somatic focus, with that feature 'near physical' and most often localized in the head, chest or stomach. Depression may lower the threshold at which individuals become aware of problems with their physical functioning – or of problems with their general state intrinsic to depression – and so be experienced physically, a phenomenon termed 'somatosensory amplification' (Barsky 1992). Such a possibility is supported by those 'negative' studies (e.g. Cheng 1989) that have failed to find evidence of any greater somatization (as against expressing cognitive depressive symptoms) in non-Western compared to Western regions, allowing the conclusion that depressed patients, irrespective of culture, are highly likely to report somatic symptoms (Bhatt et al. 1989; Escobar et al. 1983).

Reference to one particular symptom illustrates the concern. Many psychiatrists in Asian regions have argued that insomnia is a useful proxy of depression in Chinese patients; however, as it is a common feature of depression in Western regions, it is debatable whether it is truly a proxy of depression in some cultures, a true symptom correlate, or a consequence of depression per se. It therefore appears important to distinguish those 'somatic' symptoms that are more likely to reflect the

true 'physical expression' of depression from those that more reflect idiomatic reporting of psychological distress and which might be culturally determined – an objective capable of being approached using a cross-cultural study paradigm.

We therefore report a study comparing the extent to which depressed Chinese patients in Malaysia and Caucasian patients in Australia nominated both cognitive aspects of depression and a range of somatic features as reasons for their help-seeking and, additionally, as salient markers and symptoms of their depressive condition. The study allows any regional differences to be identified and, secondly, assists clarification as to which somatic symptoms are more likely to be symptoms of the underlying depression or, alternatively, more likely to be culturally determined proxies. Thus, while we concede multiple explanations for the nomination of somatic symptoms by depressed patients, our cross-cultural approach may allow identification of those somatic symptoms that are structural components of depressive syndromes. The exploratory nature of the study leads us to detail the analytic approaches sequentially in the Results' section.

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## Subjects and methods

### ■ Selection of items

An item set (see Table 1 for the items and presentation sequence in the questionnaire) was derived, and comprised two principal sub-sets. The first sub-set comprised mood and cognitive items common to Western self-report depression inventories (see Ban 1989). These items assessed constructs such as 'depressed mood', 'feeling helpless and hopeless', and 'guilt'. The second sub-set sought to capture somatic features commonly volunteered by depressed Chinese patients. The latter sub-set was derived during discussions with a number of Singapore psychiatrists, each being asked to nominate somatic features that they had observed most frequently in Chinese patients and across a wide age range, from young adulthood to elderly patients. Items were to be expressed simply, and as most commonly reported by those Chinese patients, whether expressed in English or in their Chinese dialect. Nominated items thus included several non-specific constructs such as 'health problems', 'headaches' and 'head sensations', 'chest pain' and 'chest heaviness', 'inability to breathe' and 'body aches and pains'. This process also generated a number of items that were not necessarily 'cognitive', with illustrative items including 'disturbing dreams', 'feeling dazed' and 'thinking too much'.

### ■ The questionnaire

A questionnaire was developed, which required the psychiatrist to record the patient's age, sex, origin of birth, whether English was the primary language, secondary language or not spoken, the patient's main language and/or dialect. The assessing psychiatrist was required to identify the symptom that the patients believed had initially prompted them to seek help for the present condition from anyone (whether medical or alternative). Additionally, the psychiatrist was required to record the symptom nominated by the patient as the most important one in determining or encouraging their attendance at the psychiatric service or with the assessing psychiatrist (be it included in our item list or not). The psychiatrist was also required to assess (using an overall clinical judgement) the severity of the patient's depression at that presenting interview, with options being 'very severely', 'moderately severely', 'somewhat' depressed and 'not de-

pressed at all' (rated 3, 2, 1 and 0 respectively), but no operational criteria were provided to assist consistency between rating psychiatrists (G.P. and Y.C.).

Following the initial assessment, the patients were asked to judge the extent to which they had experienced each of the 39 listed symptoms in the preceding week, with the options being 'all', 'most', 'some of the time' and 'not at all' (again rated 3, 2, 1 and 0 respectively), and which we describe as a 'salience' measure, rather than one assessing persistence or severity. After completion, they were then requested to go back over the item set and rate, in order of importance, the three items – of the total set of 39 – that they had found most distressing, with those nominated symptoms being scored 3, 2 and 1 respectively, and with any symptom not nominated receiving a zero score.

In the Malaysian study, the questionnaire was prepared in three forms (English, Malay and Chinese), with the latter two forms checked by back-translation. Confidentiality issues were explained. The psychiatrist (Y.C.) sat with patients consenting to the study (to ensure that each item was understood, and that forms were fully completed).

### ■ Patient selection

Inclusion criteria for both regions were for outpatients who had a non-psychotic depression meeting DSM-IV criteria for major depression and which was primary (i.e. not one secondary to a major condition such as schizophrenia or drug or alcohol abuse). Excluded were those who were cognitively impaired, unable to comprehend the questionnaire and complete it, and those unprepared to provide informed consent to the study. The study rationale was explained as one focusing on identifying features that cause people with depression to seek help and which best describe their condition. No reference was made to a cross-cultural component or of the study also being undertaken in another region.

### The Australian study

An attempt was made to recruit consecutive outpatient attenders of the first author (although a few were subsequently hospitalised). Consecutive recruitment was not achieved due to practice constraints (e.g. due to either the psychiatrist or the patient having insufficient time) or, on several occasions, the patient's depression being so severe that it appeared inappropriate to request their involvement and risk invalid responses. Once a sample size of 50 had been recruited, this study component ceased. All subjects were Caucasian and had Western cultural origins, whether born in Australia or other Western countries. All had English as their first language. Their age range was 20–73 years. No formal estimate was made of their socio-economic level.

### Malaysian study

This involved the second author assessing all clinically diagnosed depressed Chinese subjects who presented consecutively to the psychiatric services in the Kinta district, and which involved the outpatient clinic at Bahagia Mental Hospital and five primary health care clinics. Of the 50 recruited, Chinese was the first language for 80%, with English being the first language for the remaining 20%. Six percent were professionals, 10% semi-professionals, 14% skilled workers and 42% manual workers, and the age range was 21–71 years.

## Results

The Australian and Malaysian samples had comparable mean ages (44.0, SD 14.0 vs 43.9 SD 14.8;  $t = 0.04$ ) and female preponderances (58% vs 64%,  $\chi^2 = 0.4$ ). The mean clinician-rated depression severity level was lower in the Australian sample (1.6 vs 2.0;  $t = 2.7$ ,  $P < 0.01$ ).

Table 1 reports the prevalence of the symptoms on the salience measure (whether rated as 3, 2 or 1) as self-

**Table 1** Percentage of Australian and Malaysian depressed patients reporting symptom present (i.e. scoring 3, 2 or 1 vs 0), with odds ratios (ORs) examining over-representation in Malaysian subjects

| Symptom                   | Australia % | Malaysia % | $\chi^2$ | OR (95 %CI)     |
|---------------------------|-------------|------------|----------|-----------------|
| Health problems           | 66.0        | 76.0       | 1.2      | 1.63 (0.7–4.0)  |
| Headaches                 | 60.0        | 78.0       | 3.8      | 2.36 (1.0–5.7)  |
| Concentration             | 96.0        | 84.0       | 4.0*     | 0.22 (0.0–1.1)  |
| Chest heaviness           | 63.3        | 64.0       | 0.0      | 1.03 (0.5–2.3)  |
| Loss of interest          | 96.0        | 78.0       | 7.2**    | 0.15 (0.0–0.7)  |
| Disturbing dreams         | 65.3        | 58.0       | 0.6      | 0.73 (0.3–1.7)  |
| Anticipatory anhedonia    | 94.0        | 56.0       | 19.3***  | 0.08 (0.0–0.3)  |
| Consummatory anhedonia    | 96.0        | 68.0       | 13.3***  | 0.09 (0.0–0.4)  |
| Less able to laugh        | 88.0        | 68.0       | 5.8*     | 0.29 (0.1–0.8)  |
| Significant anxiety       | 85.7        | 94.0       | 1.9      | 2.61 (0.6–10.8) |
| Head sensations           | 56.0        | 54.0       | 0.0      | 0.92 (0.4–2.0)  |
| Body aches and pains      | 64.0        | 64.0       | 0.0      | 1.00 (0.4–2.3)  |
| Thoughts of death         | 76.0        | 40.0       | 13.3***  | 0.21 (0.1–0.5)  |
| Inability to breathe      | 40.0        | 66.0       | 6.8**    | 2.91 (1.3–6.6)  |
| Loss of appetite          | 80.0        | 46.0       | 12.4***  | 0.21 (0.1–0.5)  |
| Insomnia                  | 86.0        | 84.0       | 0.1      | 0.86 (0.3–2.6)  |
| Fatigue                   | 98.0        | 92.0       | 1.8      | 0.24 (0.0–2.2)  |
| Thinking too much         | 98.0        | 90.0       | 2.8      | 0.19 (0.0–1.7)  |
| Tearful                   | 71.4        | 56.0       | 2.5      | 0.51 (0.2–1.2)  |
| Significantly worried     | 94.0        | 50.0       | 24.0***  | 0.06 (0.0–0.2)  |
| Loss of weight            | 60.0        | 80.0       | 4.8*     | 2.67 (1.1–6.5)  |
| Feeling frustrated        | 89.8        | 82.0       | 1.2      | 0.52 (0.2–1.7)  |
| Slowed physically         | 97.9        | 80.0       | 7.7**    | 0.09 (0.0–0.7)  |
| Feeling irritable         | 90.0        | 70.0       | 6.3*     | 0.26 (0.1–0.8)  |
| Feeling dazed             | 72.3        | 28.0       | 19.1***  | 0.15 (0.1–0.4)  |
| Being irritable           | 79.6        | 76.0       | 0.2      | 0.81 (0.3–2.1)  |
| Hypersomnia               | 36.0        | 82.0       | 21.9***  | 8.10 (3.2–20.4) |
| Sadness                   | 94.0        | 62.0       | 14.9***  | 0.10 (0.0–0.4)  |
| Anger                     | 75.5        | 76.0       | 0.0      | 1.03 (0.4–2.6)  |
| Chest pain                | 32.7        | 62.0       | 8.5**    | 3.37 (1.5–7.7)  |
| Self-value dropped        | 96.0        | 86.0       | 3.1      | 0.26 (0.0–1.3)  |
| Self-critical             | 94.0        | 62.0       | 14.9***  | 0.10 (0.0–0.4)  |
| Depressed mood            | 98.0        | 70.0       | 14.6***  | 0.05 (0.0–0.4)  |
| Guilt                     | 90.0        | 68.0       | 7.3**    | 0.24 (0.1–0.7)  |
| Feeling bad about self    | 94.0        | 72.0       | 8.6**    | 0.16 (0.0–0.6)  |
| Feeling helpless/hopeless | 94.0        | 36.0       | 37.0***  | 0.04 (0.0–0.1)  |
| Physically agitated       | 70.0        | 54.0       | 2.7      | 0.50 (0.2–1.1)  |
| Suicidal thoughts         | 54.0        | 84.0       | 10.5***  | 4.47 (1.7–11.4) |
| Feel worthless            | 78.0        | 74.0       | 0.2      | 0.80 (0.3–2.0)  |

\*  $P < 0.05$ ; \*\*  $P < 0.01$ ; \*\*\*  $P < 0.001$

rated by sample patients, with the chi-square statistic quantifying differing prevalences across the samples and the odds ratio (OR) statistic quantifying over-representation and under-representation in the Malaysian sample.

The Table shows that the Malaysian patients were more likely than the Australian patients to report experiencing hypersomnia, suicidal thoughts, chest pain, inability to breathe and loss of weight. They were less likely to rate feeling helpless and hopeless, a depressed mood, being slowed physically or significantly worried, having poor concentration, anhedonia, loss of interest, an inability to laugh, loss of appetite, feeling self-critical, irritable or dazed, sadness, guilt, feeling bad about themselves and having thoughts of death.

There were no significant differences across study samples in affirming health problems, headaches, chest heaviness, disturbing dreams, significant anxiety, head

sensations, bodily aches and pains, insomnia, fatigue, thinking too much, being tearful, irritable and angry, feeling frustrated or worthless, or experiencing a drop in self-value and physical agitation.

In case sample differences reflected the imposed cut-off rule, analyses were repeated with varying cut-offs, with the cut-off 3/2 (as against 1/0) appearing to have slight superiority. Only three previously non-significant items then showed a significantly differing prevalence across the samples, all being distinctly less likely in the Malaysian sample: drop in self-value (30% vs 70%), feeling worthless (18% vs 50%) and feeling physically agitated (14% vs 36%). Dimensional analyses identified only two additional significant variables, with the Malaysian patients being more likely to report headaches ( $t = 2.5, P < 0.05$ ) and less likely to report fatigue ( $t = 2.9, P < 0.01$ ). Thus, only a small set of ten items (i. e. insomnia, tearfulness, health problems, chest heaviness, disturbing dreams, significant anxiety, body aches, head sensations, and pains and anger) remained non-differentiating in salience across the samples.

Preserving original item scores (i. e. 3, 2, 1 or 0), we then summed responses to each item for the separate Malaysian and Australian samples, with the Malaysian subjects returning significantly lower total scores (38.9 vs 54.2,  $t = 4.1, P < 0.001$ ). Total scores were unassociated with age in the Malaysian sample ( $r = 0.12$ ), but decreased with age ( $r = 0.30, P = 0.35$ ) in the Australian sample. Items were then ranked (from the highest to lowest) by their group scores. The overall agreement in ranking was minimal across the two samples (Spearman's rank order correlation = 0.28,  $P = 0.14$ ). Table 2 lists the 15 highest rating items in order for each separate sample. The nine highest ranking symptoms for the Malaysian subjects were 'somatic' constructs, with only two 'cognitive' items (feeling worthless and drop in self-value) achieving representation, and ranking 10<sup>th</sup> and 11<sup>th</sup> respectively. By contrast, the Australian sample prioritised anxiety (e. g. feeling anxious and worried), depression (e. g. depressed mood) and cognitive items (e. g. drop in self-value, guilt, hopeless and helpless, feel-

ing worthless). Few items were highly ranked by both samples, with the exceptions being insomnia and anxiety and, to a lesser degree, guilt and feeling worthless.

A series of factor analyses were undertaken (of data from the combined sample) to determine whether a coherent factor structure could be identified. The first factor (accounting for 37% of the variance) was a clear 'cognitive' factor, while the second (accounting for 9.5% of the variance) was a distinct 'somatic' factor. Three-factor to seven-factor solutions were also inspected. Only one other distinct factor (i. e. irritability) was reasonably consistently identifiable in those solutions. The three-factor solution comprised depression, anxiety (and insomnia) and somatic factors, but here some putatively somatic items (e. g. chest pain) loaded on the anxiety factor. Thus, an imposed two-factor oblique rotation solution was favoured for further consideration. Separate imposed two-factor factor analyses were undertaken separately for the Malaysian and Australian samples, although the low subject to variable ratio limits interpretation. In the Malaysian sample, clear cognitive and somatic factors were again identified. In the Australian sample, the first factor was a clear (depression) cognition factor while the second appeared to be dominated by a mix of anxiety and somatic items.

Table 3 reports the highest-loading items on those (respective) cognitive and somatic factors within the combined sample (and the rank order of those items in analyses of the separate samples). In the combined sample, the cognitive factor was dominated by anhedonia, negative self-evaluation, loss of interest and a depressed mood, while the somatic factor included respiratory, head, chest and bodily symptoms together with a generic 'health problems' item.

Factor scores were created. The associational strength ( $r = 0.50, P < 0.01$ ) between those two factors in the total sample was modest. We established that the Malaysian sample members returned lower cognitive factor scores (i. e.  $-0.63$  vs  $0.66, t = 7.9, P < 0.001$ ) and higher somatic scores ( $0.21$  vs  $-0.21, t = 2.2, P < 0.05$ ). Associations between age and both cognitive and somatic

**Table 2** Top 15 items rated by Australian and Malaysian subjects

| Australia |                        |             | Malaysia |                      |             |
|-----------|------------------------|-------------|----------|----------------------|-------------|
| Rank      | Symptom                | Total score | Rank     | Symptom              | Total score |
| 1         | Anxiety                | 28          | 1        | Health problem       | 39          |
| 2         | Depressed mood         | 24          | 2        | Insomnia             | 29          |
| 3         | Worried                | 21          | 3        | Concentration        | 16          |
| 4         | Insomnia               | 19          | 4        | Think too much       | 15          |
|           | Self-value dropped     | 19          | 5        | Head sensations      | 14          |
| 6         | Sadness                | 16          |          | Body aches/pains     | 14          |
|           | Guilt                  | 16          | 7        | Guilt                | 13          |
|           | Hopeless/helpless      | 16          | 8        | Anxiety              | 12          |
|           | Worthless              | 16          |          | Headaches            | 12          |
| 10        | Think too much         | 15          | 10       | Feel worthless       | 10          |
| 11        | Feel bad about self    | 14          | 11       | Inability to breathe | 9           |
| 12        | Anticipatory anhedonia | 13          |          | Loss of weight       | 9           |
|           | Loss of energy         | 13          |          | Anger                | 9           |
| 14        | Fatigue                | 10          |          | Self-value dropped   | 9           |
| 15        | Suicidal thoughts      | 8           | 15       | Feel irritable       | 8           |



**Table 3** Highest loading items on the two-factor solution in whole sample and rank order loading in individual samples (NL not loading at the 0.3 level or above)

|                                    | Factor loading<br>(whole sample) | Rank order          |                      |
|------------------------------------|----------------------------------|---------------------|----------------------|
|                                    |                                  | Malaysian<br>sample | Australian<br>sample |
| <i>Factor 1: 'cognitive' items</i> |                                  |                     |                      |
| Consummatory anhedonia             | 0.86                             | 4                   | 7                    |
| Self-critical                      | 0.85                             | 8                   | 1                    |
| Feeling hopeless and helpless      | 0.84                             | 22                  | 5                    |
| Anticipatory anhedonia             | 0.83                             | 7                   | 13                   |
| Self-value dropped                 | 0.83                             | 1                   | 2                    |
| Feeling bad about self             | 0.79                             | 19                  | 4                    |
| Loss of interest                   | 0.77                             | 18                  | 6                    |
| Depressed mood                     | 0.77                             | 5                   | 3                    |
| <i>Factor 2: 'somatic' items</i>   |                                  |                     |                      |
| Inability to breathe               | 0.79                             | 5                   | 4                    |
| Head sensations                    | 0.69                             | 7                   | 11                   |
| Headaches                          | 0.65                             | 2                   | 17                   |
| Chest heaviness                    | 0.57                             | 1                   | NL                   |
| Health problems                    | 0.55                             | 1                   | NL                   |
| Chest pain                         | 0.55                             | NL                  | NL                   |
| Body aches and pains               | 0.53                             | 6                   | 12                   |

scale scores were non-significant in the Malaysian sample ( $r = 0.14$  and  $0.18$  respectively), while, in the Australian sample, increasing age was associated with higher cognitive scores ( $r = 0.31$ ,  $P = 0.03$ ), but unassociated with somatic item scores ( $r = 0.15$ ).

As noted earlier, we had sought information about both 'the symptom' that had initially determined help seeking and 'the symptom' that had most encouraged the patient to attend the assessing psychiatrist. However, several subjects were unable to nominate a response to the first question and, for those responding to both questions, most nominated the same symptom. Thus, we focus on the second component – in essence, identifying the clinical feature that initiated the psychiatric consultation. Table 4 shows nominated presenting symptoms grouped into four categories, for which we demonstrated a marked regional difference ( $\chi^2 = 23.1$ ,  $df 3$ ,  $P < 0.001$ ). Here the data indicate again that the Malaysian subjects were most likely to nominate a somatic symptom (60% vs 13%), while the Australian subjects were most likely to nominate mood items (47% vs 25%).

Results risk confounding two issues: differences between samples in overall symptom reporting and differences in reporting of specific symptoms. Items were then examined using an item response theory (ITM) approach, which attempts to model how the probability that an individual will answer 'yes' to an item relates to their response level on a dimension assumed to underlie all items. We used the Rasch model, which assumes that (i) the relationship between probability and the dimension is logistic, and (ii) all items are equally discriminatory (i. e. the probability of a 'yes' increases at the same rate for each item as one moves along the dimension). The estimate of interest is the 'location' (i. e. the point on the dimension at which the probability of a 'yes' response becomes 50%). As the dimension is set to be

**Table 4** Symptom nominated as being most important when patient presented to psychiatric service

| Region    | Construct | Examples  | Prevalence |
|-----------|-----------|---|------------|
| Malaysia  | Somatic   | Insomnia, sleep problems, health problems, short of breath, chest spasm, gastric dyspepsia, giddiness, weight loss, no energy, palpitations, enuresis, headache               | 28         |
|           | Mood      | Sad, depressed, crying  | 12         |
|           | Anxiety   | Fearful, worry  | 4          |
|           | Cognitive | Hopeless  | 3          |
|           | Mood      | Depression, sadness   | 22         |
| Australia | Cognitive | Self-esteem down, indecisive, lack of concentration, lack of motivation, negative thoughts, pessimistic, nihilistic, suicidal thoughts, anergia, inability to care for others | 11         |
|           | Anxiety   | Anxiety, worry, agitated, stress  | 8          |
|           | Somatic   | Appetite loss, tiredness, weakness, slowed down, insomnia   | 6          |

standardized normal, locations will tend to lie between  $-3$  and  $+3$ , so that values toward the negative end correspond to the 'less severe' end of the dimension – and the converse. For the analyses, we continued with dichotomized item scores (i. e. 0, 1 vs 2, 3). Results from the estimation, using RUMM software (RUMM Laboratory 1998) established 'excellent' power for the analyses and that the Rasch model fitted the majority of items (i. e. probabilities  $> 0.05$ ). Thus, there were only 7 exceptions to the 78 estimates across the two samples (i. e. health problems in both samples, thoughts of death and feeling bad about yourself in the Australian sample; and disturbing dreams, slowed down physically and self-value dropped in the Malaysian sample). The analyses showed considerable variation between the two subject pools along the dimension (presumably depression), at which they were more likely than not to acknowledge the presence of the symptom. Importantly, this variation was not simply related to the prevalences of the symptoms. This analysis allows various effects to be identified. Thus, the prevalence of reporting 'health problems' was similar across the two samples. However, on the underlying dimension, the Malaysian sample had a location of  $-0.63$  (compared to the Australian sample location of  $0.76$ ), indicating that the Malaysian sample members did not have to judge that feature as too severe before returning a 1 or 2 score. While the prevalence of reporting 'chest pain' was very different across the two samples, locations of  $3.2$  and  $-0.39$  indicated that such a symptom had to be quite severe to be reported by Australian sample members, but much less so to be reported by the Malaysian sample members.

## Discussion

Before reviewing study findings, it would be useful to consider the issue of depression being 'somatized'

against a wider background. Simon et al. (1999) examined WHO-derived general practice data for more than a thousand general practice patients who met criteria for depression, involving data from 14 countries on five continents – a paper that came to our attention only after completing this study. They first contemplated the meaning of ‘somatization’, identifying three principal definitions: first, the presentation of a somatic symptom by those with psychiatric disorders; second, ‘somatosensory amplification’, where depression is reflected via somatic symptoms; and third, where there is denial of true psychological distress and the substitution of somatic symptoms.

The study by Simon et al. (1999) covered distinct Western regions (e. g. Berlin, Manchester, Seattle), as well as China (Shanghai), India (Bangalore), and a range of centres across Europe, Africa, Asia and South America. ‘Depression’ was classified by DSM-IV major depression criteria data, while DSM-IV criteria for somatoform disorder allowed ‘somatic’ features to be assessed. The prevalence of diagnosed depression varied considerably across centres, as did the proportion of assigned depressed patients reporting only somatic symptoms as their reason for consultation (ranging from 45 % in Paris to 95 % in Turkey), thus establishing that rates of ‘somatization as a presenting phenomenon’ are culturally determined. ‘Somatosensory amplification’ was assessed by calculating the rate of those with at least three unexplained somatic symptoms. This, while averaging 50 % across all centres, did not vary significantly across regions. Unexplained somatic symptom aetiology was higher in those with depression than in those without, so that the authors’ identification of a strong relationship between depression and unexplained somatic symptoms supports the view that depression itself may be expressed somatically. The extent to which ‘denial’ might determine somatization was assessed by calculating the proportion of depressed individuals at each centre who denied the two most clear-cut cognitive DSM-IV criteria (i. e. depressed mood, feelings of guilt and worthlessness), with the probability not varying significantly among the centres. Thus, while the overall prevalence of depressive symptoms varied greatly across the centres, the balance of cognitive and somatic symptoms was similar. The authors therefore concluded that the symptomatic experience of depression appeared to differ little across the regions, and that variation in ‘somatization’ was essentially restricted to presenting symptoms.

That study allows a background for considering and interpreting our findings, first noting some study nuances and caveats. The representativeness of our contrast groups is not easy to determine. While we formally contrasted Caucasians and Chinese, we also contrasted Australian and Malaysian subjects and, while all the Australians spoke English as their first language, members of the Malaysian sample varied in their use of English, Malay or Chinese dialects. Thus, while we impute differences as providing some understanding of depression in the Chinese, such differences could reflect – in

whole or in part – differences in Malaysian and Australian culture (both as they act generally and in specific regard to help seeking), language nuances and socio-economic factors. While we established the fidelity of our translated forms (by back translation), we did not examine their conceptual or semantic target equivalence, so that study differences could also reflect methodological confounding emerging from differences in the intrinsic ‘meaning’ of the constructs across the languages.

Requiring subjects to meet DSM-IV criteria for major depression was not designed to derive homogeneous groups, but more to ensure that patients met a certain level of depression severity and duration. This requirement may nevertheless have predisposed the samples to be more alike than if we had studied ‘depression’ without that impost. Additionally, we made no attempt to subtype depression. To the extent that the clinical features of depression vary across differing depressive disorders (e. g. melancholic and non-melancholic depression), then it is possible that some sample differences could reflect varying distributions of depressive sub-types. However, as we excluded those with a psychotic depression and restricted recruitment to outpatients, we judge that variation on such a basis is unlikely to be substantive. Similarly, the extent to which the two samples had patients with co-morbid anxiety conditions may well influence sample differences. The lack of differences in mean age and gender across the samples minimised their potential to confound sample comparisons. Finally, the clinical rating of severity indicated that the Malaysian sample rated as having somewhat more severe depressive disorders. Such a difference may have reflected a rater difference in making such subjective judgments or it may reflect a real difference in severity. We rejected using a formalized self-report or rater-completed depression severity measure, for the obvious reason that differences might less reflect true severity differences and more reflect cultural factors being studied, leading to circularity difficulties.

Adopting the tripartite model of Simon et al. (1999) for considering ‘somatization’, we first consider somatization as a presentation feature. The Malaysian Chinese sample were far more likely (60 % vs 13 %) to nominate a somatic symptom, while the Australian sample were distinctly more likely to nominate a depressed mood item and somewhat more likely to nominate cognitive and anxiety items.

Secondly, our data assessing cross-sectional self-reported symptomatology allow some consideration as to which somatic symptoms may reflect somatosensory amplification and which reflect residual factors (e. g. denial, cultural interpretation and meaning). Any feature that, in depressed patients, has a distinct prevalence and which failed here to differentiate across the two samples, is able to be potentially viewed as representing somatosensory amplification. Candidate items suggested in this study included insomnia, anger, crying, chest heaviness, disturbing dreams, head sensations, bodily

aches and pains, significant anxiety and health problems. Insomnia is a particularly interesting item as a number of Asian psychiatrists have argued that it is one of the most common reasons for depressed Chinese (and Indian) patients seeking assistance, whether they have any awareness as to their being depressed or not. This might suggest that insomnia is a culture-based proxy symptom of depression, and therefore overly likely to be reported in certain regions. While such explanations may still have relevance, our study (which established its high salience in both samples) argues against insomnia necessarily being over-represented in Chinese depressed patients. Thus, certain 'somatic' features (i. e. insomnia, chest heaviness, head sensations, and bodily aches and pains) may well be true concomitants of depression, being induced or amplified by depression, and thus not distinctly culturally determined.

The third component to the 'somatic model' allows that somatic symptoms rather than cognitive ones are volunteered as a reflection of denial, lack of psychological mindedness, idiomatic nuances or other cultural factors. However, while our two-factor analysis identified a 'somatic' factor, most of the high-loading items were ones that did not differentiate across the two samples at item level, so that the samples differed far less on factor scores for that dimension than on cognitive factor scores. This might indicate that this third aspect of somatization was relatively trivial.

We set out to identify 'somatic' symptoms that act as proxy utilitarian markers of true depression in cultures where depressed individuals might lack the lexicon or the cultural background to be aware that they were depressed and not be able to volunteer a symptom set weighted to cognitive features such as a depressed mood, lowered self-esteem, increased self-criticism and anhedonia. While we established that our depressed Chinese Malaysian patients were more likely than the Australian comparison sample to seek help and to present volunteering somatic symptoms, when provided with a symptom inventory made up of somatic and cognitive items, little differentiation in affirming somatic items was evident. As we established that the Malaysian Chinese subjects returned significantly lower total scores on our item inventory, these two findings allow a clear interpretation of the data. Sample differences emerged, in fact, less from differences on the somatic factor and more from differences on the cognitive factor.

As noted, differences between samples in overall symptom reporting and in reporting specific symptoms could create a major confounding issue, and we therefore undertook ITM (item response theory) analyses. Here we established that variation in reporting across the two samples was not related to symptom prevalence. In essence, when differences existed, they appeared more to reflect differences in reporting along a severity dimension rather than differing prevalences of symptoms across the sample. Thus, the samples did differ in terms of the 'threshold' for reporting certain symptoms. Such threshold differences could reflect denial, psycho-

logical mindedness or lexicon differences, as well as a range of socio-cultural factors, and might be clarified by intra-regional studies designed to clarify the relevance of each – although it is unlikely that any one factor or that any hierarchy of influences would be constant across regions and differing cultural groups.

Our study failed to resolve a set of somatic proxies of depression – but the reasons for that failure are more important to consider. While the data are clearly in line with previous studies indicating a Chinese somatization focus in presenting to health facilities and little differentiation in defining their depression, results argue for re-directing studies pursuing this issue and its clinical implications. Depression appears to be associated with far more 'satosensory amplification' than generally conceded. Thus, while somatic features may be nominated as a presenting negotiative strategy, their maintenance should not be viewed as necessarily reflecting denial or socio-cultural factors. Such hypotheses would benefit from more finely-focussed studies, while depression research might well benefit from returning to the study of the historical phenomenon of 'corporization'.

■ **Acknowledgements** We thank colleagues at the Mood Disorders Unit for comments, Drs Li Ling Ng, KT Chee and Adrian Wang at Woodbridge Hospital for generation of somatic items, Dusan Hadzi-Pavlovic for statistical analyses, Christine Boyd and Kerrie Evers for technical assistance, Kinta district mental health staff, and the NHMRC Australia (Program Grant 993208).

## References

- Ban TA (1989) Composite diagnostic evaluation of depressive disorders. JM Productions, Brentwood
- Barsky AJ (1992) Amplification, somatization, and the somatoform disorders. *Psychosomatics* 33: 28–34
- Bhatt A, Tomenson B, Benjamin S (1989) Transcultural patterns of somatization in primary care: a preliminary report. *J Psychosom Res* 33: 671–680
- Chang WC (1985) A cross-cultural study of depressive symptomatology. *Cult Med Psychiatry* 9: 295–317
- Cheng TA (1989) Symptomatology of minor psychiatric morbidity: a crosscultural comparison. *Psychol Med* 19: 697–708
- Escobar JI, Gomez J, Tuason VB (1983) Depressive phenomenology in North and South American patients. *Am J Psychiatry* 140: 47–51
- Isaac M, Janca A, Orley J (1996) Somatization: a culture-bound or universal syndrome? *J Ment Health* 5: 219–222
- Kirmayer LJ, Young A (1998) Culture and somatization: Clinical epidemiological and ethnographic perspectives. *Psychosom Med* 60: 420–430
- Kleinman A (1986) Social origins of disease and distress: depression, neurasthenia, and pain in modern China. Yale University Press, New Haven
- Parker G, Gladstone G, Chee KT (in press) Depression in the planet's largest ethnic group: the Chinese. *Am J Psychiatry*
- RUMM Laboratory (1998) Rasch Unidimensional Measurement Models. (Software package)
- Schneider K (1920) The stratification of emotional life and the structure of the depressive states. *Zentralbl Neurol Psychiatrie* 59: 281
- Simon GE, VonKorff M, Piccinelli M, Fullerton C, Ormel J (1999) An international study of the relation between somatic symptoms and depression. *N Engl J Med* 341: 1329–1335
- Tsoi WF (1985) Mental health in Singapore and its relation to Chinese culture. In: Tseng WS, Wu YH (eds) Chinese culture and mental health. Academic Press, Orlando, pp 229–250