

# Understanding Cultural Influences on Depression by Analyzing a Measure of Its Constituent Symptoms

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## Abstract

To examine the different understandings of depression between Chinese and Americans, we employed confirmatory factor analysis, multidimensional scaling, and hierarchical cluster analysis of the symptom measure provided by the Center for Epidemiologic Studies-Depression Scale (CES-D). The present study revealed a different center-periphery scatter pattern of the twenty items of the CES-D in the two cultural groups, such that Chinese made a clearer discrimination between the affective/interpersonal and somatic items, while Americans conflated such items. Moreover, Chinese tended to further separate somatic symptoms into two subdivisions: subjective symptoms and objective symptoms. These results demonstrate that the conceptual organization of the symptoms characterizing depression is culture-related, suggesting culturally appropriate modifications in its clinical practice.

**Keywords:** Depression, Center for Epidemiologic Studies-Depression Scale, Multidimensional scaling, Culture

## 1. Introduction

Is the understanding of depression identical across cultures? Recent reviews of the depression literature have demonstrated that depression may be differently construed across cultures. An increasing amount of evidence has supported the position that depression is a multi-level phenomenon involving a core group of symptoms - dysphoria, negative cognitions, psychomotor retardation, sleep disturbance, fatigue, and loss of energy (Chan et al., 2007). Research conducted by anthropologists has long argued that, beyond these common symptoms, specific symptoms and patterns of depressed symptomatology are differently emphasized across cultures. Specifically, culture imposes its influences by shaping people's experience of the symptoms, the idioms used to report them, decisions about treating these various symptoms, types of help sought, as well as

patient-practitioner communications about its symptoms (Kleinman, 2004). Thus, it is not surprising to find various patterns of somatization among depressed patients from different cultural groups (e.g., Parker, Cheah, & Roy, 2001).

Findings from such studies pose a challenge to the basic assumptions of existing psychiatric theory and practice derived from Western-based models of psychological processes (e.g., Kirmayer & Minas, 2000). In the society of the United States, it is widely accepted that the experience of depression is reflected psychologically as well as physically, whereas in China it is experienced and manifested more in physical than psychological symptomatology (Kleinman, 2004). In consequence, American and American-trained clinicians may misdiagnose the depressive disorder among Chinese immigrants based on Western psychiatric theory if they fail to calibrate their diagnosis to the culturally channeled expression of symptoms. That may be why a lower prevalence of depression is sometimes reported among Chinese compared to persons from other parts of the world, predominantly America (e.g., Chan et al., 2007; Zhang, Shen, & Li, 1998).

People's depression is not simply the result of unfortunate experiences or hormonal imbalances, but is also the outcome of culture. The pattern of human depression reflects complex interrelations and interactions among the individual, culture and the social systems where people live. There is growing evidence supporting the position that culture has an effect on the degree to which we express depressive feelings. For instance, because cultural norms of self-presentation regulate our social relations, many depressed people in China do not report feeling sad, but rather express boredom, discomfort and feelings of fatigue which are less socially sanctioned (Kleinman, 2004).

Those variations across cultures, no matter whether in the experience or the expression of depression, are significant (e.g., Manson & Bloom, 1985; Manson & Kleinman, 1995). Even though in principle there are few cultural differences in the involuntary physiological or psychological reactivity of depressed individuals (e.g., Tsai & Chentsova-Dutton, 2002; Tsai & Levenson, 1997; Tsai, Levenson, & McCoy, 2006), the subjective experiences or expressions of depression may be attended to and utilized differently in different cultures (e.g., Halbreich et al., 2007; Kleinman, 2004; Lutz, 1985). Therefore, it has been argued that a qualitative-descriptive exploration of culturally-sensitive expressions of any syndrome of symptoms should be required from cross-cultural studies.

The understanding of mental illness in Western countries is particularly relevant to the original Cartesian dualism of body and mind, by which the body and mind are presented as two distinct principles of being in the universe. However, Chinese advocate the worldview of *yin/yang*, which claims a complementary and interpenetrating equilibrium between these two forces or energies of the universe. Chinese are socialized to maintain a dynamic balance between these *yin/yang* forces. The salient difference between these two dichotomies lies in their assumptions about the linkage between body and mind. Chinese emphasize the external causes of their distress, attributing their mental illness to the somatic disorder or to a loss of equilibrium with the social environment, attributions that reduce their responsibility for the 'illness' (e.g., Chan, 2007; Luk & Bond, 1992), and provoke less challenge to the social system that could be construed as driving the depressed condition; Americans regard physical and psychological symptoms as equally reflected in mental illness.

Such differences are supported by considerable empirical evidence. However, so far most of the relevant findings only focus on whether there is a Chinese tendency to report somatic symptoms and to avoid reporting psychological symptoms of mental illness; the absence of a closer look into the linkage among these symptoms makes understanding mental illnesses such as depression cross-culturally unclear.

The purpose of the present study is to investigate what cultural sensitivities about depression may be gleaned from a detailed examination of the symptoms tapped by the Center for Epidemiologic Studies–Depression Scale (CES-D, Radloff, 1977), one of the most frequently used psychometric instruments among researchers targeting the general population aged 18 or older. Although the CES-D has been used primarily to assess depression in the United States, it has also been utilized in China (e.g., Cheng & Chan, 2005), Italy (e.g., De Gennaro et al., 2004), the Netherlands (e.g., Sonnenberg, 2003; Spijker, 2004), Japan (e.g., Nakata et al., 2007; Tanaka, 2006; Wada, 2007), Canada (e.g., Cameron et al., 2006; Gatz, 2005), Australia (e.g., Alati et al., 2007; Almeida & Pfaff, 2005), and England (e.g., Sainz & Rey, 2007). Recently, Zhang and Norvilitis (2002) pointed out that this Western-developed instrument has been increasingly applied to the previously understudied populations in China and the reliability of the full CES-D has been demonstrated in a wide variety of samples with estimates of internal consistency ranging from .8 to .9 and test-retest reliabilities ranging from .4 to .7 (Devins et al., 1988). These investigators assessed the quality of the CES-D cross-culturally, finding that it was also reliable and valid based on their Chinese and Americans samples.

However, because the way in which depression is discussed, encountered and managed varies among different societies, we believe that the understanding of depression may also differ among adults from these societies. In order to clarify probable cultural differences in the understanding of depression, it is thus sensible for us to make a direct comparison between two cultural samples using techniques that might reveal any difference in their respective understandings of this clinical syndrome.

The current study employed Confirmatory Factor Analysis to ensure measurement equivalence of the CES-D between Chinese and Americans, as well as a confirmatory multidimensional scaling (MDS) approach and hierarchical cluster analysis to further explore the relation between physical and psychological symptoms of depression in these two cultural groups. Factor analysis is widely used in the studies of construct bias. However, its models require rather stringent parameters, like multivariate normality of the items and a linear relationship between the items and the factors, constraints that pose serious obstacles to depicting the psychiatric symptomatology of multi-faceted syndromes like depression (e.g., Chentsova-Dutton et al., 2007). By contrast, MDS requires fewer and less strict assumptions than factor analysis, and can be applied to any kind of data (e.g., Bartholomew et al., 2002; Flere et al., 2008). A further advantage of MDS for present purposes is its ability to generate a visual representation of the latent structure of the data in low dimensional space (Shepard, 1962).

Increasingly, studies have employed the MDS approach to explore depression (e.g., Levine & Rabinowitz, 2007; Street, Sheeran, & Orbell, 2001; Street, Sheeran, & Orbell, 1999; Yun et al., 2004). However, none has applied MDS to the CES-D operationalization of depressive symptomatology. The main purpose of the present study was to explore whether differences exist in cultural conceptualizations of depression as measured by this multi-faceted instrument.

We expected cultural differences to exist in the way people conceptualize their experience of depression. Specifically, in light of the findings in available clinical literature, we hypothesized that Hong Kong Chinese would score significantly higher on the somatic component of depression, but lower on the affective factor compared to the US respondents. We also expect that the relationship between somatic symptoms and affective symptoms will vary across these two cultural groups in terms of their centrality in defining the construct.

## **2. Method**

### *2.1 Participants*

It has been proposed that ethnic differences may risk confounding the power of wider cultural influences (e.g., Kirmayer & Minas, 2000; Kleinman, 2004). Therefore, the two samples used in the present study were ethnically homogenous within groups to avoid any ambiguity in the results arising from the ethnicity of the respondents. College students from both United States and Hong Kong participated in this cross-cultural study. The US participants ( $n=172$ ), consisting of 78 males and 94 females, were all of Anglo descent. Their mean age was 19.01 years ( $SD=1.15$ ). They participated in the present study as a course requirement. The Chinese sample ( $n=126$ ) was selected from a university in Hong Kong, and had 50 men and 76 women with a mean age of 20.37 years ( $SD=1.94$ ). All were Chinese, and most participated in the present study in order to partially fulfill a course requirement, while a few volunteered to participate to earn a HK\$50 (USD 6.40) reward.

### *2.2 Measures*

The CES-D (Radloff, 1977) was specifically designed for research with general populations aged 18 or older. The 20 items in the scale measure somatic components, affective features, interpersonal manifestations, and positively worded aspects of depression. All participants in the present study were asked to indicate the extent to which the self-report statements correctly reflect his/her status on each of twenty different symptoms by using 4-point Likert scales ranging from (1) "rarely or none of the time" to (4) "most or all of the time". Hong Kong respondents finished a Chinese version which has gone through a translation-retranslation process to ensure the meaning equivalence during the preparation, while US sample completed the original version in English. The Cronbach alphas, one of the indexes reflecting full-scale reliability, in the present study were acceptable in both samples (HK = .73; US = .72), consistent with previous results.

### *2.3 Overview of Analysis*

As noted before, the main aim of the current study was to investigate whether different cultural profiles of depression exist between Chinese and Americans. First, psychometric properties of the CES-D were assessed using multi-sample SEM analysis. Second, statistical analyses including regression and correlation analyses were conducted to confirm whether and how the Chinese tendency of reporting somatic symptoms occurs. Finally, MDS and hierarchical cluster analysis were performed to uncover the differences in participants' conceptions of depression.

### 3. Results

#### 3.1 Confirmatory Factor Analysis

Prior to testing for invariance across the two culture groups, Confirmatory Factor Analysis (CFA) was performed to check the measurement equivalence of this scale for these two groups. For assessing consistency with Radloff's (1977) work, a four-factor specification that distinguished the somatic, affective, positive, and interpersonal items was fitted to the data with a multi-sample structure equation modeling (SEM). Based on the available literature (e.g., Crockett et al, 2005; Lee et al, 2008), we allowed four factors correlated with each other in the current model, rather than introduce a higher order factor. Table 1 presents loading descriptions and factor correlations for the two groups. The 20 CES-D items had significant loadings, and the fit statistics, RMSEA=.08, GFI=.82, CFI=.86, NNFI=.84, indicated acceptable model fit (e.g., Browne & Cudeck, 1993; Flere et al., 2007; Marsh & Hocevar, 1985).

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#### 3.2 Analysis for the Four Factors

##### 3.2.1 Regression analysis.

We examined the effect of culture for each of the four factors by conducting hierarchical regression analysis, taking gender and age as control variables which were put into the first block with culture in the second block. As demonstrated in Table 2, the effect of culture was significant for all four of these factors ( $ps<.05$ ) with higher scores on the somatic and interpersonal factors for Hong Kong Chinese respondents, but higher scores on the affective and positive factors for American respondents (See Table 3). Additionally, the results also revealed that there were gender effects on the somatic, affective, and positive factors ( $ps<.05$ ), but not the interpersonal factor ( $p>.05$ ). Specifically, females showed higher scores on the somatic and affective factors, while males scored higher on the positivity factor (See Table 3).

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##### 3.2.2 Correlation analysis.

To further examine the relationships among the different components of the CES-D, correlations among its four factors, namely the somatic, affective, interpersonal relationship, and positivity factors, were computed for the Hong Kong Chinese and the Americans (see Table 4 & 5). As indicated, these four components of the CES-D were significantly associated with each other ( $ps<.05$ ), except for the correlation between the somatic factor and the positivity factor in US group ( $p>.05$ ). Nonetheless, these components form a coherent construct of depression in both cultural groups and factor together, as would be expected from the high Cronbach alpha for the 20 items considered as measures of a single construct.

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#### 3.3 Multidimensional Scaling (MDS)

We conducted a two-dimensional, MDS, non-metric representation, with a view to ascertaining the latent relation among the 20 CES-D items. The Euclidean distance maps of the CES-D data from the HK and US sample are presented in Figures 1 and 2. In the HK sample, stress amounted to .057 for a two-dimensional representation, indicating a good fit (Cox & Cox, 2001, p. 77). A two-dimensional solution also showed a good fit for the US sample, with a stress value of .044.

Viewing Figure 1, one may identify a definite pattern discernible in the CES-D: on the far left side of the figure a four-item region appears that includes the four, positively worded items (viz., "I felt hopeful about the future"; "I felt that I was just as good as other people"; "I was happy"; and "I enjoyed life"). The remaining 16 items more or less closely clustered with each other on the right side of the display. Such an overall pattern could also be observed in the US sample (See Fig. 2).

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The differences between these two maps in their overall organization were located on the right-hand side of the display: for the Hong Kong Chinese sample, those items depicting depressive emotion, involving “I felt sad”, “I felt lonely”, “I felt depressed”, “I felt fearful”, “I felt that I could not shake off the blues even with the help from my family or friends”, “I felt that people dislike me”, “People were unfriendly” overlapped with each other and populated together as a centroid, while the somatic items, namely “I did not feel like eating; my appetite was poor”, “I was bothered by things that usually don’t bother me”, “I could not get going”, “I felt that everything I did was an effort”, “I had trouble keeping my mind on what I was doing”, “My sleep was restless”, were scattered around this centroid.

With respect to the scatter pattern on the right hand side for the American sample, there also appears to be a centroid constituted, however, by affective and interpersonal items, while somatic items are located peripherally. Items like “I felt that I could not shake off the blues even with the help from my family or friends”, “I felt sad”, “I felt lonely”, “I felt depressed”, “I felt that people dislike me”, scattered around the X axis, while somatic items like “My sleep was restless”, “I could not get going”, “I felt that everything I did was an effort”, “I had trouble keeping my mind on what I was doing”, were somewhat removed from this centroid.

For Americans, affective/interpersonal items and somatic items clustered more closely with each other than did those in the HK sample (see Fig. 3). Specifically, “I had trouble keeping my mind on what I was doing”, “I felt that everything I did was an effort”, and “My sleep was restless” positioned themselves far from the centroid (mainly involving affective/interpersonal items) in both samples, while somatic items involving “I did not feel like eating; my appetite was poor”, “I was bothered by things that usually don’t bother me”, and “I talked less than usual”, were removed from the centroid only in the Hong Kong Chinese sample.

Further, the somatic items in the Hong Kong Chinese sample were clearly separated into two clusters: one positioned at the bottom includes “I had trouble keeping my mind on what I was doing”, “I felt that everything I did was an effort” and “I could not get going”, may be labeled a subjective somatic cluster, while the other, consisting of “I did not feel like eating; my appetite was poor”, “My sleep was restless”, and “I was bothered by things that usually don’t bother me”, deals with the physiological changes or somatic changes caused by external factors and may be labeled an objective somatic factor. Such a distinction among somatic items by the Chinese indicates a heightened elaboration of somatic changes.

Based on the coordinates for each item in the Euclidean distance maps, we calculated the distances between somatic items and affective/interpersonal items in each culture (see Table 5). T tests were conducted to investigate whether there was a significant difference between the American and the Hong Kong Chinese samples. In terms of “Bother”, “Appetite” and “Going”, the Euclidean distances between each of them and the nine affective/interpersonal items were larger for the Hong Kong Chinese than for the Americans ( $p < .05$ ), while “Effort” and “Sleep” showed the reverse pattern. That is, compared to the Hong Kong sample, these items were located further from the affective/interpersonal items in the US sample ( $p < .05$ ). Additionally, though there was no significant difference found for “Talk” ( $p > .05$ ), the trend was that it was positioned a little farther from the centroid in HK, but closer to the centroid in the US. In terms of “Mind”, Euclidean distances were large in both groups. Such a pattern of results mostly supports the observation drawn from Figures 1 and 2 that the HK respondents made a sharper discrimination between somatic items and affective/interpersonal items than did the Americans.

With respect to the nine items tapping affective/interpersonal aspects of depression, their pairwise Euclidean distances were similar in the two cultural groups ( $p > .05$ ). The tightness of these items was similar in the HK and US samples.

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 Insert Table 5 about Here  
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### 3.4 Hierarchical Cluster Analysis

To supplement our analysis of the organization of depression as measured by the CES-D, hierarchical cluster analysis was performed. Whereas MDS is good at uncovering the global and continuous features that participants use to organize the domain, hierarchical cluster analysis identifies groupings of the data as a hierarchical network

of clusters and sub-clusters. The combination of MDS and hierarchical cluster analysis is widely used to interpret and complement data analyses across a number of conceptual domains (Kurt, Ture & Kurum, 2008; Lim & Lawless, 2005; Maestre et al., 2007; Primo & Vaquez, 2007).

Viewing Figures 3 and 4, one may detect that both Hong Kong Chinese and American respondents clustered items indicating depressed affect and problematic interpersonal relationships first. That is, the distances among these items are the shortest compared with those of other pairwise linkages. This close and early clustering of affective and interpersonal relationship items shows that our respondents tend to attach more centrality to these items than to the somatic items.

Additionally, the somatic items were gradually integrated into this main cluster, which also suggests that a center-periphery pattern exists in these two groups. However, it seems that the agglomerative process of adding somatic items to the centroid in the US sample was different from that in Hong Kong Chinese sample, as four steps were involved for the American respondents, while only three steps were needed for the Hong Kong Chinese.

In terms of the four positive items, the results from this cluster analysis showed that “Happy”, “Enjoy”, “Hopeful”, and “Good” clustered with each other as a distinctive group, a finding consistent with the results from the MDS.

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#### 4. Discussion

We found, as have earlier researchers (e.g., Radloff, 1977; Williams et al., 2007), that the CES-D is constituted by four factors which show metric equivalence in Chinese and American samples. Nonetheless, there were some differences existing in the relationship among types of items when comparing the Hong Kong Chinese and American respondents.

New results from our present study include the common pattern of dispersion among the 20 items between HK and American respondents, supported by our results from CFA and MDS as well as hierarchical cluster analysis. Though it is widely accepted that the four-factor construct of the CES-D remains reliable regardless of respondent culture (e.g., Covic et al., 2007; Meads et al., 2006; Williams et al., 2007; Yang & Jones, 2007), the CES-D also yielded a similar center-periphery pattern in both HK and US samples. Based on Figures 1 and 2, it seems that respondents in these two cultures both considered affective/interpersonal relationship items as a central feature in their experience of depression. This conclusion is supported by a unique pattern discernable in the Euclidean distance map: the affective/interpersonal relationship items of the CES-D grouped at the center with these items closely clustering and even overlapping with each other, while the somatic items scattered around them more peripherally. A similar finding also was revealed in the dendrograms of the hierarchical cluster analysis in that those affective/interpersonal relationship items grouped with each other at the initial steps, while the other items were integrated into this cluster step by step thereafter. From this pattern, it could be inferred that more centrality was placed on the affective/interpersonal items than somatic ones by both Americans and Hong Kong Chinese.

It goes without saying that depressive feelings are experienced by all people and are a normal component of disappointment and grief. Usually, one suffers from depression beginning with irritable mood, decreased interest or pleasure in daily life, and failure to thrive, while the somatic responses are usually regarded as the extensions of these bad feelings. In other words, these negative affects of depression are one of the sources of somatic symptoms (e.g., Rhee, Holditch-Davis, & Miles, 2005). It is natural that both Chinese and Americans regard the group of affective/interpersonal items as an important referent point for depression, though regression analysis showed that Americans regarded these items as more important than did the HK Chinese. However, if the affective items are so important in expressing depression, why are the two interpersonal relationship items treated as equally important in both Hong Kong and the US? We argue that the symptoms, “People were unfriendly” and “I felt that people disliked me”, both elicit negative feelings rather than somatic responses. Generally, when a person complains about bad interpersonal relationships with others, he or she generates bad feelings simultaneously. That is, complaints like “I felt sad” could be regarded as expressing bad feelings. So, the close mixing of affective and interpersonal items seems sensible.

However, compared to Americans, Hong Kong persons seem to discriminate somatic from affective/interpersonal relationship items to a greater extent; these two categories of items are clearly separated

based on their Euclidean distance map (see Fig. 1), while they overlap with each other considerably in the American sample (see Fig. 2). Though both samples attached importance to affective/interpersonal relationship items, different weights were put on somatic items by the respondents from Hong Kong and the US. Extra evidence from T tests based on Euclidean distances in Fig.1 and Fig. 2 showed that no significant cross-cultural differences were found in the pairwise comparisons among affective/interpersonal relationship items. That is, the closeness among these items is similar in two cultures. However, the relationships between somatic items and affective/interpersonal relationship items in Table 6 shows that pairwise contrasts in “Bother”, “Appetite” and “Going” items varied cross-culturally. Specifically, the “center” of affective/interpersonal relationship items remained the same for both Hong Kong Chinese and Americans, while the relationship of somatic items to the items in this “center” was different across the two cultural groups.

Seemingly, Americans regard somatic and affective experiences as two different components constituting depression to the same extent. Therefore, they tend to rely equally on both kinds of items to describe their depression. That is why we observe the considerable overlap of item types in the American sample when taking the overall construct of depression into consideration. Depressed Chinese individuals, however, tend to rely relatively more on their somatic symptoms rather than their sad feelings to express depression, even though they are aware of their psychological problem (e.g., Kleinman, 2004; Parker, Chan, & Tully, 2006; Parker, Cheah, & Roy, 2001). So, only the reports of somatic symptoms by Chinese people show a clear distinction between somatic and affective/interpersonal symptoms.

In Chinese culture, the concept of depression is frequently diagnosed, but does not enjoy wide usage in Chinese daily life (Kleinman, 2004). Moreover, there is a common understanding for Chinese that the physical experience of depression is distinct from the psychological one. Physical symptoms of depression are mild and curable, while psychological ones are more serious (e.g., Bjorkman, Svensson, & Lundberg, 2007; Kalkhoff, Djurich, & Burke, 2007; Wright et al., 2007). Thus, it is not surprising that there are many misdiagnoses of Chinese people by American diagnosticians, as their Chinese patients tend to express somatic symptoms including boredom, discomfort, and dizziness rather than the other symptoms of depression (e.g., Schnyer et al., 2005; Wong et al., 2007).

Depression in both Hong Kong and American culture indicates the negative side of one's health. However, in Chinese culture it also carries greater stigma (Chung & Mak, 2004). People with such a disease would be considered as abnormal all his/her life, the longstanding Chinese stereotype of diseases like depression and schizophrenia (Kung, 2003). Americans treat depression as a more neutral illness like flu, believing that people suffering from such illness would recover one day (e.g., Chung & Chan, 2004; Verma et al., 2004). Moreover, in contrast to American culture, Chinese culture emphasizes self-control (e.g., Gross, Richards, & John, 2006; Russell & Yik, 1996). Under the influence of such norms, Chinese tend to show emotional moderation, namely, reporting less intense positive and less intense negative emotional experiences (e.g., Eid & Diener, 2001; Tsai & Chentsova-Dutton, 2002). Such a normative focus is partially embodied in the actual reporting of depression. Thus, it is not surprising that in the current study an effect for culture was found in both somatic and affective factors, with Chinese scoring higher on the somatic factor, whereas Americans scored higher on the affective factor.

Superficially, the clearer discrimination between the somatic and the affective/ interpersonal items found in the HK Chinese sample appears to contradict the close relation between body and mind proposed in Chinese traditional cosmology. Based on the above evidence, however, we argue that our conclusion is not contradictory but compatible with that mind-body connectedness. It is precisely the close relation between body and mind that leads Chinese people to report the more normatively acceptable somatic symptoms whose cure seems more possible and contributes to the resolution of psychological symptoms.

In order to explore the conceptualized differences in the construct of depression among non-depressed persons from HK and the US, the present study first used hierarchical regression to investigate the cultural differences in four types of items (i.e., somatic, affective, interpersonal, and positivity), and then took all these four factors into consideration simultaneously by applying MDS as well as hierarchical cluster analysis. It was found that compared to Americans a clearer discrimination between affective/interpersonal relationship and somatic items occurs among the Chinese, a finding which is consistent with the available evidence found with depressed persons. We argue that, no matter whether Chinese are depressed or not, they are influenced by the same cultural construction. Specifically, their experiencing of depression is constrained by Chinese culture so that they share an understanding of depressive symptomatology: there is salient inequality between somatic symptoms and affective/interpersonal symptoms in terms of the degree to which they express depression - it seems to Chinese that the affective aspects of depression outweigh its somatic aspects. Therefore, when reporting depressive

symptoms they tend to present the less culturally endorsed ones, namely, the somatic aspects. That is, the tendency to report somatic symptoms in Chinese does not indicate any greater importance attached to these symptoms; in fact, it is precisely those psychological symptoms that play a more essential role in expressing a Chinese person's degree of depression.

## 5. Conclusion

Understanding cultural and ethnic differences in conceptualizing mental illness and its consequent diagnosis provides opportunities to clarify the relationship between culture and illnesses like depression. The present study found that the overall construct of CES-D is the same between the two cultural samples of Hong Kong Chinese and Americans. However, differences still reliably exist in the organization of these 20 items when they were plotted in terms of the Euclidean distance among them, reflecting the distinct understanding of depression between non-depressed respondents from Hong Kong Chinese and Caucasian Americans.

So far, three implications could be derived from the present study. Firstly, in terms of the clinical application, we claim that the combination of MDS and hierarchical cluster analysis could act as a supplementary tool to reveal the latent connection among a variety of symptoms by displaying their organization in a Euclidean distance map or dendrogram. The dispersion and clusters of the symptoms could shed light on the unique organization of these symptoms collected by a multi-faceted measure, demonstrating how a particular disorder occurs.

Secondly, findings in the present study are based on general population, and are consistent with those derived from clinically depressed persons, viz., that, Chinese tend to report physical symptoms while Americans report both physical as well as psychological symptoms. It is well-known that most people with clinical depression report a normal-to-abnormal developmental process for the disorder. Given that the symptoms of the normal person are the same as those of the abnormal person, if culturally informed approaches are applied at the beginning of this gradual process, the effect of these approaches on outcomes would be greater relative to the same approaches applied later. In the Chinese case, that early vigilance would focus on somatic complaints.

Thirdly, current understanding of mental disorders is centered on Westernized concepts and constructs. "Cross-cultural sensitivity" lays emphasis on culturally-appropriate translations of symptoms and questions, assuming that concepts and constructs are suitable to a particular culture (Halbreich et al., 2007). The different patterns of depression between Hong Kong Chinese and Americans found in the present study remind us of the necessity to understand psychological "illnesses" and their associated symptoms in their respective cultural contexts.

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Table 1. Unstandardized Solutions for CES-D Items in HK and the US

| Item   | Somatic Factor    |                   | Affective Factor  |                   | Interpersonal Factor |                   | Positivity Factor |      |
|--|-------------------|-------------------|-------------------|-------------------|----------------------|-------------------|-------------------|------|
|  | HK                | US                | HK                | US                | HK                   | US                | HK                | US   |
| I was bothered by things that usually don't bother me. "Bother"                                  | 1.00 <sup>a</sup> | 1.00 <sup>a</sup> |                   |                   |                      |                   |                   |      |
| I did not feel like eating; my appetite was poor. "Appetite"                                     | .36               | .50               |                   |                   |                      |                   |                   |      |
| I had trouble keeping my mind on what I was doing. "Mind"  | 1.00              | 1.17              |                   |                   |                      |                   |                   |      |
| I felt that everything I did was an effort. "Effort"   | .42               | .55               |                   |                   |                      |                   |                   |      |
| My sleep was restless. "Sleep"   | .90               | .96               |                   |                   |                      |                   |                   |      |
| I talked less than usual. "Talk"   | .79               | .91               |                   |                   |                      |                   |                   |      |
| I could not get "going". "Going"   | 1.09              | 1.28              |                   |                   |                      |                   |                   |      |
| I felt that I could not shake off the blues even with the help from my family or friends. "Blue" |                   |                   | 1.00 <sup>a</sup> | 1.00 <sup>a</sup> |                      |                   |                   |      |
| I felt depressed. "Depressed"  |                   |                   | 1.22              | 1.27              |                      |                   |                   |      |
| I thought my life had been a failure. "Failure"  |                   |                   | .51               | .57               |                      |                   |                   |      |
| I felt fearful. "Fearful"  |                   |                   | .72               | .80               |                      |                   |                   |      |
| I felt lonely. "Lonely"  |                   |                   | .89               | .96               |                      |                   |                   |      |
| I had crying spells. "Crying"  |                   |                   | .49               | .49               |                      |                   |                   |      |
| I felt sad. "Sad"  |                   |                   | 1.24              | 1.30              |                      |                   |                   |      |
| People were unfriendly. "Unfriendly"   |                   |                   |                   |                   | 1.00 <sup>a</sup>    | 1.00 <sup>a</sup> |                   |      |
| I felt that people disliked me. "Dislike"  |                   |                   |                   |                   | 1.21                 | 1.28              |                   |      |
| I felt that I was just as good as other people. (R) "Good" <sup>a</sup>                          |                   |                   |                   |                   |                      |                   | 1.00              | 1.00 |
| I felt hopeful about the future. (R) "Hopeful"   |                   |                   |                   |                   |                      |                   | .93               | 1.00 |
| I was happy. (R) "Happy"   |                   |                   |                   |                   |                      |                   | 1.18              | 1.25 |
| I enjoyed life. (R) "Enjoy"  |                   |                   |                   |                   |                      |                   | 1.12              | 1.23 |
| Inter-factor loading   |                   |                   |                   |                   |                      |                   |                   |      |
| Somatic Factor   |                   |                   | 1.00 <sup>a</sup> | 1.00 <sup>a</sup> | .15                  | .08               | .14               | .22  |
| Affective Factor   |                   |                   |                   |                   | .30                  | .37               | -.70              | -.70 |
| Interpersonal Factor   |                   |                   |                   |                   |                      |                   | -.25              | -.30 |

<sup>a</sup> Item fixed at 1.00 for model identification purposes and scaling.

Table 2. Hierarchical Regression Explaining Each of the Four Factors from Age, Gender, and Culture

| Four factors         | Model | Variables | t       | B     | Beta | R <sup>2</sup> | R <sup>2</sup> change | F change |
|----------------------|-------|-----------|---------|-------|------|----------------|-----------------------|----------|
| Somatic factor       | 1     |           |         |       |      | .04            | .04                   | 5.71**   |
|                      |       | Age       | -2.27   | -.27  | -.13 |                |                       |          |
|                      |       | Gender    | 2.11*   | .86   | .12  |                |                       |          |
|                      | 2     |           |         |       |      | .05            | .01                   | 4.09*    |
|                      |       | Age       | -1.23   | -.16  | -.08 |                |                       |          |
|                      |       | Gender    | 2.39*   | .96   | .14  |                |                       |          |
|                      |       | Culture   | -2.02*  | -.89  | -.13 |                |                       |          |
| Affective factor     | 1     |           |         |       |      | .06            | .06                   | 9.50**   |
|                      |       | Age       | -.44    | -.06  | -.03 |                |                       |          |
|                      |       | Gender    | 4.21**  | 1.93  | .24  |                |                       |          |
|                      | 2     |           |         |       |      | .07            | .01                   | 3.99*    |
|                      |       | Age       | -1.24   | -.18  | -.08 |                |                       |          |
|                      |       | Gender    | 3.94**  | 1.81  | .23  |                |                       |          |
|                      |       | Culture   | 2.00*   | 1.00  | .12  |                |                       |          |
| Interpersonal factor | 1     |           |         |       |      | .01            | .01                   | 1.41     |
|                      |       | Age       | -1.42   | -.06  | -.08 |                |                       |          |
|                      |       | Gender    | .65     | .09   | .04  |                |                       |          |
|                      | 2     |           |         |       |      | .03            | .02                   | 6.49*    |
|                      |       | Age       | -2.37*  | -.10  | -.15 |                |                       |          |
|                      |       | Gender    | .32     | .04   | .02  |                |                       |          |
|                      |       | Culture   | -2.55** | -.38  | -.16 |                |                       |          |
| Positivity factor    | 1     |           |         |       |      | .05            | .05                   | 7.01***  |
|                      |       | Age       | -2.65** | -.28  | -.15 |                |                       |          |
|                      |       | Gender    | -3.06** | -1.09 | -.18 |                |                       |          |
|                      | 2     |           |         |       |      | .11            | .06                   | 20.33*** |
|                      |       | Age       | -.61    | -.07  | -.04 |                |                       |          |
|                      |       | Gender    | -2.54** | -.87  | -.14 |                |                       |          |
|                      |       | Culture   | 4.51**  | 1.70  | .27  |                |                       |          |

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Table 3. Means( $\pm$  SD) for Each of the Four Factors of the CES-D in HK and US

| Four factors                      | HK                 |                    |                    | US                 |                    |                    |
|-----------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                                   | Female             | Male               | Total              | Female             | Male               | Total              |
| Somatic Factor <sup>a</sup>       | 13.52( $\pm$ 3.74) | 12.17( $\pm$ 3.22) | 12.90( $\pm$ 3.57) | 12.13( $\pm$ 3.40) | 11.46( $\pm$ 2.96) | 11.87( $\pm$ 3.29) |
| Affective Factor <sup>a</sup>     | 10.93( $\pm$ 4.04) | 8.45( $\pm$ 2.75)  | 9.98( $\pm$ 3.65)  | 11.5( $\pm$ 4.78)  | 9.8( $\pm$ 3.33)   | 10.83( $\pm$ 4.33) |
| Interpersonal factor <sup>b</sup> | 2.75( $\pm$ 1.30)  | 2.76( $\pm$ 1.25)  | 2.75 ( $\pm$ 1.28) | 2.61( $\pm$ 1.15)  | 2.42( $\pm$ .90)   | 2.52 ( $\pm$ 1.05) |
| Positivity Factor <sup>c</sup>    | 11.37( $\pm$ 3.26) | 12.3( $\pm$ 2.98)  | 11.74( $\pm$ 3.19) | 13.22( $\pm$ 3.03) | 14( $\pm$ 2.27)    | 13.58( $\pm$ 2.73) |

Note: <sup>a</sup> seven-item factor

<sup>b</sup> two-item factor

<sup>c</sup> four-item factor

Table 4. Correlations among the Four Factors in the CES-D (HK\US)

|                   | Somatic Factor | Positivity Factor | Interpersonal Factor |
|-------------------|----------------|-------------------|----------------------|
| Affective Factor  | .49**\ .18*    | -.64**\ -.64**    | .66**\ .41**         |
| Somatic Factor    |                | -.43**\ -.14      | .39**\ .22**         |
| Positivity Factor |                |                   | -.51**\ -.32**       |

Note: \*\* Correlation is significant at the 0.01 level (2-tailed)

Table 5. Euclidean Distances between Somatic Items and Affective/interpersonal Items in HK and the US

|            | Bother        |     | Appetite      |     | Mind      |      | Effort         |      | Sleep          |      | Talk     |     | Going      |     |
|------------|---------------|-----|---------------|-----|-----------|------|----------------|------|----------------|------|----------|-----|------------|-----|
|            | HK            | US  | HK            | US  | HK        | US   | HK             | US   | HK             | US   | HK       | US  | HK         | US  |
| Blue       | .67           | .29 | .78           | .08 | 1.45      | 1.75 | 1.03           | 1.70 | .67            | .84  | .57      | .54 | .53        | .70 |
| Depressed  | .67           | .25 | .80           | .11 | 1.39      | 1.62 | .98            | 1.66 | .66            | .71  | .52      | .51 | .62        | .57 |
| Failure    | .57           | .47 | .56           | .28 | 1.85      | 1.95 | 1.44           | 1.85 | .59            | 1.05 | .63      | .69 | .94        | .75 |
| Fearful    | .73           | .16 | .87           | .28 | 1.33      | 1.62 | .91            | 1.38 | .72            | .79  | .57      | .23 | .89        | .48 |
| Lonely     | .56           | .09 | .71           | .30 | 1.40      | 1.43 | 1.03           | 1.35 | .55            | .58  | .40      | .21 | .65        | .40 |
| Crying     | .33           | .24 | .35           | .19 | 1.80      | 1.76 | 1.45           | 1.55 | .35            | .89  | .43      | .40 | .97        | .72 |
| Sad        | .67           | .17 | .80           | .25 | 1.42      | 1.43 | 1.00           | 1.50 | .67            | .53  | .54      | .38 | .51        | .38 |
| Unfriendly | .39           | .27 | .43           | .15 | 1.75      | 1.78 | 1.38           | 1.62 | .41            | .90  | .44      | .46 | .89        | .73 |
| Dislike    | .48           | .28 | .52           | .09 | 1.72      | 1.72 | 1.33           | 1.71 | .50            | .81  | .50      | .54 | .83        | .60 |
| Mean       | .57           | .25 | .65           | .19 | 1.57      | 1.67 | 1.17           | 1.59 | .57            | .79  | .51      | .44 | .75        | .59 |
|            | $t=5.01^{**}$ |     | $t=7.07^{**}$ |     | $t=-1.21$ |      | $t=-4.61^{**}$ |      | $t=-3.20^{**}$ |      | $t=1.21$ |     | $t=2.15^*$ |     |

Note: \* $p<.05$  (2-tailed); \*\* $p<.01$ (2-tailed)

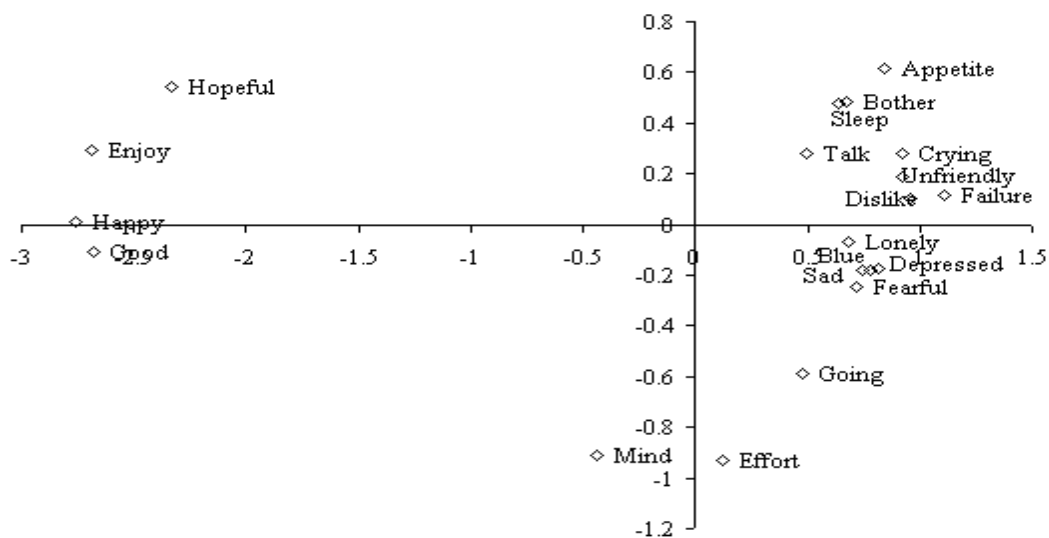


Figure 1. Euclidean distance map for Hong Kong Chinese

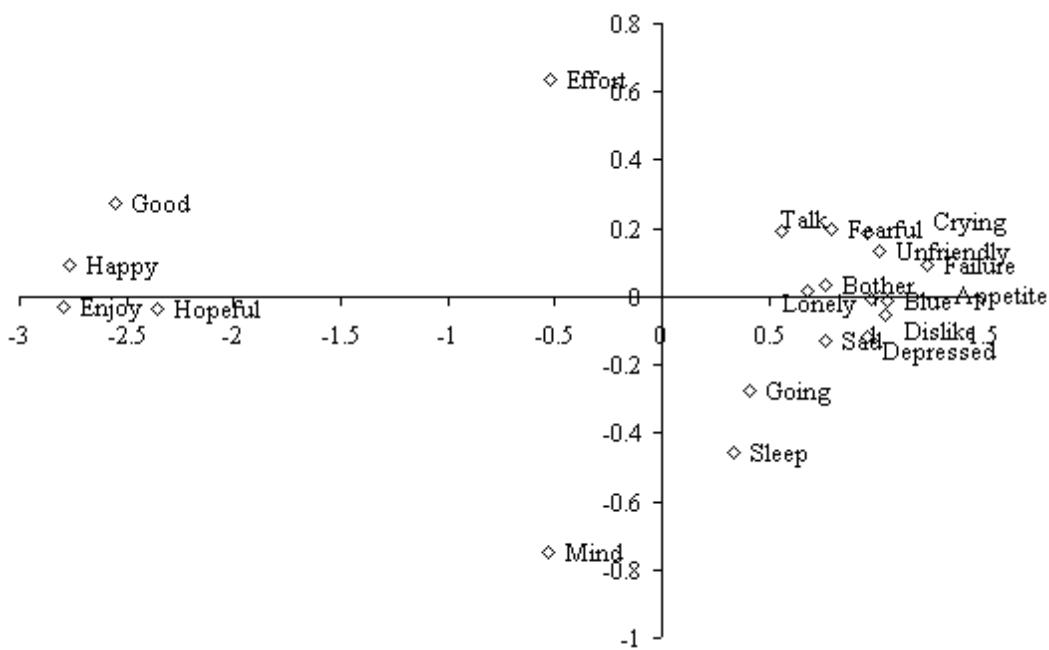


Figure 2. Euclidean distance map for Americans

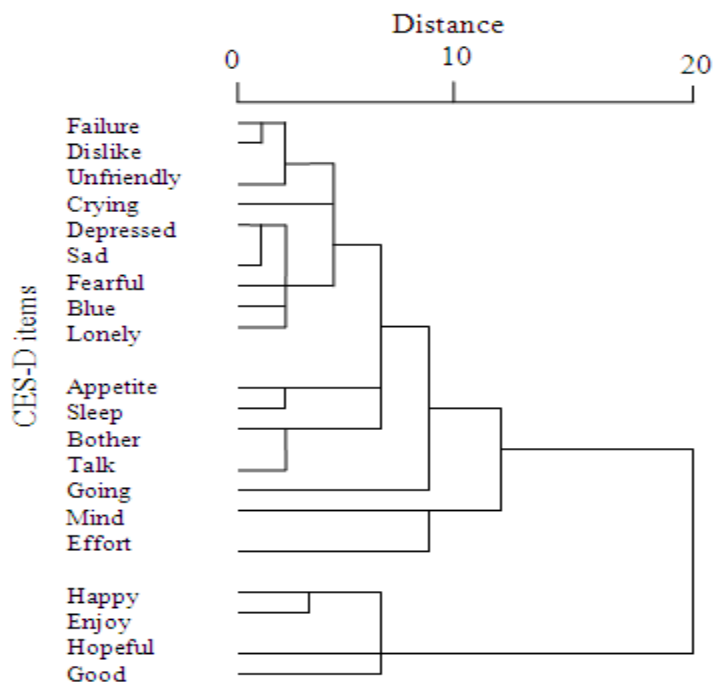


Figure 3. Dendrogram representation of the CES-D in Hong Kong Chinese

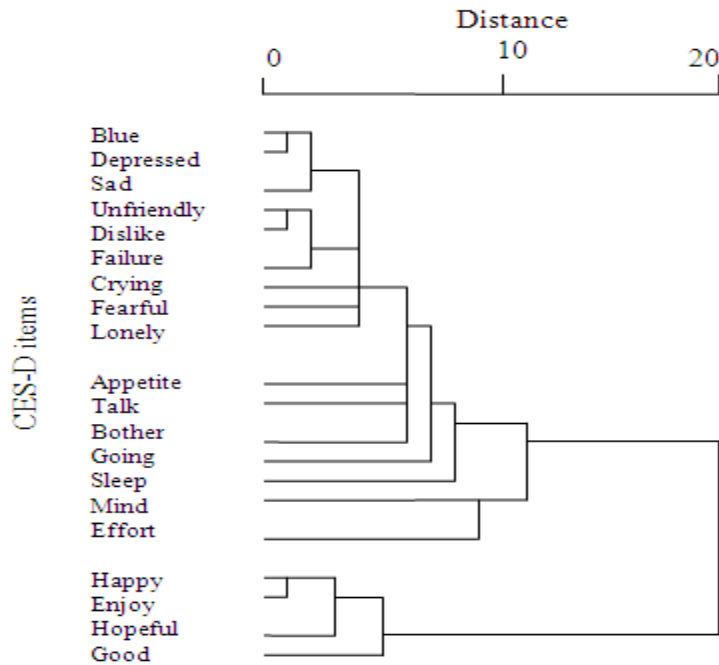


Figure 4. Dendrogram representation of the CES-D in Americans