Depression in Chinese American Immigrant Adults: An Exploration of Culturally Based Manifestations, Structure, and Measurement

by

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Abstract

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Chinese American immigrants have one of the lowest rates of mental health services utilization among minority populations in the United States. With regard to depression, this disparity is associated with stigma, insufficient knowledge of depression and its treatment, help seeking in medical and community settings, and misdiagnosis. From the viewpoint that the manifestation of depression varies culturally, this research, composed of three studies, uses an emic approach combined with item response analysis to explore cultural interpretations and expressions of distress, and their influence on assessment.

The first study investigated manifestations of social self-construal in the illness narratives of eleven men and nine women diagnosed with major depression. These narratives revealed a range of emotional, cognitive, and behavioral experiences that contained a social interpretation of the self. Also, psychological concepts of anxiety, irritability, and emotional control referred directly to a social self. This study demonstrated the social content in lived experiences of illness.

The second study examined the structure of depression. Depressed outpatients (n = 103) and community members (n = 124) completed a 47-item pilot scale containing Western and culture specific symptoms and a 21-item checklist of somatic symptoms. A multidimensional model of 59 items in three dimensions—psychological, somatic, and social—provided optimal fit of the data. Various patterns of dimensional expression within and across levels of overall distress were observed. Also, analysis of differential item functioning (DIF) showed significant influences of gender, age, education and acculturation on different areas of content. This study implicated a dimensional construct in illness presentation and progression.

The third study developed a self-report measure for screening in primary care and community settings. Based on responses to the 47-item pilot scale, 42 items fit a unidimensional polytomous model. Analysis of DIF by gender, age, and acculturation variables revealed non-equivalent items. A 9-item instrument was composed of items unbiased by gender and with content validity for the purpose of screening. This measure showed excellent reliability coefficients, and similar predictive validity but higher convergent and content validity than a commonly used Western measure. This study highlighted a role for culturally sensitive content for effective outreach and assessment.

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INTRODUCTION

This dissertation research aimed to contribute to the effective detection and treatment of depression for Chinese immigrants to the United States. Chinese Americans have one of the lowest rates of mental health services utilization among all minority ethnic groups in the U.S. (Bui & Takeuchi, 1992; Herrick & Brown, 1998; Snowden & Cheung, 1990; Sue & McKinney, 1975; Zhang, Snowden, & Sue, 1998). Such disparity in the treatment of depression, specifically, has been attributed to cultural barriers that hinder the individual's decision to use mental health services. These barriers include problems of language; limited knowledge of mental illness and Western treatments (Yeung et al., 2004; Lin, 1985; Tseng, 1975); low direct access to mental health consultation (Hong, Lee, & Lorenzo, 1995); cultural beliefs such as stigma, fate, and self-blame (Abe-Kim, Takeuchi, & Hwang, 2002; Kung, 2004; Yeung & Kam, 2008); and a view of medical care as the appropriate intervention for depression (Ying, 1990). Associated with these barriers, illness-related behaviors among Chinese Americans include seeking help in primary care and community settings rather than mental health services (Takeuchi & Cheung, 1998; Yeh, Takeuchi, Sue, 1994), emphasizing somatic rather than psychological distress (Bridges & Goldberg, 1985; Hsu & Folstein, 1997; Mak & Zane, 2004), and denying the need for help and delaying treatment until the condition is extremely deteriorated (Kung, 2004; Lin, Inui, Kleinman, & Womack, 1982; Ying & Miller, 1992). Underutilization has also been attributed to a lack of cultural sensitivity in the provision of services, including misdiagnosis by medical practitioners (Chung et al., 2003; Hicks, 2002) and a largely unexplored hypothesis of under-recognition of depression by clinicians related to the use of Western measures (Kuo, 1984; Takeuchi et al., 2007). Although these problems of treatment disparities, cultural barriers, and measurement equivalence are recognized, basic cultural research that supports improved prevention, assessment, and treatment is only incipient (Chen, Guarnaccia, & Chung, 2003; Leong, Okazaki & Tak, 2003; Yeung & Kam, 2008; Yeung, Neault, et al., 2002; Zheng & Lin, 1991).

The research objective was to explore the cultural elements that underlie the practical task of effective intervention for Chinese immigrants. In this regard, this research took the perspective of depression as an illness that manifests itself differently across cultures (Marsella, 1985). It drew from the literature of cultural factors that influence conceptualizations, presentations, and experiences of depression, to formulate three research questions. The first concerns the influence of a fundamental aspect of Chinese culture—the experience of the self as interdependent—on the manifestation of depression (Marsella, 1985; Markus and Kitayama, 1991). Researchers have demonstrated a construct of interdependent self-construal in less acculturated Chinese American immigrants (Kwan, Bond, & Singelis, 1997; Singelis, Bond, Sharkey, & Lai, 1999), but have not yet examined how individuals with depression express this social interpretation of the self.

The second question regards the existence and content of substantive components of the experience of depression, that is, the dimensionality of the depression construct. Qualitative research of explanatory models of depression supports a multidimensional construct containing psychological, somatic, and social dimensions (Yeung, Chang, et al., 2004; Ying, 1990, 2002), but the identification of symptoms that compose these dimensions and empirical modeling of its structure have not been attempted.

The third question concerns the assessment efficacy that can be gained with a culturally based instrument. In response to the need for the effective linkage of individuals to mental health

care (Sue & Zane, 1987; Okazaki, 2000), researchers have focused on culturally sensitive protocols for screening and treatment in primary care (Huang, Chung, Kroenke, Delucchi, & Spitzer, 2006; Yeung & Kam, 2008; Yeung et al., 2004; Yeung, Yu, Fung, Voroni, & Fava, 2006). An accurate assessment tool is a basic building block of this type of intervention, yet no attempts to develop a culture specific depression scale in the U.S. have been reported. Each of these three questions is addressed in a separate study.

In Study 1, the aim was to contribute to knowledge of the cultural manifestation of depression by exploring the influence of social self-construal on expressions of distress. This study was based on Marsella's theoretical assertion of the importance of the conception of the self as the bridge between culture and mental disorder (Marsella, 1985). According to his framework, Chinese culture has an unindividuated or interdependent self-structure that has a fundamental influence on forms of expression and content of illness manifestations. Empirically, the social component of depressive distress has received relatively little attention from cross-cultural researchers although its importance has been demonstrated. Several areas of research demonstrated manifestations of depression that are based on a socially oriented interpretation of the self. In explanatory models of depression, immigrants attributed depression to interpersonal situations and the social environment and viewed psychological and somatic symptoms as reactions to social problems (Yeung, Chang, et al., 2004; Ying, 1990, 2002). The investigation of interdependent self-construal (Markus and Kitayama, 1991) showed the pertinence of socially derived aspects of distress experiences (Diener & Diener, 1995; Kwan, Bond, & Singelis, 1997; Okazaki, 1997; Singelis, Bond, Sharkey, & Lai, 1999) and relational harmony (Kwan et al., 1997) in the psychological orientation of Chinese and other Asians. Also, measurement researchers in China revealed an interpersonal verbal style in which social terms were used to express Western psychological concepts of depression, along with culture-specific interpersonal concepts and contextual expressions relevant to the depression construct (Zheng, Xu, & Shen, 1986).

In this study, the objective was to identify and quantify forms of expression of depressive distress that contained social interpretations of the self. This was achieved by examining the narratives of the explanatory models of illness of 20 immigrant adults, 11 men and 9 women, who were diagnosed with major depression or dysthymia, and were receiving Western mental health or traditional Chinese medicine treatments in the community. As a complement, clinicians' accounts of their patients' explanatory models were also analyzed. These narratives of lived experiences of depression were carefully probed to identify emotional, cognitive, and behavioral symptom experiences and expressions associated with a social or interdependent self-construal. The research task was to find explicit social content as well as the expression of psychological concepts from the viewpoint of interdependent self-construal. To understand the relative importance of social versus psychological presentations of distress, the frequency with which men and women expressed each form of social and psychological symptom was calculated. Finally, the exploration was extended to causes and topics, such as types of adverse life events, on which presentations of distress were centered, and forms of expression between genders and across treatment settings.

In Study 2, the research aim was to gain knowledge about the structure of depression, including its specific content and the influence of acculturation and other social variables. Such knowledge, as it represents the cultural manifestation of illness, is essential for informing the development of interventions and stimulating basic research of cultural aspects of illness progression and mediators of change. Intervention research for Chinese Americans has largely

relied on the cross-cultural validity of depression measures developed for European Americans (Chen et al., 2006; Huang et al., 2006; Kuo, 1984; Mui, Kang, Chen, & Domanski, 1996; Rankin et al., 1993; Yeung, Howarth, et al., 2002; Yeung, Neault, et al., 2002; Yeung et al., 2004; Ying, 1988). Without a cultural object of comparison, this line of research assumes that the structure of depression, defined in the DSM-IV-R and operationalized in Western measures, is valid for less acculturated Chinese Americans. This study challenges the assumption of university by taking cultural specificity as a starting point. Its framework was based on theoretical considerations of health and illness as integrating mind, body, and social elements in Chinese culture (Chan, Ho, & Chow, 2001), as well as empirical knowledge concerning the somatization of depressive distress, the influence of interdependent self-construal on the expression of mental illness, and cultural behaviors and styles of illness presentation.

The structure of depression was investigated with a bottom-up emic approach and a modern item response analytic method. The first step was the identification of a broad range of content with potential relevance to the depression construct through qualitative interviews with individuals receiving treatment for depression and clinical experts from mental health, medical, and community settings. With this qualitative data, a pilot depression scale of 47 Western and culture specific items belonging to psychological, somatic, and social domains of content was constructed. To the somatic domain, 21 items were added from an unpublished checklist of somatic symptoms experienced by patients with neurasthenia. This pilot measure was administered to a sample of 227 participants, composed of individuals diagnosed with major depression by clinicians in the community and non-diagnosed community members. With this data, a series of unidimensional and multidimensional models of various combinations of the three hypothesized domains were analyzed. A three dimensional model had the best fit to the data. The next steps were the validation of each dimension and the overall construct in relationship to diagnoses of depression and neurasthenia, and the identification of dimensional patterns of expression within and across levels of overall distress. Finally, the analysis of differential item functioning, or measurement equivalence at the item level, between subgroups of gender, age, education, and acculturation, revealed that these variables had significant influences on the expression of important areas of content for each subgroup.

In Study 3, the aim was to contribute to knowledge of how cultural elements can improve the effectiveness of the assessment instrument, which could be critical for linking Chinese American immigrants with mental health care. To do so, this study developed a self-report depression measure that considered the culturally based conceptualizations of immigrant adults, and has validity and viability for screening individuals who seek help in primary care and community organizations. The need for this research originates from investigations of translated versions of various Western self-report symptom checklists with low-income immigrants. In these investigations, two notable problems concerning cultural validity appeared. First, some symptom concepts were invalid or appeared to function differently from how they functioned for other ethnic samples (Chang, 1985; Chen et al., 2006; Huang et al., 2006; Kuo, 1984; Ying, 1988, 1989). Second, there were very high refusal and non-completion rates, especially when the patient was expected to self-administer (Yeung et al., 2004; Yeung et al., 2006). A small body of research concerning a culture specific conception of depression shed light on this measurement problem (Yeung, Chang, et al., 2004; Ying, 1990, 2002). Specifically, Chinese immigrants conceptualized depression experience as psychological, somatic, and interpersonal. The impact of this conceptualization on the presentation of depression, and the practical problem of

obtaining additional assessment efficacy, has been little explored (Zheng & Lin, 1991; Leong, Okazaki, & Tak, 2003; Yeung et al., 2002).

This study took the next step of operationalizing a culturally based construct of depression in a brief instrument that is intended for reaching individuals in medical and community settings. To explore its validity, this brief instrument was compared with a commonly used Western screening measure, the Patient Health Questionnaire Depression Module (PHQ-9; Kroenke, Spitzer, & Williams, 2001), which has been researched with Chinese American immigrants. In an emic approach, this study was conducted in the natural setting and employed an item response modeling approach to measure construction (Wilson, 2005). An initial task was formulating a construct that described the cultural manifestation of depression to be measured. This construct definition served to guide the entire scale development process. The next step was the development of a large pool of pilot items through qualitative interviews with depressed outpatients and clinical experts in diverse medical and community settings. This pool of items consisted of culture specific and Western symptom concepts, as well as appropriate language expressions for these concepts. This pilot scale was administered to a sample of 227 individuals diagnosed by clinicians in the community and non-diagnosed community members. The empirical task was fitting a Rasch unidimensional item response model to the data, and using the model's information on item fit and item functioning by subgroups of interest, especially gender, to choose unbiased items to comprise a brief screening measure, called the Chinese American Depression Scale (CADS-9). Finally, the comparison of CADS-9 to PHQ-9 revealed the role of cultural elements in effective measurement.

STUDY 1

Depression in Chinese American immigrants: Social self-construal in manifestations of distress

ABSTRACT

In this qualitative study, we aimed to contribute to knowledge of the cultural manifestation of depression in Chinese American immigrants by exploring the influence of social self-construal on expressions of distress. We examined the explanatory model illness narratives of 20 immigrant adults, 11 men and 9 women, who were diagnosed with major depression and receiving traditional Chinese medicine or western mental health treatments in the community. We also analyzed clinicians' accounts of their patients' explanatory models. Distress manifestations centered on the struggle to fulfill one's expected social role in face of adverse life events and, in some cases, a genetic factor of mental illness. These adverse life events concerned loss of family, divorce, the Cultural Revolution, rejection in childhood, domestic violence, physical injuries, and most prominently, an inability to obtain an adequate social and economic function in U.S. society. We identified a range of emotional, cognitive, and behavioral symptom experiences that contained a social interpretation of the self. We also observed the expression of psychological concepts related to anxiety, irritability, and emotional control that referred directly to a social self-construal, and the relatively less frequent expression of typical Western psychological symptoms of depression. Furthermore, we found indications of differential patterns of expression between genders, and across depression severity levels and treatment settings. We thus demonstrated the nature and relative importance of socially based manifestations of distress in Chinese American immigrants. These findings suggest an important and distinct social domain in a cultural construct of depression, and important implications for culturally effective assessment and treatment.

Marsella asserted that the self provided the bridge between culture and mental disorder, "a bridge for understanding why disorders assume certain forms of expression and content" (Marsella, 1985, p. 299). He characterized non-Western cultures as having an unindividuated self-structure which emphasizes interdependencies in human relations, versus an individuated one common in the West which stresses the independence and separateness of individuals. He also contended that the unindividuated self-structure corresponded to a cognitive orientation with a preference for metaphorical language and imagistic mediation of reality. For ethnic Chinese, the conceptual model of mental illness is grounded in the Confucian tradition. In this model, the conception of the person is relational and harmony in one's relationships and within one-self (i.e., balance of mind and body) are paramount to one's health (Lin, 1985; Tseng, 1975). With these considerations, depression would be experienced as interpersonal or somatic difficulties, which respectively reflect disharmony between people and soma and psyche (Ying, 1990), whereas it is conceived as psychocentric in the West (Kleinman & Lin, 1981; Tseng, 1975). The literature has given ample attention to the nature of somatic complaints in the experience and presentation of depressive distress. However, less is known about the nature of socially based manifestations of depression even though it has an overarching cultural and theoretical importance.

The study of the manifestation of depression in Chinese began with Kleinman's (1977) observation that Chinese somatized their psychological distress. Specifically, Kleinman found that 87% of neurasthenic patients could be reclassified with major depression. These observations stimulated a series of inquiries into the nature of somatization for Chinese in the U.S. and East Asia (Bridges & Goldberg, 1985; Gaw, 1974; Hong, Lee & Lorenzo, 1995; Hsu & Folstein, 1997; Kirmayer, Dao & Smith, 1998; Kwong & Wong, 1981; Tseng, 1975; Tung, 1994). However, this focus of inquiry has largely faded with the clarification that somatic presentations represented an "idiom of distress"—a socially sanctioned form of illness behavior that arises from the importance of emotional restraint and the stigma of mental illness in Chinese culture (Kleinman, 1982). Furthermore, Chinese recognize and report psychological experiences, especially once a relationship is established with the clinician (Sue, Zane & Young 2005), and when queried with symptom checklists (Huang, Chung, Kroenke, Delucchi & Spitzer, 2005; Yeung et al., 2002, 2004, 2008). With this view of somatic complaints as an illness behavior and a cultural style of presentation, the western conception of depression has largely been assumed to fit ethnic Chinese, and the study of the cultural manifestation of depression considerably obscured. The trend toward the dominance of a few self-report measures that appear to be psychometrically fit for Chinese (Huang et al., 2005; Yeung et al., 2008) has also contributed to diminishing cultural research of depression (Leong & Okazaki, 2003).

The social component of depressive distress is an area of study that has received relatively little attention even though the empirical literature has indicated its importance. From several vantage points, researchers observed a manifestation of depression that is based on an interdependent or socially oriented interpretation of the self. In explanatory models of depression, immigrants attributed depression to interpersonal situations and the social environment, and viewed psychological and somatic symptoms as reactions to social problems (Ying, 1990, 2002; Yeung, Chang, Gresham, Nierenberg & Fava, 2004). The investigation of interdependent self-construal (Markus and Kitayama, 1991) demonstrated the nature of the social self, especially the pertinence of socially derived aspects of distress experiences (Okazaki, 1997) and relational harmony (Kwan, Bond & Singelis, 1997) in the psychological orientation of Chinese and other Asians. The research of depression measurement in China revealed an interpersonal verbal style in which social terms were used to express Western psychological

concepts of depression, along with the validity of specific interpersonal concepts and contextual expressions to the depression construct (Zheng, Xu & Shen, 1986). Finally, the study of psychological and somatic verbal styles and common language expressions that employ body words confirmed the metaphorical nature of communicating social distress (Tung, 1994).

These theoretical and empirical considerations raise the question of the cross-cultural validity of the western construct, which strongly emphasizes affective and self-focused cognitive content, and implicate an important role for interpersonal concepts of distress in achieving assessment efficacy for less acculturated immigrants. The consistently lower depression scores of first generation Chinese Americans (Kessler et al., 1994; Takeuchi, 2007; Takeuchi et al., 1998) also support a hypothesis that western measures do not function equivalently or optimally. Considering the important disparity in the utilization of mental health services by Chinese Americans (Abe-Kim et al., 2007; Herrick & Brown, 1998; Hong, Lee &Lorenzo, 1995; Snowden & Cheung, 1990; Sue & McKinney, 1975; Ying & Miller, 1992; Zhang, Snowden, & Sue, 1998), and the many cultural barriers to care that have been identified (Abe-Kim, Takeuchi, & Hwang, 2002; Kung, 2003, 2004; Lin, Inui, Kleinman &Womack, 1982; Okazaki, 2000a; Yeung & Kam, 2008) research that supports culturally effective linkage to mental health intervention merits attention. Furthermore, the assumption that forms of expression operationalized in western measures are efficacious for this group has remained largely unchallenged due to the lack of basic research that takes cultural specificity as a starting point.

In this study, our objective was to contribute to knowledge of the cultural manifestation of depression in Chinese American immigrants by exploring the influence of social self-construal on the expression of depressive distress. Using Kleinman's (1980) explanatory model of illness interview, we examined the illness narratives of adults who were diagnosed with depression, and were receiving western and traditional Chinese medicine (TCM) treatments in public and private clinics. As a complement, we also analyzed clinicians' accounts of their patients' explanatory models. We probed these lived experiences of depression to identify symptom experiences and expressions associated with a social or interdependent self-construal. We looked for explicit social content as well as the expression of psychological concepts from a viewpoint of interdependent self-construal. We thus aimed to contribute to basic knowledge of the construct of depression in Chinese American immigrants that may be useful for improving the assessment of depression.

SOCIAL INTERPRETATIONS IN EXPLANATORY MODELS

Studies of explanatory models of depression revealed prominent social interpretations focused on situational and environmental causes, and the conceptualization of depressive symptoms as social problems or emotional reactions to interpersonal situations. One method of investigation was the explanatory model of illness interview (Kleinman, 1980), which elicits illness schemas and symptoms as a reflection of the sociocultural context (White & Marsella, 1982). This semi-structured interview asks the patient the name of the problem, its cause, impact, chief problem, severity, most feared consequence, course of illness, and kind of treatment that should be obtained. Two studies of low-income immigrants showed prominent social interpretations in conceptions of depression, although complaints were principally somatic, then psychological (Yeung et al., 2004; Ying, 1990, 2002). Ying's (1990) study of Chinese immigrant women's conceptions based on a case vignette also explored social relationships by adding two questions concerning quality of relationships with family members and others. The other study investigated

primary care patients with major depression using Weiss' (1997) explanatory model interview catalogue, an adaptation of Kleinman's interview that includes an exploration of stigma.

In both studies, participants most commonly attributed the cause of illness to external stress or pressures and interpersonal problems. The concept of 'external stress or pressures' concerns one's relationship with the environment explicitly. In contrast with 'stress,' which refers to an internal experience of tension, this expression describes a state of being overwhelmed by external demands which one has difficulty fulfilling. Furthermore, the community women named topical areas associated with the social environment, including external stress (37.2%), interpersonal difficulties (24.3%), and immigration difficulties, (20.0%), much more frequently than psychological problems (7.1%) as causal factors. Also, these women frequently considered interpersonal problems as one of the chief complaints even though they demonstrated strong psychological awareness (e.g., unstable mood, melancholia, nervousness and anxiety, and a psychiatric problem). The clinical study brought attention to the association of increased distress from social stigma and higher severity depression.

Another method of study that explored cognitive reasoning for psychological and somatic symptoms through a verbal association experiment found that students from Hong Kong attributed distress principally to social and interpersonal situations and life problems, whereas Caucasian American students' explanations were more 'psychologized' and individual-centered (White, 1982). Hong Kong students showed a distinct cognitive process where social reasoning was applied to psychological and somatic experiences. However, while they cited emotional causes for problems of crying and controlling emotions, they did not cite somatic reasoning for affective complaints. They explained both somatic and emotional complaints with external pressures, which implied knowledge of social or interpersonal etiology. They consistently referred to external pressures, especially 'family' and 'studies,' as a reason for emotional complaints such as sadness and depressed feelings. They also frequently used personality attributions to explain interpersonal difficulties, which demonstrated the importance of conceptions of moral character and desirable social behavior. Furthermore, Chinese students omitted references to mediating emotions in their causal explanations, which Caucasian Americans readily inferred.

INTERDEPENDENT SELF-CONSTRUAL

Markus and Kitayama (1991) proposed the theoretical framework of interdependent versus independent self-construal as a key variable in the experience of distress across cultures. This field of research demonstrated the influence of interdependent self-construal on concepts related to depression, and the nature of the Chinese social self in which behavior and the concept of self are in relationship to the social group. Researchers first demonstrated the presence of interdependent self-construal in Asian Americans compared to European Americans (Kwan, Bond & Singelis; 1997; Singelis, Bond, Sharkey & Lai, 1999; Okazaki, 1997), and its slow change with exposure to U.S. culture (Kato & Markus, 1993). Then, in relationship to mental health, interdependent self-construal was found to correlate positively with mental health symptoms, including distress in social situations, fear of social evaluation, and social avoidance (Okazaki, 1997, 2000b).

Relational concepts of subjective well being, as opposed to self-focused ones, were also shown to be more relevant for individuals from collectivistic cultures (Okazaki, 2002; Diener & Diener, 1995; Suh, Diener, Oishi & Triandis, 1998). In a comparison of Hong Kong university students and their U.S. counterparts, interdependent self-construal predicted higher levels of life

satisfaction, which was mediated through relationship harmony across one's most important dyadic relationships (Kwan et al., 1997). Also, individually oriented self-esteem concepts were less relevant for those with interdependent than independent self-construal in Asian American students (Singelis et al., 1999). These findings corroborate the proposition that psychological constructs of self-esteem and self-congruence, essential characteristics of mental health in the West, are less central to East Asians, whose self-appraisals are based on external social standards (Suh, 2000).

INTERPERSONAL VERBAL STYLE AND METAPHORICAL EXPRESSIONS

The study of depression measurement, which was conducted almost exclusively outside the U.S., produced direct evidence of the influence of social self-construal on the expression of depressive distress, as well as knowledge of a metaphorical style of expression. An investigation of verbal styles through clinical and community subjects' interpretations of key Western depression concepts revealed the non-equivalence of the majority of 16 key terms and a distinctive interpersonal verbal style of expression (Zheng, Leyi, & Qijie, 1986; Zheng, Xu, & Qijie, 1986). Also, the study of the adaptation of Western scales with culturally based interpersonal items, while maintaining psychological items with face validity for Chinese, confirmed the pertinence of this interpersonal style to the depression construct. The study of verbal styles also found psychological, somatic, and neutral styles of expression, which supported the metaphorical and contextual nature of distress presentations. Also, the demonstration that common language expressions containing body words had the function of communicating emotional distress due to interpersonal disruptions supported understanding of this interpersonal verbal style, and further clarified the social nature of somatic complaints (Tung, 1994).

The interpersonal verbal style consisted of the use of social expressions for psychological terms (Zheng et al., 1986). These expressions described self-focused ethical behaviors, such as 'want to apologize to others' and 'ashamed because of bad actions' for 'guilt.' They referred to social comparisons and judgments, such as 'feel less capable than others' and 'I am a weak person' for 'failure.' They also indicated cut-off relationships, as in 'no one understands or cares about me,' 'lonely,' and 'friendless' for 'hopelessness.' Confirming the pertinence of this style to the assessment construct, several adapted measures improved validity and reliability with the addition of interpersonal items. In China, Lin's (1989) Chinese Depression Scale added common idioms about social relations and unpleasant past events to the Center for Epidemiologic Studies Depression Scale (Radloff, 1977). These included: "I have felt I have a lot to talk about but can't find the opportunity to say it", "I don't think others trust me", "I feel suffocated," and "I remember unpleasant things from the past." The last item referred to disrupted social relations during the Cultural Revolution (Kleinman & Kleinman, 1995). In Taiwan, the Chinese Health Questionnaire (CHQ-12), a community measure of psychiatric morbidity, included two interpersonal items, 'getting along with family or friends,' and 'worried about family or close friends' (Cheng & Williams, 1986; Cheng, Wu, Chong & Williams, 1990). In Australia, researchers used 'not having usefulness,' and 'not willing to socialize' in place of 'less worthwhile' and 'keeping a distance from others,' respectively, in the Depression in Medically Ill (DMI-10; Chan, Parker, et al., 2007).

Tung's (1994) study of the use of expressions with body words to communicate interpersonal distress provides a background for understanding the symbolic nature of physical complaints. In this study, Chinese American immigrants were asked to explain their understanding of commonly used terms that contained body words. The word 'heart,' *xin*,

connotated ethics and affective states. Respondents described it as the region of content and substance of emotions and "the ruler" of life. It is heavily ethical and social, and the person has responsibility for it. This ethical realm concerns judgments of the quality of one's actions and feelings towards others. One respondent explained, 'If your heart is not good, then your entire person is not good." In the affective realm, the expression *xin qing,* or mood, literally means the heart's sentiment. A respondent explained, "A person's mood is dependent on the heart." To be sad is 'like your heart is injured" and "the heart is sad and worried." The word 'body,' *shen ti*, represents the self. It describes a person's worth, origin, and lineage. The expression *ti hui*, to empathize, literally means "the body acknowledges". The word is used as a personal pronoun in place of "self," as in "put your body in the other person's place and understand him." The body is capable of thinking, feeling, and experiencing. The expression for 'social status,' *shen fen*, was explained as: "The body can feel and sense. This sense tells you of your position in the world." The abdomen represents internal reactions, especially being frustrated or pent-up, and the quality of being intimate and secretive. The face is related to social honor and position, and self-respect. Considering this study, the frequent use of body words in all of the verbal styles can be understood as expressions of social distress.

The study of verbal styles also supported knowledge of the metaphorical and imagistic nature of distress presentations. The psychological style employed single-word feeling states, consistent with a western style, but also philosophical statements about life, and behavioral and context-focused descriptions of functioning rather than first person statements. For example, subjects used 'life has no flavor' for 'loss of interest,' and 'being alive is not interesting' for 'suicidal interest.' They used 'don't know how to deal with things' for 'indecisiveness,' and expressed self-pity as 'unfortunate' and 'unlucky'. In the somatic and neutral styles, the heart and brain were frequently used to describe psychological key terms. For example, 'uncomfortable inside heart' was the most commonly chosen for 'depressed,' although it also represented 'anxious.' The stronger expression, 'intolerable inside heart' was used for 'agitated'. Also, 'heart beating' was used for 'fearful.' Brain expressions included, "brain becomes stupid," and "I cannot use my brain." Somatic descriptions were also behavioral and contextual, such as 'no sexual energy due to poor health' for 'loss of sexual drive,' and 'no taste in my mouth' for 'poor appetite.' The Chinese Depression Inventory (CDI), which included six of the culture specific expressions found in this study (e.g., 'being uncomfortable in one's heart,' 'being alive is not interesting,' and 'a weak person in life'), alongside Western items, was the only culturally tailored measure to be tested in the U.S. (Zheng & Lin, 1991). The CDI was found to have comparable predictive validity as the Chinese Beck Depression Inventory, but other forms of validity were not reported (Yeung et al., 2002).

METHOD

Sample

Participants were recruited from two TCM clinics, two community mental health agencies, one social services organization, and two private psychotherapy practices located in the greater San Francisco metropolitan area. These organizations all provided services to a predominantly Chinese immigrant clientele. Ten clinicians, who provided treatment in Chinese language, and whose professional experience with Chinese immigrants ranged from 5-25 years, recruited their 20 patients for this study. All patients were first-generation Chinese Americans, fluent in

Chinese, who had a diagnosis of major depression. Four patients had comorbid diagnoses. Seven of the ten clinicians who provided services to 15 of these participants gave complementary interviews about their patients' explanatory models.

Explanatory Model of Illness Interview

We administered Kleinman's (1980) semi-structured explanatory model of illness interview consisting of nine questions, and added Ying's (1990) two questions about relationships. The eleven questions were: (1) What do you call the problem that you have? What is its name? (2) What do you think caused this problem? (3) How does this illness impact you? (4): What is the chief problem that your illness brings? (5) How severe is your illness? (6) In terms of your illness, what do you fear the most? (7) How do you get along with your family members now? (8) How do you get along with other people in your life? (9) Does your illness have a long or short course? (10) What kind of treatment do you think you should obtain? (11) What is the most important outcome you hope the treatment will result in?

Procedure

Two bilingual research assistants conducted explanatory model interviews with clinical participants in the Chinese dialect of the participant's preference. Handwritten notes, taken during interviews in Chinese and English, were used to generate detailed interview transcripts immediately after each interview. The principal researcher (RW) conducted the interviews with clinicians bilingually. Clinicians were asked to answer questions from the viewpoint of the patient. The researcher informed the clinician of the content of the patient's interview when there was a substantive discrepancy between accounts, and asked for clarifications to explore changes in the patient's perspective over time. The principal researcher and five bilingual research assistants analyzed the illness narratives. For each analytic area of interest, groups of three persons, the researcher and two assistants, separately analyzed and coded transcripts, then met to combine findings and resolve discrepancies. Findings were also reviewed by all six analysts in group meetings. The Committee for the Protection of Human Subjects of the University of California, Berkeley, approved this study's research protocol.

We analyzed the illness narratives for causal attributions and symptom experiences that implicated a social self-construal. Knowledge of causal attributions was intended to support understanding of symptom manifestations. The analysis of causes was based principally on responses to the question about cause of illness, but also included any explicit mention of causes in other parts of the interview. We identified symptom experiences based primarily on responses to questions about impact, chief problem, and most feared consequence, but also included descriptions of problematic experiences provided by participants under the other questions. We considered pertinent symptom experiences to be emotional, cognitive, and behavioral experiences that implicated interpersonal relations, the social environment, or cultural values associated with social self-construal. In this process of symptom identification, we also identified psychological experiences of illness that did not specifically contain a socially based interpretation. This study excluded the analysis of somatic symptoms.

For exploratory purposes, we grouped participants by treatment setting, severity of depression, and level of social functioning. We called these the TCM, Western Medicine (WM), and Disability groups. While individuals of the WM and Disability groups all received Western treatment (i.e., psychotropic medications or psychotherapy), the latter grouped all individuals

who either received supplemental security income for disability, or received social security insurance benefits due to being unemployable. Thus, individuals in the Disability group generally had lower psychosocial functioning. With these groupings, we observed patterns of usage for each symptom by treatment group and gender, when such were evident. We also identified substantive sub-forms or sub-topics of expression within each symptom.

ANALYSIS

Sample Characteristics

The characteristics of the 20 participants, 11 male and 9 female, are reported in Tables 1 and 2. The large majority (90%) of participants rated their own English ability levels as poor (n = 9) or fair (n = 8), and a minority (10%) as good (n = 1) or excellent (n = 1). Eleven gave interviews in Cantonese, and nine in Mandarin. On average, the male group was older, resided more years in the U.S., and received treatment for more years. Also, the male group had lower psychosocial functioning, with four more persons who had disability status and were unemployed, and two fewer persons who were employed or studying full-time, compared with the female group.

Table 3 summarizes the characteristics of the three treatment groups, TCM (n = 5), WM (n = 7), and Disability (n = 8). False names were given to facilitate identification of the participant's group. Men and women of the TCM group have surnames that begin with 'C' and 'D,' respectively. The surnames of men and women in the WM group begin with 'K' and 'L,' respectively. Men and women of the Disability group have surnames that begin with T and 'W,' respectively. Participants of the TCM group were the most educated, with each having at least a college education. The WM group was the second most educated, with a wide range of education levels from completed middle school to current study in a master's program. The Disability group was the least educated overall, with five persons having middle school or less education. The TCM group lived the shortest time in the U.S., with 9.2 mean years of residence, compared to 14.1 and 19.3 mean years for the WM and Disability groups, respectively. Also, the Disability group was much older, with a mean age of 53, compared to 43 and 36 years for the TCM and WM groups, respectively. Furthermore, the WM group had four participants who immigrated at a much younger age, with age at immigration of 7 (Mr. Koo), 12 (Ms. Lau), 17 (Ms. Lai), and 18 (Mr. Kau) years, compared with the rest of the sample, whose ages at immigration ranged from 27-41.

Treatment Group Profiles

TCM Group

The five participants of the TCM group received treatment in private clinics that provided TCM interventions, including acupuncture and herbal medicine. All but one, Mr. Chu, were employed full-time. All had mild to moderate depression, except for Dr. Du, a TCM physician, who had very mild symptoms with occasional recurrence of more severe symptoms. In her narrative, she recounted a period of severe depression 16 years earlier soon after her arrival in the U.S. All participants viewed Western medical evaluation as an initial step of help seeking when their somatic symptoms first appeared. Three of the five participants used Western medical care briefly, without helpful results for their somatic problems, before turning to TCM treatment on a

regular basis for their problems, which mostly did not alleviate. The two men of the group also feared the appearance of new physical problems. Two of the five, Mr. Chu and Mrs. Der, knew of a genetic factor of depression in their families, but both were too fearful to consult either a psychiatrist or psychologist when referred by their TCM physician. Also, Mrs. Der refused to try anti-depressants prescribed by her family doctor.

The participants of the TCM group shared several characteristics. First, as the group with the fewest years of residence and the most education, they placed strong emphasis on personal difficulties related to adaptation to the U.S. environment. They cited: (a) unsatisfying and physically demanding jobs, compared to the ones they had in their native countries; (b) difficulties of language, finances, and housing; (c) constant pressures and stress of dealing with a new cultural environment; and, (d) fear and uncertainty about their future social and economic outcomes.

Second, traumatic life events also impacted the distress experiences of three of the participants. Mr. Chan suffered the death of his father and diagnosis of both of his young children with a disabling condition all in the same year. Mrs. Der underwent a significant financial loss on the stock market, shoulder and arm pains related to computer use, a car accident, work problems, and her boyfriend's rejection of marriage and children. Dr. Du was an 'astronaut' wife to the U.S., who left her husband and daughter behind in China for five years, and started her life in the U.S. alone. ('Astronaut' refers to the immigration of one family member ahead of the others, and 'parachute' refers to family members who are left behind in the native country.)

Third, this group showed a struggle with understanding their illness as an internal and psychological experience rather than only somatic and externally derived. Their TCM physicians educated them about their diagnosis of depression, yet their ability to recognize the condition oscillated and developed only slowly as emotional difficulties, especially mood instability, worsened. The experience of psychological instability itself, whether the emotions concerned upset and crying, or frustration and temper tantrums, caused significant alarm. This group, except for Dr. Du, also showed a strong social stigma of mental illness. Furthermore, consistent with the TCM framework in which mind, body, and social experiences are integrated, participants believed that physical health problems and social stressors and pressures caused their psychological problems, and psychological problems also affected physical problems. Their narratives indicated a cognitive process involving uncertainty, a need of justification, and questioning of their personal relationship to their psychological experiences. Mrs. Der's narrative illustrates this process.

> Part of my problem is physical. Part of it is about my mental problems… There are many mental obstacles that people can't help. At first, I wasn't paying too much attention because I didn't feel like I was depressed. But now, I can't drive. I have headaches. I feel a lot of psychological stress and pressures… I went to my [primary care] doctor first because I had sudden headaches… This month, I can't drive again. This may be related to my physical problem—an endocrine imbalance. The physical problem can be related to both internal health and the external environment. I haven't had my period for three months… My sister also has some mental problems, and she has taken anti-depressants in China… She has no physical problems… But, I feel my physical problems. My heartbeat is about 50, much lower than other people… I'm not sure if my nervousness is related to my physical health problems. I know my physical problems can come from external pressure and stress… I go to my [TCM] doctor for my physical health problems. She made me realize some of my mental problems.

Western Medicine Group

The seven participants of the WM group all obtained treatment because their conditions had reached crisis or socially dysfunctional states. These participants obtained treatment from clinical psychologists and psychiatrists in private practice (n = 3), non-profit mental health (n = 1) and social services organizations (n = 1), and community mental health agencies (n = 2). The majority used psychiatric medications regularly, or tried medications briefly. All used psychotherapy, clinical social services, or counseling. Three participants, Mr. Kau, Mr. Koo, and Ms. Lau, used psychiatric medications on an ongoing basis. One man, Mr. Kwok, used medications for three years, then psychotherapy alone for one year. Two women, Ms. Lai and Mrs. Lum, tried medications very briefly, and one woman, Mrs. Li, refused referral to psychiatric consultation to obtain medications.

This group focused on several different types of life events. Two men, Mr. Kau and Mr. Koo, reported lack of family support and insufficient knowledge about mental illness as the reasons they did not obtain treatment before they reached states of crisis, at the ages of 17 and 20, respectively, which led to emergency hospitalizations. Both regained functioning with the use of medications, and had families that supported their treatment and process of recovery. Mr. Koo regained fairly high functioning, as shown by his return to college and employment in a mental health clinic. Mr. Kau regained lower functioning, but was able to maintain a part-time clerical position. Mr. Koo described his family situation and emergency hospitalization:

> "When I was a kid, I was very quiet. My mom did not bring me to see a doctor. I think she lacked understanding about mental health issues… When I was seventeen, I waited for a week [*after having very bad symptoms*], and then I was sent to emergency services. My family did not know what was happening and what to do with me. I was very emotionally unstable. Then, the pastor from my church came and told my parents to take me to the hospital."

Three participants, Mr. Kwok, Ms. Lai, and Ms. Lau, focused on difficult relationships with parents. Mr. Kwok and Ms. Lai experienced parental rejection and abandonment, respectively, during their childhoods. A significant part of their narratives centered on the impact of these events on their psychological development and difficulties in adulthood. Mr. Kwok's parents and siblings discriminated against him due to his homosexuality. He sought treatment in adulthood when he became dysfunctional due to emotional crises and heightened problems with his partner and family. Ms. Lai was a 'parachute child' whose parents left her with her grandparents in Taiwan so they could immigrate to Hong Kong. She was also sexually assaulted as a teenager. She sought treatment during her first year in the U.S. due to conflict with a high school teacher. Ms. Lau suffered intense conflict with an anxious and controlling mother who managed her teeth brushing and hand washing as a child. She sought help in college due to heightened nervousness and relations with male peers that triggered auditory hallucinations. While parents were identified as contributing factors, these three participants showed varying levels of difficulty with manifesting anger and blame toward their parents. At the extreme, Mrs. Lau only spoke of her mother's strong supportiveness since her diagnosis. Also, it was also not she, but her clinician who shared the mother's severe controlling behavior, and her slow acceptance of a genetic factor behind her illness.

Two women, Mrs. Li and Mrs. Lum, shared the experience of divorce and caring for their children as single mothers in the U.S. Mrs. Li was a 'parachute wife' who had waited with her son in China for 13 years before joining her husband in the U.S. However, she divorced due to being a victim of domestic violence by her parents-in-law and husband upon her arrival to the

U.S. She refused referral to mental health providers and only used counseling services from social services organizations that assisted victims of domestic violence. Mrs. Lum was an 'astronaut wife' who had experienced marital conflict and depression with suicide attempts prior to her immigration to the U.S. Her son, whom she raised in the U.S., had gambling and drinking addictions, and was unable to maintain employment. She self-treated with alcohol, and sought professional treatment due to intensifying conflict with her parents over her son's problems and how she had raised him.

Disability Group

The eight participants of the Disability group all received treatment from community mental health agencies. All used medications on an ongoing basis and had chronic and severe depression, except for Mrs. Wu, who used medications on and off as needed after more than ten years of regular use. Also, all used individual or group psychotherapy for treatment. Six received Supplemental Security Income for Disability (SSI), one had just applied for SSI, and one received social security insurance benefits.

All eight participants experienced severe and chronic depression that was associated with one or more traumatic life events, and significant struggles to maintain employment given their low education levels and immigration in middle adulthood. Five participants had lived through the Cultural Revolution. These five showed a particularly strong stigma against mental illness, perceptions of danger in their social environment, and fear of loss of significant others and social rejection. Three of the five demonstrated a re-experiencing of traumas and losses, and shard their awareness of the impact of the Cultural Revolution on their illness. For example, Mr. Tang had been imprisoned, fled to the mountains and wilderness, and escaped to Hong Kong. He had also lost one of three brothers, who died while attempting to swim to Hong Kong.

> [*My problem is*] mainly caused by my social environment. When I was a child, I didn't get a chance to study in school. I experienced the Cultural Revolution, and later stowed away many times to try to escape to Hong Kong. I was sentenced to two years in prison. I feel mentally nervous. My illness was induced by those situations. I always have nightmares about being killed by someone as I stow away… I have to be careful to make friends. I'm afraid that people will say I am crazy or I am mentally ill… In the past… I always got into fights with others because they always threatened me, and said that they would hurt my son and father.

The other two participants who experienced the Cultural Revolution, Mr. Tsang and Mrs. Wu, did not speak of their traumatic experiences themselves. Mr. Tsang's clinician described the impact of the Cultural Revolution.

> He was driving a van, transporting and escorting the elderly. One day, he passed out in the car because of his blood sugar… The agency let him go because he wasn't suitable for the job… He's divorced. His wife left him. He's not useful, not desirable for the job market anymore. He is one of the better educated. He was in middle management in a school in China. He was a vice principal and a teacher, so he had good status there. During the CR, he was a victim of political persecution because of his overseas relations. So, in China, he never really got to enjoy his good job. He was treated unfairly. He understood that it was because of politics… He chose to stay away from the political turmoil. He didn't participate when small groups had to testify to adhere to communism… He has a nice, passive personality. He doesn't try to change a lot aggressively. He was sad when he came to the U.S. He's not a physically strong person. He had no income. He had to rely on his sister… He sees himself as a victim. He didn't actually decide anything. He is a victim of his wife and his company that abandoned him.

At age 55 and after working for 15 years in the U.S., Mr. Tsang began to have depressive symptoms immediately after being dismissed from his job of driving a van. He had passed out due to becoming diabetic. Mrs. Wu's education was interrupted after middle school because of the Cultural Revolution. She sought medical then psychiatric care when she lost her husband, on whom she was fully dependent. Also, her children blamed her for his death, although it was due to cancer. [*Note*. The rule of Mao Tse Tung and the Cultural Revolution impacted the worsening of social stigma against mental illness and strengthened the importance of emotional restraint as socially acceptable behavior. The study of psychology was largely outlawed from 1949 to 1980. Maoists viewed depression and other forms of mental distress as expressions of wrong political thinking (Zhang, 1995). Thus, the expression of one's negative affect and psychological malaise could be treated as criticism of the political regime (Lee, 1999)].

The three younger male participants of the Disability group, Mr. Tam, Mr. Teng and Mr. Tu, were not affected by the Cultural Revolution, but suffered other traumatic life events. Mr. Tam, the least educated in the sample, had a debilitating back injury at work, which left him unable to care for his wife and young son. Mr. Teng married and divorced three times, and had five children. He perpetrated domestic violence against his third wife, fought with police, and was imprisoned for one year. He obtained treatment for depression after he expressed suicidal ideation of jumping off a bridge to a social worker. Mr. Tu had an overprotected and co-dependent relationship with his mother and never married. After her death, he was hospitalized due to suicidal ideation, and since then was also no longer able to find work. Although he had only received treatment for three years at the time of his interview, he reported depressive symptoms of 26 years, which is almost his entire period of residence in the U.S.

Causal Attributions

The 20 participants named a total of 64 causes. Women named 2-6 different causes, with an average of 3.8, and men cited 1-5 causes, with an average of 2.7. Table 1 displays the distribution of all 64 named causes by three domains, social, psychological, and biomedical or physical. The majority (73%) of all causes cited by participants were social, and smaller proportions were psychological (16%) and biomedical or physical (11%). Men most commonly attributed the cause of their illness to a family event (36%) and acculturative stress related to economic difficulties (36%), followed by general acculturative stress (27%) and emotional and mental problems (27%). Women most frequently named self-isolation, interpersonal ruptures, and lack of social support (44%), and emotional and mental problems (44%), followed by family events (33%), economic acculturative stress (33%), general acculturative stress (33%), and a genetic factor (33%). Participants did not report causes that could be classified as traditional folk beliefs, such as religious, superstitious, or supernatural beliefs.

The common social causes attributed by both men and women were: (a) family events (35%), (b) economic acculturative stress (35%), and (c) general acculturative stress (30%). First, causal family events for men included a wife's cancer diagnosis, wives' decisions to divorce, and death of father and diagnosis of two children with disabilities. Women named as causes a husband's death, maintaining face as a successful 'astronaut wife' whose marriage ended in divorce without family reunion, and victimization of domestic violence. Second, economic acculturative stress referred to difficulties related to employment, finances, and housing. Third, general acculturative stress concerned problems of language, culture, and the general U.S. environment.

Three types of causes were much more frequently named by women then men. These were: (a) self-isolation, ruptures, and lack of social support (44%), (b) interpersonal conflict (33%), and (c) difficulties fulfilling family duties (33%). First, women's experiences of self-isolation and rupture referred to situations of: struggling in the U.S. due to insufficient social and economic resources and loss of social role as mother, since one's child and husband were left behind in China; beginning to hear voices after losing a male friendship; facing boyfriend's refusal to marry and have children; and, withdrawing oneself socially to hide life difficulties and shame after husband's death. Men's attributions of self-isolation regarded a lack of family support during a period of academic and work stress, and social withdrawal due to not meeting one's own social expectations. Second, interpersonal conflict referred to: hostility of neighbors toward a single mother; disagreements with two sons and extended family over one son's homosexuality; and, blame of young children for father's death from cancer. Men's interpersonal conflicts referred to unwanted loss of self-control and arguments with one's family, and acceptance by family due being in a gay relationship. Third, family duties, named by women only, referred to strong concerns about raising children as single mothers, and ability to care for children, parents, and mother-in-law.

Two types of early traumas were cited as causes, ones that occurred during adulthood prior to immigration (25%), and others that occurred in childhood within one's family (15%). First, traumas prior to immigration included victimization during the Cultural Revolution and, for one woman, rape during adolescence. Traumas of the Cultural Revolution included physical punishment, imprisonment, escape to Hong Kong, murder of parents, and loss of educational, social and political rights. For men, childhood family traumas were mistreatment by parents due to perceived personal failures and homosexuality, and death of both parents. For the one woman who experienced a family trauma, this concerned abandonment by parents who immigrated and left their young 'parachute child' to be raised by grandparents.

External pressures and life stress (25%), as a cause, referred to general social and contextual factors, excluding acculturation-specific difficulties, which created a sensation of 'pressures.' Specifically 'pressures' is an experience of constant impingement and oppression coming from the environment that arises from difficulties with meeting the expectations of one's social role. This concept refers to one's relationship with the environment rather than a predominantly internal experience of tension, which is captured in the concept of stress, as in a person feeling "stressed" or "stressed out."

There were two types of psychological causes: (a) emotional and mental problems (35%), and (b) personality traits (15%). First, emotional and mental problems referred to strong expressions about very difficult affective states and poor mental functioning. For men, this referred principally to not having control of one's emotions and behaviors, which could cause one to become 'crazy.' Women described cognitive and affective states. For example, one woman attributed her depression to "feeling inferior" and being "not as good as others." Another woman referred to a life stage problem where one can no longer let go of past problems, becomes "hopeless," and has a "very messy heart" and "no place to stay in this world anymore."

Overall etiologic conceptions showed that both men and women had a complex understanding of past and present social contributors to their conditions. It was common to cite two or more social causes, and integrate social and psychological elements. As an example of a man's conception of multiple causes, Mr. Tien named five causes involving both past and present factors: (a) physical injury, (b) loss of his parents as a young child, (c) persecution during the Cultural Revolution, (d) economic acculturative stress, and (d) wife's illness.

> I fell on my head when I was playing basketball. It injured my head and I lost my vision temporarily… Other factors affecting my mental health include pressures and stress living in mainland China. My family's political views were different from the society's political views. It made our lives very difficult in China. Also, my dad and mom passed away when I was a kid. When I came to the U.S., the problem was mainly related to employment and also how to keep my job. In 1992, I had more than ten different jobs. Some of them I quit because I didn't like them, but I also got laid off by employers… [*My illness*] got severe when I was unemployed in 1992 and also my wife was diagnosed with cancer. When I was at work, I always worried that her health was in poor condition. I always wanted to go home and check on her status."

As an example of a woman's conception of causes, Mrs. Li's interpretation intertwined an emotional cause with four social causes, including a family event of domestic violence, economic acculturative stress, interpersonal conflict with neighbors, and the family duty of raising her child as a single mother.

> When I first came to the U.S., I had no family or relatives here with me. I had experienced domestic violence from my family-in-law. They used all different ways to force me and my son to leave the household. I was very unhappy living with them. After leaving them, I now moved to this little apartment with my son. I am also very unhappy here. I have to share a public kitchen with four other families… My neighbors are very mean and they always take advantage of me. They know that I am a single mom. One time during an argument with one of my male neighbors, he said he would kill me and I filed a police report. It doesn't matter that I have left my husband. I think I still will have to encounter domestic violence living in this apartment… I sometimes wonder about the reasons I came to the U.S. I feel very miserable. When I stayed with my ex-husband's family, he had an affair with another woman. My husband was rich and my family in China was also in middle class. I did not have to worry about money. Now, I have no money to raise my son. The rent is so high, but I can't move out… My neighbors are very mean to me, and they don't even let me use the kitchen sometimes. Often times, the neighbors would say something very hurtful in loud voices, such as 'the lady had no husband and the kid had no dad.'

Symptom Experiences

We grouped symptom experiences into four areas: (a) social, (b) anxiety, (c) irritability and emotional control, and (d) other psychological symptoms. (See Table 4.) The social group contained emotions, cognitions, and behaviors that directly expressed social self-construal. The anxiety group consisted of anxious emotional experiences in which objects of anxiety concerned the social self or the social environment. Experiences of irritability were affective and behavioral manifestations in which causes and objects of irritability were social in nature. Participants' distress over loss of emotional control indicated one's responsibility for emotional restraint in social relations and achievement of interpersonal harmony. The last group, other psychological symptoms, included illness experiences that did not implicate a social self-construal, but rather concerned internal or psychological experiences. These symptoms are shown in Table 4, but not illustrated in this paper.

Social symptoms were the most prevalent form of depression experience in terms of the variety and number of symptoms that were expressed by over half of participants. Five social symptoms were used by over 50% of the group, compared to only one anxiety symptom, one irritability and emotional control symptom, and two 'other psychological' symptoms. Fear (90%) and anger-related (60%) symptoms had a higher proportion of endorsement than any of the other psychological symptoms (25%-55%). 'Unhappy, sad, or depressed,' suicidal ideation, and

anhedonia (i.e., loss of interest), which are considered as core symptoms of depression by the DSM-IV (American Psychiatric Association, 2000), were expressed by approximately half of the group.

Regarding differences of experience between genders, men demonstrated more frequent use of five of seven social symptoms than women. Women showed higher usage of only low self-esteem and guilt. Regarding anxiety symptoms, women had slightly higher usage of both symptoms, although fear was common to the large majority of men and all women. Regarding irritability and emotional control symptoms, men much more frequently expressed anger (73%) then women (44%). The expression of psychological symptoms was fairly balanced, although higher proportions of men expressed anhedonia and auditory hallucinations, and much higher proportions of women expressed crying and suicidal ideation. Also, the larger proportion of men with higher severity depression (i.e., considering that the Disability group has six men and only two women) may bias results for symptoms typically expressed by persons with higher severity (e.g., hallucinations and suicidal ideation).

Social Symptoms

***Low self-respect from loss of social role and status*.** The experience that affected all nine men (100%) and eight of nine (89%) women concerned low self-respect and despair due to negative changes in social role and status, particularly with regard to meeting socially based expectations. Men and women showed distinct styles of expression and areas of focus based on gender roles.

For men who were married or once married, their low self-respect centered on the roles of father, husband, and economic provider. For the single men, difficulties concerned one's potential for marriage and academic and professional success, and being homosexual. All five men of the TCM and WM groups did not state their personal despair and feeling of worthlessness directly, but described the loss of role as difficult changes and events that occurred in their lives. Similarly, three of six men in the Disability group did not directly share their sense of worthlessness or loss of ability to work, but strongly externalized their distress by attributing their situation to other people and the economy. It was their clinicians who provided information about their external attributions. In contrast, the other three of six men of the Disability group made first-person statements about their low self-worth, psychological functioning, and inability to work, thus showing awareness and expression of an internalized experience.

In the TCM group, Mr. Chan described his loss of professional independence, and struggle to be a proper husband and father in face of his children's disabilities.

> I had a good career in Taiwan. I was a photographer and I helped take photos of movie posters and people's weddings. However, after I came here, I was unable to continue my career because my English was not too good… Now I work at a warehouse. My job in Taiwan had a lot of flexibility and I had lots of freedom to carry out my responsibilities. However, my current job doesn't have much flexibility and I have to take people's attitudes sometimes… I treat this as a temporary job, but I am not too clear about my future at this point. I just know that I can't keep doing this job forever… Sometimes, when I come home with my stress from work and with [*my wife's*] stress at home, we just argue…I feel like, because I am a man, I should tend to not argue with my wife. I should just take everything that she says and keep it inside myself. I try not to argue back… I ask myself, how can my wife handle all this work on her own?

Also of the TCM group, Mr. Chu referred to his loss of his role as head of family, but did not himself speak of his professional situation.

> [*Family members*] here are very different from China. They are more egocentric and they like to make their own decisions. I can't talk too much to ask about their lives.

His clinician shared his suffering over his loss of economic and social status.

> He was a violinist. He came to the U.S. His language was not good. In Taiwan, everyone respected him, but not here. He thinks it is the stress of the U.S. In Taiwan, he didn't have these symptoms. The cause is because he came to the U.S. and he can't get enough respect and doesn't have the right job here… He's not working in a position, and not working regularly. He has a few [*music*] students… He puts a lot of pressure on his family, which has brought a lot of problems.

In the WM group, Mr. Koo stated his chief problem as, "I feel very depressed because I want to earn more money, but I can't because I hear voices. I cannot find a better job because of my problem and I also can't do well in school." Mr. Kau said, "I think the biggest problem will be related to my school performance and marriage." Mr. Kwok identified his chief problem as an attempt to recapture his professional status after years of inactivity due to depression, and problems of social acceptance of his homosexuality.

> My relationship. I am gay. It was also my first relationship. I am Chinese. And, there's our culture, how it sees this issue. There were a lot of problems too. I didn't know how to deal with these problems. There were many causes… I couldn't really get a job. I felt incompetent. Then, I decided to go to nursing school. I wanted to make a change. I wanted to put myself into the education system. I tried to rebuild my career. I didn't have a full-time job for almost six years.

The three men in the Disability group who externalized their experience focused on the loss of control of their outcomes. First, Mr. Tsang, who viewed the impact of illness as somatic problems, described his chief problem as feeling 'pessimistic,' 'uncomfortable and hardened,' and 'I don't want to be alive anymore.' He told his clinician that he was 'unlucky,' and 'I did nothing wrong, but I have no job.' His clinician explained:

> He is one of many men who immigrated during middle age. He's not useful, not desirable for the job market anymore. He is one of the better educated. He was in middle management in a school in China. He was a vice principal and a teacher, so he had good status there… [*Here,*] his agency let him go… His wife left him… He was sad when he came to the U.S. He's not a physically strong person. He had no income. He had to rely on his sister… He sees himself as a victim of his wife and his company… He didn't do anything wrong. He's the one who was no longer wanted.

Second, Mr. Tam told his clinician that his biggest fear was being unable to work and care for his 5-year old son. His clinician explained Mr. Tam's self-perception:

> In his view, he doesn't see his depression as affecting his ability to work, because it is the back injury. He sees himself as a victim due to the back injury. So, he has no work, and no role as father to make money for his family... So, for this patient, everything comes down on him, from the outside. It isn't from the inside where being depressed causes the outside problems.

Third, Mr. Teng, who called himself 'weak mentally' and 'not good at doing things,' stated:

> I don't have a family. My parents all passed away. My wife divorced me a few years ago. When I didn't have this illness before, I was always afraid that she would leave me, which she finally did.'

His clinician added:

> He sees his ex-wife as the problem… She called the police for domestic violence. He fought with the police and ended up in jail for 12 months… He says, "I was falsely accused, that woman called the police!" He feels totally helpless. He feels he can't change anything… He was angrier at one time at the system for not giving him any justice. He doesn't view [*his illness*] as severe. He sees it as an external situation, that he can't get hired.

The three men in the Disability group who internalized their experience showed awareness of the roles they played in their own situations, and spoke of their experience of illness as belonging to themselves. First, Mr. Tien said simply, "I'm useless" before describing his employment problems.

> When I came to the U.S., the problem was mainly related to employment and also how to keep my job. In 1992, I had had more than 10 different jobs. Some of them I quit because I didn't like them, but I also got laid off by employers.

His clinician added:

> He hasn't worked for 30 years… His wife left him and he is unable to work. He thinks that other people immigrated, got jobs, got a home, a car, and he didn't.

Second, Mr. Tang described his disability:

> I cannot have a normal life like others around me of the same generation… I always need to take medicine, and see doctors. I have this feeling that I can't go anywhere… It brings a lot of inconvenience. I cannot go to work… I'm afraid that I have no money to pay the rent… I fear feeling that my strength does not match my ambitions.

Third, Mr. Tu, dependent on his mother until she died, shared his emotional state and behaviors, as well as poor social integration.

> I am discontent with my reality… I have poor relationships with other people, and [*because of this*] I had problems at work… [*The illness*] has affected me for more than 10 years, almost 20 years already… I hope I can have a normal life again.

His clinician added: "He sees it this way. He has no English. He can't get a job, and depended on his mom…"

For the women, low-self respect centered primarily on difficulties of fulfilling roles of mother and wife, or loss of role altogether. Precipitating events included being astronaut wives, loss of an intact family due to divorce or husband's death, and poor economic role that hindered care of family. The more educated women also spoke of struggles of professional status. Similar to the men, women also expressed a sense of being without control of their situations, and described the circumstances of immigration. However, in contrast to most of the men, all described and emphasized their own internal states rather than an externalized experience.

Ms. Deng and Ms. Lau, both single, expressed concern regarding marriage and professional status. Mrs. Deng stated:

> I am a failure. I have no marriage, no money, no children, no education, no status living in the U.S. I can't read and write English well. It's hard to get a job without good English skills.

Ms. Lau feared that she would be unable to be like other "normal" people, and be an independent, adult daughter, who could one day care for her parents. Her clinician added that she depended on her parents financially, and had only held a few jobs for very short periods of time.

Mrs. Der and Dr. Du spoke of professional difficulties and family caretaking. Mrs. Der's struggle included a fear of driving that threatened her role:

> My only reason to stay here is for kids to have better future… My jobs aren't too satisfying here… I have only been here for a very short period of time… I can't drive, but you need to drive in the U.S. I have lots of pressures and stress because I have to send kids to school. I feel like there's no meaning for me to live in the U.S. My only reason for staying here is for my kids to have a better future… I cry when I drive. I can't change my job to a further location… My parents have come this

> year. My salary isn't too high, but it is enough to take care of my parents and my mom-in-law. I bring them out every weekend. I take good care of them and I want to give them the best.

Dr. Du, as astronaut wife, suffered from being separated from her family and thus unable to fulfill her role as wife and mother. She recalled that she could not make regular phone calls to her family due to the high cost. She recalled her struggle with regard to her professional and economic situation.

> There were a lot of pressures and my future path was not clear… My working condition was not good and I had no money or health insurance for a body check up, and didn't know where to seek help… I hadn't gotten my license [*in the U.S.*] yet, so I could only work at the restaurant. I just had just a lack of confidence and I also felt that I was no good. I was not perfect, but there was nothing I could do to improve the situation.

Mrs. Li, Mrs. Lum, and Mrs. Wu suffered loss of social status due to family breakup. Mrs. Li and Mrs. Lum were parachute and astronaut wives, respectively, whose marriages ended in divorce. Mrs. Wu lost family status due to losing her husband to cancer. All three women indirectly manifested an experience of social stigma associated with the loss of their intact families. Mrs. Li described her hurt and instantaneous role loss upon joining her husband.

> I waited for my husband in China for 13 years. He left my son and me in China when my son was just a few months old. His whole family immigrated here, and he told me to wait for him. Whenever I think about his affair with another woman, I feel very angry and hurt. I felt like I finally got a chance to come here. But I lost everything in one day. The day I arrived, my husband told me that he had a wife here. My mom-in-law forced me to leave the house.

Mrs. Lum was proud to have the privilege to immigrate to the U.S. as a middle-class Hong Kong family, but then lost her social reputation altogether due to divorce and not reuniting in the U.S. She emphasized her economic role of providing for her elderly father and young adult son. She said, "[*My chief problem is*] my financial situation. I never care about my health or anything, but I only care about my finances. Mrs. Wu, who had depended fully on her husband, described her difficulties of being an adequate mother:

> I can't handle housework very well because I am very forgetful. My children always say that I forget about things. I overcook the food. Since I spend too much time completing my house chores, I rarely have much time to talk to them. Then, now, they say I never talk to them. Also, they talk in English, and I speak Chinese.

Her clinician added: "[*Her chief problem*] was raising her children. She was dependent on her husband and now they blamed her his death." The clinician's explanation also indirectly suggested that she, like her children and mother, also considered her husband's death to be her fault, perhaps superstitiously.

Compared to the other women, Mrs. Wang's experience showed a unique emphasis, aside from a socioeconomic one. She struggled with being Christian, and a traditional versus acculturated mother, given that one of her sons was homosexual.

> My younger son was very angry and talked to me. We are Christians and we are very anti-homosexuality. He thought his older brother was evil, and he felt disappointed with him because he had tried so hard to support his education… Now, I can understand the older son more and I feel he's also having a difficult life too. The more differences you have, your life will be more difficult… I visited my older son this year. His roommate is a Ph.D. student in biology who does research on DNA. He's also gay. He told me that homosexuality has something to do with genetics. He told me that both of his sisters and he are gay. Now, I feel I am in the middle between my sons. My younger son wants me to hate the older son, but I just can't. If I leave my older son, he will be

> very lonely… I have tried to go back to work as a teacher too… Now, I slowly realize that I really can't work.

Her clinician also described her change process toward a new role as an independent adult.

> Her chief problem is her inability to enjoy herself. She wants to have a life of her own… She's made some progress now. She's taking classes, photography, enjoying her free time, and getting her own life.

Social withdrawal and avoidance. Eight men (73%) and seven women (78%) described behaviors of social withdrawal and avoidance. In order of importance, this group demonstrated five types of explanations for these behaviors: (a) shame of mental illness, (b) symptom of depression, (c) personality characteristics resulting from childhood traumas and family relationships, (d) shame of family breakup, and (e) difficulties of cultural adjustment. These behaviors were based on social reasoning, rather than an anhedonic form of withdrawal.

Regarding the first type of explanation, five men and three women associated their social withdrawal and avoidance with the shame of mental illness. For three of these men, persecution during the Cultural Revolution was implicated in their social mistrust and strength of stigma. Among these three men, Mr. Tang described himself as having a 'cold nature,' a language expression from the period of the Cultural Revolution that describes an unfeeling nature, or an inability to empathize that was a response to the witness of repeated human atrocities.

> I have to be careful about making friends. I'm afraid that people will say I am crazy or I am mentally ill. So, I isolated myself, and have no friends now… Now, I have no friends, only have friends playing mahjong with me, but I never socialize with them. I have a cold nature with other people.

Mr. Tsang said, "I have no friends. With other people, I'm normal. I'm not sociable anymore." His clinician explained:

> He gets along with the support group members okay. He doesn't bother anyone. He's someone who can be easily overlooked because he doesn't say anything. If I'm trying to remember who were the six or seven people in today's support group, he's going to be number seven."

Mr. Tien described his own isolation.

> I don't have too many conflicts with people, but I think they don't really understand me well. It's hard to find a genuine friend. When I talk to people about my problems, they usually have some kind of stereotype against my problem even though they will not say it in front of me.

Between the two men who did not experience the Cultural Revolution, Mr. Teng, described his relationships outside of his family.

> Not good and not bad. So-so. If you have these problems, I think people may not want to keep close contacts with you. I don't think people want to keep close contacts with me. I am good at talking, but not good at doing things. I guess people don't like to keep close contacts with those who can't do things efficiently.

Mr. Kau described his social discomfort and quiet personality.

> I don't have much problem getting along with other people, but sometimes I don't know how to socialize with them. I don't have any problems with my coworkers. When I hang out with friends outside work, it seems like we don't have a common topic to talk together. However, if I hang out with people with mental illness, I will have a lot to say. This will not happen if I am with normal people… When I was a kid, I was very quiet. My mom did not bring me to see a doctor.

Among the three women who showed shame of mental illness, Ms. Lau said, "One of my friends knows about my illness. I am afraid to tell other friends." Her psychologist described her as 'quite isolated' and 'doesn't interact. Mrs. Lum said, "I don't want to socialize with people… I don't want other people to help me. I isolated myself from friends." Finally, Mrs. Wang described her social situations in detail.

> It's very hard to find really close friends at my age. I have a lot of friends. I still keep in touch with my coworkers. One of my closest friends often reminds me about my health problems. I talked to her a lot before and we became very close friends seventeen years ago. Then, later people told me that she talked behind my back, and those things she said were not true. I felt hurt, but at least she was there for me when I needed her… The support group does not work very well… Sometimes, they throw really harsh comments on me. Now, I also teach myself what I should avoid. I need to avoid telling people about my problems because I am afraid of people's stereotypes. It may be my problem and the experience of people talking behind me in the past. I feel that I can't really trust people now… I know I don't have to follow the people in church. Their views on homosexuality are too extreme. I know I can't leave God. Otherwise, I would have nothing. Now, I have socialized less in church because people all have different opinions.

Second, one man and two women regarded their social withdrawal and avoidance as one symptom among a constellation of symptoms of depression. Mr. Tam related his self-isolation to his irritability: "I have no friends… I am not working now. I sometimes argued with people at work too." Dr. Du associated her avoidance behavior to tiredness: "I didn't socialize with people… I isolated myself from friends. I did not want to participate in any social activities because I had no energy." Mrs. Deng said, "I don't want to go out with friends anymore. I just want to stay in my house if I don't have to go to work."

Third, two men and one woman viewed their withdrawal and avoidance as a result of personality traits that developed in childhood. Mr. Tu shared succinctly: "I do not get along well with other people. I have no friends. I am picky about choosing friends." His clinician explained the crisis triggered by his mother's death.

> He doesn't have friends. He isn't social. He is bored… He doesn't initiate contact with anyone, but his cousin and sister have dim sum with him weekly. He is excellent in the therapy group. He responds well. He helps out. He wants more social life, but also doesn't. He's ambivalent… He thinks he's always been like this. The problem of not being able to form relationships is a problem he's had throughout his life, and not a dramatic event. He knows it's his personality. It's not that he doesn't like relationships. He is shy.

Mr. Kwok and Ms. Lai themselves cited their family problems, and also showed guilt regarding their poor respect of their parents. Mr. Kwok explained:

> I am not close to [*my family*]. When I grew up, they were not that close to me. I felt isolated even though we lived together. They were very busy and I often felt left behind when I was young. I am also the youngest one in the family. Now, it makes me feel that I don't want to call them or talk to them because I feel like I will not get anything from them. But, I feel bad. That's why I am working with my psychologist on that issue. My family has no idea about my therapy…

Ms. Lai said her problems developed from being a parachute child and victim of rape.

> I will always remember there's something missing in my life – it's imperfect like there's hole in my life. Even my boyfriend is good to me, I don't think he can give me the family that I lacked in my childhood. He can't make up that missing piece in my life. I actually would rather my parents are dead, or they treat me badly, so that will give me an excuse to hate them… The root of these

> problems are related to my family… I don't have trust in relationships of all kinds, like friendships or intimate relationships. I even fear that the sexual assault will happen again.

Fourth, two women explained their social withdrawal and avoidance as a result of the shame of family breakup. Mrs. Wu said:

> I have no friends. My mom told me not to tell anyone [*that I no longer had a husband and all my difficulties*]. I had no one to share with and talk to me... My relatives? They are afraid of me for sure. Since I don't know how to communicate with them and don't want to talk to them about my things, they will not like me.

Mrs. Li shared her perception of stigma as a single mother, and a fear of the environment.

> When I first came here, I was afraid to go out because I could not speak much English. I did not go out for the first three months after my arrival. I did not have a SSN or green card. My parents-in-law told me that it was dangerous to go out. I also did not want to go out and spend money because I did not have much money on me… I had no chance to make contact with the outside world. I had no friends. I cried a lot, and I didn't think people would want to make friends with me… Now as I live in this house, I am often afraid that people will poison me. There was an occasion which they put their nasal mucus into my rice cooker. Sometimes, when I cooked, they would sweep and get the dirt into my food... I feel that they are just like my family-in-law who also gave me harsh comments.

Fifth, Mr. Chu alone related his avoidance to difficulties of cultural adjustment, specifically his own acculturative changes and intercultural differences.

> Sooner or later, the relationships [*of families in the U.S.*] become very courteous. From my experience, I see many Chinese families having to guess what their family members are up to now. The problem is more serious when it comes to my family in China. The wall between us is even thicker. When I talk to them, they don't necessary understand my situation and I don't understand about theirs. I feel like I am not totally an American or a Chinese. I just have different views compared to Americans or Chinese.

Shame and loss of face. Nine men (82%) and six women (67%) manifested shame and loss of face regarding the social stigma of mental illness. Three other sources of shame and loss of face were being gay, having a gay child, and family breakup. Face is the respectability that a person can claim from others, by virtue of the social position that one occupies and the degree to which one is judged to have functioned adequately in that position and in one's general conduct (Ho, 1975:883). It contrasts with the concept of shame, which describes an internally focused condition of humiliation, guilt, or shortcoming. In this study, we considered shame and loss of face a concept unit although some manifestations emphasized one or the other more strongly. Expressions of shame and loss of face with regard to mental illness implicated not only personal suffering, but also a family shortcoming and a view of oneself as a social burden. Each treatment group emphasized a specific style of expression that regarded level of acceptance of a mental condition, and ability to disclose this condition.

In the TCM group, two men and one woman showed a strong struggle with accepting their mental condition. Mr. Chu and Mrs. Der both insisted on their physical problems although they knew of an inherited risk factor. Mr. Chu's physician explained:

> I have a heart problem. I have a heart problem. Please help my heart… [*Mental illness*] is in his family history. He knew about it. It was genetic… But, he says it is [*due to*] the stress of the U.S.

Mrs. Der focused repeatedly on her debilitating fear of driving. Her physician explained:

> She doesn't say it is depression. When I told her it was depression, she said, 'Yeah, my sister has it too.' Her sister told her she had problems in Beijing… She is scared of talking to a psychiatrist or psychologist.

Mr. Chan showed an oscillating experience of integrating the physical and mental aspects of his experience.

> There was a moment before when I suspected I might have "depression." I think my stomach pain may be related to an expression of my depression. My Chinese doctor suggested that there might be psychological problems that impacted my physical health.

In the WM group, the three men and three women who showed shame and loss of face used mental illness terms, but often showed difficulty with accepting their illness by attributing these terms to their clinicians. For some, there was a clear need to minimize the severity of their problem. For others, their narratives and clinician's explanations showed a learning process toward accepting their problem as an internal illness. Among the men, Mr. Koo said simply, "My psychiatrist told me I have schizophrenia." Mr. Kwok gave the name of his problem as 'depression,' and expressed his shame by adding that his family had no idea about his therapy. His clinician described his changes during four years of psychotherapy:

> First, he had difficulty accepting that he was depressed. He saw it as a problem in his relationship with his partner. Later on he stressed that his problem with his family was very severe, so he saw it as a family problem. Finally, he said he was so stressed, so overwhelmed… He [*had first*] externalized his problem. He saw his family as messed up, and that they ignored him… Later on, he acknowledged his diagnosis after he was disabled for a few years.

Mr. Kwok also expressed shame of his homosexuality due to his family's rejection and the challenge of coming out to his mom. Mr. Kau, employed in the mental health field, used the term 'bipolar' in English, and shared his shame explicitly:

> I know have a mental disorder… I know I have "bipolar" disorder… I don't know how to talk to my future wife about my mental disorder… Many people in the Chinese community haven't accepted people with mental illness yet. Many of them do not have proper education on mental illness. The media has talked about health-related issues, but rarely about mental health.

Among the women, Mrs. Li minimized the severity of her problem: "I think I am a little depressed. She had refused anti-depressants, and only accepted help from domestic violence agencies. Her shame and loss of face also concerned her status as a single mother.

> Often times, the neighbors will say something very hurtful in loud voices such as, "the lady has no husband and the kid has no dad." I feel that they are just like my family-in-law who also gave me harsh comments… I think I do not have a "complete" family in my life.

Mrs. Lum showed awareness of her own denial and a process of change.

> I tend to hide my sadness in front of other people. I don't want to let them know I am sad. People usually see me as a happy individual… I can analyze the problems that I have very well, but I just can't accept them. I want to rely on my own, I don't want other people to pity me and help me. I always try to help myself. In 2004, I was studying at the community college. I was very depressed and down. My counselor advised me to go back to therapy. Before that, I had tried to stop going to my therapy because I felt I was fine dealing with my own problems. I didn't want other people to look down at me. Before, I drank a lot to impress people… In my work and volunteer work, people did not like me and talked behind my back."

Mrs. Lau used the English word for depression: "Its called 'depression.' It's considered to be serious too." Then, she explained her strong fear of telling her friends about her mental illness.

During the interview, she asked to skip the demographic questions on age, and marital and immigration status. Her psychologist said she avoided acknowledging that she had psychotic features, and saw herself as a sick person who needed to hide her condition.

In the Disability group, four men and two women showed the strongest shame and loss of face, as they had the most difficulty with using a mental illness term. The men also often disclosed their experience in terms of other people's behavior rather than their personal state. Mr. Tien said, "My psychiatrist said I have depression and schizophrenia." He had also explained that others had stereotypes against him for his problems. Mr. Teng stated, "Depression? I am not sure. I forgot [*the name* of] it… He had said that other people would not maintain social relationships with someone with "these problems." His clinician added that Mr. Teng did not see himself as having depression even after five years of treatment. Mr. Tang stated: "I'm afraid that people will say I am crazy. I cannot tell others I have this illness… The psychologist said I have depression." Similarly, Mr. Tsang explained, "My doctor said this is depression." His clinician said that he called his problem a condition rather than an illness.

Between the two women in the Disability Group, Mrs. Wu's behavior during her interview and communicated a deep experience of shame and loss of face regarding mental illness and loss of family. She misinterpreted the interviewer's first question about the name of her condition. She answered the question as if she had been asked how she identified herself when she arrived at the clinic, "I went to the waiting room and asked for [*my social worker*] and told them my name." After the interviewer asked the question again, Mrs. Wu answered, "Depression, right?" She disclosed her shame later in her interview.

> I'm afraid that I will become crazy. It is scary to see those people who get angry and can't control themselves on the street. They shout at other people… My relatives? They are for sure afraid of me. Since I don't know how to communicate with them and don't want to talk to them about my things, they will not like me.

Mrs. Wu also showed shame and loss of face regarding her husband's death since she did not disclose any information about dealing with her children's accusation of her responsibility for his death, which, according to her psychiatrist, was her most significant problem for many years. Mrs. Wang was more comfortable with naming her problem as anxiety rather than major depression, which was her diagnosis.

> My psychiatrist said it's more like anxiety than depression… One of my closest friends often reminds me about my health problems… Then, later people told me that she talked behind my back, and those things she said were not true... I was hurt… [*However*,] I have a very nice friend in Taiwan and she's very protective of me. Whenever I go to Taiwan, she will not want me to stay in other people's homes and hear too much gossip. She will invite me to her home. I feel protected in her home... It's hard to expect people to treat you the best.

She also experienced shame over her son's sexual orientation, by stating her fear of others laughing at her at a health support group should she share her son's situation with them. She also reproached herself for her own attitude and expectation toward this group.

Helplessness, fate, and hopelessness. Seven men (64%) and six women (67%) communicated experiences of hopelessness, helplessness, and bad fate. There was a distinct difference of usage of these concepts by gender. The men who expressed these concepts had more severe depression, whereas the women only had mild to moderate depression. Six of the seven men belonged to the Disability group and one to the TCM group. In contrast, all six women belonged to the TCM and WM groups. Among these three related concepts, the most frequent experience concerned

helplessness and fate, which described a lack of control or low self-efficacy over expected personal and family outcomes and self-attributions of misfortune and poor fate. Descriptions of helplessness showed a state of dire social worthlessness where the individual perceived oneself as not able to be helped or changed by any external resource, and felt a sense of not belonging to the world. The second most commonly used concept was hopelessness, which was associated with a sense of meaninglessness of life due to one's social failure. Experiences of both helplessness and hopelessness were often made in comparison with the achievements of others.

Six men and three women emphasized concepts related to helplessness and fate. Three of these six men, Mr. Tien, Mr. Tsang, and Mr. Tang, were victims of the Cultural Revolution. They experienced an absence of control with regard to the permanence of their illness, which they viewed as assigned to them by misfortune and fate. They did not present this experience themselves. First, Mr. Tien's clinician described: "He sees himself as useless, and helpless about his illness that's not ever going to go away." Second, Mr. Tsang's clinician described the impact of illness:

> He says, 'I'm unlucky.' He was unlucky because he was born during a time of turmoil. He didn't do anything wrong… The impact is that he has depression, loss of interest, loss of hope and motivation… He is helpless."

Mr. Tsang himself stated his chief problem as, 'I feel pessimistic. I'm always feeling that I do not want to live anymore. I also feel uncomfortable and hardened." Third, Mr. Tang's clinician said:

> He says, 'my karma is bad' (*m'eng sai m'hou*). It's his karma. His fate is not good. He doesn't have good fate like others. I was born in a family with this disorder.

Among the other three men who expressed helplessness and poor fate, Mr. Teng said, "There's nothing I can take into my control." Mr. Teng's clinician confirmed his very frequent expressions of complete helplessness and inability to effect changes in his life. Next, Mr. Tam said, "Even if I want something to happen, I cannot control it." Finally, Mr. Chan, of the TCM group, also expressed helplessness, but was the only man, perhaps given his less severe state, to show a search for understanding and help through religion.

> At that time, my dad had just passed away and that was very difficult for me. I felt that life was unfair. I asked why would all these things happen to me. Why did this [*problem of disability*] happen to both of my children? I think having a religion doesn't work for me. Having a religious or spiritual faith may make the problem even worse. I am an atheist, and I don't believe praying can help solve the problem. I think when people are weak or feel empty, there's no way to help.

Among the three women who expressed helplessness and poor fate, Mrs. Lum expressed misfortune and a need of control by preparing her own funeral.

> As I get older, there are things that aren't in my control anymore… I will think this is the end of world… I will ask myself how come I am not as fortunate as other people… How come other people get these things but not me? …Now, I want to do things that prepare my funeral… I have also got a new insurance policy, so that my family or I can receive benefits whether I live or die. I am hopeless and I am helpless.

Mrs. Der referred to a problem of control implicitly, "There are many mental obstacles that people can't help." Finally, Dr. Du stated:

> I was just lacking confidence, and I also felt that I wasn't good. I was not perfect. There was nothing I could do to help this situation."

Regarding the expression of hopelessness, two men and three women used the word 'hopeless' Mr. Tang said: "My illness is long term. I feel hopeless, and always tired." Mr. Tu used the word 'hope' in speaking of his lack of social belonging: "When I feel depressed, I want to commit suicide—feeling there is no sense of belonging to the world… I hope I can feel everything is good in the world again." The three women who expressed hopelessness did so more directly then the men. They also linked hopelessness to emotions of unhappiness, meaninglessness, and low self-worth. Mrs. Wang described her hopelessness due to her conflict between her two sons: "I felt it was hopeless as I had all my hopes on my children." Mrs. Deng linked her hopelessness to the difficulties of her life in the U.S., "I feel hopeless. There's no meaning to living in the U.S." Finally, Mrs. Li also expressed hopelessness in terms of her need of outside help.

> I think I am a little depressed now. I just feel that I can never be happy even If I want to be… When they terminated my case, I felt hopeless again and I was very unhappy.

Low self-esteem and worthlessness. Seven women (78%) and five men (45%) communicated an experience of low self-esteem and worthlessness. These experiences were framed in the social contexts of: (a) comparison with others, (b) acceptance by family and peers, and (c) socioeconomic role and functioning. Most women expressed their sense of worthlessness explicitly and compared themselves with others. Most men expressed their low self-worth indirectly, focusing on experiences related to functioning and their usefulness. Men did not frequently use strong negative self-descriptors during their interviews, but did so with their clinicians. Also, all but one of the women belonged to the TCM and WM groups, and all but one of the men belonged to the Disability group.

Four of the seven women made explicit social comparisons and statements of worthlessness. First, Mrs. Lum said:

> How come other people get these things, but not me? …I am worthless. I have no self-worth, no self-esteem, and no confidence… [*In Taiwan*], they think people who can't contribute to society, like people who are paralyzed, are a waste of societal resources.

Second, Ms. Lai said, "My biggest problem was feeling inferior. I always thought I was not good compared to others." Third, Mrs. Deng expressed her low worth in many ways.

> I often ask how come other people have these things [*that I want*], but I don't… I am a failure… I think I have no value… I am a waste… I feel I am stupid compared to a lot of Americans. I am not as good as other people… There is no meaning to live. I am worthless."

Fourth, Dr. Du showed awareness of her low-self esteem as a part of a constellation of symptoms.

> I couldn't rest well. I couldn't concentrate at work. It hurt my self-esteem and I got some symptoms of panic attack too. I felt something was wrong with my body… My work situation was not good. I had no money for a medical exam, and didn't know where to seek help…

The other three women referred to low self-esteem indirectly. First, Ms. Lau said her chief problem was her "inability to take care of herself," and "It affects my life functioning." However, her psychologist said she viewed herself as "not capable" and "not as able as her sister," and also formed very high expectations that became very stressful. Second, Mrs. Li implied low self-worth in her expectation that others would reject her.

> When I first came to the U.S… I experienced domestic violence from my family-in-law… My parents-in-law used all different ways to force my son and me to leave the household… I had no chance to make contact with the outside world. I had no friends. I cried a lot, and I didn't think people would want to make friends with me.

Third, Mrs. Wang's claim of high self-worth contrasted with her description of dysfunction.

> If I were in Taiwan, I would be seen as trash… They think people who can't contribute to society like people who are paralyzed are a waste of societal resources… I still feel very uncomfortable. I feel like I've fallen into the water, but I don't know how to swim. I am still floating and sinking… I think my problems are very serious because I can't take care of myself. I am a very strong person, and have very high self-esteem. I am jealous of those who can take care of themselves.

Among the five men who expressed this symptom category, only Mr. Kwok, the highest functioning of the five, expressed his incompetence openly.

> I couldn't really get a job. I felt incompetent. So, I decided to go to nursing school. I wanted to make a change. I wanted to put myself into the education system. I tried to rebuild my career.

Two of the men, who saw themselves as victims of other people and external circumstances, indicated their poor functioning in their interviews, but shared their sense of uselessness with their clinicians. First, Mr. Teng described himself in terms of his task performance.

> I feel weak mentally and I always have to repeat things over and over again, such as counting money over and over again. For example, when people receive change, they can count it immediately and put it in their pockets, but I have to count many times, and I also spend a long time even putting it into my pocket.

Second, Mr. Tien's clinician explained his feeling of uselessness and comparison with others:

> He feels useless. He feels he can't work. During the Cultural Revolution, he was considered an intellectual—the educated class. In 1977, when the Cultural Revolution ended, he was 27... He is hypersensitive about what happened. He tends to have a depressive interpretation… He sees himself as useless, helpless about his illness that's never going to go away… He sees it as his wife having left him and he is unable to work. Other people immigrated, got jobs, got a home, a car, and he didn't.

The remaining two men spoke in terms of normalcy and meeting standards. Mr. Tang, whose clinician said he saw himself as 'disabled' and 'unable to work,' said:

> I cannot have a normal life like others around me of the same generation. I always feel tired, and weep (suffer) silently. I always need to take medicine, and see doctors. I have this feeling that I cannot go anywhere.

Finally, Mr. Tu stated: "I have set exorbitantly high standards for myself." His clinician provided details:

> He said to the psychiatrist, 'I feel useless. No one should suffer for me. I want to put my finger in a socket'… He knows that he is weird, not like the average person because he stays at home, day after day. He feels he is a little different…

Guilt and self-blame. Five women (56%) and four men (36%) experienced guilt and self-blame. We considered these concepts as closely related. These experiences were consistently associated with poor fulfillment of one's family roles. Women and men across groups shared experiences of guilt and self-blame, and most who expressed their guilt made explicit mention of it, although a few cases of indirect disclosure suggested a stronger difficulty with their experience. Objects of

guilt included: (a) failed marriages, (b) duties of parenting, including responsibility for a child's homosexuality, and (c) respect toward one's parents.

First, one woman and one man felt guilt with regard to their failed marriages. Mrs. Lum explained:

> I have lost my family and my marriage and I feel very sad about it. However, at the same time, I have achieved my personal growth and I have done things that I want. There are many things that I don't think are worth mentioning. I can just keep those in my memory. I don't like to follow people's directions. I like to do things in my own way. I think this is also part of my fault in making my marriage unsuccessful…

Mrs. Lum's clinician shared an additional element of guilt regarding family duty.

> [*The cause of her condition*] was her relationship with her ex-husband that ended in divorce, her relationship with her kids, and the care for her elderly parents. She was always worried about what she had to do for her family… She took responsibility for everyone's well being. As for many Chinese, she has so much guilt related to duty—regarding not fulfilling her duties toward her family… She is the provider for both dad and son… She feels very guilty for how her son turned out.

Mr. Tien's clinician explained that he blamed himself for his wife's decision to divorce him, even though Mr. Tien himself, when asked about his family relationships, said, "Not too good. I divorced my wife. She blamed me for being a burden to her."

Second, three women and one man shared guilt regarding their poor parenting. After being asked several times about family relationships before giving a response, Mrs. Wu answered:

> My children always say that… I rarely have much time to talk to them. Then, now, they say I never talk to them.

Dr. Du made reference to being cutoff from and needing to care for her daughter and husband in China: "I was here by myself and I could not make many phone calls back to China. It was very expensive at that time." Mrs. Wang blamed herself for her son's homosexuality: "I asked myself whether it was my fault that he's gay." Mr. Chan cited the impact of illness as his inappropriate behavior toward his daughters, and difficulties with meeting his responsibility of assisting his wife.

> Sometimes when I become emotional, I will scold [*my two young girls*] for their misbehaviors. I just can't hold my frustration at that moment, but I will feel guilty after yelling at them… I ask myself, how can my wife handle all this work on her own… When I go to work, my wife needs to stay home to deal with my children and other people [due to my children's disabilities]. Sometimes, teachers and staff or other people don't understand my children's problems.

Third, one woman and two men suffered guilt over their disrespectful feelings toward their parents. Ms. Lai said: "I actually would rather my parents are dead, or they treat me badly, so that will give me an excuse to hate them." Mr. Kwok felt guilty for distancing from his family whom, according to his clinician, he resented and viewed as "messed up."

> Now, it makes me feel that I don't want to call them or talk to them because I feel like I will not get anything from them. But, I feel bad. That's why I am working with my psychologist on that issue. My family has no idea about my therapy.

Mr. Tu expressed his guilt toward family by revealing his nightmares and hallucinations. We assumed that he was referring to his mother, who passed away, or possibly to his sister and cousin, who took him out weekly for dim sum.

> I always have nightmares about having a bad relationship with my family… I cannot concentrate and always have hallucinations. I always hear voices criticizing me."

External pressures. Five men (45%) and four women (44%) described the impact of pressures on their physical and emotional states. 'External pressures' or 'pressures' concerns the interface between the person and the social environment. It is a form of distress resulting from the challenges of the social expectations and circumstances posed by the environment. 'Pressures' was most relevant to the TCM group, as four of five members of this group used this category. This group emphasized pressures as an external cause that impacted physical health and emotional health. Two participants from each of the other groups also cited external pressures. The two participants of the WM group viewed pressures as a problem with which they were not equipped to handle during challenges of young adulthood. The three participants of the Disability group acknowledged long term consequence of pressures on their state of mental illness.

Among the four participants of the TCM group, Mr. Chu presented a third-person explanatory discourse, which ended with a first-person description about the link of pressures to fatigue and emotional volatility.

> When you undergo any [*external*] changes, you also experience some physical and mental changes. When you reach a certain point, you will want to find a place to release the energy. It is also related to our culture and family upbringing… I believe it is more problematic for men than women because we had more pressures. Immigrant women can easily find an American husband and change their lives, but men can't. We are used to our living pattern, and we also have pride in ourselves… Most people cannot feel the pressure immediately after they come to this country. Sooner or later, you begin to realize this pressure especially when you encounter a failure… We grow up in a culture which family and society put a lot of pressures on us, and these pressures will gradually become problematic to our health and mental health… I guess for everyone, [*depression*] will be a long course problem. You can't quite solve the problem unless you go back to China. For every aspect of life like family or job, you will still face these pressures continuously. These pressures may reduce as they live here longer. However, it doesn't matter whether you are a first or second generation here, the pressures will still continue, unless you are White… At the beginning [when I immigrated], I did not have that much of an emotional change. Now, I can feel more emotional changes like feeling annoyed and upset. These changes may be related to the external pressures, or fatigue from work, my family, and my language. During the past two years, I always get tired easily, but I still want to do more."

Second, consistent with Mr. Chu's theory, Dr. Du identified how pressures provoked her depression.

> When I came to the U.S., I was the only person to come here. My husband and child were in China. There were lots of pressures and my future path was not clear… Back then, I didn't know much about depression… I finally began to realize the problem after I talked to my friends. It was two months after that I had the symptoms [*of depression*]. At first, I just thought I didn't sleep well or I had too many pressures and stresses. Gradually I got better as I stayed here longer.

Third, Mr. Chan acknowledged the impact of pressures on his psychological difficulties: "[*Our two children's disabilities*] cause a lot of stress and pressure in our lives, which may lead to some of our psychological problems." Finally, Mrs. Der viewed her physical problems as a result of pressures, but debated the origin of her nervousness.

> At first, I wasn't paying too much attention because I didn't feel like I was depressed. But now, I can't drive. I have headaches. I feel a lot of psychological stress and pressures. I can't sleep well. I'm afraid to drive. I went to the doctor because I had sudden headaches… I am not sure if my

> nervousness is related to my physical health problems… Even just sitting in the car, I am very nervous. I can't move. I know I have nothing wrong physically because I have gotten a physical checkup… I could drive after moving to the new apartment. But, this month I can't drive again. This may be related to my physical problem—endocrine imbalance… My sister has taken anti-depressants in China. She is afraid of raining… and riding public transportation. She has no physical problems that make her feel nervous to do these things. We just don't know why she's scared. But, I feel my physical problems… When I get nervous, my heart beats very fast… I'm not sure if my nervousness is related to my physical health problems. I know my physical problems can come from external pressure and stress.

In the WM group, Ms. Lau and Mr. Koo experienced pressures during college. Mrs. Lau saw the cause of her mental illness as 'huge pressures' especially with regard to social relationships with men that provoked auditory hallucinations. Mr. Koo associated his ability to handle pressures with family support.

> I felt a lot of stress and pressure from my teachers and academic work… One day when I was at school, I began to hear really loud voices and I told the school staff, and they sent me to the hospital. I dropped out of school… I was not happy because my family was not there… I was dealing with my school stress and my problems on my own.

In the Disability group, the three participants acknowledged the impact of pressures on their psychological health. Mr. Teng stated, "Also, living in America has given me lots of stress and pressures. I feel very nervous. I guess all these pressures created my problem [*of depression*]." Mrs. Wang explained, "I have tried to go back to work as a teacher too, but I got too nervous. When I taught, I felt pressured." Mr. Tien re-experienced pressures that he had first suffered during the Cultural Revolution.

> Other factors affecting my mental health include the pressures and stress of living in mainland China. My family's political views were different from the society's political views. It made our lives very difficult in China. I am fearful of political pressure. I am afraid of political pressure from the government of China.

Anxiety Symptoms

Fear. All nine women (100%) and nine men (82%) experienced fear. Fear was the most frequently manifested emotional experience for men and women. The large majority of these experiences were presented under the question of 'most feared consequence.' However, all expressions that used the word 'fear' throughout the narratives were counted. The majority of participants expressed fear with regard to social outcomes and situations. Objects of fear, by order of frequency, included: (a) inability to fulfill social roles, (b) debilitation from mental and physical illness, (c) stigma of mental illness, (d) un-named objects, (e) past traumas, and (f) the U.S. environment. Women shared their fears more frequently than men, who only disclosed their fears to their clinicians. Women also tended to name one to several objects of fear, whereas men most frequently cited only one object.

Regarding the inability to fulfill social roles, five women and five men revealed fears regarding their social roles. For women, this object of fear was relevant to all four women of the WM group and one woman of the TCM group. First, Ms. Lai stated:

> I'm fearful of losing my degree, job, my boyfriend, and other things. Sometimes, I am afraid that I haven't turned the stove off or locked my friend's car. I will go back and check. I think this is my anxiety.

Second, Ms. Lau did not herself name her fears, but her clinician explained, “She fears that she is not able to work, not able to support herself…” Third, Dr. Du stated, “Back then, I didn’t know much about depression. I was afraid that one day I would fall, and not be able to continue my life.” Fourth, Mrs. Lum’s fears regarded the loss of her role as wife and caretaker.

> When I first encountered my problems [*of marriage and family*], I could not face them. I was very fearful. I wanted to leave Hong Kong, or even leave this world. I had tried many ways to kill myself such as cutting my veins, drinking chemicals, and many other methods.

Her clinician further explained:

> She fears that her dad and son are not taken care of [*if she dies*]. She’s really concerned about her son’s care, how he will survive on his own. He was quite sheltered. He was seen here once. He was gambling, drinking, and couldn’t hold a job for long. He was a dealer in Reno for a while, and had an abusive relationship with a woman. She is the provider for dad and son.

Fifth, Mrs. Li fears also centered on family caretaking.

> When I stayed with my family-in-law, I often worried that they would take away my child. I did not know much about the law and anything about child custody. My fear of losing my child made me cry the most. Whenever I thought about my child’s future, even though they treated me badly, I still needed to stay. I could not sleep or eat well… [*Today,*] I am also afraid and suspicious of getting myself and my child poisoned by my neighbors.

For the five men, the expression of fears regarding social and economic roles was most relevant to those in the Disability group, as three of the five men belonged to this group. These three men referred more specifically to a very basic level of welfare and social independence, and the role of caretaker and protector of their children. First, Mr. Tang stated:

> I am afraid that I don’t have money to pay the rent, and afraid that someone will teach my children to become bad.

Second, Mr. Tsang’s clinician described Mr. Tsang as fearing ‘no place to stay and no food to eat.’ Third, Mr. Tu’s clinician said Mr. Tu feared “being unable to work and care for his young son.” The fears of the two other men, Mr. Kwok and Mr. Chu, were more future-oriented. Mr. Chu stated, “When I first came here, I was fearful about my future. As I stayed here longer, my fear went down and I began to worry more.” Mr. Kwok’s clinician said, “His big fear is about his career, and what to do with his life.”

Regarding the fear of debilitation due to mental and physical illness, this object of fear was slightly more common of women in the lower severity groups, but used by men in all groups. Women mostly emphasized the physical aspect of this fear, whereas only the men in the TCM group had this emphasis. The men of the WM and Disability groups generally focused more on the psychological impact of illness. Among the four women who had this fear, Mrs. Wang explained:

> I am not afraid of death… I am afraid I will be paralyzed and I need people’s help… I felt that there’s no place for me to stay in this world anymore… I wasn't able to move well before, and I wanted to die.

Mrs. Lum feared physical suffering.

> I am fearful of all the physical pains and symptoms that I have had recently. My hand and arm are very painful now, and it also affects my neck. I have headaches now too, and this may be related to my stress. I am very concerned about these somatic pains.

Mrs. Der feared driving, which she associated with physical health.

> This month, I can't drive again. This may be related to my physical problem—an endocrine imbalance. The physical problem can be related to both internal health and the external environment. I haven't had my period for three months… My dad said it's only ten minutes of driving, why am I afraid of that? He said that I am just afraid of death. Then, I thought about it. That's true. Why do I have to be afraid of driving? Then, I sit in the car and begin to drive. I still feel very nervous and I cry as I drive. I don't know why. If the driving distance is short, my body can still handle my nervousness. But a 25-minute drive, I can't handle it. If I know I have to drive the next day, I can't sleep well. Then, the next day I have a headache and I can't drive… I will feel a lot of pain if the problem continues. I am still young… Can't I just find a job without driving in the U.S.?

Mrs. Der's physician added:

> She thinks it is very severe, that she could 'almost die'. She doesn't say it's depression. When I told her it was depression, she said, 'Yeah, my sister has it too.'

In contrast to these three women, Mrs. Deng's fear regarded the psychological aspect of depression. Her TCM physician explained:

> She was scared. 'How come I cry all the time?' She didn't want to be like this. She wanted to keep smiling, but couldn't. She couldn't concentrate at work. She felt all slowed down… She doesn't want unstable emotions. She doesn't want to feel scared.

Among the six men who feared debilitation due to physical and mental illness, Mr. Chu feared getting liver cancer and Mr. Chan feared "health problems" in general. Mr. Chan said, 'I don't have time to do a physical checkup because I'm afraid of finding out about more serious health problems'. Similarly, Mr. Tsang minimized the mental aspect and gave attention to his physical condition, which his clinician explained.

> He has more fear about his medical problem. This problem of depression is not very significant… He doesn't see now that he has this illness and has changed much. He doesn't label it as an illness, but a condition.

The remaining three men focused on the psychological side, especially the fear of recurrence of a severe episode. First, Mr. Kau, who returned to work and school after over ten years of western treatment, stated, "I am afraid that if something big happens, I will become very emotional and my problems will relapse." Second, Mr. Tien said he feared being "unable to control depression and violence." Third, Mr. Tang said: "I always fear feeling unhappy, and that my strength doesn't match my ambitions. His clinician explained that he feared becoming like his older brother, who had more severe depression, resisted treatment, and walked aimlessly around Chinatown everyday.

> He fears that when he becomes older, he'll be like his older brother. He's not like others who have vague knowledge about the course of the illness. He has concrete knowledge because of his family [*history of depression*]. He's not asking for more. He is grateful. He also wants to sleep better, have less headaches, and now, he has a new fear about his heart condition.

Regarding the stigma of mental illness, three women and one man expressed fear of others' judgments. Mrs. Wu stated:

> I'm afraid that I will become crazy. It is scary to see those people who get angry and can't control themselves on the street. They shout at other people… My relatives? They are for sure afraid of me.

Ms. Lau feared disclosing her illness to friends. Her clinician added: "She fears she cannot be like other people, and not do what normal people do." Mrs. Der and Mr. Chu both feared the need of psychiatric treatment. Mrs. Der's physician explained:

> She is scared of talking to a psychiatrist, so she doesn't want to go see a psychiatrist. She went to a primary care physician and her regular checkup was okay. I referred her to a psychiatrist, but she said her English is not good, so she was scared to go.

Similarly, Mr. Chu's TCM physician said that he feared psychiatric medications.

Three types of objects were the least frequently used: unnamed objects, past traumas, and the U.S. environment. First, three men disclosed a generalized fear state without being able to name the objects of fear. Mr. Teng said, "I know I have fears, but I'm not too sure about what these fears are. I am just fearful of everything." Mr. Kau said, "Sometimes, after I get out of work, I feel fear of things around me." Mr. Koo feared hearing voices, but did not share their content. Second, Mr. Tien and Ms. Lai feared the repetition of past traumas Mr. Tien recalled the Cultural Revolution: "I am fearful of political pressure. I am afraid of political pressure from the Chinese government." Ms. Lai explained, "I am afraid or even fear that the sexual assault will happen again. Finally, only Mrs. Li recalled a fear of the U.S. environment when she first immigrated.

> When I first came here, I was afraid to go out because I could not speak much English. I did not go out for the first three months after my arrival. I did not have a social security number or green card. My parents-in-law told me that it was dangerous to go out.

***Worry*.** Five women (56%) and four men (36%) experienced worry over impending situations. Objects of worry regarded three areas: (a) family welfare, (b) financial sufficiency for oneself or family, and (c) personal well being. In some cases, these worries originated from past traumas. In other cases, they concern poor outcomes that will occur due to current known difficulties. Although the number of participants who expressed worry was small, its expression was slightly favored by women in the TCM and WM groups, and men in the Disability group.

Three women and two men experienced worry about family welfare. Mrs. Li worried about losing her son to her ex-husband in a child custody case, and her son's health due to the physical maltreatment he had received.

> Now he has a lot of physical health problems such as frequent nose bleeding. I worry about his health a lot.

Mrs. Lum, according to her clinical social worker, was "always worried about what she had to do for her family." Mrs. Wu worried about taking care of her two young children after her husband passed away. Mr. Tien, who was persecuted during the Cultural Revolution, cited worry as the main impact of illness.

> I can't learn because I can't really concentrate and I always worry too much about everything. When I worked, I always worried about my family and kids. Sometimes, I have auditory hallucinations in which I hear people crying… My wife was diagnosed with cancer. I worried a lot about her health. When I was at work, I always worried that her heath was poor. I always wanted to go home and check on her status."

His clinician described Mr. Tien's exclusive focus on his son:

> He' says, 'I'm nervous. I worry a lot about my son, about his job.' …He has all his hopes on his son and doesn't focus on himself… He doesn't talk about himself at all. It's all about his son.

Mr. Chu suggested current marital and family problems behind worries about the future.

> I worry about whether I would have a divorce like other immigrant families… I worry about my children and about their adjustment to living here. When my children grow up, I will worry about whether there are any intergenerational or intercultural conflicts.

Two women and two men expressed worry about financial sufficiency. Mrs. Lau stated worry about "my future such as earning enough to live." Ms. Lai named worry about "money issues" and "my marriage in the future." Mrs. Li said:

> I also worry about my living now. Everything is so expensive. I wonder whether I will have the ability to raise my child and make money to sustain my living.

Mr. Tang stated simply, "I worry about financial problems." Mr. Li stated, "I worry about my financial problems and also my English proficiency."

Two women expressed worry about personal well-being. Mrs. Li shared:

> When it is quiet, sometimes I feel bored, and begin to worry whether I can have a normal life back... I have thought of going back to China and doing things that I enjoy.

Mrs. Deng explained, "I worry about my weight. I always think I am too fat, but I love to eat, and I love sweets."

Irritability and emotional control symptoms

Anger, blaming, violence, and loss of emotional control. Eight men (73%) and four women (44%) experienced anger or blaming, committed physical aggressions towards others, or suffered from the loss of emotional control. Anger, blaming, and violence—externalized emotions and behaviors—were directed toward family members in most cases and sometimes toward non-family. Also, the majority of male participants emphasized the control of emotions as their foremost concern, alongside the emotional or behavioral experiences themselves. Fewer than half (five of the eight men and one of the four women) of this group disclosed the experiences themselves. Furthermore, the others only communicated these experiences indirectly or with significant restraint. Participants viewed the absence of self-control as socially inappropriate and personally intolerable, and demonstrated a strong despair and self-criticism over it. Several participants (Mr. Tu, Mr. Tam, and Mrs. Wu) referred to the loss of emotional control as becoming 'crazy' and a state of 'madness.'

This problem area touched: (a) all men but no women belonging to the TCM group, (b) five of six men and both women of the Disability group, and (c) only one of three men and two of four women in the WM group. The men expressed two forms of anger. We called the first an 'active' form of anger, in which violence and loss of emotional control are associated with feelings of depression and hurt, impulsivity and lack of fear, and suicidal thoughts. The second was a 'passive' form of anger that was associated with a perception of being victimized and helpless. In the former, the person externalizes his or her perception of mistreatment or unfairness actively, whereas, in the latter, there is an acceptance of one's unlucky state or bad fate by means of attribution to others. The women's expressions of anger were more similar to the passive, blaming, and helpless form, as none shared a problem of violence and only one suggested a problem of emotional control.

Six of the eight men showed an active form of anger. First, Mr. Tu had awareness of a direct link between his anger and depression.

> [*The name of my problem is*] depression. I have no energy, cannot concentrate, and have a bad temper… When I have a bad temper, I want to kill someone. That's when I am extremely angry. When I feel depressed, I want to commit suicide. I feel there is no sense of belonging to the world… I fear that I cannot control my emotions and that I will be drive to madness.

Second, Mr. Tam also described the occurrence of anger with hurt and feeling depressed.

> Sometimes, I argue with my family members, and I begin to lose my control and become crazy. I get angry and start yelling at people. Sometimes I feel very mad and hurt (*seung hoi dou ow*)... I also act impulsively. When I want to do something, I will do it immediately without thinking of the consequences of my actions… I have young kids and they run around at night, which keeps me from sleeping. I also argue with my wife. Sometimes, I get mad and lose my temper, and I hit my kids… Sometimes, I get very bored (*hou meun*). I feel I am a bit crazy. Sometimes, I feel very depressed… I have argued with my brother-in-law. He has used a knife to threaten me, and said he would kill me. I did not really care and told him to kill me. I am not afraid of death.

Mr. Tam's clinician observed an increase of irritability with the onset of suicidal ideation. Third, Mr. Tien described loss of control and violence as his most feared consequence of illness.

> I fear that I can't have control of my depression and violence. I used violence against my wife when I was in China. When I came to the US, I stopped using violence against my wife after I got help from mental health professionals here...

Fourth, Mr. Tang, whose clinician said he had one episode of fighting that involved the police rather than a pattern of violence, shared his own violent behaviors.

> In the past, [*my depression*] was more serious. I always got into physical fights with others, because they always threatened me, and said they would hurt my son and father. Now, my illness is getting better… At the beginning, I had a bad relationship with my family. I always argued with them and broke things at home.

Fifth, Mr. Kwok viewed his temper tantrums as the main impact of illness and a precursor of a larger emotional problem. His clinician said that one of his most feared consequences was being overwhelmed with anger.

> Something's wrong with my emotions too. I threw temper tantrums more. I could not really explain that. When I had more stress, it became worse. Then, my boyfriend suggested that I see a doctor. By that time, I felt out of control. I mean my mood was out of control.

Sixth, Mr. Chan spoke of anger at both home and work, and a man's role to contain his emotions.

> I have two young girls; I will scold them for misbehaving. I just can't hold my frustration at that moment... At my company, I just feel like even though I don't bother others, others will still come to bother me… My boss always gives me a hard time at work, which makes me very mad… However, my personality is quite easy going. For example, if I am upset, I can forget about it by doing something I enjoy like fishing and taking photos... Sometimes, when I come home with my stress from work and with her stress at home, [my wife and I] just argue. However, after we finish arguing and expressing our anger, we will be fine… I feel that because I am a man, my tendency should be to not argue with my wife. I need to take everything that she says and keep it inside myself. So, I try not to argue back.

The two other men expressed a passive anger. In these manifestations of blaming, there was not always an overt recognition of anger. They tended to share neither their own experience of uselessness, loss of social functioning, nor their own contribution to their illness. First, Mr. Teng had shared with his clinician that he was 'falsely accused' by his wife, which led to his imprisonment for one year, and also victimized by society for not providing him with

employment and justice for his ex-wife's actions. During his interview, he shared a sense of helplessness and loss: "My wife divorced me a few years ago. Before I had this illness, I was always afraid that she would leave me, which she finally did." Second, Mr. Chu, whose clinician said he frequently blamed his wife and daughter for their wrongdoings, recounted his awareness of the onset of emotional changes through his experience of irritability, then anger.

> At the beginning [*when I first immigrated*], I did not have that much of an emotional change. Now, I can feel more emotional changes like feeling annoyed and upset… In the past two years, I always get tired easily, but I still want to do more. I guess that makes me over my limit, and I also throw temper tantrums."

Among the four women who experienced anger, only one presented her state directly and explicitly. Mrs. Li associated the emotions of anger and hurt in her experience of domestic violence.

> Whenever I think about his affair with another woman, I feel very angry and hurt… Even now, I still tremble when I think about my life with [*my ex-husband's*] family during those months. When I smell detergent, it reminds me of my time with them… My mother-in-law would ask my husband's girlfriend to visit… Sometimes, when I finished washing dishes, she would make them dirty again, and make me wash everything over again. My ex-husband did not allow me to argue with his mom. If I did, he would tell me and my son to leave… My limbs and joints felt painful because they used to hit my body. They also hit my head… I also feel sad that my family-in-law and my ex-husband hit my child.

The other three women did not admit their anger so clearly. Mrs. Lai's presentation hinted at the inappropriateness of feeling anger, yet her use of the word 'hate' showed her blame and resentment, and the threat that her parents represented.

> I don't want to talk to my family. I can't really identify my feelings toward them—sad or angry. I still care about them, but I can't face them now. I want to protect myself because I have a lot to do in my life… I will always remember there's something missing in my life. It's imperfect like there's a hole in my life. Even if my boyfriend is good to me, I don't think he can give me a home and family that I lacked in my childhood... I actually would rather my parents be dead, or they treat me badly, so that will give me an excuse to hate them"

Mrs. Wang expressed herself with restraint, yet described a situation that infers blame of her church community for not supporting her viewpoints.

> I want to have a clear mind and understand more about homosexuality. I know I can't blame it on anyone. I don't have to follow the people in church. Their views on homosexuality are too extreme. I also know that I can't leave God. If I did, I would have nothing. I have socialized less in church because people all have different opinions. For example, when we comment about the war in Iraq, people will get mad at me because I'm opposed to the idea of war.

Finally, Mrs. Wu described anger and the need for control in other people, and thus spoke indirectly of her own need of self-control, which she associated with proper brain functioning.

> I'm afraid that I will become crazy. It is scary to see those people who get angry and can't control themselves on the street. They shout at other people. I am afraid that my brain cannot function well.

Her clinician said that her most feared consequence was "so much anger and getting so angry."

Emotional and cognitive imbalances. Four men (36%) and four women (44%) manifested distress concerning emotional and cognitive imbalances. These imbalances concerned irritability and emotional disturbances in general, but exclude anger and violence. This group of symptoms

is very culture-specific in that participants refer to the heart, the figurative place of emotions, and the brain, the organ responsible for cognitive and emotional regulation. Thus, many language expressions with the word 'heart' are used. For example, 'heart is very messy' (*sum hou leun*) means one's emotions are uneasy, confused, and difficult. A common expression translated to disturbed, troubled, or bothered (*hou fan*) is also a heart expression that describes an internal state of difficulties, conflict, and confusion. It can also describe a state of being without a solution, or inability to think through one's problem and calm oneself down. *Troubled* (煩惱) means literally "brain feels vexed." In TCM, this concept refers to a vague and fidgety sense of anxiety, uneasiness, and agitation (Maciocia, 2007).

Furthermore, similar to the loss of emotional control, which regards anger and violence, the state of being imbalanced in the heart and brain are a main focus of distress. That is, the state itself is an object of despair, alongside the difficult cognitions and emotions themselves. Considering, without overlap, the six men and one woman who revealed a problem of loss of emotional control with this group, which experienced imbalances, then a total of eight men (73%) and five women (56%) experienced one of the two. These proportions make the concern for control and imbalance of internal states a very important symptom concept.

Three of the four men related mood changes with thinking imbalances. First, Mr. Kwok feared and needed control of his undesired thinking.

> [*My depression*] has something to do with my thinking pattern. I have a lot of flaws in my thinking. I think these flaws caused problems… My thinking patterns made me make wrong decisions and I could not control my mood. I got upset easily by little things… I just try to clear away some garbage thinking. This is why I work with my psychologist on every issue. It is a good opportunity for my own mental growth… I also want to control my bad thinking—just like how people go through the training of their minds… I think therapy and my own thought training help. I think the most helpful one will be to learn how to control my own thoughts.

Second, Mr. Tien similarly shared that proper thinking would calm his emotions.

> I can't be calm mentally. I have trouble controlling myself. I need medication to calm me down, and I need to get medication by injection to calm me down… I think that my heart can't calm back down… Sometimes I can't keep myself calm for even five minutes… I hope my thinking will not lean to an extreme side and I can feel that my heart is calm.

His clinician also placed the origin of Mr. Tien's imbalance in the past.

> In his time, he was considered an intellectual. During the Cultural Revolution, he was considered the educated class. In 1977, when the Cultural Revolution ended, he was 27. He is a very sensitive person… He was persecuted, denied privileges… He couldn't move on with his education because he had family in the wrong places… He is hypersensitive about what happened. He tends to have a depressive interpretation…

Third, Mr. Tsang's clinician described his main symptom as an inner disturbance regarding emotions and thinking.

> He doesn't want to be as disturbed, not so 'fan' (*m'seung gum fan*), and not think so much (*m'hou lum gum doh*), which is like worried, milder than anxiety, in Chinese.

One man and two of the four women referred to problems of the past that cause sensitivity. First, Mr. Kau referred to his need to balance his emotions as a key symptom of depression.

> I am afraid that if something big happens, I will become very emotional and my problems will relapse. Of course, it will be something big, not like failing a class… If possible, I would like to try

> Chinese medicine too because I have heard it helps to control emotions… I hope the treatments will stop the relapse and help balance my emotions—just keep my emotions stable.

Second, Mrs. Wang explained that family conflict due to her son's homosexuality triggered her depression problem, which had its origins in childhood when she lost her parents. She cried when she shared that her son refused her visit because she accepted his gay brother.

> I think it [*my depression*] happened since I was a child. We grew up in a communist society. I saw myself lose my family. I went to Taiwan as a refugee student… I think people when they reach about my age, they begin to experience a lot of things such as divorce, conflicts in the child-family relationship, and many other problems. Sometimes, when there's something [like this] happening, I just cannot let it go… My heart was very messy (*I was feeling uneasy and confused*)… I still feel very uncomfortable… This illness causes a lot of problems. It affects my sleeping pattern and emotions… I hope that acupuncture will help control my emotions… The medication for emotional problems makes it difficult for me to sleep well.

Finally, Mrs. Lum also described her sensitivity and inability to let go.

> When people reach my age, we sometimes become sensitive about many things, which include those very minor ones… As I get older, there are things that aren't in my control anymore. Sometimes there are things that aren't in my control, or I can't let go, and I think this is the end of the world… Psychologically, I feel very sensitive and I also cry very easily. Sometimes, I cry without my own consciousness… Physically, I feel my heart state (*or mood*) is imbalanced (*sum lei m'ping hung*).

Her clinician added that Mrs. Lum labeled her condition as one of troubled thoughts, along with concentration difficulties, and that her ruminations centered on her failed marriage, her responsibility for her son's poor outcome, and other family events.

The remaining two women expressed despair with regard to changing mood states. First, Mrs. Deng described her problem simply as, "I am always in a bad mood," referring to her general irritability and heart imbalance. Her TCM physician said that her presenting problems were unstable emotions, along with headaches and frequent crying. Second, Mrs. Der, whose experience centered on her fear of driving, was aware of a problem of repressed emotions.

> I listen to some music when I drive. It helps at the beginning because I feel more relax and pay less attention to my fear of driving... Now, I also sing. Sometimes, I think crying helps. It allows me to express my feeling. When I drive, sometimes, I pull aside and cry. It works a little bit. After crying, I feel much better and my emotion gets better.

Her TCM physician added: "She is not comfortable. She is very Chinese. She holds everything inside."

DISCUSSION

We used Kleinman's explanatory model of illness interview to observe the presence of social self-construal in the manifestations of distress of Chinese American immigrants. Through a systematic search of illness narratives for expressions of distress that contained a social interpretation of the self, we discovered a set of social symptoms that pertained to the lived experiences of depression of men and women in different stages of illness. In this search, we observed the social form of specific anxiety and irritability symptoms and their prominence in this group's repertoire of expressions of distress. As for their raison d'etre, we saw that the breakdown of the immigrant's social and cultural world—be it due to the U.S. environment, past

and present traumas, or genetic illness—appeared to instigate a process of fear, worry, and anger with regard to all the precious and life-sustaining objects that were about to be lost. We thus observed the nature of depression in first-generation Chinese Americans in the context of their adjustment to U.S. society.

We undertook this investigation with the practical objective of contributing to effective assessment. We discovered the set of social symptoms that we aimed to see. However, these symptoms represent conceptual areas rather than expressions that can be directly used in a self-report instrument. Also, many of these symptom concepts are consistent with Western concepts that are used to assess depression (e.g., hopelessness, worthlessness, social withdrawal). Nevertheless, it is also evident that the form and content of how these concepts are expressed by Chinese immigrants represent important nuances that may be critical for more effective assessment. Thus, it remains for future research to develop the specific content that is useful for a depression scale, and investigate how this content pertains to the construct of depression—as cultural elements of a psychological construct, or its own social dimension within a multidimensional structure.

Aside from the social domain that we aimed to see, we also discovered three other phenomena that may have important implications for assessment. The first was the relatively infrequent expression of a few psychological concepts considered to be 'universal' symptoms of depression—such as unhappiness, depressed mood, anhedonia, and suicidal ideation. We pondered the implications of this imbalance in favor of socially oriented concepts. We recognized that the presentation of distress in the context of a semi-structured interview would be very different from that which is obtained in a structured assessment, in which the respondent is faced with answering every question that is posed. Nevertheless, there was a tendency to diminish attention on and not report aspects of distress that were very internal and mind-focused. Given the values of interdependence and emotional restraint in Chinese culture, perhaps it is permissible and expected for Chinese immigrants in the U.S. to speak of social disharmony and functioning in one's social role rather than internal states. These findings highlight the importance of understanding the factors that underlie the appearance of each domain and how these domains interact. This large imbalance between social and psychological concepts also led us to hypothesize the existence of social and psychological dimensions of distress, that is, two distinct sub-constructs.

The second phenomenon concerned the differences in manifestations across treatment groups. The different forms of presentation that were demonstrated suggested important factors that influence the manifestation of depression. One factor was the stigma and shame of mental illness, which had a critical impact on how illness was conceptualized and presented. The TCM group viewed their illness as physical and was largely unable to admit to a mental illness. They spoke of fear of physical debilitation and emphasized the impact of external pressures. The WM group recognized their psychological illness, although to varying degrees. Most still attributed the diagnostic labels they gave in their interviews to their clinicians. They also showed an arduous process of learning about management and acceptance of illness. However, they were able to state the psychological impact of illness. The Disability group showed the strongest stigma and shame. They were unable to name their illness in the first person, but instead spoke of themselves by describing how others viewed and treated them, and how they judged others to be 'crazy.' Nevertheless, they easily shared their very poor functioning, loss of social role, and helplessness. They also acknowledged the long-term consequence of the external pressures they experienced as immigrant in the U.S. on their current state of poor health. This finding not only

suggests that stigma is a key factor for successful intervention, but that much care must be paid to assess persons in different phases of illness and treatment settings.

The third phenomenon concerns the externalization versus internalization of distress, self-awareness, and ability to disclose. There was a tendency for men to externalize, and be more restricted in breadth of self-awareness and ability to disclose. With regard to self-awareness and disclosure, men of the Disability group were more similar to the women in their style of expression than the men of the lower severity groups. We found that the men of the TCM and WM groups tended to not speak directly of their personal despair and worthlessness, but rather focused on the challenging circumstances they faced. Also, almost every man of the TCM and Disability groups named irritability and emotional control as main problems. In contrast, women, and men of the Disability group, readily spoke of their internal states and acknowledged a range of concepts. They easily expressed: low self-esteem and worthlessness; helplessness, fate, and hopelessness; fear; and worry. They also spoke overtly about their lack of control, and need for control, but without neglect of the impact of immigration and past traumas. Also, the women who experienced anger showed the 'passive' rather than 'active' form. The men who disclosed anger and blame, worry, and low self-esteem and worthlessness, did so mostly with their clinicians. Also, several women voiced their fear of the stigma of mental illness, compared to only one man. Yet, several men expressed a strong fear of objects that were unknown to them. We suspect that the social and psychological concepts that men, as well as women were unable to speak to be the areas where they suffered the most profoundly. The implications of all of these phenomena to culturally sensitive and accurate assessment for each gender require investigation.

Considering all of the different forms of expression relevant to each group and gender, we also able to ascertain an overall process of illness. At the lower level of severity, there is an emphasis on somatic and social or environmental attributions. As the severity of depression increases, one learns to recognize, and is forced to acknowledge the internal or psychological aspects of one's illness. This may explain why core psychological concepts of depression were infrequently expressed, that is, they may be more easily endorsed by a subgroup of persons with specific traits. Those who can recover to a fairly functional state, such as the participants of the WM group, have learned to manage their condition, and thus show relatively higher acceptance of their mental illness. Even with a small sample of twenty participants, it was possible to see the outline of this process of illness. Further research is needed to better understand this process and the factors that influence the expression of depression. Such knowledge of illness progression may be critical to the development of effective interventions.

We thus used the explanatory model of interview to learn about the fundamental social nature of experiences of depression in Chinese American immigrants. However, the concepts and forms of expression that we found are limited by our sample. All of our participants were persons diagnosed with depression who were receiving some form of care and support for their conditions. Thus, we do not know if the set of social symptoms we found applies to individuals who have never been told they have depression, such as those who present to primary care with somatic complaints, or to social services agencies for help with diverse problems. Their level of awareness and ability to disclose may be very different from those with mild depression in the TCM group of this study. Also, while this study provided basic knowledge of a social domain, the development of effective assessment tools, using modern psychometric techniques such as item response analysis, depends on a rigorous and repetitious process of qualitative and empirical investigation. The findings of this study support this undertaking.

Table 1.

Sample characteristics

	N	Age		Years in U.S.		Years Treatment		Employed/Student		Unemployed/
		Mean	Range	Mean	Range	Mean	Range	Full-time	Part-time	Disability
Men	11	47.3	30-57	17.6	9-34	7.9	0.5 - 22.0	3	2	6
Women	9	40.9	24-54	11.7	3-27	5.8	0.5 - 15.0	5	2	2
TOTAL	20	44.4	24-57	15.0	3-34	7.0	0.5 - 22.0	8	4	8

Note. 'Years Treatment' considers all treatments obtained, including non-psychiatric Western medicine, TCM, Western psychotherapy and psychiatry. Participants in the 'Unemployed/Disability' group all received supplemental security income for disability (SSI), except for one man who had just applied for SSI, and another man who received social security insurance benefits.

Table 2.

Participant characteristics: Three groups by treatment setting, severity of depression, and social functioning

Name	Age	Marital Status	Educ.	Years Treatment	Life Difficulties
Traditional Chinese Medicine Group: Mild/Moderate Depression, Employed Full-time, and Higher Functioning:					
Mr. Chan	38	M	M.A.	3.5	Stomach pains/fear of physical illness; Two children with disability; Loss of father.
Mr. Chu	49	M	M.A.	0.5	Fear of heart/thyroid illness; Fear of psychiatrists/psychologists; Part-time work; Genetic factor.
Ms. Deng	35	S	M.A.	0.5	Car accident/computer-related shoulder/arm pains; Financial loss in stocks; Boyfriend problems.
Mrs. Der	40	M	B.A.	1.0	Sudden headaches, fatigue; Fear of driving; Fear of psychiatrists/psychologists; Genetic factor.
Dr. Du	51	M	O.M.D.	14.5	Suspicion of a severe physical problem; No money for physical checkup; Astronaut wife alone 5 yrs.
Western Medicine Group: Moderate/Moderately Severe Depression, Employed/Studying Part-time or Full-time, and Moderate Functioning:					
Mr. Kau	30	S	in B.A.	9.0	Crisis hospitalization; Goals to maintain work, complete college, and marry.
Mr. Koo	41	M	< B.A.	22.0	Crisis hospitalization; College dropout; Clerical job.
Mr. Kwok	43	S	< B.A.	4.0	Family rejection in childhood; Family acceptance of homosexuality; Career change.
Ms. Lai	24	S	B.A.	7.0	Parachute child left by parents and raised by grandmother; Rape; Genetic factor.
Ms. Lau	28	S	in M.A.	2.5	Controlling mother in childhood; Perfectionism; Male relations, Genetic factor.
Mrs. Li	33	D	Mid. S.	2.0	Parachute wife left in China with son for 13 years; Domestic violence/divorce in U.S.
Mrs. Lum	53	D	High S.	5.0	Marital problems; Astronaut wife; Divorce; Alcoholism; Son's addictions.
Disability Group: Moderately Severe/Severe Depression, Unemployed (SSI or social security insurance benefits), and Lower Functioning:					
Mr. Tam	45	M	< Elem. S.	1.0	Debilitating workplace back injury; Applied for SSI.
Mr. Tang	51	M	< Mid. S.	20.0	Prison/escape to Hong Kong in Cultural Revolution; Death of brother; Genetic factor.
Mr. Teng	52	D	Mid. S.	12.0	Three divorces; Domestic violence with police fight and 1-year imprisonment.
Mr. Tien	57	D	High S.	10.0	Death of parents as child; Head injury; Beaten in Cultural Revolution; Fired from jobs repeatedly.
Mr. Tsang	57	D	High S.	2.0	Persecuted in Cultural Revolution; Became unemployable; Diabetes.
Mr. Tu	57	S	Mid. S.	3.0	Over-protected and dependent relationship with mother; Death of mother; Became unemployable.
Mrs. Wang	50	D	B.A.	7.0	Loss of parents in Cultural Revolution; Chronic pain; Family conflict over gay son.
Mrs. Wu	54	W	Mid. S.	13.0	Cultural Revolution; Blamed by family for husband's death of cancer; Care of 2 young children.

Note. False names were chosen to facilitate participant's group identification (e.g., surnames beginning with 'C' and 'D' are men and women, respectively, who belong to the TCM group). The Disability group consists of persons who receive treatment in community mental health agencies. Marital Status: M = married; S = single; W = widowed. Education: B.A. = bachelor of arts; M.A. = master of arts; O.M.D. = Doctor of Oriental Medicine; Mid.S. = Middle School; High S. = High School. SSI = Supplemental security income for people with disabilities.

Table 3.

Causal Attributions

Domain	Male (*n* = 11)	Female (*n* = 9)	Total (*N* = 20)
Social:			
Family events: domestic violence, divorce, death, illness	4 (36%)	3 (33%)	7 (35%)
Economic acculturative stress: employment, financial, housing	4 (36%)	3 (33%)	7 (35%)
General acculturative stress: new language, culture, environment)	3 (27%)	3 (33%)	6 (30%)
Self-isolation, interpersonal ruptures, lack of social support	2 (18%)	4 (44%)	6 (30%)
Traumas prior to immigration: Cultural Revolution, sexual assault	3 (27%)	2 (22%)	5 (25%)
External pressures and life stress: general, non-acculturative stressors	3 (27%)	2 (22%)	5 (25%)
Interpersonal conflict: disagreements, arguments	2 (18%)	3 (33%)	5 (25%)
Family traumas in childhood: abandonment, loss of parent	2 (18%)	1 (11%)	3 (15%)
Family duty: difficulties in fulfilling responsibilities	0 (0%)	3 (33%)	3 (15%)
Subtotal	*23 (77%)*	*24 (71%)*	*47 (73%)*
Psychological:			
Emotional and mental problems	3 (27%)	4 (44%)	7 (35%)
Personality traits: shyness, 'thinking flaws,' high standards	2 (18%)	1 (11%)	3 (15%)
Subtotal	*5 (17%)*	*5 (15%)*	*10 (16%)*
Biomedical and Physical:			
Genetic ('chemical changes,' 'genetics')	0 (0%)	3 (33%)	3 (15%)
Sleep problems (changed 'sleep patterns')	0 (0%)	2 (22%)	2 (10%)
Physical changes, head injury	2 (18%)	0 (0%)	2 (10%)
Subtotal	*2 (7%)*	*5 (15%)*	*7 (11%)*
TOTAL	*30 (100%)*	*34 (100%)*	*64 (100%)*

Note. Percentages represent the number of individuals out of the group total. For example, '4 (36%)' means that four or 36% of the 11 males cited a family event as a cause. Domain subtotals represent the number of causes out of the total causes for the group. For example, '23 (77%)' means that 23 or 77% of the 30 causes cited by males were social.

Table 4.

Symptom Experiences

Symptom	Male (n = 11)	Female (n = 9)	Total (N = 20)
Social:			
Low self-respect from loss of social role or status	11 (100%)	8 (89%)	19 (95%)
Social withdrawal and avoidance	9 (82%)	7 (78%)	16 (80%)
Shame and loss of face	9 (82%)	6 (67%)	15 (75%)
Hopelessness, helplessness, and fate	7 (64%)	6 (67%)	13 (65%)
Low self-esteem and worthlessness	5 (45%)	7 (78%)	12 (60%)
External pressures	5 (45%)	4 (44%)	9 (45%)
Guilt and self-blame	4 (36%)	5 (56%)	9 (45%)
Anxiety:			
Fear	9 (82%)	9 (100%)	18 (90%)
Worry	4 (36%)	5 (56%)	9 (45%)
Irritability and emotional control:			
Anger, blaming, violence, and loss of emotional control	8 (73%)	4 (44%)	12 (60%)
Emotional and cognitive imbalances	4 (36%)	4 (44%)	8 (40%)
Other psychological symptoms:			
Unhappy, sad, or depressed	6 (55%)	5 (56%)	11 (55%)
Suicidal ideation or thoughts of death	4 (36%)	6 (67%)	10 (50%)
Loss of interest or pleasure in activities	5 (45%)	3 (33%)	8 (40%)
Nervousness	4 (36%)	4 (44%)	8 (40%)
Auditory hallucinations	5 (45%)	2 (22%)	7 (35%)
Crying	0 (00%)	5 (56%)	5 (25%)

Note. Percentage values represent the numbers of individuals out of the group total. For example, '11 (100%)' means that 11 or 100% of all men expressed the concept.

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STUDY 2

The structure of depression in Chinese American immigrants: An exploration of the psychological, somatic and social dimensions of distress with item response analysis

ABSTRACT

We explored the structure of depression in Chinese American immigrant adults using item response analysis. This study originated from theoretical considerations of health and illness as integrating mind, body, and social elements in Chinese culture, and empirical knowledge concerning somatization, interdependent self-construal, and cultural behaviors in illness presentations. Depressed outpatients (n = 103) and community members (n = 124), ages 21-60, completed a 47-item pilot depression measure containing Western and culture specific symptoms, a 21-item checklist of somatic symptoms, a self-report measure of neurasthenia, and the Acculturative Stress Questionnaire. A multidimensional model consisting of 59 items in three dimensions—psychological, somatic, and social—provided optimal fit of the data. The dimensions were strongly correlated with diagnoses of depression (r_{bp} near .600) and neurasthenia (r_{bp} near .700), and acculturative stress (r near .670). High AUC values (near .910) and rates of correct classification (near .920) for each dimension indicated excellent convergent validity. Analysis of differential item functioning revealed significant influences of gender, age, education and acculturation within each dimension, and suggested the association of somatization and neurasthenia with an internalized experience of psychological and social distress. Also, examination of person scores by dimension suggested various patterns of expression within and across levels of overall distress. These findings support research of the implications of a cultural construct of depression for effective intervention in this ethnic group.

INTRODUCTION

Chinese Americans have one of the lowest rates of mental health services utilization among all minority ethnic groups in the U.S. (Abe-Kim et al., 2007; Herrick & Brown, 1998; Snowden & Cheung, 1990; Sue & McKinney, 1975; Zhang, Snowden, & Sue, 1998). The problem of cultural barriers to the use of services and their consequences is well known, but basic research that supports improved prevention, assessment, and treatment is only incipient. Cultural barriers include traditional beliefs (e.g., fate, stigma, and self-blame) (Abe-Kim, Takeuchi, & Hwang, 2002; Kung, 2004; Yeung & Kam, 2008), problems of language, limited knowledge of mental illness and Western treatments (Lin, 1985; Tseng, 1975), low direct access to mental health consultation (Hong, Lee, & Lorenzo, 1995), and the view of medical care as appropriate intervention (Yeung, Kung et al., 2004; Ying, 1990). As a consequence, illness behaviors include the denial of the need for help, delay of treatment until one's condition is extremely deteriorated (Kung, 2003; Lin, Inui, Kleinman, & Womack, 1982; Okazaki, 2000; Ying & Miller, 1992), and help seeking in medical and community rather than mental health settings (Takeuchi, Sue, & Yeh, 1995).

In the area of depression, cross-cultural researchers reported three types of findings that support a culturally based structure of depression, which contains important somatic and social domains, together with the psychological domain that is central to the Western conception of depression. First, adult immigrants conceptualized depression as an experience that integrated mind, body, and social elements in their explanatory models of illness (Yeung, Chang, et al., 2004; Ying, 1990, 2002). This conceptualization is consistent with a cultural heritage based on traditional Chinese medicine (TCM; Chan, Ho, & Chow, 2001; Hsu, 1985), rather than a western biomedical model that dichotomizes mind and body. Second, the content of Western measures was sub-optimal for recognizing depression in Chinese in the U.S. and China. Some symptom concepts and expressions had questionable validity (Kuo, 1984; Ying, 1989; Zheng, Xu, & Shen, 1986) or functioned non-equivalently (Chang, 1985; Huang et al., 2006), while other concepts that concerned somatic and interpersonal difficulties were found to be valid (Cheng & Williams, 1986; Cheng, Wu, Chong & Williams, 1990; Lin, 1989; Zheng & Lin, 1991). Third, neurasthenia and a range of somatic symptoms were associated with depression, as an idiom of distress (Kleinman, 1986) and possibly a less severe or early phase of illness for Chinese Americans (Chen, Guarnaccia, & Chung, 2003). In a large-scale community study of immigrants, the diagnoses of current depression and neurasthenia overlapped partially (23.1%), with the sample with depression scoring higher than the sample with neurasthenia across a range of symptom domains, but both groups scoring very high on somatization (Zheng et al., 1997). Also, the finding of neurasthenia as a clinically salient and distinct condition, non-overlapping with any DSM-III disorder, and with higher prevalence (3.61% current rate) than all other disorders, suggested a role for neurasthenic complaints as an important idiom of distress.

These findings challenge the debate about a process of modernization in which neurasthenia is expected to become obsolete, and the western psychiatric concept of depression applicable worldwide (Parker, Gladstone, & Chee, 2001). For immigrants, this process concerns how acculturation to U.S. society influences illness conceptions, behaviors, and idioms of distress—whether these become wholly 'Americanized' or, instead, a cultural amalgam, as indicated by this small body of cross-cultural literature (Chen et al., 2003; Ying, 2002). The direct study of the range of somatic and interpersonal symptoms that are valid to a Chinese construct of depression, and the dimensionality of this construct has not been attempted. Also, the

examination of the role of neurasthenic concepts in a culturally based, integrated construct of depression has not been explored.

Gaining knowledge about the structure of depression, including its specific content and the influence of acculturation, is expected to contribute to addressing the problem of disparities in the detection and treatment of mental illness for Chinese Americans. One key guideline for culturally competent intervention is the match between the service provider's and client's conceptualizations of the problem (Sue & Zane, 1987; Yeung & Kam, 2008; Yeung, Yu, Fung, Vorono, & Fava, 2006). In this vein, research of the structure of depression, as it represents the manifestation of a cultural experience of illness (Marsella, 1985; Marsella, Kinzie, & Gordon, 1973), is essential to informing the development of interventions. Such basic knowledge may also support research of disease progression, mediators of behavioral change, and treatment design and response. It may also inform the lower rates of depression typically found for Chinese Americans compared to White Americans in major epidemiologic surveys (Kessler et al., 1994; Takeuchi et al., 1998), and primary care studies of immigrants (Chen, Huang, Chang, & Chung, 2006; Huang, Chung, Kroenke, Delucchi, & Spitzer, 2006; Yeung et al., 2006). Intervention research has largely focused on the cross-cultural validity of measures developed for European Americans (Chen et al., 2006; Huang et al., 2006; Rankin, Galbraith, & Johnson, 1993; Kuo, 1984; Yeung et al., 2008; Yeung et al., 2006; Yeung, Howarth, et al., 2002; Yeung, Neault, et al., 2002; Ying, 1988;). The assumption that the structure of depression, defined in the DSM-IV (American Psychiatric Association, 2000) and operationalized in Western measures, is efficacious for less acculturated Chinese Americans remains largely unchallenged without research that takes cultural specificity as a starting point (Leong, Okazaki, & Tak, 2003; Zheng & Lin, 1991).

In this study, we explored the structure of depression of Chinese American immigrant adults. We aimed to examine: the presence and interrelationships of psychological, somatic, and social dimensions of distress; the range of symptom concepts and expressions that compose these domains; and the influence of variables highlighted by the literature as pertinent to the conception of depression. With an emic approach, we conducted the study in the natural setting, with the case criterion being clinical diagnosis by a community clinician. We first uncovered a large pool of symptom concepts and idiomatic expressions through qualitative interviews with depressed outpatients and clinical experts in medical care and community settings. We then used item response modeling techniques to explore the structure that underlies this pool of items and a range of somatic symptoms. We conducted unidimensional analyses to model each of the three dimensions as subscales, and multidimensional analyses to assess the validity of distinct dimensions within an overall construct. We also analyzed the concordance of the overall structure and individual dimensions with external constructs of depression, neurasthenia, and acculturative stress. Finally, we examined differential functioning of symptom concepts to understand the role of gender, somatization, and socioeconomic and acculturation variables in illness expression.

CULTURAL CONCEPTUALIZATION OF DEPRESSION

Four areas of study support knowledge of a cultural conceptualization of depression and its psychological, somatic, and social domains. The investigation of explanatory models of illness (Kleinman, 1980) explicitly demonstrated a cultural conceptualization of depression through illness narratives (Yeung, Chang, et al., 2004; Ying, 1990, 2002). The research of interdependent

self-construal (Marsella, 1985; Markus & Kitayama, 1991) highlighted the relevance of social interpretations of psychological distress (Diener & Diener, 1995; Kwan, Bond, & Singelis, 1999; Okazaki, 1997, 2002; Singelis, Bond, Sharkey, & Lai, 1999). The study of somatization revealed the role of somatic complaints as a social idiom of distress and form of illness behavior (Kleinman, 1977, 1986). Finally, the investigation of factor structures of translated self-report depression instruments suggested the existence of an integrated conceptualization, and questioned the validity of the western construct.

The investigation of conceptualizations of depression in Chinese American immigrants revealed a culturally based construct that contains psychological, somatic, and interpersonal domains of distress. This knowledge was revealed through the study of illness narratives using Kleinman's (1980, 1988) "explanatory model of illness" interview and Weiss' explanatory model interview catalogue (Weiss, 1977), which are intended to elicit the patient and family's conceptualization of the problem as a reflection of their sociocultural context (White & Marsella, 1982). Two such studies, one of immigrant women in the community (Ying, 1990, 2002), and the other of immigrants in primary care diagnosed with depression (Yeung, Chang, et al., 2004) demonstrated an integrated mind-body construct. In both studies, participants' explanations of illness combined psychological and physical causes and consequences. These findings are consistent with a cultural heritage rooted in TCM, where mind, body and external forces, including social and ecological conditions, interact dynamically, and there is no distinction between causes and symptoms (Chan, Ho, & Chow, 2001). The immigrant women's conceptions also demonstrated the presence of a social component of illness. They all cited interpersonal conflict, not in the vignette, as a cause, chief problem, or most feared aspect of illness in their explanations. These findings reflected the Chinese cultural conception of the self as interdependent (Hsu, 1985), and the objective of socialization to avoid interpersonal conflict and social disapproval (Russel & Yik, 1996).

The study of immigrant women furthermore distinguished two types of explanations, which suggested the existence of sub-constructs—psychological and somatic. For all elements of the interview—name, cause, consequence, impact, and course of illness—respondents presented explanatory models that were either primarily psychological (57%) or physical (30%). Although these explanations were more psychological or somatic in overall emphasis, psychological, somatic, and interpersonal elements were significantly intermingled in every narrative. The finding of the strong association of higher levels of somatic complaints with lower acculturation in the primary care study, a relationship that is supported in other studies (Wong & Ujimoto, 1998), suggested that the somatic conceptualization is associated with lower acculturation (Takeuchi, Chun, Gong, & Shen, 2002).

Concerning the role of an interpersonal domain of symptom experiences, the literature on interdependent self-construal (Marsella, 1985; Markus and Kitayama, 1991) proposed the fundamental importance of a social construct in mental illness experience. Marsella (1985) theorized the concept of self as the critical link between cultural variables and symptom manifestations. He characterized non-Western cultures as promoting an un-individuated self-structure which emphasizes interdependence in human relations, and a preference for conveying experiences with metaphorical language and images. Using Markus and Kitayama's (1991) framework of interdependent versus independent self-construal, researchers demonstrated the presence of an interdependent self-construal in Asian Americans, and its relationship to acculturation (Kwan et a., 1997; Singelis et al., 1999). In these studies, Asian American college students showed a stronger interdependent self-construal compared to European American

students, but weaker than that of students from Hong Kong. Regarding the influence of acculturation, a slow process of internal change was observed through Asian American immigrants' demonstration of an implicit collectivistic self-concept on a word-fragment completion task, even though they expressed an explicit individualistic orientation (Kato & Markus, 1993).

The research of interdependent self-construal has provided basic knowledge about the relationship of self-construal to constructs of depression, social anxiety, and self-esteem for Asian Americans. This literature indicates that relational concepts of subjective well being, as opposed to self-focused ones, were relevant for individuals from collectivistic cultures (Diener & Diener, 1995). For individuals with an interdependent self-construal, relationship harmony across one's five most important dyadic relationships mediated life satisfaction (Kwan et al., 1999), and self-esteem concepts were less relevant given their lower scoring compared to individuals with independent self-construal (Singelis et al., 1999). Also, higher interdependent self-construal correlated weakly to moderately with social anxiety, which included fear of social evaluations and social avoidance (Okazaki, 1997). Thus, theoretically and empirically, this literature suggests that psychological distress for unacculturated Chinese Americans is experienced in terms of one's social relationships, which implies that the social and psychological domains may represent a single construct rather than separate ones. A next step for this area of research is the exploration of concepts that may be specific to the cultural manifestation of psychological distress for individuals with interdependent self-construal, rather than the application of western measures of psychological constructs (Okazaki, 2002).

The research of somatization provided knowledge of a somatic domain of depression presentation. The study of somatization, a phenomenon that has long been debated, generally considers the expression of somatic complaints as a style of presentation. Chinese Americans, like Chinese in Asia, were once viewed as 'somatizers' for their tendency to report predominantly physical complaints (Gaw, 1974; Kleinman, 1977; Okazaki, 2000b; Tseng, 1975), and higher levels of somatoform disorders than White Americans (Bridges & Goldberg, 1985; Hsu & Folstein, 1997). The original hypothesis was that Chinese repressed or denied affective states. However, researchers then showed that somatic complaints were cultural "idioms of distress," that is, a style of presentation appropriate to the expectations of the social setting (Kleinman, 1982). Other types of research complemented this view of somatic complaints as illness behavior. Tung (1994) demonstrated that body-related verbal expressions commonly used in Chinese language symbolized interpersonal disruptions, and were intended to communicate psychological distress metaphorically. Also, it was observed that immigrants reported psychological content in psychotherapeutic settings once a relationship was established with the clinician (Sue, Zane, & Young, 2005), and in medical settings when directly queried with diagnostic instruments (Huang et al., 2006; Yeung, Howarth, et al., 2002; Yeung, Neault, et al., 2002; Yeung et al., 2008). Although somatization is now largely understood as a style of presentation, the social contexts and traits of persons associated with the expression of somatically focused psychological distress have not yet been investigated. Researchers have also posed two new hypotheses that require further examination. The first views somatization as a stress response rather than the expression of psychological problems in somatic terms (Mak & Zane, 2004), and the second views somatic self-attention as an early phase of illness (Chen et al., 2004).

The investigation of factor structures of self-report instruments revealed a problem of validity of the construct and its content for Chinese due to findings of un-interpretable factors.

The majority of studies of White American samples have supported four conceptually pure factors—depressed or negative affect, positive affect, somatic and psychomotor retardation, and interpersonal problems (Shafer, 2006). In contrast, studies of Chinese in the U.S. on the Center for Epidemiologic Studies Depression Scale (CES-D; Ying, 1988; Kuo, 1984) and the Zung Self-rating Depression Scale (SDS; Chang, 1985), and in Asia of the CBDI (Gupta & Yick, 2001; Yen, Robins, Lin; 2000; Zheng, Liang, Goa, Zhang, & Wong, 1988), Chinese Hamilton Depression Rating Scale (HRSD; Zheng et al., 1988), and CES-D (Boey, 1999; Cheung & Bagley, 1998; Kuo, 1984; Ying, 1988) showed conceptually mixed factors with psychological, physical and social items loading together. For example, in community studies in the U.S. (Ying, 1988; Kuo, 1984) and Hong Kong (Boey, 1999) of the CES-D, depressed affect and somatic items consistently clustered to form one factor. A second factor in one of the U.S. studies contained symptoms of all three domains. Only interpersonal problems represented a pure factor in these studies (Cheung & Bagley, 1998; Kuo, 1984). Thus, these mixed factors were not explainable in terms of western-defined clinical features of depression, but suggested an integrated conceptualization. Pure and interpretable factors (suicidal intention/alarm, depression/retardation, irritability and anxiety, and somatization) consistent with the second edition of the *Chinese Classification of Mental Disorders*' (CCMD-2; Chinese Medical Association, 1995) features of depression were found for Chinese on the Chinese Depression Inventory (CDI; Zheng & Lin, 1991), which contained culture specific content. The CDI was composed of items from the BDI, ZSDS, and HRSD, with a large number of items replaced with psycholinguistically equivalent and idiomatic expressions used by Chinese with depression. The CDI was investigated in the U.S. but factorial and item-level validations were not reported (Yeung, Howarth, et al., 2002; Yeung, Neault, et al., 2002).

CULTURAL SPECIFICITY OF SYMPTOM CONTENT

Research of cross-cultural assessment has generated a small body of knowledge of symptom concepts that are valid to the Chinese construct of depression. The focus of this research has largely been on the validation of western self-report inventories. Researchers in the U.S. showed that some symptom concepts did not function well for immigrants. Researchers abroad adapted western instruments by identifying items with poor face validity, and then modifying these with expressions that have cultural and psycho-linguistic equivalence (Chan, Parker, Tully, & Eisenbruch, 2007), or adding new culture specific concepts (Cheng & Williams, 1986; Cheng et al., 1990; Lin, 1989; Zheng & Lin, 1991). One early study conducted in China provides an important framework for understanding this body of research and the cultural uniqueness of symptom content in the Chinese construct, and how it is critically different from the content of western measures (Zheng et al., 1986). This study also clarified the use of metaphorical language, especially a somatic language, and the manifestation of psychological distress as difficulties related to interpersonal experiences. Although this important study took place outside of the U.S., its findings support the conceptualization of depression of Chinese American immigrants.

Zheng and colleagues (1986) explored the Chinese form of verbal expression for typical western depression terms based on Marsella's (1980) hypothesized psychological and somatic patterns of emotional expression. Clinical and community subsamples generated and rated different ways of expressing each of 16 key terms, with the original term as one of the options. Four styles were observed: psychological, somatic, neutral (psychological and somatic), and

deficient (lacking expression due to suppression or denial). Only three of the 16 original terms were retained (agitation, fearful, and self-pity), and three terms (being punished, suicidal interest, and weight loss) were expressed in the deficient style, suggesting a lack of relevance or its social inappropriateness. The Chinese interpretations of western symptom terms not only revealed the non-equivalence of the majority of concepts and the importance of using appropriate verbal expressions, but also three prominent patterns that demonstrate the holistic, intertwined, and metaphorical nature of verbal expressions and illness conceptions.

First, a culture-specific psychological style was observed for the description of psychological key terms. Three types of expression were observed: single-word feeling states, behaviorally or mind-focused descriptions of functioning, and philosophical or descriptive statements focusing on life rather than first person statements. For feeling states, participants communicated 'depressed' with 'agitation' and 'uncheerful, unhappy, or unenjoyable,' and 'anxious' with 'worry' and 'agitation.' Mind-focused descriptions included, 'It hurts my brain,' 'hesitate to make decisions,' and 'don't know how to deal with things' for 'indecisiveness.' Indirect philosophical statements were 'life has no flavor' for 'loss of interest, and 'being alive is not interesting' and 'thinking about death' for 'suicidal interest.' The clinical group used the psychological style significantly more for 'depressed' and 'suicidal interest' than the community group, which largely provided no expression for 'suicidal interest.'

Second, interpersonal concepts and terms with cultural nuances of meaning were commonly chosen for psychological key terms. Specifically, feeling states were described in terms of relationships and one's behaviors. For 'guilt,' the expressions described self-focused ethical behavior, such as, 'I don't deal with things well,' 'want to apologize to others,' and 'ashamed because of bad actions.' For 'failure, there was a reference to being judged or social comparison, such as 'feel less capable than others,' 'feel foolish,' and 'I am a weak person.' For 'hopelessness,' the meanings concerned cut-off relationships, such as 'no one understands or cares about me,' 'lonely,' and 'friendless.' For 'self-pity,' participants used 'unfortunate' and 'unlucky,' which refers to the notion of fate.

Third, participants incorporated body words, especially heart and brain, to describe diverse psychological concepts in a neutral style, and used behaviorally or contextually oriented somatic descriptions for somatic key terms. 'Fearful and 'depressed' were most likely to be expressed somatically. 'Heart beating' was most commonly chosen for 'fearful'. 'Uncomfortable inside heart' was the most common expression for 'depressed', and also the third most common for 'anxious.' For 'agitated,' they used the stronger expression, 'intolerable inside heart.' Brain expressions included, "brain becomes stupid," and "I cannot use my brain.' Behavioral descriptions included 'don't want to do anything' for 'tired,' and 'don't want to eat anything,' 'can't eat,' and 'no taste in my mouth' for 'poor appetite.' The small minority who answered the question on 'loss of sexual drive,' explained it contextually as 'no sexual energy due to poor health' and 'no interest in the opposite sex.' Clinical and community groups showed similar levels of somatic expression of emotional concepts, even though the clinical group had significantly higher somatization scores on the SCL-90. Also, the clinical group most frequently used somatic expressions for 'lack of sexual drive', while the community group was largely deficient in communicating this concept.

The applicability of these basic findings for Chinese Americans has not been studied systematically. However, assessment research conducted in the U.S. and abroad has provided pieces of knowledge that generally support this framework. The investigation of translated measures revealed many invalid symptom concepts or expressions, but this information is

limited for Chinese Americans because few studies in the U.S. explored equivalence of item functioning (Chang, 1985; Huang et al., 2006; Ying, 1989). In the U.S. studies, the somatic items that showed non-equivalence of meaning compared to other ethnic groups concerned psychomotor abnormalities, and sleep and appetite abnormalities on the PHQ-9 (Huang et al., 2006) and psychomotor agitation and constipation on the SDS (Chang, 1985). In the psychological domain, positive self-concept and positive affect items on the CES-D were consistently problematic in the U.S. (Kuo, 1984; Ying, 1988, 1989), and Asia (Yen et al., 2000; Cheung & Bagley, 1998). These items queried feeling 'as good as other people,' hopefulness about the future, feeling happy, and 'enjoying things.' Ying (1989) attributed this to the Chinese value of minimizing positive affect and de-emphasizing positive self-concept. Investigation of the CBDI in China revealed that seven of twenty-one symptom expressions correlated very poorly with other items (Zheng, Zhao, Phillips, & Liu, 1988). These were loss of libido, sense of punishment, self-hate, self-accusation, crying spells, irritability, and somatic preoccupation. Research of the CBDI in the U.S. study did not report item level validity (Yeung, Neault, et al., 2002).

Two studies outside of the U.S. that adapted Western scales with psycholinguistically equivalent expressions for items with poor face value demonstrated the importance of language to content validity. First, Zheng & Lin's (1991) CDI (discussed earlier) illustrates the improvement of construct validity with psycholinguistically equivalent expressions. For example, this measure replaced the terms for depression, suicide, sexual drive and sense of failure drawn from the BDI, with 'being uncomfortable in one's heart,' 'being alive is not interesting,' 'not interested in the opposite sex,' and 'a weak person in life,' respectively. Second, researchers in Australia adapted the Depression in Medically Ill (DMI-10; Chan et al., 2007) with idiomatic and psycholinguistically equivalent items to improve reliability considerably. For example, they replaced the terms 'vulnerable,' 'less worthwhile,' 'keeping a distance from others' with terms that mean 'emotions getting hurt,' 'not having usefulness,' and 'not willing to socialize.'

Two studies conducted outside of the U.S. that developed new scales with items from western measures and new cultural content highlights the types of somatic and interpersonal content that are relevant to the Chinese construct. First, Lin's (1989) Chinese Depression Scale (CDS) retained CES-D psychological concepts of depressed mood, guilt, worthlessness, helplessness and hopelessness (Lin, 1989), and added common idioms related to social relations and unpleasant past events. The new items were: "I have felt I have a lot to talk about but can't find the opportunity to say it", "I feel suffocated," "I feel suspicious of others," "I don't think others trust me", "I don't think I can trust others", and "I remember unpleasant things from the past." The last item referred to experiences of disrupted social relationships during the Cultural Revolution. Second, Cheng and colleagues (Cheng & Williams, 1986; Cheng et al., 1990) developed the Chinese Health Questionnaire in Taiwan to assess psychiatric morbidity in the community based on a British measure. They retained six western items that queried psychological concepts of depression and anxiety, and sleep disturbance, and added six culture-specific items to assess somatic and interpersonal content. These were headache or pressure in head, heart palpitations and worry about heart trouble, chest discomfort or pressure, limb numbness or shaking, getting along with family or friends, and worried about family or close friends.

NOSOLOGIC CONTEXT OF THE STRUCTURE OF DEPRESSION

The research of a cultural structure of depression concerns one of the most prominent areas of disagreement between the American and international diagnostic systems—the inclusion of neurasthenia in the ICD-10 (World Health Organization, 1992, 2003) and CCMD-2 (Chinese Medical Association, 1995) versus its relegation to the status of a culture-bound syndrome in the DSM-IV (Lee, 1998; Lee & Kleinman, 2007). This disagreement represents a broader debate about the universality of the DSM-IV nosology, which is based on the dichotomization of mind and body according to a western biomedical framework. The results of two studies of neurasthenia, one in the U.S. (Zheng et al., 1997) and one in China (Chang et al., 2005), both of which found neurasthenia to be a clinically salient and distinct diagnostic entity, implicated neurasthenic concepts with the structure of depression for Chinese Americans. Specifically, Zheng and colleagues' (1997) finding of a 23.1% concordance of current depression (major depression or dysthymia) and neurasthenia in Chinese American immigrants supports this relationship. This finding is consistent with a process of acculturation where immigrants, from Chinese societies where neurasthenia was not long ago the most prevalent psychiatric syndrome, expectedly learn new conceptions and idioms of distress with exposure to U.S. society. Chang and colleagues (2005) study of a small sample of primary care patients from rural areas in China provided a contrasting result that further supports this relationship. In this study of individuals who likely had little or no exposure to western culture, neurasthenia did not overlap with depression, but only overlapped (59.2%) with somatoform disorders.

The investigation of immigrants was the only large-scale community study of neurasthenia ever conducted in the U.S. This study employed the ICD-10 criteria for neurasthenia, which is very similar to the definition of neurasthenia as a culture-bound syndrome in the DSM-IV. The primary care study in China was the first examination of the relationship of the Chinese conception of neurasthenia, defined by the CCMD-2, and western diagnostic entities since Kleinman's (1982) seminal finding that 87% of patients with neurasthenia could be reclassified with major depression according to the DSM-III (American Psychiatric Association, 1980). It was Kleinman's study that stimulated the operationalization of criteria for neurasthenia in the ICD-10 and CCMD-2. The ICD-10 requires fatigue and weakness as the single core symptom, and two of seven conditional symptoms over six months. The CCMD-2 criteria require any three of five conditional symptoms over three months: (a) physical or mental fatigue or weakness, (b) irritability or worry, (c) excitability, (d) tension induced pains, and (e) sleep disturbances. International researchers question the clinical validity of the ICD-10 definition given its substantial diagnostic overlap with somatoform disorders (Bankier, Aigner, & Bach, 2001). Chinese researchers consider the CCMD-2 definition of neurasthenia, translated to *shenjing shuairuo*, or 'nerve exhaustion and weakening' in Chinese, more appropriate for Chinese patients who experience prominent symptoms other than fatigue (Lee, 1994).

The study of immigrants examined the relationship of neurasthenia to the nine psychological symptom scales of the Symptom Checklist (SCL-60-R; Derogatis, Lipman, & Covi, 1973), and DSM-III diagnoses with a diagnostic interview. The primary care study took place in the same hospital in China in which Kleinman conducted his seminal study fifteen years earlier. These researchers used the Brief Symptom Inventory (Derogatis and Melisaratos, 1983), which contains the same nine symptom scales as the SCL-60, and a checklist of 25 somatic symptoms pertinent to neurasthenia (Zheng & Lin, unpublished instrument), and DSM-IV diagnosis with a diagnostic interview. The investigators concluded that neurasthenia was neither

a ‘somatized’ or ‘masked’ form of depression, nor equivalent to somatization disorder or a subtype of undifferentiated somatoform disorders. However, a limitation of these studies is the examination of neurasthenia in relationship to a western nosology. In TCM, neurasthenia is conceived holistically as an integrated experience of somatic, cognitive, and affective symptoms resulting from the functional disharmony of mutually independent vital organs (Lee, 1998). Whether there would be a larger overlap between neurasthenia and a culture-specific, holistic construct of depression has not been explored.

Although not the interpretation of the researchers, these two studies presented results that imply that neurasthenia is a less severe expression of depression. On face value, the CCMD-2 definition expresses a combination of basic somatic and affective symptoms that could fit with depression or anxiety syndromes. In both studies, the pure depression group reported higher levels of distress across all nine symptom scales compared with the pure neurasthenia group. The sample with neurasthenia scored nearly as high as the sample with depression on somatization, hostility, and a few specific anxiety concepts. The specific anxiety scales were phobic anxiety and paranoid ideation in the immigrant study, and the obsessive-compulsive scale in the primary care study. The primary care study also found that those with depression self-reported significantly higher levels of distress due to poor mental health, and role limitations due to emotional problems. Nevertheless, the functional impairment associated with neurasthenia, as shown by the 3.3 workdays missed per month, was clinically significant.

These results can be viewed in two ways. First, neurasthenia can be seen as a milder manifestation of a culture specific experience of depression where somatic and hostility symptoms are the first symptoms to become more severe, or to be reported, as in a process of disease progression. In this scenario, other types of symptoms, especially psychological, are reported at higher severity levels when the condition worsens. Second, neurasthenia can be viewed as a distinct entity that differentiates from depression principally by somatization, hostility, and specific anxiety-related symptoms. However, considering that somatic symptoms are the most common clinical expression of distress worldwide, accounting for one third to three quarters of visits to primary care (Kirmayer, Dao, & Smith, 1998), somatization would likely have a role in depression, neurasthenia, or any other mental illness construct. The community study also provided information about social and environmental factors that differentiated the expression of neurasthenia. Individuals with pure neurasthenia had significantly less social support from family and relatives, and more stress from daily hassles (interpersonal and interracial conflicts, neighborhood conditions, etc.). Also, the group with neurasthenia was more educated and had significantly more subjects whose religious beliefs were Western (Protestant or Roman Catholic), which indicates a higher level of acculturation. These factors suggest that presentations of neurasthenia may function as a cultural idiom of distress for particular stress situations and a specific social group within the immigrant population.

The results of these investigations also indicated that somatic and anxiety concepts are integral to the structure of depression. Given that neurasthenia has a major somatic component, the finding in both studies that the pure depression group scored slightly higher than the pure neurasthenia group on the somatization scales shows the prominent role of somatic concepts in depression. Also, the finding that individuals with pure depression in the primary care study scored higher than individuals with neurasthenia on somatic symptoms associated with neurasthenia demonstrates a somatic overlap in the depression and neurasthenia constructs. Furthermore, the nearly similar scores on many anxiety-related symptom scales between the pure depression and pure anxiety disorder groups indicate the relevance of anxiety to the depression

construct. In the immigrant study, the pure depression group scored significantly higher on the depression scale, as expected, than the pure anxiety disorder group, but significantly lower on only the phobic anxiety scale, and not the remainder of the anxiety-related scales (i.e., obsessive-compulsive, anxiety, interpersonal sensitivity and paranoid ideation scales). In the primary care study, the depression and anxiety disorder groups scored similarly on the obsessive-compulsive and phobic anxiety scales.

A more recent aspect of the nosological debate that has stimulated further insights into the somatic content of depression for Chinese immigrants concerns chronic fatigue syndrome (CFS; Ware & Kleinman, 1992a, 1992b). Just as the presentation of neurasthenia was a less stigmatized form of distress presentation for Chinese than a psychiatric disorder, some experts consider CFS the contemporary revival of neurasthenia. The Centers for Disease Control and Prevention's (CDC; 2001) criteria for CFS requires a core symptom of unexplained, persistent, and debilitating fatigue over six months, and any four of eight conditional symptoms (impaired memory or concentration, exhaustion following physical or mental activity, unrefreshing sleep, muscle pain, multijoint pain, headaches, sore throat, tender cervical and axillary lymph nodes). Many clinicians in the U.S. see the symptom complex of CFS as similar to that of neurasthenia (Abbey & Garfinkle, 1991; Starcevic, 1999). However, the neurasthenia definition does not have fatigue as a core symptom although fatigue 85% or more of Chinese patients with neurasthenia present with fatigue (Zheng et al., 1992). Also, CFS is more restrictive than neurasthenia given that it requires impairment of social functioning and persistence of symptoms over six rather than three months.

The little research that exists of the validity of CFS for Chinese suggests that fatigue is a precursory symptom of depression (Lim et al., 2003), and an important idiom of distress especially for those who tend to view their personal problems as a result of stressful external situations (Surawy, Roberts, & Silver, 2005). In two studies of Chinese Americans diagnosed with CFS, one primary care (Park, 1999) and one community (Lim et al., 2003), a reduction in life stress was the principal factor associated with the cessation of symptoms in a one-year follow-up. Also, the community study showed that the acquisition of a depression diagnosis at follow-up was due to the persistence of life stressors (e.g., financial and job hassles, and traumatic events), and associated with higher acculturation. A study of patients with CFS in Hong Kong suggested that fatigue was a non-stigmatized expression of distress (Lee et al., 2000). These patients viewed 'feeling tired' as a common and normal experience rather than a sickness, and thus did not consider fatigue to be their primary complaint. Also, the majority attributed their fatigue to psychosocial factors.

ITEM RESPONSE ANALYSIS

Item response analysis can provide rich information about the nature of depression experience in several important ways (Embretson & Reise, 2000; Reckase, 1997; Wilson, Allen, & Li, 2006a, 2006b). First, an item-based approach provides a means of ascertaining not only the specific symptom concepts and expressions that belong to the construct, but also the level of severity that each symptom, as expressed in a scale item, represents. This approach supports the generation of detailed knowledge about the breadth of symptomatic experiences relevant to different phases of illness, and is also directly useful for assessment purposes (Embretson & Reise, 2000; Wilson, 2005). More specifically, item response analysis, using the Rasch (1960) family of models, provides item and person location estimates along a continuum of illness experience from mild to

severe. The probability an individual will respond in a certain way to a particular item is modeled as a logistic function of the relative distance between the item and person locations. Maximum likelihood estimation is used to transform ordinal raw scores into linear, interval scale measurement units called 'logits' (logarithm of odds). In this way, item difficulty and person ability are placed on the same logit scale so that it is possible to make predictions about one variable from the other. Also, Rasch modeling produces objective measures of the latent trait that are not dependent on the instrument or the participants of the study. To produce such unbiased estimates of item properties, Rasch models assume local independence in which responses to a given item are independent from the responses to the other items in the instrument conditional upon the person and item parameters. It is thus possible to observe the types of items that are associated with each level of severity, and examine patterns of expression across these levels, as well as obtain reliable results from a small and unrepresentative sample.

Second, the application of a multidimensional measurement model provides information for theoretical interpretations of sub-constructs within the latent trait of depression (Allen & Wilson, 2006; Briggs & Wilson, 2003). If a multidimensional analysis fits the data better than a unidimensional model, then the dimensions contain important information about the nature of depression. In practice, dimensions may represent illness processes that have utility as targets of intervention or mediators of change (Allen & Wilson, 2006; Dunn, Resnicow, & Klesges, 2006). In the case of a multidimensional latent trait, a composite unidimensional analysis of all of the items may result in adequate reliability but information about the dimensions is lost. Also, a consecutive analysis (Davey & Hirsch, 1991), where each subscale of items is analyzed as a unidimensional model, provides separate scores for each dimension and improves information about each subscale, but at the expense of lower reliability due to the fewer number of items in each model. Conducting a simultaneous, or multidimensional analysis of the subscales is a solution that gives information about the separate dimensions, maintains reliability, and achieves higher estimation accuracy. Also, the multidimensional model allows for direct estimation of the correlation between dimensions or subscales (versus derived correlations that are attenuated by measurement error), and information from both subscales to be used in the calibration, which reduces the standard errors of the item and person estimates (Briggs & Wilson, 2003). In other words, a participant's responses on one subscale provide collateral information about other dimensions measured by the other subscales (Wang, Wilson, and Adams, 1997).

For the study of depression, if a latent multidimensional construct is treated as unidimensional, then each individual is considered to have only an overall level of depressive distress, and the distinction between psychological, somatic, and social expressions of illness is lost. This may not be harmful if the dimensions are highly correlated, but, regardless of the magnitude of the correlation, there would be a 'theoretical impurity,' and the invisibility of the subscales precludes any examination of relationships between dimensions (Allen & Wilson, 2006; Briggs & Wilson, 2003). Also, while item response modeling provides a technique for examining dimensionality statistically, it is recognized that the validity of the dimensions rests on their theoretical and practical utility. As stated by Briggs and Wilson (2003), "The art of assessing dimensionality is to find the smallest number of latent ability domains such that they are both statistically well-defined and substantively meaningful" (p. 88). The use of multidimensional analysis in psychometric and health behavior research is incipient (Allen & Wilson, 2006), and investigators have only begun to demonstrate its practical benefits (see Watson et al., 2006 for an example).

Third, the analysis of differential item functioning (DIF) provides a technique for examining finer sub-processes of illness expression across subgroups, especially the influences of variables that have been hypothesized to be associated with the presentation of depression (e.g., somatization and acculturation), called a 'theory of DIF' (Wilson, 2005). Knowledge of DIF is also directly useful for constructing measures that are unbiased for the subgroups of interest (Bond & Fox, 2001; Embretson & Reise, 2000). The Rasch model assesses DIF by quantifying the extent to which item severity estimates vary across subgroups of interest. The latent variable (e.g., depression) is calibrated separately for each subgroup (e.g., males and females) to show whether individuals at the same level of severity are responding similarly to each item. Significant differences in the resulting item parameter estimates indicate that the item does not function equivalently for the two groups. These differences can be understood substantively as differences in experiences, willingness to report, or other factors concerning the meaning or relevance of the symptom to the construct of depression for the subgroup. Thus, the exhibition of DIF in groups of items that represent content areas provides information for substantive interpretation of the construct for important subgroups. Also, information about symptom concepts and expressions that are biased is directly useful for assessment purposes.

METHOD

Sample

The sample consisted of 103 (45.4%) diagnosed outpatients and 124 (54.2%) community members, of whom 104 (45.8%) were males and 123 (54.2%) females. The clinical sample had a smaller proportion of males than females (36.9% vs. 63.1%, $n = 38$ vs. $n = 55$), and the community sample a smaller proportion of females than males (46.8% vs. 43.2%, n=58 vs. n=66). All participants resided in the San Francisco metropolitan area and were recruited from organizations that served predominantly Chinese American immigrants. Clinical participants were recruited from: community mental health agencies (20.4%), non-profit mental health clinics (19.4%), non-profit medical centers (14.6%), a job training program for persons with mental illness (13.6%), social services organizations (8.7%), a TCM clinic (6.8%), private psychotherapists (1.9%), and unknown sources (7.8%). The remaining (6.8%) were individuals who participated as community members but were classified into the clinical sample given their clinical status. The majority of community participants (70.2%) were recruited through a non-profit social services organization. Participants included staff's personal acquaintances and clients, family and friends of clients, and persons attending an economic resource fair. The remainder were: parents of children receiving services from a community child development center (11.3%), persons using an employment assistance program (4.8%), clients of a private acupuncturist (4.8%), members of a mental health support group for families (3.2%), persons in a health clinic waiting room (1.6%), and persons referred by friends who had participated (4.0%).

Tables 1 and 2 summarize sample characteristics. There were few significant differences between groups. First, within the clinical sample, women had lower English ability than men, with a significantly higher than expected count reporting a poor level (46.2% vs. 22.2%), and fewer reporting fair (36.9% vs. 41.7%) and very good to excellent (16.9% vs. 36.1%) levels (Pearson Chi-Square = 7.252, $d.f. = 2$, $p = .027$). Second, the clinical sample immigrated at a

significantly younger age (30.2 vs. 34.7 mean years, $p < .01$) and had resided much longer in the U.S. (15.1 vs. 9.2 mean years, $p < .001$) than the community sample.

The sample consisted of persons born in China (74.4%), Hong Kong (17.6%), Taiwan (4.8%), and other countries (2.7%). The large majority of participants was Cantonese-speaking, and knew both Cantonese and Mandarin. Participants reported Cantonese (70.9%), Mandarin (18.9%), and other dialects (10.1%) as their most fluent dialect. The majority (75.9%) of Cantonese speakers also spoke Mandarin, less than one-half (41.8%) of Mandarin speakers spoke Cantonese, and those who reported other dialects as their most fluent also knew either Mandarin (52.2%) or Cantonese (47.8%). Over half (56.8%) knew two dialects, and the remainder, one (21.1%), three (19.8%), or four (2.3%) dialects. Participants were predominantly low-income: 69.8% earned less than $20,000 per year, 13.1% earned $20,000-$29,999, 10.4% earned $30,000-$49,999, and 6.8% earned $50,000 or more.

The clinical sample ($n = 103$) was comprised of 96 persons recruited by clinicians and 7 community members who reported a diagnosis of depression. Specific diagnoses were: 41.7% major depression, 8.7% dysthymia, 40.8% 'diagnosis of depression, but don't know the name,' and 8.7%, although recruited by a clinician, reported absence of any diagnosis. Approximately one-third (34.3%), or 35 persons, reported other diagnoses, comorbid or past. Sixteen (13.7%) named anxiety disorder, 13 (12.7%) said schizophrenia, 4 (3.9%) named bipolar disorder, 2 (2.0%) reported 'other mental disorder, but don't know the name,' and one (1.0%) named neurasthenia. Clinical participants were not excluded for being asymptomatic at the time of interview because it was not possible to ascertain this status. Five persons (4.6%) who scored in the sub-diagnostic range (under 5) of the PHQ-9 all answered, 'Yes, mildly,' when asked, 'Do you believe you are experiencing depression now?" Among eight individuals (7.9%) who reported absence of symptoms at the time of interview, seven scored in the diagnostic range of the PHQ9, with three above 10, which indicates major depression, and four in the range of 5-9, which indicates 'minimal symptoms' requiring support. Only one male participant's score of one was consistent with his own report of current symptom experience.

47-item Pilot Depression Scale

Given the objective of exploring the structure of depression from an emic perspective, we developed a 47-item pilot scale, the Chinese American Depression Scale (CADS-47) through a bottom-up, qualitative approach of self-report and clinical observation. We interviewed 34 adults (18 women, 16 men), ages 25-59, among whom 26 were diagnosed with major depression and eight with dysthymia, and 29 clinical experts from diverse community settings. The group's median years of residence in the U.S. was 15, and median years of education was 9. The experts were 9 clinical social workers, 2 family therapists, 2 psychologists, 8 psychiatrists, 5 primary care and internal medicine physicians, and 3 TCM physicians. All experts were Chinese, worked largely with a Chinese immigrant clientele, and all provided treatment in Chinese language, although two used translators. Clinical participants and experts were from community and non-profit mental health and medical clinics, a health maintenance organization, and private psychotherapy and TCM practices. We conducted two forms of interviews: explanatory model of illness (Kleinman) and item generation with a symptom checklist. The symptom checklist consisted of 60 symptom concepts compiled from seven measures that have been researched in ethnic Chinese: PHQ-9 (Chen et al., 2006), CES-D, CBDI (Yeung, Neault, et al., 2002; Zheng et al., 1988), CHQ-12 (Cheng, 1985; Cheng & Williams, 1986), CDI (Zheng & Lin, 1991), CDS

(Lin, 1989), and the Short Depression Scale (North East Medical Services, unpublished instrument).

Twenty clinical participants gave explanatory model interviews. Seven clinicians who provided treatment to 15 of these participants confirmed and complemented these interviews by answering the same explanatory model questions from their patients' perspective, and explaining any discrepancies and changes in symptom reporting over time. Fourteen clinical participants and 22 clinical experts gave item generation interviews. Clinical participants spontaneously identified current symptoms, and past symptoms from the period when they began to have depression-related problems, then evaluated the relevance of symptoms on the list that they had not already identified spontaneously, both current and past. Experts first rated the symptoms as rare, common, or very common for their clientele in general. Then, they observed differences in frequency of use between men and women, and typical Chinese verbal expressions used for the item concept, if the Western one was inappropriate. They also named other, unlisted symptom concepts.

With this data, we compiled CADS-47 by: (a) counting the symptoms most commonly expressed in the explanatory model narratives and item generation interviews; (b) using experts' ratings of relevance; and (c) forming a focus group of 4 clinical experts to determine the most appropriate Chinese verbal expression for each symptom concept. Five other experts also individually classified each item as belonging conceptually to the psychological, somatic, or social domains. They classified five items as both psychological and social, one item psychological and somatic, and one item somatic and social. We defined four response options for each item because a dichotomous or 2-option response scale was not expected to provide adequate information to discriminate persons along the severity continuum. In past research, Chinese immigrants were able to understand the 4-option Likert scale when assisted by the researcher, but with some difficulties when unassisted. We chose a period of two weeks of symptom occurrence to remain consistent with commonly used self-report measures such as the PHQ-9 and CES-D, which are based on the DSM-IV. The use of number of days has the advantage of being unambiguous. Accordingly, there is one item stem for all questions: "Over the past two weeks, were you bothered by the following problems? If so, how much?" The response options were: 0-*not at all/no days (0 days)*; 1-*a little bit/a few days (1-3 days)*; 2-*quite a bit/about half the time (4-10 days)*; and, 3-*extremely/nearly every day (11-14 days)*.

Other Measures

Somatic Symptoms Checklist. This is a checklist of 25 somatic symptoms commonly reported by patients with neurasthenia (Zheng & Lin, unpublished instrument). This measure has a Cronbach's alpha of .86. Primary care patients in China diagnosed with *shenjing shuairuo* commonly reported approximately half of these symptoms as their most distressing somatic complaint (Chang, Myers et al., 2005). For the present study, the focus group of experts eliminated two items, brain-ear sounds and 'swelling' in head/neck, due to their inapplicability for Chinese American immigrants. Also, two other items, slowness/difficulty in thinking and rumination about past unpleasant events, were eliminated due to overlap with two items on CADS-47.

Neurasthenia Questionnaire. This questionnaire is a diagnostic measure of current *shenjing shuairuo* ('weakness of nerves'), or neurasthenia as defined in the CCMD-2. We translated an English version developed as a supplement to the SCIDP (Version 1.0) by Lin (see

Zheng et al., 1992; Paralikar, Sarmukaddam, Agashe, & Weiss, 2007). A diagnosis is given if at least three of five groups of symptoms are present over three months, and one of three conditions met. The five symptom groups are: (i) weakness: mental fatigue, lack of energy, slowness of thinking, poor memory, or difficulty in concentration; (ii) emotional: easily worried, or annoyed or irritable; (iii) excitement (mental agitation): recalling or thinking too much, and difficulty stopping oneself from remembering past unhappy events; (iv) nervous pain: myalgia or tension headaches; and, (v) sleep disturbance. The three conditions are: (i) symptoms have interfered with daily activities; (ii) experience of significant and persistent distress; or (iii) help or treatment has been sought.

ASQ-11. The 11-item Acculturative Stress Questionnaire was developed for this study with the same item response modeling procedure that was used to develop the unidimensional subscale models in this study. Fourteen pilot items were generated based on the concepts in Ying's (2005) Migration-Acculturation Stressors Scale, which included physical environmental, biological, social, and cultural variables (Berry, Kim, Minde, & Mok, 1987) that were identified in the acculturative stress literature (Ben-Sira, 1997; Church, 1982; Juffer, 1987; Pedersen, 1995; Ryan & Twibell, 2000; Ritsner, Modai, & Ponizovsky, 2000; Stephen & Stephen, 1993; Van Tilburg, Vingerhoets, & Van Heck, 1996; Yeh & Inose, 2003; Ying, 1996; Ying, Lee, & Tsai, 2000). Applying a unidimensional Rasch partial credit model, we retained 11 items with acceptable fit statistics (Infit of 0.86 – 1.22, Outfit of 0.81 – 1.25) that discriminated the middle to upper levels of stress severity. Reliability was moderately high (MLE = 0.845, EAP/PV = 0.866). All items had the same stem: "How much is…a current stressor?" Response options were 0-*not at all*, 1-*very little*, 2-*sometimes*, and 3-*always*. The items asked about: 'dealing with differences in Chinese and American cultures (e.g., cultural differences in values and behaviors),' 'work/or academic situation of family members,' 'housing and safety,' 'transportation,' 'maintaining health (having adequate food, rest, exercise, and leisure),' 'having illness,' 'being able to obtain needed health care,' 'missing your native country,' 'missing family and friends in your native country,' 'having a social support network of family and friends in the U.S.,' and 'dealing with racial discrimination.' We removed the three items that were the easiest to endorse although their Infit and Outfit values were acceptable. These items predicted extremely mild or no stress given their location at the very bottom of the severity continuum. These were 'language,' 'your work and/or academic situation,' and 'your financial situation.' Also, these items provided little information for discriminating among participants given that more than 85% of participants responded 1, 2, or 3 on each of these items.

ACC-US-11. The 11-item Acculturation to U.S. Questionnaire (ACC-US-11) is a self-report measure of acculturation to U.S. society that considers three conceptual areas: (a) language, (b) cultural knowledge, values, and behaviors, and (c) mental health knowledge and beliefs. It was developed for this study with the same the same item response modeling procedure that was used to develop the unidimensional subscale models in this study. Twelve items were generated based on the three areas. Applying a unidimensional Rasch partial credit model, we retained 11 items with acceptable fit statistics (Infit of 0.81 – 1.29, Outfit of 0.78 – 1.38) that discriminated the entire continuum of acculturation. Reliability was moderately high (MLE = 0.798, EAP/PV = 0.778). All items had the same stem: "How much is…a current stressor?" There were two sets of response options, one for frequency and the other for quality: 0-*not at all*, 1-*very little*, 2-*sometimes*, and 3-*always*; and, 0-*very poor*, 1-*fair*, 2-*good*, and 3-*excellent*. Three questions about language queried speaking and understanding English, and use of English with family members. Four questions about culture inquired about: familiarity with

U.S. cultural practices and customs; reading, viewing, and listening to media in English; agreement with American values; and, consideration of one's behavior and thinking as American. Finally, four questions asked about mental illness: trust in western forms of health treatment; exposure to information about mental illness such as depression, anxiety, and schizophrenia; exposure to information about western medications for mental illness; and, belief of effectiveness of western medications for mental illness. The item that was removed queried reading comprehension of English. It was removed to reduce redundancy since it predicted the same level of acculturation as the questions on speaking and understanding English.

Analysis Strategy

Our strategy entailed three steps. First, we assessed the dimensionality of depression by conducting and comparing unidimensional and multidimensional analyses to identify the model with the best fit to the data. Second, we examined validity by comparison with external measures. Third, we conducted analysis of DIF to identify variables that influence the construct of depression. We used *ACER ConQuest* software (Wu, Adams, Wilson, & Haldane, 2007a) to conduct item response analyses, and *PASW Statistics* (SPSS, Inc., 2009) software for all other analyses

Step 1. Assessing the Dimensionality of Depression

To evaluate the dimensionality of the depression construct, we fit unidimensional and multidimensional models and compared their fit to the data. We first examined relationships between two content domains at a time to explore bi-dimensionality, and to support the evaluation of a construct with three dimensions. In one of the bi-dimensional assessments, we considered psychological and social content domains together as one dimension in order to evaluate these as one sub-construct. Then, we considered the three domains as individual dimensions. To prepare these comparisons, we modeled 'consecutive' unidimensional subscales of each content area, composite unidimensional models containing items from two or three subscales, and multidimensional models with items assigned to dimensions as defined by the unidimensional subscales. The consecutive subscales or models determined the content and presence of the hypothesized sub-constructs and provided individual estimates for each dimension. As a preliminary step to support the content validity of these consecutive models, and since CADS-47 had not been analyzed for fit to a depression construct, we first conducted a unidimensional analysis of CADS-47 to identify items with poor fit, as additional information for modeling the consecutive models.

We analyzed unidimensional models of the data with a partial credit model (PCM) through an iterative process of item reduction and recalibration. The PCM is a Rasch (1960) model extended to polytomously scored items (Masters, 1982; Masters & Wright, 1996). It is suited for psychological phenomenon because it assumes that that each item has a unique structure of ordered response categories, or thresholds (Embretson & Reise, 2000). A 'threshold' is the point of equal probability of answering two response options, such as '0' and '1' or above, on a 4-option Likert scale. In the PCM, the distance between thresholds, or probabilities associated with answering 0, 1, 2, or 3, for an item is permitted to be different from the structure of thresholds for other items.

At each step of the process of item reduction, we assessed item fit, overall fit of the model, and the use of response categories as intended. First, to assess item fit, we examined Infit and Outfit mean square statistics (Wright and Stone, 1979). These statistics indicate the fit of the data to the values expected by the Rasch model (Smith, 2000, Wright and Stone, 1979). The mean square statistic is a transformation of the residuals, the difference between predicted and observed values, to an expected value of one, with a range from 0 to infinity. Values of 1.0 indicate that data meet the model's expectations. Values less than 1.0 indicate observations that are too predictable, and values greater than 1.0 show unpredictability and noise. Although a variety of ranges have been proposed to indicate adequate fit, we considered items to fit the model if the mean square statistics fell within the range of 0.66 to 1.33. However, we sometimes applied a more lenient range of 0.5 to 1.5 considering the importance of retaining items based on substantive rationale (Wilson, 2005), and since items with fit statistics in this range can still be productive for measurement (Linacre, 2005; Linacre & Wright, 1994). Also, given this study's objective to provide an initial examination of a construct rather than to produce an efficacious diagnostic measure, application of this more lenient rule supported the exploration of more potentially relevant symptom concepts.

In the assessment of item fit, we attributed more importance to eliminating items whose mean square values were greater than 1.33, which are considered 'misfitting,' than those that were less than 0.66, which indicate 'overfitting.' We also attributed primary importance to Infit statistics, which are weighted to give more value to on-target observations, and measure the match between patterns of responses to items and persons. Aberrant Infit values usually cause more concern than large Outfit scores because they indicate a threat to the reliability and validity of these scale (Linacre, 2002). We used Outfit statistics only as a secondary indicator when more information to determine item exclusion was needed. Outfit statistics are unweighted estimates of the degree of fit of responses; these show the influence of off-target observations and measure how well the item estimate predicts respondents' answers to the item.

Second, to examine overall fit, we observed improvements in the relative fit of the initial and final models by observing reductions in deviance. We also evaluated reliability coefficients, and considered adequate fit to be between .80 and .90, and optimal fit when greater than .90. Third, we examined the use of response categories in the intended manner. This included review of category usage for infrequently and irregularly used response options (Masters & Wright, 1996), and Infit and Outfit of response option step estimates, and verification that average measures of item difficulty and respondent ability, and the step calibration of each response option advanced monotonically with each advance in response option (Linacre, 2005).

We analyzed multidimensional models of the data with the multidimensional random coefficient multinomial logit (MRCML) model, an extension of the Rasch family of item response models (Adams, Wilson & Wang, 1997). We used the MRCML model that represents a multidimensional form of the PCM (Masters, 1982; Masters & Wright, 1996). Given that some items belonged conceptually to two domains, we analyzed a 'within-item' model where items can be related to more than one latent dimension (Wu, Adams, Wilson, & Haldane, 2007b). In this modeling procedure, item parameters and population means and variances are estimated by the marginal maximum likelihood technique. Log response probabilities are added up over items and persons into a likelihood function. Using ConQuest software (Wu et al., 2007a), we chose the Markov Chain Monte Carlo (MCMC) estimation algorithm with 1000 nodes in order to achieve convergence and higher accuracy of parameter estimates for a small sample size. A detailed discussion of parameter estimation with the MRCML model can be found in Adams,

Wilson, & Wang (1997), and use of MCMC algorithms for psychometric tests in Sinharay (2004).

To compare the fit of multidimensional and composite models, we used the likelihood ratio test statistic since these are cases of the same model (i.e., nested). The test statistic is distributed as a chi-square with degrees of freedom equal to the difference in numbers of linearly independent parameters of both models (Rao, 1973). To compare the fit of multidimensional and consecutive models, we used the Akaike Information Criterion (AIC; Akaike, 1974) for comparing non-nested models that analyze the same data. We also compared correlations between dimensions and reliability coefficients across models.

Finally, to explore information provided by the multidimensional model, i.e., participants' score differences across dimensions, we evaluated frequency and patterns of score differences by calculating a sum of squares indicator, DI_p, the sum of squared differences of mean dimension score and separate dimension scores for each participant (Allen and Wilson, 2006). For exploratory purposes, we arbitrarily set two thresholds for a discrepant case at DI_p of 1.0 and 0.5 to observe frequency and patterns of discrepancy, and two ranges of overall depression severity based on the distribution of composite raw scores.

Step 2. Relating Distress Dimensions and Overall Depression with External Measures

To examine criterion validity, we used a point-biserial correlation between dimensional scores of the multidimensional model and the score of the composite model with the depression criterion represented by the clinical and community subsamples. Also, to explore predictive validity specifically, we conducted Receiver Operating Curve (ROC) analyses to examine the area under the curve (AUC) and derive optimal cutoff scores to determine rates of correct classification (Swets, 1995). To evaluate convergent validity, we correlated the dimensional and composite scores with diagnosis of neurasthenia and level of acculturative stress. We used a point-biserial correlation (r_{bp}) for neurasthenia diagnosis, and Pearson's correlation for acculturative stress. Complementarily, we also examined AUC and rates of correct classification for diagnosis of neurasthenia.

Step 3. Examining Influential Variables with Analysis of DIF

We evaluated DIF on all dimensions for dichotomous sub-groupings of gender, age, education, years of residence in the U.S., and acculturation to U.S. We also examined DIF on the psychological and social dimensions for the sub-grouping variables of somatic distress and neurasthenia diagnosis. In our interpretations of patterns of influence or bias, we considered education, years in the U.S., and acculturation to U.S. together as a theoretical grouping related to acculturation and socioeconomic status. Similarly, we observed DIF by somatic distress and neurasthenia as an interpretative unit. We analyzed the influence of these variables on: (a) psychological and social items together as an analytic unit, as a means of exploring their conceptual overlap, and (b) somatic items.

We generated subgroups based on either substantive reasons or empirical analysis of cutoff values that maximize detection of significant DIF for the sub-grouping variable while maintaining adequate sample size for each sub-group. We conducted all DIF analyses on the consecutive unidimensional models to maximize estimation power given this study's small sample size. We tested differences in item difficulty for significance at $\alpha = 0.05$ by using the

joint standard errors to calculate a t-statistic. We considered the effect size of DIF, or logit difference in item estimates between subgroups, to be large when greater than .638 logits, intermediate when in the range of .426-.638 logits, and small when below .426 logits, which is based on a standard of categorization of effect sizes (Longford, Holland, and Thayer, 1993) derived for Rasch models (Paek, 2002). This standard considers items with intermediate and large effect sizes as an important source of bias, and small effect sizes as a negligible source of bias (Paek, 2002). We applied a significance level of 5.0% to determine if the proportions of total items with intermediate and large effect sizes occurred beyond chance.

To examine the levels and types of bias that are present in the structure of depression, we assessed all items with statistically significant DIF (i.e., with small, intermediate, or large effect sizes) for their levels of presence, patterns of occurrence, and initial theories of DIF. To generate theories of DIF, we explored the areas of: (a) cultural and social roles, such as those related to gender and social class; (b) adult developmental stages, such as developmental tasks and needs, and changes in physical functioning; (c) internalization versus externalization of distress in terms of attributing and focusing the experience or problem on oneself versus others, respectively; and (d) psychological and somatic (i.e., 'mind and body') functioning in the TCM framework of Five Elements—Earth, Wood, Fire, Water and Metal—and their associated organs—Spleen, Liver, Heart, Kidney and Lung, respectively, which represent organ networks rather than the anatomical organs.

RESULTS

Assessing the Dimensionality of Depression

Estimation of Consecutive Unidimensional Subscales. Sixty-eight items, 47 from the pilot depression scale (CADS-47) and 21 from the somatic symptoms checklist, were divided into three initial subscales from which the process of item reduction and re-calibration began. The initial psychological subscale contained 22 items, the somatic subscale had 37 items, and the social subscale had 16 items. Five items were shared by the psychological and somatic subscales, one item was shared between psychological and somatic subscales, and one item belonged to both somatic and social subscales. The preliminary calibration of CADS-47 revealed four items that fit a unidimensional depression construct poorly, with Outfit from 1.39-1.50, that were considered for removal during the calibration of the three subscales. These were: *alwayssleep* ("You always want to sleep and don't want to get out of bed"), *headaches* ("You have headaches"), *addiction* ("You drink or gamble to make yourself feel comfortable"), and *familyprobs* ("You are severely bothered by family relationships or matters").

We conducted two calibrations to derive a well-fitting psychological subscale. The first calibration of the 22-item psychological subscale revealed three items with Infit above 1.33, and no items below 0.67. The items with high Infit were: *stress* (1.37), *psychotic* (1.40), and *addiction* (1.57). We removed only the item with highest Infit, *addiction*, which had been identified as having poor fit in CADS-47, and recalibrated. The 21-item subscale had Infit values of 0.71-1.44, and Outfit of 0.67-1.46, except for *psychotic* (2.66) and *stress* (1.56). The Infit statistics for s*tress* and *psychotic* were 1.44 and 1.37, respectively. Given the importance of immigration-related stress as a depression factor for first generation Chinese Americans, and the role of psychotic symptoms in severe mental illness in general, we retained these items, and

conducted no more calibrations. The likelihood ratio test indicated that the 21-item model fit significantly better than the 22-item model ($\chi^2_{diff} = 178.087$, $d.f. = 3$, $p < 0.00001$). Also, the reliability coefficient increased minimally from 0.924 to 0.926 (MLE), and 0.959 to 0.960 (EAP/PV). We found no misusage of response categories, and the average measure of respondent ability and step calibrations of each response option advanced monotonically. However, three items located at the highest severity, *hurtself*, *suicidal*, and *psychotic*, each had one infrequently used response options. The first two items had counts of four, and the last item a count of six for response option '3'. However, their Infit values, 0.83, 1.17, and 1.04, respectively, showed that the counts were sufficient for estimating an adequate fit of these difficult to endorse items.

We conducted five calibrations to derive a somatic subscale. The first calibration of the 37-item somatic subscale revealed three items with very high Infit: *sleepmore* (1.74), *hairloss* (1.55), and (irregular) *menstruation* (1.67). Two items identified as having poor fit in the CADS-47 model, *sleepalways* and *headaches* had acceptable Infit of 1.16 and 1.06, respectively. We removed *sleepalways* and *headaches* due to their poor fit in CADS, and due to conceptual repetition of items. The estimated severity location of *sleepalways* fell between two other sleep-related items with acceptable Infit, and *headaches* was similar to *heavyhead* (a pre-headache experience) and located very similarly on the severity continuum. In the second calibration of 35 items, the original three items with high Infit appeared again: *sleepmore* (1.77), *hairloss* (1.48), and (irregular) *menstruation* (1.62). We then removed these items and calibrated a 32-item model, in which two items showed high Infit. These were: (painful/swollen) *lymphnodes* (1.44) and (low) *sexualdesire* (1.37). We retained *sexualdesire* given its nearly acceptable Outfit, and prominence in the Western conception of depression. We calibrated a 31-item model in which only *sexualdesire* had a high Infit of 1.39. Again, we retained *sexualdesire*. We examined the model for repeated concepts, and chose to eliminate *sleeptired* ("still feeling tired after sleeping") due to occupying very similar estimated location as *sleepprob* ("You are unable to sleep well"), even though both had Infit and Outfit very close to 1.0. We chose *sleeptired* over *sleepprob* given the former occupied a location on the item severity continuum with four other items, while *sleepprob* had an estimated location nearly equal to only one other item.

The final 30-item somatic subscale had Infit values of 0.74-1.30, with only *sexualdesire* (1.46) outside this range, and Outfit of 0.61-1.45, except for *stutter* (1.79), *sexualdesire* (1.61), and *throat* (1.51). The likelihood ratio test indicated that the 30-item model fit significantly better than the 37-item model ($\chi 2_{diff} = 2851.261$, $d.f. = 21$, $p < 0.00001$). Each calibration of fewer items demonstrated improved fit in terms of significantly lower deviance compared to its precursor within which it was nested. Also, the reliability coefficient was adequately high, but decreased slightly from 0.918 to 0.913 (MLE), and 0.964 to 0.918 (EAP/PV) from the 37-item to the 30-item model. We found no misusage of response categories and the average measure of respondent ability and step calibrations of each response option advanced monotonically.

We conducted two calibrations to model a social subscale. The first calibration of the 16-item social subscale revealed one item, *familyprobs*, with a high Infit of 1.53. This item was also identified as problematic during the calibration of CADS-47. We removed this item, and calibrated a 15-item model. Infit values ranged from 0.75-1.33 for all items except *respect* (low respect from work and family) whose Infit was 1.45 (up from 1.31 in the 16-item calibration). We retained this item given its adequate Outfit of 1.30 and strong emphasis by clinical experts of the relevance of this concept to depression during item generation for CADS-47. The likelihood ratio test indicated that the 15-item model fit significantly better than the 16-item model ($\chi 2_{diff} =$

537.604, *d.f.* = 3, $p < 0.00001$). Also, the reliability coefficient was moderately high, and also decreased slightly from 0.851 to 0.844 (MLE), and 0.927 to 0.923 (EAP/PV). We found no misusage of response categories and the average measure of respondent ability and step calibrations of each response option advanced monotonically.

Estimation of Composite Unidimensional Models. We analyzed the composite unidimensional models that were needed for the dimensional assessments based on the content of three consecutive subscale models. We considered these subscales to contain adequately valid content, and conducted no item reductions in the remaining models. The 50-item composite model of the psychological and somatic subscales had Infit statistics from 0.71-1.33, with seven somatic items outside this range. These were: *jointaches* (1.34), *daysleep* (1.37), *hiccups* (1.40), *lightsensitive* (1.41) *tinnitus* (1.46), *sexualdesire* (1.46) and *throatsore* (1.56). Reliability was very high at 0.950 (MLE) and 0.985 (EAP/PV). The 31-item psychological and social subscale had Infit statistics from 0.73-1.31, except for *stress* (1.34) and *psychotic* (1.45), and reliability of 0.938 (MLE) and 0.971 (EAP/PV). The 44-item composite model of the somatic and social subscales had Infit statistics from 0.74-1.33, with only one item, *sexualdesire* (1.52) outside this range. Reliability was 0.939 (MLE) and 0.975 (EAP/PV). The 59-item composite model of all three subscales had Infit statistics from 0.68-1.23, with eight somatic items above this range. These were *indigestion* (1.34) and the same seven somatic items that had high Infit in the composite psychological and somatic model, which now had Infit from 1.35-1.58. Reliability was very high at 0.958 (MLE) and 0.990 (EAP/PV). Table 3 shows the deviance and AIC statistics for these models.

Estimation of Multidimensional Models. We analyzed four multidimensional models with two dimensions (2D) and one with three dimensions (3D). The 50-item 2D psychological and somatic model had a reliability of .924 (MLE) and .947 (EAP/PV) for the psychological dimension, .910 (MLE) and .935 (EAP/PV) for the somatic dimension, and the dimensions correlated at .937. The 31-item 2D psychological and social model had a reliability of .910 (MLE) and .953 (EAP/PV) for the psychological dimension, .793 (MLE) and .944 (EAP/PV) for the social dimension, and correlation of dimensions of .971. The 44-item 2D somatic and social model had a reliability of .910 (MLE) and .936 (EAP/PV) for the somatic dimension, .838 (MLE) and .921 (EAP/PV) for the social dimension, and correlation of dimensions of .931. The 59-item 2D psycho-social and somatic model, reliability of .936 (MLE) and .946 (EAP/PV) for the psycho-social dimension, .906 (MLE) and .944 (EAP/PV) for the somatic dimension, and correlation of .942. Table 3 shows the deviance and AIC statistics for these models.

Results for the 3D model are presented in figures and tables. Figure 1 shows the multidimensional construct that is assessed. Tables 4-6 show the parameter estimates and item text for each dimension. Figure 2 contains a Wright Map, a diagram of the ordered locations of items from easiest to most difficult to endorse, and the distribution of respondents within each dimension from not depressed to severely depressed. Tables 7 and 8 report the reliabilities and correlations of the 3D model (in comparison with the consecutive and composite approaches).

Comparison of Fit, Reliabilities, and Correlations across Models. Table 3 summarizes the comparisons of fit of the data analyses. For all comparisons, the likelihood ratio tests indicated that the multidimensional models fit the data significantly better than the composite models. Also, the lower AIC values of the multidimensional models indicated better fit to the data than

the consecutive models, which had higher AIC values. The improved fit of the 2D models confirmed that every combination of two dimensions was more appropriately modeled as multidimensional (without confounding or additional information provided by a third dimension). In this way, information was gained by modeling the dimensions simultaneously and lost in the composite model. Finally, these findings supplement the results of the superior fit of the 3D model to confirm the existence of three distinct dimensional sub-constructs of depression.

Table 7 displays the reliabilities obtained for the three analytic approaches. The EAP/PV reliabilities of the multidimensional model are slightly higher than the reliability values of the consecutive approach, and closer to the reliability of the composite model, which serves as a standard since it incorporates all possible items. The multidimensional reliabilities are enhanced (i.e., the error due to randomness of responses to items is diminished) compared to the consecutive reliability coefficients as a result of the estimation of each dimension benefiting from the correlation information provided by responses to items of other dimensions in the model. The much higher social dimension reliability from the multidimensional model compared to that of the consecutive model is due to this enhancement, i.e., the correlation information from the responses to items of the other, larger dimensions diminished the error due to randomness of responses to items within the social dimension. This pattern is not shown by the MLE estimates of reliability, which are likely less accurate due to the small sample size. It is expected that EAP/PV estimation provide higher accuracy for small sample sizes. The MLE reliabilities would be expected to be higher and closer to the composite reliability if the sample size were increased.* The lower reliability of the social dimension is likely due to the lower number of items, 15 compared to 21 psychological and 30 somatic items. With these considerations, the EAP/PV reliabilities for all dimensions are very high and show that the content or set of items measures the particular distress dimension or sub-construct with very high accuracy.

[*Note: EAP/PV reliability is the explained (expected a posteriori) variance according to the estimated model divided by total persons' variance. Plausible values, or multiple imputations are draws from the posterior of each respondent's ability parameter to allow more accurate estimation of distributional quantities, especially upper and lower quartiles, when samples and numbers of items are small. MLE estimates will generally yield very poor estimates of these distributional quantities due to overestimating the standard deviation (see Das and Zajonc, 2009).]

Table 8 displays the estimated correlations between the three dimensions from the multidimensional analysis and consecutive analyses. The multidimensional correlations, which are calculated simultaneously from the variance-covariance matrix produced by ConQuest, are noticeably (an average of .058) higher than the correlations calculated from the consecutive models' estimated logit scores, which are attenuated due to measurement error. Consistent with the pattern of correlations found in the 2D models, the psychological and social dimensions have the highest correlation (0.975), followed by the psychological and somatic dimensions (0.941), then the somatic and social dimensions with the lowest correlation (0.914).

These high correlations imply that the dimensions may be treated unidimensionally as measurement instruments for some purposes. However, this finding also confirms that somatic distress is as integral to the construct of depression as psychological distress, and their very high correlation implies that a somatic distress measure could be employed to predict psychological distress with fair precision, and vice versa. Furthermore, the results from the calibration of composite models (reported above) indicate an important precaution for the interpretation of the very high correlation of psychological and somatic distress, and lower, yet still fairly high

correlation of social and somatic distress. These results indicate an overall better fit of somatic and social distress concepts as a construct than somatic and psychological distress. The composite model of the psychological and somatic subscales revealed seven somatic items that had Infit values above 1.33, from 1.34-1.56, which indicates a degree of misfitting of the item and off-target observations within a psycho-somatic unidimensional construct of depression. In contrast, only one of these seven somatic items had an Infit value above 1.33 in the composite social and somatic model, which indicates a marginally lower degree of item misfit and off-target observations when somatic distress was modeled with social distress. This implies more discrepancy in the fit or simultaneous expression of somatic and psychological distress concepts. Thus, even though somatic and social distress dimensions were correlated more weakly, the less aberrant fit of the items in a unidimensional construct shows that these two dimensions of distress can be expressed simultaneously with more consistency.

Exploration of Score Differences across Dimensions. We calculated the sum of squares indicator (DI_p) for every participant. We set two thresholds for a discrepant case at 1.0 and 0.5, and two ranges of overall depression severity based on the distribution of composite raw scores: (i) mild-moderate for scores of 25-75, and (ii) moderate-severe for scores 75 and higher. Figure 4 shows the distribution of overall scores and these cutoff values. (We were not interested in observing discrepancies in the group below a score of 25 because we assumed that this group neither had clinically relevant risk, nor expressions of distress that were clearly relevant to the depression construct.) DI_p values ranged from 0.00-8.61. At the 1.0 threshold and among those who scored 25 or higher, 25 participants, or 11.0% of the sample, had discrepant scores across dimensions. At the 0.5 threshold, this number increased to 52 participants, or 22.9% of the sample.

We visually inspected logit scores for patterns of use of dimensions among the 52 participants (22.9% of sample) who were above the 0.5 threshold. Overall, we observed a relatively stronger usage (i.e., scores) of somatic and psychological dimensions by the mild-moderate group, and psychological and social dimensions by the moderate-severe group. (See Table 9.) The 24 participants in the mild-moderate group predominantly used patterns of expression in which somatic and social distress were scored relatively higher than psychological distress. Half (50.0%) of this group emphasized somatic distress with or without emphasizing psychological distress, while the other half predominantly emphasized social distress (29.2%) or psychological distress with or without social distress (20.8%). In contrast, the 28 participants of the moderate-severe group mainly used patterns of expression that emphasized relatively higher psychological and social distress dimensions. Three-quarters (75.0%) of this group emphasized psychological and social, just psychological, or just social distress, while only one-quarter (25.0%) emphasized somatic distress alone or somatic with psychological distress.

We compared participants with the same composite depression score to illustrate usage of patterns of dimensional distress. Table 10 shows two groups of respondents who scored the same percentage on overall depression, and had relatively high degrees of discrepancy as indicated by their DI_p. For the group that scored 23% on overall depression (i.e., in the mild-moderate range), as shown in Figure 5, Mr. Leong emphasized social distress, Mrs. Wang reported higher somatic and some psychological distress, while Mrs. Wu expressed much stronger social and psychological distress. For the group that scored 59% on overall depression (i.e., in the moderate-severe range), as shown in Figure 6, each participant emphasized a particular domain: Mr. Chan, psychological distress; Mrs. Mei, somatic distress; and, Mr. Kwong, social distress.

Relating Distress Dimensions and Overall Depression with External Measures

Moderate correlations of the dimensional scores with the study's depression criterion (raw scores r_{bp} near .600) and moderately high AUC values (near .850) and rates of correct classification (near .770) demonstrated construct validity of the multidimensional model. (See Tables 11 and 12.) These statistics are likely biased downward since the criterion consisted of diagnosed persons some of whom are expected to have been asymptomatic at the time of their participation. The dimensional statistics were very close to one another and slightly below the composite statistics. Each dimensional score thus showed excellent predictive validity compared to the composite model score. The mean raw scores and percentages of total possible points for each dimension and the composite model were: (a) psychological, 22.6 points (*SD* = 16.2), 35.8%; somatic, 28.3 points (*SD* = 20.0), 31.4%; social, 15.5 points (*SD* = 13.0), 34.4%; and, composite, 58.8 (*SD* = 41.46), 33.2%. The optimal cutoffs scores derived with ROC analysis, 20 for psychological, 25 for somatic, 15 for social, and 52 for the composite scale, were just below the mean raw scores, except for the social dimension, which was equal to the mean raw score.

High correlations of dimensional scores with diagnosis of neurasthenia (raw scores r_{bp} near .700) and acculturative stress (*r* near .670) demonstrated convergent validity of the multidimensional model. The very high AUC values (near .910) and rates of correct classification (near .920) for each dimension further indicated excellent convergent validity. Also, the dimensional statistics were very close to one another and slightly below the composite statistics. Thus, individual dimensions discriminated neurasthenia nearly as well as the composite model. The optimal cutoffs scores derived with ROC analysis were 19 for psychological, 25 for somatic, 11 for social, and 52 for the composite scale, which were all just below the respective mean raw scores.

A comparison of the strength of association of depression scores with the study's depression criterion versus the diagnosis of neurasthenia showed that the latter relationship was stronger. That is, intercorrelations, AUC values, and rates of correct classification, for dimensional and composite measures, based on the diagnosis of neurasthenia were higher than those based on the study's depression criterion. This is represented graphically in Figures 3 and 4, which show the distribution of overall depression scores by the study's depression criterion and diagnosis of neurasthenia, respectively. These findings further demonstrated the close relationship of the constructs of depression and neurasthenia, even with consideration of the likely downward bias of the indicators based on the depression criterion.

Examining Influential Variables with Analysis of DIF

We chose cutoffs for dichotomous grouping variables based on empirical testing and substantive differentiation of the ability to acculturate. (See Table 13.) We set the cutoff for 'age' at 40 years with consideration of the reported difficulties that middle aged and older adults encounter with assimilating to a new culture. For education, we placed the cutoff at 'less than high school' based on clinical experts' evaluation of this group's strong maintenance of traditional Chinese values and beliefs, and very slow acculturation to U.S. society. We established the cutoff of seven or fewer for years of residence, and score of less than or equal to 13 for the acculturation scale, ACC-US-11, after empirical testing of different values to determine the cutoffs that showed more items with significant DIF. Also, seven years corresponds to the length of residence required for naturalization. We used the total raw score on the 30 items of the somatic dimension to measure

somatic distress. We did not exclude the two items that also belonged to the psychological and social dimensions since we expected that this relatively small number would not influence the DIF results. A cutoff score of less than 40, or greater than or equal to 40 was also established empirically.

Tables 14-16 contain items with statistically significant DIF at $\alpha = 0.05$ based on a t-statistic calculated with the joint standard errors. In all tables, psychological and social items are considered together as one analytic unit. Table 14 shows DIF results by gender and age. Table 15 reports DIF findings by the three acculturation-related variables (education, years of residence in the U.S. society, and score on the ACC-US-11). Table 16 displays psychological and social items with statistically significant DIF by diagnosis of neurasthenia and somatic distress. Large effect sizes, greater than .638 logits, are bolded. Intermediate effect sizes, from .426 to .638 logits, are bolded and italicized.

Considering all subgroup variables (i.e., across all three tables), large proportions of total items had statistically significant DIF. First, 17 of 59 (28.8%) total items had intermediate or large effect sizes. In the psychological domain, 7 of 21 (33.3%) items had large (*psychotic, crying,* and *suicidal*) or intermediate (*hurtself, burden, useless,* and *stress*) effect sizes. In the social domain, four items (26.7%) had intermediate (*norespect, burden, lostface* and *blaming*) effect sizes. In the somatic domain, seven items (23.3%) had intermediate (*getstarted, decisions, light, coldsweat,* and *throat*) or large (*stutter* and *sexdesire*) effect sizes. At a 5.0% level of significance, these are statistically significant proportions beyond chance occurrence. The majority of these items, 13 of 17 (76.5%) belonged to the upper half of the severity continuum (i.e., the upper 29 items in Figure 2, from *stutter* through *socialize*), while the remaining four items belonged to the lower half. (Henceforth, these ranges are called 'higher severity' and 'lower severity.') Second, the large majority of items, 46 of 59 (80.0%), including 20 of 31 (64.5%) psychological and social items, and 26 of 30 (86.7%) somatic items, showed statistically significant DIF. This finding shows the strong sensitivity of the expression of distress to population traits in general. However, it is patterns of influence of specific variables that are of interest for understanding manifestations and processes of illness in population subgroups. Thus, we examined variables individually for the level of presence DIF, patterns of occurrence, and initial theories of DIF.

Gender DIF. The analysis of DIF by gender (Table 14) revealed that only 2 of 59 (3.4%) total items, which includes one psychological (*crying*) and one somatic (*stutter*), had large effect sizes. This proportion is statistically insignificant at $\alpha = .05$. Also, 14 of 59 (23.7%) total items, which includes 7 of 31 (22.6%) psychological and social items, and 7 of 30 (23.3%) somatic items, had statistically significant DIF. While this proportion is moderately small, we observed two patterns. First, men favored easier endorsement of psychological and social items over somatic items, and women favored easier endorsement of somatic items over psychological and social. The majority (5 of 7) of the psychological and social items with statistically significant DIF were easier for men (*bored, suicidal, not talk, norespect,* and *lonely*), compared to only two items (*crying* and *meaningless*) for women. The large majority (6 of 7) of somatic items with statistically DIF were easier for women (*memory, heavyhead, dizzy, bodyaches, jointaches,* and *thinkslow*), compared to only one item (*stutter*) for men. Second, with regard to item severity, there was one notable pattern of all four body-related items that were easier for women being of lower severity, and the two head-related items (*heavyhead* and *dizzy*) being of higher severity.

Also, each group had one item with a large effect size, which was *crying* for women, and *stutter* for men.

We observed an initial theory of DIF that implicates gender and social roles. In men, expressions of distress are associated with being unable to resolve a problem of inadequate social role, and low social position and self-worth within one's family and in U.S. society. These expressions are externalized and other-focused, that is, directed toward and interacting with the social and cultural environment. In women, expressions of distress are influenced by the cultural value and norm of primary duty toward family. These expressions emphasize internalized and self-focused psychological states, and a use of bodily idioms of distress.

During item generation of CADS-47, clinical experts predicted that c*rying* and *meaningless* would be easier for women, *suicidal* more difficult for women, and *bored* easier for men. *Meaningless* refers to the despair of not having or fulfilling a proper social role (e.g., as wife or mother), and sometimes suggests suicidal thoughts. Women express suicide less due to a prominent sense of duty toward their family role. *Bored* describes being unable to find a way out of current problems and get along with the environment. It is an experience of helplessness and being unable to breathe because there is no movement or current of air around one's heart, as represented in the Chinese character (悶). Men use this term in lieu of stronger and more direct emotional expressions. The three social items that were easier to endorse for men (*nottalk*, *norespect*, and *lonely*) reflected social distress, including, respectively, hiding from and not talking with others due to shame and loss of face, social devaluation in U.S. society, and social isolation and lack of understanding by family and friends. Clinical experts also predicted that women would express a range of physical complaints, especially headaches, which is consistent with the head (*dizzy* and *heavyhead*, a pre-headache experience) and body (*jointaches* and *bodyaches*) items. *Stutter* is identified in the general population as a common risk factor of depression for males due to experiences of low self-esteem that result from stuttering.

***Age DIF*.** The analysis of DIF by age (Table 14) showed that only 3 of 59 (5.1%) total items, which includes one psychological (*psychotic*) and two somatic (*getstarted* and *sexdesire*), had intermediate or large effect sizes. We considered this proportion as statistically insignificant given its proximity to $\alpha = .05$. However, only a moderate proportion of total items, 18 of 59 (30.5%), had statistically significant DIF. This includes a small proportion of psychological and social items, 4 of 31 (12.9%), and a large proportion of somatic items, 14 of 30 (46.7%).

We observed a pattern of relatively balanced and large numbers of somatic items that were easier to endorse for each age group. Eight somatic items were easier for the younger group, and six for the older group. However, for the psychological and social items, a small pattern of bias was seen in the three items with conceptual overlap (*bored, lonely* and *troubled*) that were easier for the younger group, which were all of lower severity, compared to only one psychological item (*psychotic*) that was easier for the older group. Combined with the five of eight somatic items that were also of lower severity (*getstarted*, *tired*, *sleepday*, *fatigue*, and *concentrate*), there is evidence of bias toward easier endorsement of lower severity items by the younger group. No clear pattern was observed for the older group as the six somatic items were split between lower and higher severity ranges.

We also observed a theory of DIF that regards developmental phases of adulthood. In the younger group, expressions of distress are associated with the developmental tasks and needs of younger adults. Thus, this group emphasizes emotional experiences that derive from the expectation of self-initiated engagement with the environment, particularly the need of social

support and development of a social network. In the somatic domain, the emphasis is on the unexpected experience of loss of efficiency. In the older group, manifestations of distress are associated with entrance into middle and later adulthood. Their expressions emphasize concern over permanent changes in physical functioning, and uncertainty and confusion about their mental health.

Explanations provided by clinical experts supported this theory for the psychological and social items. Experts explained that *bored, lonely* and *troubled* had overlapping but different meanings for younger and older adults. For the younger group, these terms can signify an internal discomfort associated with one's own lack of active engagement with people and activities. In contrast, for the older group, it refers exclusively to a passive experience where significant others are not providing the needed social contact and support (e.g., one's children not visiting as frequently as expected of them). For the younger, *bored* can mean the individual has nothing to do or feels no interests in any activities, thus describing an 'active' psychological malaise that depends on the one's own actions. It can also signify a passive and dependent state of not receiving adequate social attention, which is the meaning used by the older group. For the younger, *lonely*, similar to *bored*, describes psychological suffering deriving from one's inadequate social activity, and the passive stance of not receiving expected social support. Again, for the older, only the latter is relevant. For the younger, *troubled* expresses: (a) a desire to be left alone or not bothered by others; (b) the presence of emotional difficulties, conflict, and confusion; (c) an inability to calm oneself down; or, (d) a state of being without a solution for or unable to think through one's problem. Only the last meaning is valid for the older group. *Troubled* (煩惱) means literally "heart feels vexed." In TCM, this concept refers to a vague and fidgety sense of anxiety, uneasiness, and agitation that occurs in the Heart (Maciocia, 2007).

To obtain an understanding of the unusually high endorsement (i.e., responses of 1, 2, or 3) of *psychotic* by nearly one-quarter (23.2%) of participants, we conducted a qualitative investigation with a 'think aloud' method (American Institutes for Research, 2000) while sampling was still in progress. In this method, participants share their thoughts about the item and their response at the time of answering the item. We also confirmed the clarity of the item text ("you have auditory or visual hallucinations"), and explored its meaning with participants. We thus detected a traditional form of expression where dream, imagination, and lived experience are little differentiated. Participants expressed meanings in addition to the intended Western conception. These included: (a) revisiting a dreamt experience when awake, (b) imagination and fantasy, and (c) confusion over whether an experience had occurred or had been imagined or dreamt. Also, since the item text was easy to understand, and clearly represents a symptom of mental illness in Chinese language, we deduced that older participants affirmed this concept to express their preoccupation with being mentally ill.

Regarding the somatic dimension, among the eight items that were easier to endorse for younger adults, five items (*getstarted, tired, sleepday, fatigued*, and *concentration*) indicated a focus of attention on diminished efficiency, that is, a lowered ability to carry out daily tasks and responsibilities. *Coldsweat*, which describes a fear response, and *nausea* may represent generalized bodily responses to anxiety-provoking situations. In contrast, for the older adults, all six items (*sexdesire, indigestion, jointaches, bodyaches, tinnitus* and *abilityloss*) that were easier to endorse referred to specific areas of diminished physical functioning which occur normally in the aging process. Also, *tinnitus*, in the sense of a concern over unusual, and possibly phantom ear sounds is consistent with the higher endorsement of *psychotic* by this group.

Acculturation DIF. Analysis of DIF by the acculturation-related variables revealed that 10 of 59 (16.9%) total items, which includes seven psychological and social items (*norespect, suicidal, hurtself, psychotic, lostface, burden*, and *useless*) and three somatic items (*stutter, sexdesire,* and *decisions*), had intermediate or large effect sizes. This proportion is statistically significant at $\alpha = .05$. However, when each acculturation variable is considered individually, the proportion of items with intermediate or large DIF is only statistically significant for acculturation score, with 4 of 59 (6.8%) qualifying items.

More than half of total items, 33 of 59 (55.9%), had statistically significant DIF. This includes a very large proportion of psychological and social items, 18 of 31 (58.1%), and a large proportion of somatic items, 15 of 30 (50%). Viewing the psychological and social dimensions individually, a higher proportion of psychological items, 14 of 21 (66.7%), had statistically significant DIF, compared to the social items, 8 of 15 (53.3%). Considering the acculturation variables individually, education revealed the largest proportion of psychological and social items, 10 of 31 items (32.3%), with statistically significant DIF, compared to years in U.S. and acculturation score, each of which with 7 of 31 (22.6%) items. However, the latter two variables revealed more biased items, as the majority of items (5 of 7) with intermediate or large effect sizes were associated with these variables. For the somatic items, each variable revealed similar proportions of items with statistically significant DIF, with education and acculturation score each having 6 of 30 (20%) items, and years in U.S. having 5 of 30 (16.7%) items.

We observed two patterns. The first pattern concerns the balance of items with statistically significant DIF between the acculturation groups. The numbers of psychological and social items that were easier to endorse for each group were fairly balanced. Eleven items were easier for the more acculturated group, compared to nine items for the less acculturated group. However, there was a moderate favoritism of somatic items by the less acculturated, with nine items being easier for this group, compared to only six items for the more acculturated. This overall pattern was generated largely by the education variable, which showed a strong favoritism of: (a) psychological and social items by the more educated group, with eight items that were easier to endorse, compared to only three items for the less educated group; and, (b) somatic items by the less educated group, with five items that were easier to endorse, compared to only one item for the more educated.

The second pattern concerns a large imbalance of items of higher and lower severity between the acculturation groups. The majority of items easier for the more acculturated group were of higher severity, while the majority of items easier for the less acculturated group were of lower severity. For the more acculturated group, 8 of 11 (72.7%) psychological and social items were of higher severity, with the lower severity items being *stress*, *anhedonia*, and *troubled*. For the less acculturated group, 7 of 9 (77.8%) psychological and social items were of lower severity, with the two higher severity items being *burden* and *psychotic*. Similarly, yet to a smaller degree, a majority of somatic items, 4 of 6 (66.7%) that were easier for the more acculturated were of higher severity, with the lower severity items being *fatigue* and *sleepday*. Also, a majority of somatic items, 5 of 9 (55.6%) that were easier for the less acculturated group were of lower severity, with the higher severity items being *sexdesire*, *vision*, *throat*, and *tinnitus*.

We observed a theory of DIF that regards changes in social status after immigration, and living with unachievable social expectations. For the more acculturated, this concerns adaptation to relatively large decreases in social status due to higher levels of education and professional status prior to immigration. Expressions of distress emphasize a struggle with the environment in which one faces constant threats to social status and self-worth. These expressions are both

externally oriented, describing difficulties with the social environment, and internally oriented, describing one's own role and place. The somatic items fit with this theory moderately. Somatic expressions are physical responses to an externalized view of one's problems and strong internalized emotions. For the less acculturated, manifestations of distress reflect a permanent and very low level of social status, and inability to integrate into U.S. society. This group's expressions show a static and self-directed experience regarding the inability to make a social contribution, and sense of inadequacy and poor adaptation. Accordingly, this group's somatic distress emphasizes the loss of functioning.

Within this theory, manifestations of distress are also specifically influenced by each acculturation variable. Those with higher education are aware of and able to communicate a large range of psychological and social experiences, whereas those with lower education focus strongly on somatic experiences, possibly as idioms of distress, and a severe internalized psychological experience. Those with more years in the U.S. recognize and express their failure and poor state of mental health. Those with fewer years, in their initial attempt to adapt as immigrants, demonstrate an externalized experience that emphasizes the need of help and social support, and the impact of external stressors. Finally, those with higher acculturation scores, most indicative of overall acculturation, including knowledge of mental illness, are aware of and able to present the most severe psychological and self-focused concepts, as is typical of European Americans.

Among the eleven psychological and social items that were easier for the more acculturated, seven items (*norespect*, *nottalk*, *stress*, *meaningless*, *ownfault*, *lostface*, and *troubled*) directly suggested an experience associated with a diminished social role and status. Items that indicated an externalized experience referred to others' behaviors (*norespect*) and judgments (*lostface*), not presenting oneself for social ridicule (*nottalk*), and the impact of constantly impinging and threatening pressures in the environment (*stressed*). Items that indicated an internalized experience referred to self-blame (*ownfault*), despair of failure in one's role (*meaningless*), and feeling 'stuck,' i.e., without a solution and unable to calm one's emotions (*troubled*). Among the remaining four items, *anhedonia* describes an internal state that is likely more relevant to those with higher education due to the important role of pleasurable activities in their lifestyles. The emphasis on *psychotic* represents a severe and internalized experience, as it suggests worry about having mental illness after many years of difficult adjustment to U.S. society. It is complemented by *lostface*, which suggests recognition of one's failure to meet social expectations after years of difficulties. *Suicide* and *hurtself*, with large and intermediate effect sizes, respectively, may indicate an externally oriented act in that it results from one's poor fit with the environment, or an internally oriented reaction to psychological suffering and low self-worth. Also, these self-harm concepts, which are highly shameful in Chinese culture, are easier to endorse for those who with higher acculturation scores. These are complemented by *ownfault*, which refers to an individually focused concept of guilt that is consistent with U.S. culture.

Among the nine items that were easier to endorse for those with lower acculturation, four items (*burden*, *useless*, *hopeless*, and *ruminate*) expressed an internalized sense of low social worth. *Burden* and *useless* suggested an inability to provide a social contribution to one's family and society, and a lack of basic economic, and cultural and language skills to become integrated. *Hopeless* refers to low self-efficacy with regard to improving one's situation. *Ruminate* describes an anxious past-focused psychological state of uncontrolled thinking about life difficulties and the events that contributed to one's situation. The easier endorsement of *psychotic* suggests a

traditional form of expression and concern over one's deteriorating mental state that is held by persons with lower education. Complemented by *burden* and *ruminate*, these three items show the internalized and severe psychological experience of those with lower education. Four items (*bored, lonely, stress*, and *angry*) that were easier for recent immigrants suggested a type of distress related to the initial adaptation of immigrants. These items described an environment-focused experience of needing social engagement and support (*bored* and *lonely*), pressures from the environment (*stress*), and lack of fairness or mistreatment, or regret over the decision to immigrate (*angry*).

Among the six items that were easier to endorse for the more acculturated, *fatigue* and *sleepday* are signs of an externalized form of depression, called 'atypical' depression. In this type of depression, the individual experiences his or her problem as entirely under the influence of external events, and any criticism or rejection can immediately induce strong feelings of depression, and the desire to sleep or even die (Gorman, 2007). Thus, *hurtself* and *suicide* are consistent with this framework. However, *fatigue* and *sleepday* may also be more disturbing to the more educated and acculturated, respectively, as difficulties that become noticeable in the context of white collar jobs and lifestyle. *Stutter*, with an intermediate effect size for DIF by acculturation score, also has an external orientation in that low self-esteem results from a more acculturated immigrant's stuttering in frequent social interactions with European Americans. Three somatic items (*coldsweat, light,* and *hiccups*) showed an internalized or somatized distress, in line with the psychological and social items (*ownfault*, *meaningless* and *troubled*) that demonstrated an internalized process. *Coldsweat* and *light*, referring to sensitivity to light, may be easier for this group just as *coldsweat* and *nausea* were easier for younger adults, as these may represent strong anxiety experienced as generalized bodily discomfort, rather than specific problems of somatic functioning. Also, these two somatic items, coupled with *hurtself, psychotic* and *lostface*, highlight the immigrants' recognition of very severe disturbances after many years of difficulties of adaptation. According to TCM, *hiccups* can be caused by emotional frustration, which greatly reduces the Liver *qi* (energy). Light sensitivity is also associated with Liver disturbances. In western medicine, emotional distress is also considered a trigger of hiccups, and, in severe cases, treatment includes the antipsychotic medication, Thorazine (chlorpromazine).

Among the nine somatic items that were easier for the less acculturated, five items concerned thinking and loss of functioning (*thinkslow*, *decisions*, *bodyaches*, *abilityloss* and *abilityfear*). These items construe ongoing difficulties in a different culture and language (*thinkslow*, *decisions*, *abilityloss*), and fear of losing one's social role altogether (*abilityfear*). *Decisions*, with an intermediate effect size, may be indicative of the many dilemmas and decision-making situations with which one is faced in an early stage of immigration. Also, *thinkslow* and *abilityloss*, associated with low acculturation score, suggest experiences of persons who have low language skills and other difficulties with regard to daily living in U.S. society. *Bodyaches* may be related to blue collar employment. All of these items concern concrete difficulties related to functioning, which is consistent with an internalized low self-worth and concern of poor role fulfillment. *Sexdesire* also indicates a specific loss of functioning. Its easier endorsement by this group can also be viewed as the lower social stigmatization of this concept in Chinese culture compared to U.S. culture. *Vision*, *tinnitus,* and *throat*, all items of higher severity, are experiences of the head and neck. In the western medical literature, there is a hypothesized association of physical symptoms in the head and neck with chronic fatigue syndrome and depression. Sore throat is also a defining symptom of chronic fatigue syndrome.

These items may also represent an internalized preoccupation with mental health and health, which are expressed through bodily metaphors.

***Neurasthenic and Somatic DIF*.** Analysis of DIF by diagnosis of neurasthenia and somatic distress (Table 16) revealed that 6 of 59 (10.2%) total items, which includes three psychological and social items (*psychotic*, *stress* and *blaming*) and three somatic items (*light, coldsweat* and *throat*) had intermediate effect sizes. This proportion is statistically significant at $\alpha = .05$. Examining each variable individually, only DIF analysis by neurasthenia showed a statistically significant proportion of items, 4 of 59 (6.8%), with intermediate effect sizes. A moderately large proportion of total items, 24 of 59 (40.7%), had statistically significant DIF. This includes 13 of 31 (41.9%) psychological and social items, and 11 of 31 (36.7%) somatic items. Considering neurasthenia alone, a higher proportion of somatic items, 11 of 30 (36.7%), had statistically significant DIF, compared to the proportion of psychological and social items, which was 7 of 31 (22.6%). Considering somatic distress alone, 11 of 31 (35.5%) psychological and social items had statistically significant DIF.

We observed patterns related to each variable. First, regarding the diagnosis of neurasthenia, the numbers of psychological and social items that were easier to endorse for each group were fairly balanced. Three items were easier for those with neurasthenia, and four items were easier for those without. However, there was bias in favor of psychological items given that all seven items were psychological, with only one of these being both psychological and social. Regarding the somatic items, the numbers were imbalanced in favor of those without neurasthenia, with seven items being easier for this group, compared to only four items for the group with neurasthenia. With regard to item severity, all three psychological and social items that were easier for those with neurasthenia were of higher severity, while the majority of items (3 of 4 that were easier for those without neurasthenia were of lower severity, with the exception of *suicidal*. Among the somatic items, the majority of items easier for both groups were of higher severity. For those with neurasthenia, three of four items were of higher severity, with the exception of *abilityfear*. For those without neurasthenia, five of seven items were of higher severity, with the exceptions of *jointaches* and *decisions*.

Second, regarding somatic distress, the numbers of psychological and social items were also fairly balanced. Five items were easier for those with higher somatic distress, and six items were easier for those with lower somatic distress. Also, the items that were easier for those with high somatic distress slightly favored higher severity items, with only two of five items being of lower severity (*hopeless* and *anhedonia*). The items that were easier for those with low somatic distress tended to favor lower severity items, with only two of six items being of higher severity (*blaming* and *norespect*).

We observed a theory of DIF that concerns internalization versus externalization across dimensions. Those who have neurasthenia and high somatic distress internalize their low social worth and disengagement, and manifest their distress through somatic symptoms of anxiety and generalized discomfort focused in the head. Those who do not qualify for neurasthenia or have low somatic distress externalize. They focus attention on the impact of the environment on their well being, and are able to manifest their irritation and blame toward others. Also, the somatic experiences of this group focus on specific bodily functions, as well as mental functioning and experiences of the head and neck.

All six psychological and social items (*psychotic, afraid, meaning, lostface, hopeless* and *anhedonia*) that were easier for those with neurasthenia or somatic distress revealed an

internalization of distress. Four items (*meaningless*, *lostface*, *hopeless*, and *anhedonia*) showed a self-directed psychological experience. These were complemented by a manifestation of fear, expressed in *afraid*, and mental confusion, expressed in *psychotic.* In contrast, all seven items (*stress, angry, irritated, suicidal, blaming, norespect* and *bored*) that were easier to endorse by those who did not have neurasthenia or had low somatic distress demonstrated an externalization of distress. This group emphasized irritability (*irritated* and *angry*) and attributed their difficulties to others (*blaming* and *norespect*). Also, *stress* and *bored* suggested, respectively, an experience of outside pressures, and needed engagement with the environment that was lacking. In this vein, the endorsement of *suicide* can be viewed as an externally oriented act that results from one's poor fit with the environment, or a feature of atypical depression.

Among the four somatic items that were easier to endorse by those with neurasthenia, *coldsweat, dizzy,* and *light* were of higher severity. *Coldsweat*, together with *abilityfear*, directly indicate strong fear, including, in the latter item, that of losing one's social functioning. Also, this group emphasized a strong and generalized head-focused discomfort in *light* and *dizzy*. These somatic items represent an internalized somatic experience which complements the concepts expressed in *psychotic*, *afraid* and *meaningless.* (This is similar to the analysis of DIF by years in the U.S., in which *coldsweat*, *light, psychotic*, *lostface, and hurtself* functioned together similarly.) For the group without neurasthenia, the seven somatic items that were easier to endorse covered a range of areas of somatic functioning. Several items, *jointaches*, *stomach*, and *indigestion*, referred to specific bodily functions. The other items, *decisions, throat, tinnitus*, and *vision*, suggested a concern regarding mental functioning and illness located in the head and neck. The three latter items were also of higher severity. This symptom constellation of those with neurasthenia is generally consistent with disturbances of the Liver, which is associated with tinnitus, blurry vision, abdominal pain and digestive disorders, and, in the emotional arena, feelings of anger and irritability (Maciocia, 2007).

DISCUSSION

Item response analysis provided a method for exploring the structure of depression for Chinese American immigrants from an emic perspective. The existence of a culturally based structure was an old hypothesis that had remained unexplored, and for which findings from diverse areas (e.g., somatization, social self-construals, etc.) had not been considered together. With the item response approach, we were able to identify a spectrum of culture specific and western content, and examine how these formed dimensions and interacted within a model.

We found the structure we aimed to see—a multidimensional model of depression that accounted for the hypothesized somatic and social domains. The model was robust, with excellent reliability and validity based on a criterion of diagnosis in the natural setting. The overall (composite) measure very accurately pulled apart the clinical and community subsamples, even with consideration of the unknown proportion of asymptomatic participants in the clinical subsample. At the same time, it discriminated the subsamples with and without neurasthenia with even higher accuracy. We thus found evidence that neurasthenia is an important cultural expression of depression. However, neurasthenia did not appear to be a 'somatized' form of depression, since persons with neurasthenia showed more difficulty with endorsing a set of symptoms of physical functioning. Rather, its peculiarity may be a very self-contained state of fear and despair that affects mind and body, considering that *psychotic*, *afraid*,

meaningless, on the psychological side, and *light*, *coldsweat*, *dizzy* and *abilityfear*, on the somatic side, were the easier items for this group. Also, this state appeared very 'inactive' or 'frozen' given that *suicidal* and other-directed anxiety items (*angry*, and *irritated* and *stress*) were more difficult to endorse.

We then discovered richer information about the nature of this structure at the dimensional level of analysis. Each dimensional measure showed comparably high reliability and validity. Furthermore, their strong intercorrelations demonstrated their similarity and equal potential for measuring depression effectively. However, by viewing participants' scores across dimensions, we detected a high level of discrepancy in how these dimensions were used. Nearly one-quarter of the sample had a pattern of discrepant usage in which scores on one or two dimensions contributed much more strongly to the person's overall score. Also, the large majority of this group, especially those in the mild-moderate range, showed a pattern in which their somatic or social score was a discrepantly large component of their overall score. This suggests that a scale with predominantly psychological concepts would be sub-optimal for assessing this group, especially those in a milder phase of depression. Also, the problem of screening efficacy should focus on the region of lower severity, including near the cutoff score, where the most difficulty exists for separating out those who are depressed, and those needing linkage to mental health care are situated. These findings raised several questions. First, what are the social, cultural, and psychological characteristics of the persons who use each type of pattern? Second, are these patterns related to stage or severity of illness, or location of help seeking? And, finally, how can each dimension be used to contribute to successful outreach and clinical effectiveness?

Given indications of each dimension's specific and important function, we explored variables that influenced their expression with the analysis of DIF. We expected that gender, age, and acculturation would impact the expression of depression, and were also 'curious' about the implications of neurasthenia and somatic distress. We not only found the strong sensitivity of the expression of depression to these population traits due to the large proportions of items affected, but also detected a sub-construct regarding each variable given the substantive patterns formed by these items. Women used a bodily metaphor and men emphasized culturally based social and psychological concepts. Young adults underscored a range of generalized and less severe somatic experiences, as well as a few culture-specific psychological and social concepts, while older adults acknowledged psychoticism and specific problems of bodily functioning. We observed an impact of acculturation that exceeded our expectations, as two-thirds of psychological and half of social and somatic items were sources of bias. The more acculturated favored higher severity concepts across dimensions, and the more educated in particular stressed a gamut of psychological and social concepts. In firm contrast, the less acculturated favored a large range of somatic items of lower and higher severity, yet predominantly lower severity psychological and social items. Persons with neurasthenia showed an internalized fear-centered psychological and somatic experience that de-emphasized other-directed emotions and concrete physical problems. Finally, those with high somatic distress favored self-focused psychological and social experiences, and those with low somatic distress emphasized other-focused ones.

Knowledge of the multidimensional structure of depression and its breadth of content made it possible to discover sub-constructs within its dimensions. Although the numbers of biased items were very large in some cases, we still expected the dimensional measures to be useful given their strong predictive validity, and the limited numbers of 'worrisome' items (i.e., those with intermediate and large effect sizes) per variable. However, the level of concern becomes greater when all three acculturation variables are considered together, or if both acculturation and

gender variables were of interest, in which case there would be, respectively, 10 or 11 total 'worrisome' items. This question of bias has central importance for the task of effective assessment. Many of these 'worrisome' concepts are used in existing self-report instruments (e.g., *suicidal*, *hurtself*, *crying*, *getstarted*, *decisions*, *sexdesire* and *psychotic*), and their impact on under-recognition is largely unknown. For the less acculturated, a short scale containing just two or three of these items would likely be sufficient to create bias. Coupled with this group's more difficult endorsement of mostly higher severity items, and easier endorsement of mostly lower severity items, as detected in the sub-construct, the risks of bias and thus under-detection are abundant.

The development of a scale for this population requires consideration of biased items, especially the 'worrisome' ones, and sub-constructs. Ideally, non-biased items would be chosen to form a scale for each sub-group of interest. More practically, if the objective were a scale for all adult immigrants, then the care required to compose this scale would be much greater. It would be necessary to determine empirically that the impact of all sub-constructs is minimized. Overall, the research question concerns the level of des-aggregation of the population, or specificity of content, that is needed to obtain effective measures for subgroups of interest. This also requires knowledge of which subgroups are at highest risk of being 'missed.' Our analysis indicated that those at such risk are the less acculturated, less educated, have neurasthenia, or place emphasis on higher somatic or social distress and are in a less severe or earlier stage of depression. The next steps of research could be to confirm whether a non-biased scale—one that performed adequately well for the whole population—could be developed with the available items. In addition, it would be interesting to explore whether a measure of only somatic, or only social items could serve the assessment needs of certain subgroups.

Apart from the objective of accurate instruments, this study's use of item-based measurement provided a comprehensive list of symptoms that can serve as a tool for individualized clinical assessment. This list can be used in several ways. First, a clinician can place the patient on the severity continuum based on the initial presentation of symptoms, and then direct the patient toward concepts that were not touched upon to better ascertain severity. Second, the items that are easier to endorse for a specific subgroup can be used as 'flags' or signals of depressive distress, since this group is most comfortable with these items. For example, a new client who speaks of his or her difficulties in terms of other people or external conditions (as in *stress*, *angry*, *irritated*, *blaming*, *norespect*, and *bored*) should be assessed further and carefully, even if they do not initially present self-centered emotions and difficulties. Similarly, the endorsement of items that are more difficult for the subgroup can be seen as 'red flags' or signs of higher risk that also call for further assessment. For example, if a man mentions that he cries, or someone with little education shares that he or she has thoughts of self-harm, these presentations indicate very high severity, as these items are expected to be more difficult. Third, a clinician can first ascertain the presence of each dimension (i.e., what the patient is able to access and present), and then delve into the one or ones that highlight the patient's profile. For example, with a patient who seems disposed to speak only in physical terms, the clinician may inquire about other somatic symptoms along the continuum.

This study also offered new theories that, if validated, may inform the development of effective prevention and treatment methods. These theories concern facets of the lives of Chinese immigrants to the U.S. that impact the manifestation of depressive distress. They pertain to culturally based gender roles, developmental tasks and physical changes associated with life stage, changes in social position associated with acculturation and socioeconomic backgrounds,

phase of immigration, and the psychological processes of internalization and externalization, which interacted with cultural expressions of distress. There was also a descriptive theory based on TCM.

We ascertained one more new theory regarding the process of illness and dimensional expression that links patterns of usage and theories of DIF. It is in the earlier or milder stage of depression in which either somatic or social expressions may predominate. Psychological expressions appear to emerge as depression becomes more severe. This is seen in the patterns of discrepant usage where patterns with dominant somatic or social scores were typical of the milder group, while patterns with a dominant psychological score were typical of the more severe group. Also, the relatively weaker inter-correlation of the somatic and social dimensions is consistent with the finding that these two dimensions do not occur together as dominant scores in any of the usage patterns. This explains why the set of other-oriented psychological and social items (*stress*, *angry*, *irritated*, *blaming*, *norespect*, and *bored*) were more difficult for the group with higher somatic distress. Finally, considering that individuals without neurasthenia and those with lower somatic distress have less severe or no depression, externalization toward bodily functions and social relationships, respectively, indicates that externalization and internalization are functions of illness stage and severity. This theory may be relevant to understanding the critical zone of assessment (i.e., near the cutoff) when the objective is linkage to care, and targets of intervention when the objective is effective prevention and treatment.

This study provided a rich background for further research through the finding of a multidimensional structure of distress and incipient knowledge about how these dimensions function within culturally based manifestations of depression. The multidimensional approach especially provided rich information about the nature of depression at an interpretational level. However, empirical results derived from a very small sample can only provide hints of a theoretical structure and point the way toward a larger scale, confirmatory investigation. Nevertheless, the findings of this study revealed many new hypotheses that may support more culturally efficacious intervention and reduce mental health disparities for this cultural group. Also, given that one underlying objective of our research was to help clinicians and community workers to ‘hear’ the distress within the common language expressions and bodily metaphors spoken by their immigrant patients and clients, item response modeling was an effective means of generating an initial set of symptoms for this purpose.

Table 1.

Sample Characteristics: Age, Age at Immigration, and Years in U.S.

	Clinical	Community	Total
f	103	124	227
%	45.4%	54.6%	100.0%
Age in years			
Mean	45.3	44.0	44.6
(*SD*)	(10.6)	(11.2)	(10.9)
Age at immigration			
Mean	30.2**	34.7**	32.6
(*SD*)	(13.0)	(11.7)	(12.5)
Years in U.S.			
Mean	15.1***	9.2***	11.9
(*SD*)	(10.6)	(8.0)	(9.7)

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Table 2.

Sample Characteristics: English Language and Education

	Clinical	Community	Total
English language (%)			
Very Poor	37.6%	38.2%	37.9%
Fair	38.6%	48.8%	44.2%
Very good/Excellent	23.7%	13.0%	17.8%
Total	*100.00%*	*100.00%*	*100.00%*
Education (%)			
Elementary School	12.6%	6.5%	9.3%
Middle school	20.4%	15.3%	17.6%
High school	42.7%	54.8%	49.3%
AA or higher	23.3%	23.4%	23.3%
Total	*100.00%*	*100.00%*	*100.00%*

Chi-square differences between clinical and community subsamples were significant at $p < .05$ for both English language and education.

Table 3.

Comparing Analyses of the Data

Dimensions/Model	No. of Parameters	G^2	AIC	AIC comparison/ Likelihood ratio test (G^2)
Psychological & Somatic				
1. Composite (50 items)	151	20481.947	20783.947	
2. Consecutive	155	21139.639	21449.639	
3. Multidimensional (2D)	155	20331.531	20641.531	
Model 2 vs. Model 3				20641.531 < 21449.639
Model 1 vs. Model 3				$\chi^2_{diff} = 150.416$, df = 4, $p < 0.00001$
Psychological & Social				
1. Composite (31 items)	94	12873.907	13061.907	
2. Consecutive	110	15169.199	15389.199	
3. Multidimensional (2D)	98	12860.494	13056.494	
Model 2 vs. Model 3				13056.494 < 15389.199
Model 1 vs. Model 3				$\chi^2_{diff} = 13.413$, df = 4, $p < 0.001$
Somatic & Social				
1. Composite (44 items)	133	18378.844	18644.844	
2. Consecutive	137	18944.768	19218.768	
3. Multidimensional (2D)	137	18226.021	18500.021	
Model 2 vs. Model 3				18500.021 < 19218.768
Model 1 vs. Model 3				$\chi^2_{diff} = 152.823$, df = 4, $p < 0.00001$
Psycho-social & Somatic				
1. Composite (59 items)	178	24281.737	24637.737	
2. Consecutive	185	25331.511	25701.511	
3. Multidimensional (2D)	182	24123.928	24487.928	
Model 2 vs. Model 3				24487.928 < 25701.511
Model 1 vs. Model 3				$\chi^2_{diff} = 157.809$, df = 4, $p < 0.00001$
Psychological, Somatic, & Social				
1. Composite (59 items)	178	24281.737	24637.737	
2. Consecutive	201	27626.803	28028.803	
3. Multidimensional (3D)	186	24092.962	24464.962	
Model 2 vs. Model 3				24464.962 < 28028.803
Model 1 vs. Model 3				$\chi^2_{diff} = 188.775$, df = 8, $p < 0.00001$

Note. Composite refers to a unidimensional model composed of items from both domains. Consecutive refers to a unidimensional model for each domain. AIC and likelihood ration tests show that multi-dimensional analyses provided more information and better fit of the data across comparisons of domains. G^2: Deviance; AIC: Akaike's Information Criterion.

Table 4.

Psychological Dimension: Parameter Estimates from Multidimensional Analysis and Item Text

Item No./Label		Difficulty Estimate	Error	Item Text
P1	Stress	-0.263	0.099	You feel heavy stress living in the US. 你在美國生活感到重大的壓力.
P2	Troubled	-0.232	0.097	Many things make you feel very troubled or bothered. 很多事情讓你覺得很煩惱.
P3	Worried	-0.212	0.097	Many things make you feel very worried. 很多事情讓你感到很擔心.
P4	Bored	0.118	0.092	You are very bored. 你感到很沉悶.
P5	Health[SM7]	0.281	0.056	You are very afraid of having health problems. For example, you might have cancer or heart disease. 你非常害怕自己健康有問題. 例如：患癌症或心臟病.
P6	Helpless[SC1]	0.290	0.057	You feel very helpless. You feel you have no way to change your own fate. 你感到很無助。你感到沒有辦法改變自己的命運.
P7	Nervous	0.325	0.091	You are very nervous. 你感到很緊張.
P8	Ruminate	0.379	0.095	You think about unpleasant things the whole day and cannot stop. 你整天不停地想起不愉快的事情.
P9	Unhappy	0.440	0.092	You feel very unhappy. 你感到非常不開心.
P10	Anhedonia	0.499	0.089	You have no interest in many things. For example, you used to like to exercise, go shopping, or go out for entertainment, but not anymore. 你對很多事情失去興趣. 例如：你從前很喜歡做運動, 逛街或出外娛樂，但現在已經失去興趣.
P11	Irritated	0.535	0.095	You feel emotionally irritated. 你感到心煩氣燥.
P12	Useless[SC5]	0.638	0.056	You feel useless. 你覺得自己沒用.
P13	Angry	0.639	0.095	You have tantrums and get angry very easily. 你很容易發脾氣和發怒.
P14	Hopeless[SC7]	0.740	0.057	You feel hopeless. 你感到沒有希望.
P15	Meaningless[SC9]	0.829	0.057	You feel life is meaningless. 你感到做人沒有意思.
P16	Afraid	0.910	0.093	You feel very afraid. 你感到很害怕.
P17	Burden[SC14]	1.021	0.058	You feel you are a burden to your family and society. 你覺得自己是家人和社會的負擔.
P18	Crying	1.567	0.102	You cry. 你哭.
P19	Psychotic	2.317	0.119	You have auditory or visual hallucinations. 你有幻聽和幻覺.
P20	SelfHarm	2.533	0.127	You have thoughts about hurting yourself. 你想過傷害自己.
P21	Suicidal	2.654	0.134	You think about killing yourself. 你想過自殺.

Note. Items are ordered top to bottom from easiest to endorse (mild) to most difficult to endorse (severe).
[SC] Item also belongs in the social dimension, with the item number indicated. [SM] Item also belongs to somatic dimension, with the item number indicated.

Table 5.

Somatic Dimension: Parameter Estimates from Multidimensional Analysis and Item Text

Item No./Label		Difficulty Estimate	Error	Item Text
SM1	Fatigued	-0.599	0.091	You feel very fatigued. 你感到很疲累.
SM2	AbilityLoss	-0.009	0.083	You feel your working & learning ability has decreased significantly. 你感到做事和學習能力明顯下降.
SM3	SleepProbs	0.079	0.082	You are unable to sleep well. 你睡得不好.
SM4	Tired[N]	0.104	0.087	Have you experienced: Feeling physically tired or having no energy? 你是否有以下感覺：體疲倦或疲乏無力
SM5	Concentrate	0.154	0.086	You are unable to concentrate well. 你難以集中精神.
SM6	Memory	0.223	0.086	Your ability to remember things has worsened very much. For example, you forget where you put your keys, or your appointments. 你記性比以前差很多. 例如：忘記帶鎖匙或約會時間.
SM7	Health[P5]	0.281	0.056	You are very afraid of having health problems. For example, you may have cancer or heart disease. 你非常害怕自己健康有問題. 例如：患癌症或心臟病.
SM8	Decisions	0.346	0.086	You have trouble making decisions. 你常拿不定主意.
SM9	GetStarted	0.358	0.085	It feels very hard to get started on doing things. 你感到做事總是提不起勁.
SM10	ThinkSlow	0.376	0.086	You feel that you are thinking very slowly. 你覺得自己思想很緩慢.
SM11	AbilityFear[SC4]	0.430	0.053	You are afraid of losing your working ability completely one day. 你害怕有一天會完全失去做事能力.
SM12	SleepDay[N]	0.502	0.083	Have you experienced: Wanting to sleep during daytime? 你是否有以下感覺：白天想睡覺
SM13	Bodyaches	0.596	0.081	You have bodily aches and pains. 你感到渾身疼痛.
SM14	Jointaches[N]	0.712	0.083	Have you experienced: Jointaches? 你是否有以下感覺：關節痛
SM15	Heart	0.820	0.086	You have heart palpitations or chest discomfort. 你感到心跳加速或胸悶.
SM16	SexDesire[N]	1.072	0.133	Have you experienced: Low sexual desire or dysfunction? 你是否有以下感覺：性功能障礙
SM17	ThinkUnclear[N]	1.096	0.090	Have you experienced: Unable to think clearly? 你是否有以下感覺：頭腦不清醒
SM18	HeavyHead[N]	1.123	0.090	Have you experienced: Feeling of heaviness in head? 你是否有以下感覺：頭重
SM19	AppetiteLoss	1.130	0.089	You have poor appetite. 你感到沒有胃口.
SM20	Indigestion[N]	1.190	0.090	Have you experienced: Stomach bloating, or poor or uncomfortable digestion? 你是否有以下感覺：胃氣脹，消化不良造成的不適
SM21	Dizzy[N]	1.254	0.090	Have you experienced: Feeling faint or dizzy? 你是否有以下感覺：頭暈目眩
SM22	Light[N]	1.372	0.090	Have you experienced: Sensitivity to light? 你是否有以下感覺：對光敏感
SM23	Stomach	1.486	0.099	You have stomach pains or discomfort? 你感到胃痛或胃不舒服.
SM24	Tinnitus[N]	1.499	0.096	Have you experienced: Tinnitus (ringing sound in ears)? 你是否有以下感覺：耳鳴
SM25	Throat[N]	1.543	0.097	Have you experienced: Throat discomfort or soreness? 你是否有以下感覺：喉嚨不適或疼痛
SM26	Vision[N]	1.567	0.097	Have you experienced: Temporary unclear vision? 你是否有以下感覺：暫時性視覺模糊
SM27	ColdSweat[N]	1.655	0.099	Have you experienced: Cold sweat (due to fear)? 你是否有以下感覺：出冷汗（因害怕）
SM28	Hiccups[N]	1.953	0.113	Have you experienced: Hiccups? 你是否有以下感覺：打嗝
SM29	Nausea[N]	2.019	0.116	Have you experienced: Nausea or throwing up? 你是否有以下感覺：作嘔惡心或嘔吐
SM30	Stutter[N]	2.739	0.138	Have you experienced: Stutter? 你是否有以下感覺：口吃

Note. Items are ordered top to bottom from easiest to endorse (mild) to most difficult to endorse (severe).
[N] Item is from the checklist of somatic symptoms associated with neurasthenia. [P] Item also belongs to psychological dimension, with the item number indicated. [SC] Item also belongs in the social dimension, with the item number indicated.

Table 6.

Social Dimension: Parameter Estimates from Multidimensional Analysis and Item Text

Item No./Label	Difficulty Estimate	Error	Item Text
SC1 Helpless[P6]	0.290	0.057	You feel very helpless. You feel you have no way to change your own fate. 你感到很無助。你感到沒有辦法改變自己的命運.
SC2 Lonely	0.369	0.087	You feel very lonely. 你感到很寂寞.
SC3 NotGood	0.390	0.084	You feel like no matter how hard you try, you can't be as good as other people. 你感到不論你多努力都比不上別人.
SC4 AbilityFear[SM11]	0.430	0.053	You are afraid of losing your working ability completely one day. 你害怕有一天會完全失去做事能力.
SC5 Useless[P12]	0.638	0.056	You feel useless. 你覺得自己沒用.
SC6 HideProbs	0.649	0.085	You hide your life difficulties from other people. 你隱瞞自己生活有困難.
SC7 Hopeless[P14]	0.740	0.057	You feel hopeless. 你感到沒有希望.
SC8 NotTalk	0.817	0.086	You don't want to talk. 你不想說話.
SC9 Meaningless[P15]	0.829	0.057	You feel life is meaningless. 你感到做人沒有意思.
SC10 NoRespect	0.905	0.090	You feel you don't have the kind of respect from work and family that you should have. 你覺得在家中和工作的地方得不到應該有的尊重.
SC11 OwnFault	0.923	0.088	You feel everything is your fault. 你感到所有問題都是自己的錯.
SC12 LostFace	0.924	0.084	You think you made your family lose face. 你感到讓親人丟臉.
SC13 Socialize	0.974	0.087	You don't want to have contact with people, socialize, or go out at all. 你完全不想和別人接觸，交往，或外出.
SC14 Burden[P17]	1.021	0.058	You feel you are a burden to your family and society. 你覺得自己是家人和社會的負擔.
SC15 Blaming	1.155	0.094	You strongly blame your family members or partner for your life difficulties. 當你生活有困難，你強烈地埋怨家人或伴侶.

Note. Items are ordered top to bottom from easiest to endorse (mild) to most difficult to endorse (severe).
[P] Item also belongs to psychological dimension, with the item number indicated. [SM] Item also belongs in the somatic dimension, with the item number indicated.

Table 7.

Comparing Reliabilities of Three Approaches of Data Analysis

	Analytic Approaches		
Dimension	Composite	Consecutive	Multidimensional
Psychological			
EAP/PV	n/a	.960	.969
MLE	n/a	.926	.907
Somatic			
EAP/PV	n/a	.958	.969
MLE	n/a	.913	.908
Social			
EAP/PV	n/a	.923	.966
MLE	n/a	.844	.776
Composite Depression			
EAP/PV	.990	n/a	n/a
MLE	.958	n/a	n/a

Note. The multidimensional EAP/PV estimates are closer to The estimate of the composite approach than the consecutive estimates. The higher EAP/PV estimates are likely more accurate than the lower MLE estimates since the EAP/PV procedure produces better accuracy with small sample sizes. A larger sample would likely increase the MLE estimates in general, and such that the multidimensional estimates would also be higher than the consecutive estimates.

Table 8.

Correlations between Depression Dimensions

	Psychological	Somatic	Social
Psychological	1.000	0.898	0.922
Somatic	0.941	1.000	0.837
Social	0.975	0.914	1.000

Note. Multidimensional correlations are shown below the diagonal. Correlations of logit scores from the consecutive (unidimensional) models are shown above the diagonal. The consecutive estimates are attenuated by measurement error, and are lower than the multidimensional correlations, which are estimated simultaneously with the variance-covariance matrix.

Table 9.

Distribution of Participants Across Patterns of Discrepant Usage of Dimensions

		Psychological or Social Patterns						Somatic Patterns			
		P	SM	SC	P	SM	SC	P	SM	SC	P	SM	SC
Score Range	Total	+	-	+	+	-	-	-	-	+	+	+	-	-	+	-
Mild-Moderate:																
f	24		3			2			7			5			7	
%	100.0%		12.5%			8.3%			29.2%			20.8%			29.2	
Moderate-Severe:																
f	28		11			7			3			3			4	
%	100.0%		39.3%			25.0%			10.7%			10.7%			14.3%	

Note. Only the 52 participants (22.9% of total sample) who were flagged as having discrepant scores above a threshold of 0.5 on the DI_p indicator (sum of squares of the difference of the mean dimension score and the score of each dimension) are included in this table. '+' indicates that the participant scored relatively higher on the dimension compared to dimensions with '-'. Determination of the pattern for each participant was based on visual inspection. The mild-moderate group includes participants who had a composite raw score of 25-74 (i.e., 14.1%-41.8% of total possible points). The moderate-severe group includes those who had a composite raw score of 75 or higher (i.e., 42.4% or more of total possible points).

Table 10.

Illustration of Differential Dimensional Distress Patterns of Participants with Similar Overall Scores

Participant (DI_p)	Dimension Score		
	Psychological	Somatic	Social
Three participants who scored low (23% of total) on overall depression:[a]			
Mr. Leong (0.458)			
Raw score (% of total)	21	20	**29**
Logit Estimate (SD)	-0.65 (0.35)	-0.34 (0.26)	0.29 (0.31)
Mrs. Wang (0.931)			
Raw score (% of total)	22	**30**	**9**
Logit Estimate	-0.33 (0.34)	0.25 (0.23)	-1.11 (0.51
Mrs. Wu (2.245)			
Raw score (% of total)	**35**	13	**56**
Logit Estimate (SD)	0.03 (0.29)	-.91 (0.32)	1.21 (0.30)
Three participants who scored moderately high (59% of total) on overall depression:[b]			
Mr. Chan (0.886)			
Raw score (% of total)	**76**	50	64
Logit Estimate (SD)	2.06 (0.30)	0.90 (0.20)	0.91 (0.30)
Mrs. Mei (1.112)			
Raw score (% of total)	44	**71**	40
Logit Estimate (SD)	0.61 (0.28)	1.74 (0.22)	0.33 (0.29)
Mr. Kwong (1.494)			
Raw score (% of total)	51	57	**82**
Logit Estimate (SD)	0.49 (0.28)	1.15 (0.20)	2.20 (0.39)

Note. Names are false. Overall depression scores are the total of raw scores of items from all three dimensions, with items belonging to two dimensions counted only once.
[a] These participants scored 41 or 42 out of a possible 177 points on overall depression.
[b] These participants scored 104 or 105 out of a possible 177 points on overall depression.

Table 11.

Intercorrelations of Dimensional and Composite Depression Scores with the Depression Criterion, Neurasthenia, and Acculturative Stress

Model	Depression* Criterion	Neurasthenia* Diagnosis	Acculturative** Stress
Multidimensional:			
Psychological			
Raw	0.601	.713	.688
Logit	0.572	.685	.661
Somatic			
Raw	0.584	.707	.652
Logit	0.543	.669	.615
Social			
Raw	0.604	.685	.663
Logit	0.575	.657	.623
Composite:			
Raw	0.614	.731	.689
Logit	0.579	.695	.652

Note. The depression criterion refers to clinical and community subsamples, in which the former consists of individuals with major depression or dysthymia who were receiving treatment in community and private clinics. Correlations with the depression criterion may be biased downwards due to some clinical participants being asymptomatic at the time of interview. Neurasthenia diagnosis was assessed with a self-report measure based on CCMD-2 criteria. Acculturative stress was assessed with the Acculturative Stress Questionnaire-14, a self-report checklist. The depression criterion and neurasthenia diagnosis correlated only moderately (0.533).
*Point biserial correlation (r_{bp}).
**Pearson product moment correlation of total scores (r).

Table 12.

Receiver Operating Curve Analysis and Rate of Correct Classification of Dimensional and Composite Depression with Depression Criterion and Neurasthenia

	Depression Criterion		Neurasthenia Diagnosis	
Model	AUC	Correctly Classified	AUC	Correctly Classified
Multidimensional:				
Psychological	.851	.770	.926	.848
Somatic	.845	.770	.926	.831
Social	.853	.774	.908	.830
Composite:				
Overall	.858	.779	.932	.844

Note. The depression criterion refers to clinical and community subsamples, in which the former consists of individuals with major depression or dysthymia who were receiving treatment in community and private clinics. Correlations with the depression criterion may be biased downwards due to some clinical participants being asymptomatic at the time of interview. Neurasthenia diagnosis was assessed with a self-report measure based on CCMD-2 criteria. Rates of correct classification were determined with optimal cutoff scores derived from Receiver Operating Curve analysis. AUC is the area under the Receiver Operating Curve.

Table 13.

Subgroups Used for Analysis of Differential Item Functioning

	f	%
Gender		
Male	104	45.8%
Female	123	54.2%
Age		
40 or under	78	34.4%
Over 40	149	65.6%
Education		
Less than High School	61	26.9%
High School or above	166	73.1%
Years in U.S.		
7 or fewer	93	41.0%
Over 7	134	59.0%
Acculturation		
Low	80	35.7%
High	144	64.3%
Somatic Distress		
Low	57	25.3%
High	168	74.7%
Neurasthenia		
Not Diagnosed	110	48.9%
Diagnosed	115	51.1%

Note. Percentages are based on valid frequency. Acculturation groups were based on the Acculturation of Chinese to the U.S. Questionnaire (ACC-US-11); the 'low' group scored below 14 and the 'high' group scored 14 or above. Somatic distress groups were based on the 30 items of the somatic dimension; the 'low' group scored below 40 and the 'high' group scored at least 40.Cutoff scores were derived empirically to demonstrate the strongest presence of differential item functioning.

Table 14.

Differential Item Functioning by Gender and Age: Ease of Endorsability and Effect Size

Item No./Label		Gender		Age	
Psychological and Social Items					
Easier to endorse for males or those who are younger:					
P4	Bored	M > F	0.410	Y > O	0.256
P21	Suicidal	M > F	0.300		
SC8	NotTalk	M > F	0.292		
SC10	NoRespect	M > F	0.256		
SC2	Lonely	M > F	0.232	Y > O	0.268
P2	Troubled			Y > O	0.230
Easier to endorse for females or those who are older:					
P18	Crying	**F > M**	**0.706**		
P15/SC9	Meaningless	F > M	$0.226^{P}/0.242^{SC}$		
P19	Psychotic			**O > Y**	**0.762**
Somatic Items					
Easier to endorse for males or those who are younger:					
SM30	Stutter	**M > F**	**0.642**	Y > O	0.266
SM9	GetStarted			***Y > O***	***0.456***
SM27	ColdSweat			Y > O	0.388
SM29	Nausea			Y > O	0.378
SM4	Tired			Y > O	0.332
SM12	SleepDay			Y > O	0.306
SM1	Fatigue			Y > O	0.258
SM5	Concentrate			Y > O	0.212
Easier to endorse for females or those who are older:					
SM6	Memory	F > M	0.324		
SM18	HeavyHead	F > M	0.316		
SM21	Dizzy	F > M	0.296		
SM13	Bodyaches	F > M	0.262	O > Y	0.282
SM14	Jointaches	F > M	0.238	O > Y	0.290
SM10	ThinkSlow	F > M	0.212		
SM16	SexDesire			**O > Y**	**1.190**
SM20	Indigestion			O > Y	0.334
SM24	Tinnitus			O > Y	0.256
SM2	AbilityLoss			O > Y	0.214

Note. Statistically significant differences (p <.05) are indicated with '>' or '<'. For example, 'M > F' means the item is easier to endorse, and scored higher by males than females who have the same level of depression. M = males; F = females; Y = younger (age 40 or under); O = older (over age 40). Effect sizes are in logits. Bolded text indicates a 'large' effect size that is greater than .638 logits, and bolded and italicized text indicates an 'intermediate' effect that is .426-.638 logits.

Table 15.

Differential Item Functioning by Education, Years in U.S., and Acculturation: Ease of Endorsability and Effect Size

Item No./Label		Education	Years in U.S.	Acculturation
Psychological and Social Items				
Easier to endorse for those with more education and exposure to US:				
SC10	NoRespect	***M > L 0.482***		M > L 0.324
P21	Suicidal	M > L 0.272		**M > L 0.656**
SC8	NotTalk	M > L 0.270		
P1	Stress	M > L 0.340	~~L > M 0.338~~	
P10	Anhedonia	M > L 0.324		
P20	Hurtself	M > L 0.266	M > L 0.310	***M > L 0.576***
P15/SC9	Meaningless	M > L 0.226[P]		
P2	Troubled	M > L 0.226		
P11	OwnFault			M > L 0.314
P19	Psychotic	~~L > M 0.404~~	***M > L 0.538***	
SC12	LostFace		***M > L 0.426***	
Easier to endorse for those with less education and exposure to US:				
P17/SC14	Burden	***L > M 0.454***[P]/***0.448***[SC]		
P19	Psychotic	L > M 0.404	~~M > L 0.538~~	
P8	Ruminate	L > M 0.236		
P4	Bored		L > M 0.388	L > M 0.232
P1	Stress	~~M > L 0.340~~	L > M 0.338	
SC2	Lonely		L > M 0.312	
P13	Angry		L > M 0.292	
P12/SC5	Useless			***L > M 0.436***[P]/0.330[SC]
P14/SC7	Hopeless			L > M 0.304[P]
Somatic Items				
Easier to endorse for those with more education or exposure to US:				
SM1	Fatigue	M > L 0.222		
SM27	ColdSweat		M > L 0.260	
SM30	Stutter		M > L 0.408	***M > L 0.426***
SM22	Light		M > L 0.258	
SM12	SleepDay			M > L 0.232
SM28	Hiccups			M > L 0.240
Easier to endorse for those with less education or exposure to US:				
SM16	SexDesire	***L > M 0.432***		
SM26	Vision	L > M 0.362		
SM10	ThinkSlow	L > M 0.312		L > M 0.324
SM11/SC4	AbilityFear	L > M 0.268		
SM13	Bodyaches	L > M 0.242		
SM8	Decisions		***L > M 0.554***	
SM25	Throat		L > M 0.376	
SM2	AbilityLoss			L > M 0.238
SM24	Tinnitus			L > M 0.316

Note. Statistically significant differences (p <.05) are indicated with '>' or '<'. For example, 'M > L' means the item is easier to endorse, and scored higher by those with "More" education than those with "Less" education who have the same level of depression. Effect sizes are in logits. 'Acculturation' refers to the total score on the Acculturation of Chinese to the U.S. Questionnaire (ACC-US-11). L = Less (less than high school education, 7 or fewer years in U.S., 13 or fewer points on ACCUS-11), M = More (high school or above education level, more than 7 years in U.S., 14 or more points on ACC-US-11. Bolded text indicates a 'large' effect size that is greater than .638 logits, and bolded and italicized text indicates an 'intermediate' effect size that is .426-.638 logits. A crossed out effect size indicates that it does not match the direction of endorsability under examination. [P]Effect size of the item found in the psychological (unidimensional) model. [SC]Effect size of the item found in the social (unidimensional) model.

Table 16.

Differential Item Functioning by Neurasthenia Diagnosis and Somatic Distress: Ease of Endorsability and Effect Size

Item No./Label		Neurasthenia Diagnosis		Somatic Distress	
Psychological and Social Items					
Easier to endorse for those with neurasthenia or more somatic distress:					
P19	Psychotic	***Yes > No***	***0.428***		
P16	Afraid	Yes > No	0.364	M > L	0.292
P15/SC9	Meaningless	Yes > No	0.222^{P}	M > L	$0.320^{P}/0.262^{SC}$
SC12	LostFace			M > L	0.334
P14/SC7	Hopeless			M > L	0.272^{P}
P10	Anhedonia			M > L	0.240
Easier to endorse for those without neurasthenia or less somatic distress:					
P1	Stress	No > Yes	0.422	***L > M***	***0.428***
P13	Angry	No > Yes	0.394	L > M	0.338
P11	Irritated	No > Yes	0.344	L > M	0.304
P21	Suicidal	No > Yes	0.304		
SC15	Blaming			***L > M***	***0.426***
SC10	NoRespect			L > M	0.276
P4	Bored			L > M	0.238
Somatic Items					
Easier to endorse for those with neurasthenia:					
SM22	Light	***Yes > No***	***0.590***		
SM27	ColdSweat	***Yes > No***	***0.572***		
SM21	Dizzy	Yes > No	0.306		
SM11/SC4	AbilityFear	Yes > No	0.278		
Easier to endorse for those without neurasthenia:					
SM25	Throat	***No > Yes***	***0.502***		
SM14	Jointaches	No > Yes	0.316		
SM23	Stomach	No > Yes	0.314		
SM20	Indigestion	No > Yes	0.310		
SM24	Tinnitus	No > Yes	0.246		
SM26	Vision	No > Yes	0.240		
SM8	Decisions	No > Yes	0.232		

Note. Statistically significant differences ($p < .05$) are indicated with '>' or '<'. For example, 'L > M' means the item is easier to endorse, and scored higher by those who have a "Less" somatic distress than those who have "More" somatic distress who have the same level of depression. L = Less (less than 40 points on SOMA-30), M = More (40 or more points on SOMA-30); No = Not Diagnosed with Neurasthenia; Yes = Diagnosed with Neurasthenia. Bolded text indicates a 'large' effect size that is greater than .638 logits, and bolded and italicized text indicates an 'intermediate' effect that is .426-.638 logits.

[P]Effect size of the item found in the psychological (unidimensional) model.

[SC]Effect size of the item found in the social (unidimensional) model.

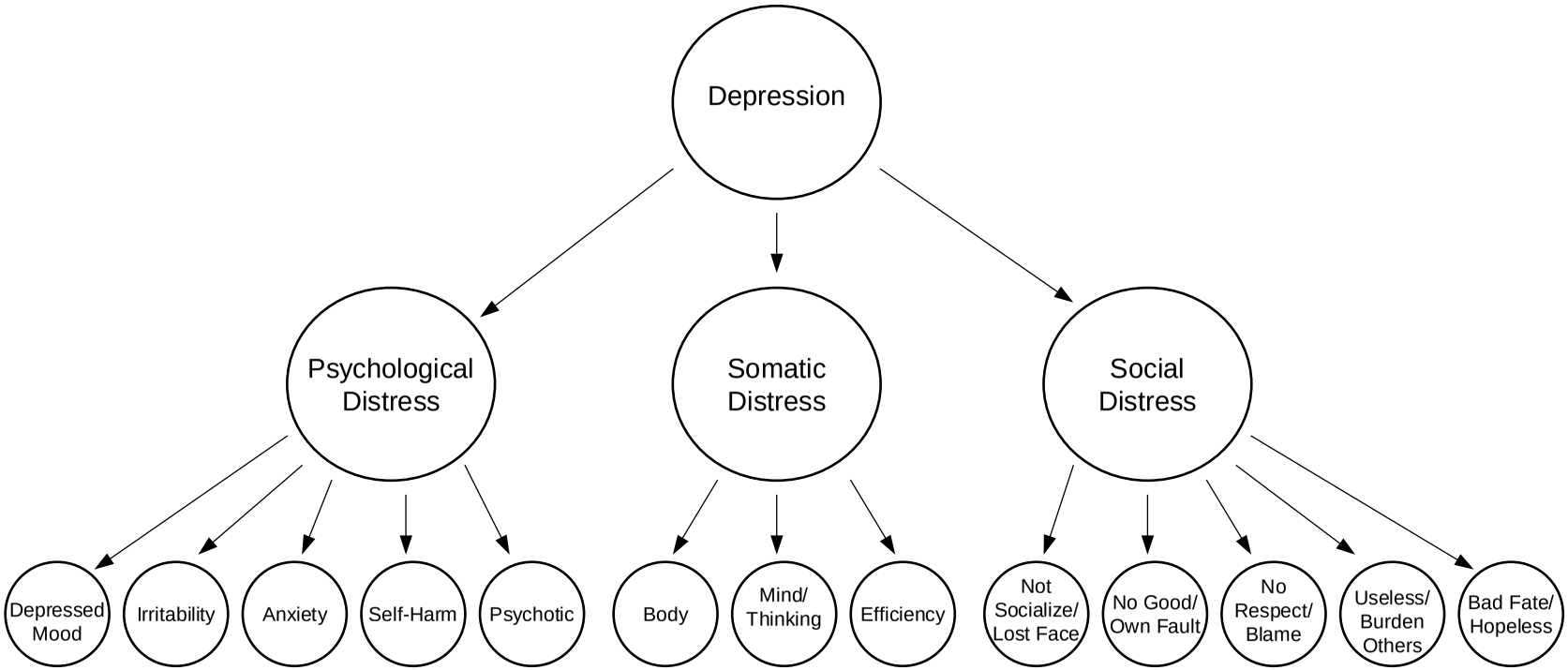
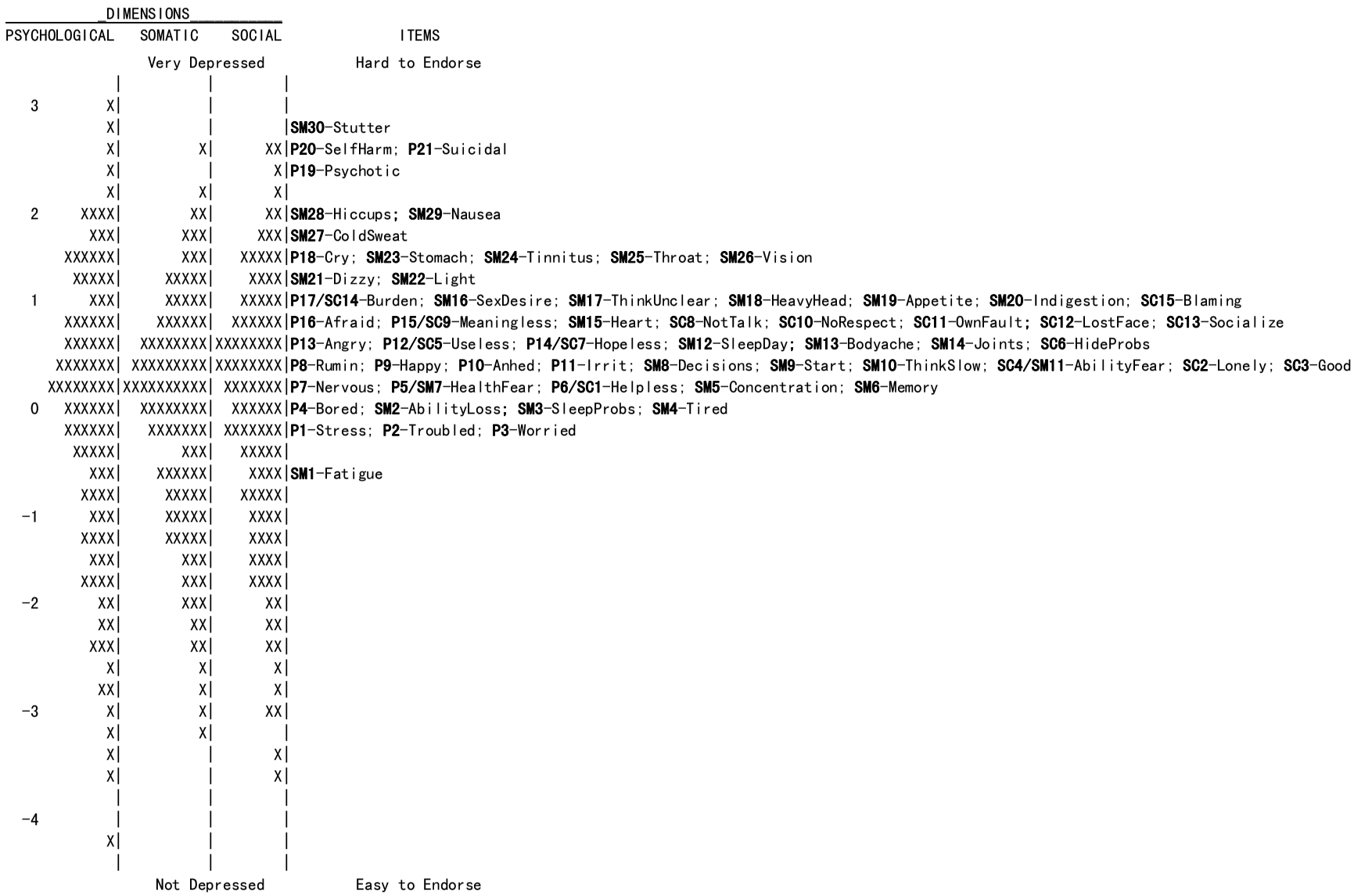


Figure 1. Multidimensional depression construct: Three dimensions of distress and symptom groups.

Figure 2. Wright map: Distribution of persons and item parameter locations in multidimensional analysis of depression.



Note. The mean of the person distributions was set to zero logits in the analysis. Thus, the relative locations of the three person distributions are not shown. Each 'X' represents 2.1 cases. P = psychological item; SM = somatic item; SC = social item

Figure 3. Distribution of overall depression scores by clinical and community subsamples.

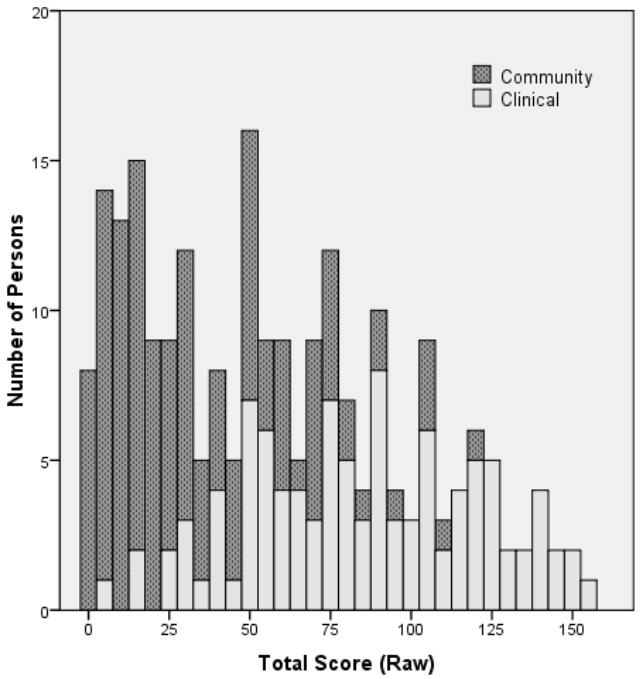


Figure 4. Distribution of overall depression scores by diagnosis of neurasthenia.

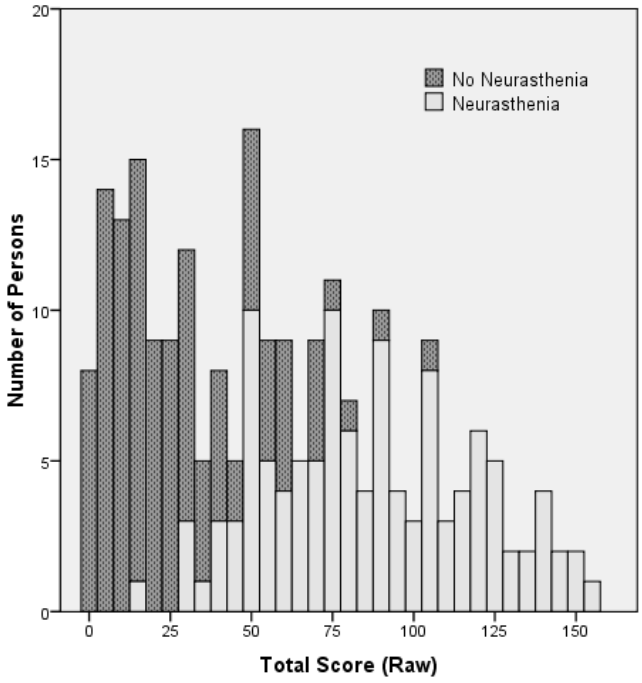


Figure 5. Dimension scores of three participants who scored low (23% of total possible points) on overall depression.

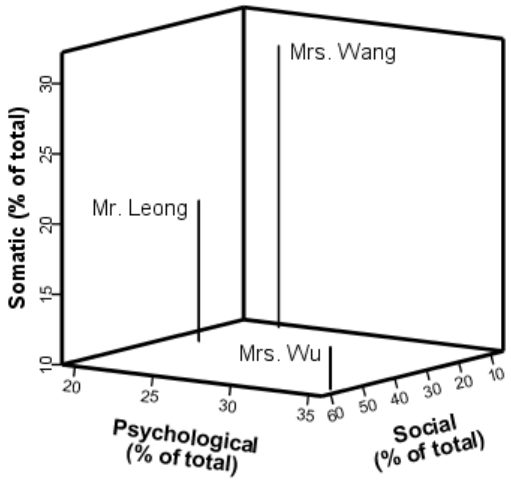
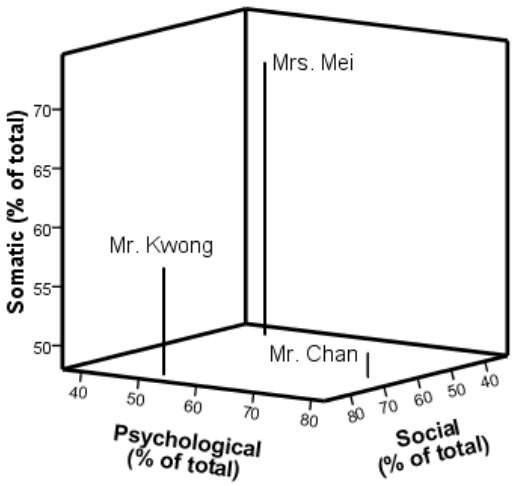


Figure 6. Dimension scores of three participants who scored moderate (59% of total possible points) on overall depression.



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STUDY 3

The Chinese American Depression Scale (CADS-9): Development of a culture-specific screening measure for immigrant adults using Rasch item response modeling

ABSTRACT

We used an item response modeling approach to develop a self-report depression measure for screening Chinese American immigrant adults in primary care and community settings. Depressed outpatients (n = 103) and community members (n = 124), ages 21-60, completed the 47-item pilot Chinese American Depression Scale, the Patient Health Questionnaire Depression Module (PHQ-9), the Acculturative Stress Questionnaire (ASQ-14), and a diagnostic measure of neurasthenia (NT). A unidimensional Rasch Partial Credit model of 42-items with Western and culture-specific content in psychological, somatic, and social domains fit the data. Analysis of differential item functioning by gender, age, and acculturation variables revealed non-equivalent items, and an important influence of acculturation variables on the expression of the construct. We comprised a 9-item measure (CADS-9) that was unbiased by gender, with high reliability (MLE: 0.846; EAP/PV: .904, and Cronbach's α = 0.912), and moderate correlation with clinical diagnosis (r_{bp} = 0.577). With consideration of the screening objective, CADS-9 outperformed PHQ-9 on content validity, although both had similar indicators of reliability and validity. Using separate ROC-derived cutoff scores for each gender, CADS-9 correctly classified 76.6% of the sample, and provided near equal specificity for men (0.789) and women (0.785). These indicators likely underestimated true probabilities since some community participants had undiagnosed depression and some clinical participants were asymptomatic. Correlations of CADS-9 with PHQ-9 (r = 0.885), and ASQ-14 (r = 0.691) and NT (r_{bp} = 0.705) demonstrated concurrent and convergent validity, respectively. These findings raise implications concerning the role of culture-specific and Western symptoms in diagnosis and screening, and support research to validate CADS-9 in a screening intervention.

Chinese Americans have one of the lowest rates of utilization of mental health services among all minority ethnic groups in the U.S. (Abe-Kim et al., 2007; Herrick & Brown, 1998; Snowden & Cheung, 1990; Sue & McKinney, 1975; Zhang, Snowden, & Sue, 1998). This disparity in the treatment of depression has been attributed to cultural barriers that hinder the decision to use mental health services. These barriers include problems of language, limited knowledge of mental illness and Western treatments (Lin, 1985; Tseng, 1975), low direct access to mental health consultation (Hong, Lee, & Lorenzo, 1995), cultural beliefs (e.g., stigma, fate, self-blame) (Abe-Kim, Takeuchi, & Hwang, 2002; Kung, 2004; Yeung & Kam, 2008), and the view of medical care as the appropriate intervention (Ying, 1990). Associated with these barriers, illness behaviors include seeking help in primary care and community settings rather than mental health clinics (Takeuchi, Sue, & Yeh, 1995), and denying the need for help and delaying treatment until the condition is extremely deteriorated (Kung, 2003, 2004; Lin, Inui, Kleinman, & Womack, 1982; Okazaki, 2000a; Ying & Miller, 1992). Thus, the literature has indicated the need for effective linkage of individuals to mental health care (Sue & Zane, 1987). Given the high estimated prevalence of depressive disorders among immigrants who present in primary care (e.g., 19.6%, Yeung, Yu, Fung, Vorono, & Fava, 2006), researchers have focused attention on effective screening and treatment in this setting as a means of addressing this problem (Chen, Huang, Chang, & Chung, 2006; Huang, Chung, Kroenke, Delucchi, & Spitzer, 2006; Yeung, Howarth, et al., 2002; Yeung, Kung, et al., 2004). An accurate assessment tool that has cultural acceptability is a basic building block of this type of intervention (Chen et al., 2006; Yeung, Howarth, et al., 2002).

Investigators have tested translations of various self-report symptom checklists, which are intended for convenient and mass application, with low-income immigrants. They examined the Chinese Beck Depression Inventory (CBDI; Yeung, Howarth, et al., 2002; Yeung, Neault, et al., 2002) and the Patient Health Questionnaire Depression Module (PHQ-9) for screening in primary care (Chen et al., 2006; Huang et al., 2006; Yeung et al., 2008; Yeung, Yu, Fung, Vorono, & Fava, 2006), and the Center for Epidemiologic Studies Depress Scale (CES-D) detecting depression in the community (Rankin, Galbraith, & Johnson, 1993; Kuo, 1984; Ying, 1988). Two notable problems concerning cultural validity appeared in these investigations. First, some symptom concepts were invalid or appeared to function differently from other ethnic samples (Huang et al., 2006; Ying, 1989). Second, there were very high non-completion (Ying, 1988) and refusal rates (e.g., 38.3%, Yeung et al., 2006) especially when the patient was expected to self-administer the screening instrument (Yeung, Howarth, et al., 2002; Yeung, Neault, et al., 2002). A small body of research that revealed a culturally based conceptualization of depression sheds light on this measurement problem (Yeung, Chang, et al., 2004; Ying, 1990). Specifically, Chinese immigrants conceptualized depression experience as psychological, somatic, and interpersonal. How this conceptualization impacts the presentation of depression, and the practical problem of obtaining additional assessment efficacy, has been little explored (Chen, Guarnaccia, & Chung, 2003; Leong, Okazaki & Tak, 2003; Yeung & Kam, 2008; Yeung, Neault, et al., 2002; Zheng & Lin, 1991). Finally, very low rates of major depression in primary care using the PHQ-9, such as 3.2% (Yeung et al., 2006) and 4.1% (Chen et al., 2006) also suggest a hypothesis of sub-optimal validity.

From the viewpoint that depression manifests itself uniquely across cultures (Marsella, Kinzie, & Gordon, 1973), we aimed to develop a self-report depression measure that considers the culturally based conceptualization of Chinese immigrant adults, and has validity and viability for screening primary care patients and community members in social services agencies. To

achieve these aims, we employed an item response modeling approach to measure construction (Wilson, 2005), and conducted the investigation in the natural setting. We first formulated a construct that describes the cultural manifestation of depression to be measured, and developed a large pool of pilot items through qualitative interviews with depressed outpatients and clinical experts in medical and community settings. We then administered the pilot scale to individuals diagnosed by clinicians in the community, and non-diagnosed community members. Next, we fit an item response Rasch Partial Credit Model (PCM; Masters, 1982; Masters & Wright, 1996) to the data, and used its information on item fit and functioning to choose items to comprise a brief screening measure. Finally, we assessed validity based on the study criterion and external measures. With this study, we hoped to contribute to knowledge of how cultural elements can improve the effectiveness of the assessment instrument, which may be critical for linking this cultural group with mental health care.

DEPRESSION MEASUREMENT

The development of a new depression measure based on the conceptualization of a cultural group is not an unusual endeavor in the context of the diversified tradition of self-report symptom checklists in the U.S. A large number of self-report symptom checklists (287) have been developed for different populations and contexts since the first, published in 1918, through 2000 (Santor, Gregus, & Welch, 2006). Fifty measures were developed through 1969, 120 from 1970-1989, and 117 more from 1990-2000, with the rate of growth slowing only after 2000. Seventy of these checklists were used in basic science and treatment outcome research from 1990-1999. Such checklists were intended for application in basic science and treatment research rather than diagnose depression, which is the role of diagnostic interview instruments. These instruments aimed to measure a variety of conceptual frameworks, such as psychodynamic (Arieti & Bemporad, 1980), attachment (Bowlby, 1969), interpersonal (Coyne, 1976), behavioral (Lewinsohn, Youngren, & Grosscup, 1979), and cognitive (Beck, 1963). They also exhibited large variability in terms of the types of symptom domains, the proportion of items assessing a symptom domain, and the number of different items and verbal expressions used to assess different symptoms (Snaith, 1993; Santor et al., 2006). Thus, the introduction of a measure that has cultural content and is intended for the purpose of intervention in a specific context can be viewed as fulfilling a conceptual niche.

In the construction of a new measure, it is important to consider the level and types of differences of content that are appropriate given that some degree of equivalence of construct definitions and operational criteria is necessary to ensure scientific rigor (Suppes, 1977). Although depression checklists are intended to measure the same construct, there has been significant heterogeneity of content across measures developed through 2000, and even the five most commonly used ones (Santor et al., 2006). These measures contain 16 symptom domains, most of which are consistent with DSM-IV depression criteria (American Psychiatric Association, 2000). The first and third most common were depressed mood and anhedonia, considered the original core domains of depression, which were present in 100% and 67%, respectively, of all measures. The second most common domain (67%) was worthlessness, which, along with other cognitive features, became prominent with the introduction of cognitive theories of depression (Beck, 1963; Bibring, 1953). Other cognitive and behavioral domains were: suicide (60%), hopelessness (57%), agitation (48%), crying (43%), and social withdrawal (23%). The somatic and concentration domains were: sleep disturbances (62%), low energy

(60%), appetite disturbances (50%), and concentration (52%). Nearly half of checklists assessed anxiety (46%), which is inconsistent with the DSM-IV, and irritability (42%) domains, which the DSM-IV considers a criterion for children. The two least used domains were decreased libido (17%) and no interest in others (9%). This range of domains demonstrates that a breadth of content areas can be appropriate to the depression construct, depending on the conceptual framework and purpose of the measure. The main guideline for scientific rigor remains a practical demonstration of validity with an external criterion (Santor, 2005), as well as a substantive rationale (Suppes, 1977).

MEASUREMENT OF DEPRESSION IN CHINESE

The literature of the study of depression measurement in Chinese in the U.S. and other countries supports the development of a culture-specific scale to examine problems of content validity that have been raised but not closely examined in the U.S. This area of study has traversed various phases. The main focus in the U.S. and abroad has been the validation of scales with literal translation of items. To address the poor item face validity, some researchers abroad studied Chinese verbal styles and linguistically equivalent symptom expressions (Zheng, Xu, & Shen, 1986), and adapted western scales by eliminating invalid western concepts and adding culture-specific ones (Chan, Parker, Tully, & Eisenbruch, 2007; Cheng & Williams, 1986; Cheng, Wu, Chong & Williams, 1990; Lin, 1989; Zheng & Lin, 1991). Overall, this literature indicates sub-optimal content validity of Western measures for assessing depression in Chinese. That is, the valid construct of depression for Chinese likely contains some or most, but not all Western symptom concepts, and also integrates culturally unique somatic and social expressions. However, a trend toward the dominance of a few measures that appear to be psychometrically fit contributes to obscuring this problem (Leong et al., 2003).

In the investigation of translated self-report scales developed in the U.S., researchers generally concluded that these measures had satisfactory reliability and validity for use with ethnic Chinese. In the U.S., researchers investigated the CBDI (Yeung, Howarth, et al., 2002; Yeung, Neault, et al., 2002), CES-D (Kuo, 1984; Rankin et al., 1993; Ying, 1988), PHQ-9 (Chen et al., 2006; Huang et al., 2006; Yeung et al., 2004), and Geriatric Depression scale (GDS; Mui, Kang, Chen, & Domanski, 1996). In Hong Kong, China, and Taiwan (Leong & Okazaki, 2003), researchers most frequently examined the CBDI (Zheng & Lin, 1991; Zheng, Wei, Goa, Zhang, & Wong, 1988), followed by the CES-D (Cheung & Bagley, 1998; Liu, 1995; Meng, 1997), Zung Self-Rating Scale for Depression (SDS; Chang, 1985; Lee, 1990; Lee et al., 1994), and Hamilton Rating Scale for Depression (HRSD; Zhao & Zheng, 1992; Zheng, Zhao, Phillips, & Liu, 1988). A principal limitation of these studies, which has not been raised, is the demonstration of cross-cultural validity with a diagnostic interview that is also defined by western nosology, rather than a culturally based criterion. This method of cross-cultural study is limited in two steps—the use of a translated Western instrument, and its comparison with another translated Western instrument. This approach assumes the validity of the western construct and content for Chinese and does not allow a true comparison with a cultural construct. Even though these studies concluded adequate reliability, they frequently questioned their degree of cultural sensitivity and provided some evidence of differential content. Furthermore, very high rates of returning blank CBDI (38.3%, Yeung et al., 2004) and PHQ-9 (27%, Yeung et al., 2006) forms by immigrants in primary care waiting rooms suggest a need to examine concepts for content validity and cultural acceptability for screening contexts.

The research of translated measures provided knowledge of the invalidity of item concepts by direct examination of item fit. However, only a handful of studies of Chinese Americans explored non-equivalence of item functioning (Chang, 1985; Chen et al., 2006; Huang et al., 2006; Kuo, 1984; Ying, 1988, 1989). In the U.S. studies, somatic items that showed non-equivalence of meaning compared to other ethnic groups were psychomotor abnormalities, and sleep and appetite abnormalities on the PHQ-9 (Huang et al., 2006), and psychomotor agitation and constipation on the SDS (Chang, 1985). In the psychological domain, the positive self-concept and positive affect items on the CES-D were consistently problematic in the U.S. (Kuo, 1984; Ying, 1988), and Asia (Cheung & Bagley, 1998; Yen, Robins, & Lin, 2000). These items queried being 'as good as other people,' 'hopefulness about the future,' 'feeling happy, and 'enjoying things.' Ying (1989; 2002) attributed this to the Chinese value of minimizing positive affect and de-emphasizing positive self-concept. Investigation of the CBDI in China revealed that seven of twenty-one symptom expressions correlated very poorly with the other items (Zheng et al., 1988). These were: loss of libido, sense of punishment, self-hate, self-accusation, crying spells, irritability, and somatic preoccupation. Research of the CBDI in the U.S. did not report item-level validity (Yeung, Neault, et al., 2002).

The research of translated measures also provided two indirect indications of poor content validity. First, the practice of setting cutoff scores to obtain the most predictive power for Chinese samples (Lee, Chiu, Kwok, & Leung, 1993; Woo et al., 1994; Yang, Soong, Kuo, Chang, & Chen, 2004; Yeung, Neault et al., 2002) suggests differential item functioning compared to the populations for which the original cutoffs were established. Also, the interpretation of typically lower mean scores for Chinese Americans as an artifact of cultural resilience (Hwang, Chun, Takeuchi, Myers, & Siddarth, 2005) obscures the hypothesis of under-recognition due to the invalid concepts (Hicks, 2002; Takeuchi et al., 2007). Similarly, the lower depression rates of Chinese American men compared to women also raise this question of non-equivalence. Second, considering first-order factors as an exploration of the degree to which items fit content domains, the common finding of un-interpretable factors for Chinese samples suggests a misfit. The majority of studies of White American samples supported four conceptually pure factors—depressed or negative affect, positive affect, somatic and psychomotor retardation, and interpersonal problems (Shafer, 2006). In contrast, studies of community Chinese typically revealed conceptually mixed factors with psychological, somatic, and interpersonal items loading together. Such mixed factors were derived for samples in the U.S. on the CES-D (Ying, 1988; Kuo, 1984) and the SDS (Chang, 1985), and in Asia on the CES-D (Boey, 1999; Cheung & Bagley, 1998), CBDI (Gupta & Yick, 2001; Yen et al.; 2000; Zheng et al., 1988), and Chinese HRSD (Zheng et al., 1988). The only pure factor found for Chinese was interpersonal problems on the CES-D (Cheung & Bagley, 1998; Kuo, 1984). Also, a structure of pure factors similar to that of White Americans derived for Chinese immigrant college students on the CES-D (Ying, Lee, Tsai, Yeh, & Huang, 2000) supported the association of content invalidity to lower acculturation.

A study in China of interpretations of western symptom terms revealed a culturally distinctive verbal style that sheds light on the problem of content validity (Zheng, Xu, & Shen, 1986). The researchers showed the non-equivalence of the majority of 16 key western concepts and three elements of a verbal style for expressing depression. First, respondents employed a psychological style that incorporated single-word feeling states, behaviorally or mind-focused descriptions of functioning, and philosophical or descriptive statements focusing on life rather than first person statements. For example, they used 'don't know how to deal with things' for

'indecisiveness,' and 'uncheerful,' 'unhappy,' or 'unenjoyable' for 'depressed,' and 'being alive is not interesting' for 'suicidal interest.' Also, the clinical group preferred the psychological to the somatic style for expressing 'depressed' compared with the community group, and the latter largely provided no interpretation for 'suicidal interest.' Second, respondents incorporated body words, especially the heart and brain, to describe psychological concepts. They also used behaviorally or contextually oriented somatic descriptions for western somatic terms. For example, 'heart beating' was used for 'fearful', 'don't want to do anything' for 'tired,' 'don't want to eat anything,' and 'no taste in my mouth' for 'poor appetite,' and 'no sexual energy due to poor health' for 'loss of sexual drive.' Third, interpersonal concepts and terms were commonly used for psychological key terms. For example, expressions described self-focused ethical behavior, such as 'want to apologize to others,' and 'ashamed because of bad actions' for 'guilt.' They also referred to being judged or social comparison, such as 'feel less capable than others' for 'failure,' and cut-off relationships, as in 'no one understands or cares about me' for 'hopelessness.'

Researchers abroad also attempted to achieve stronger validity by adapting Western scales with linguistically equivalent and idiomatic expressions. Two studies incorporated psycholinguistically equivalent expressions for items with poor face validity. Zheng & Lin's (1991) Chinese Depression Inventory (CDI) illustrates improved construct validity with psycholinguistically equivalent expressions. The CDI was composed of items from the BDI, SDS, and HRSD, with a large number of items replaced. For example, this measure replaced the terms for depression, suicide, sexual drive and sense of failure with 'being uncomfortable in one's heart,' 'being alive is not interesting,' 'not interested in the opposite sex,' and 'a weak person in life,' respectively. The CDI found pure and interpretable factors (suicidal intention/alarm, depression/retardation, irritability and anxiety, and somatic) consistent with the features of depression defined in the *Chinese Classification of Mental Disorders* (CCMD-2; Chinese Medical Association, 1995). The investigation of the CDI in the U.S. did not report factor structure, but similar predictive validity as the CBDI (Yeung, Neault, et al., 2002). Researchers in Australia found considerable improvement of reliability by adapting the Depression in Medically Ill (DMI-10; Chan, Parker, Tully, & Eisenbruch, 2007). For example, they replaced the terms 'vulnerable,' 'less worthwhile,' 'keeping a distance from others' with terms that mean 'emotions getting hurt,' 'not having usefulness,' and 'not willing to socialize.'

Researchers abroad also developed two new scales with western and indigenous items, which highlight the types of somatic and interpersonal content that are relevant to the Chinese construct. Lin's (1989) Chinese Depression Scale (CDS) retained CES-D psychological concepts of depressed mood, guilt, worthlessness, helplessness and hopelessness, and added common idioms related to social relations and unpleasant past events. The new items were: "I have felt I have a lot to talk about but can't find the opportunity to say it", "I feel suffocated," "I feel suspicious of others," "I don't think others trust me", "I don't think I can trust others", and "I remember unpleasant things from the past." The last item referred to experiences of disrupted social relationships during the Cultural Revolution. Cheng and colleagues developed the Chinese Health Questionnaire (CHQ) in Taiwan to assess psychiatric morbidity in the community based on a British measure (Cheng & Williams, 1986; Cheng, Wu, Chong & Williams, 1990). It contained six western items that queried psychological concepts of depression, anxiety, and sleep disturbance, and six culture-specific items that assessed somatic and interpersonal experiences (headache or pressure in head, heart palpitations and worry about heart trouble, chest discomfort

or pressure, limb numbness or shaking, getting along with family or friends, and worried about family or close friends).

CULTURAL CONCEPTUALIZATION OF DEPRESSION

The tradition of emic research in cultural psychology provides a framework of cultural relativism that clarifies the findings concerning the validity of Western measures of depression for Chinese. In particular, this literature provided explicit knowledge of a culturally based conceptualization of depression that contains somatic and socially oriented domains of distress that are largely absent from the Western construct. Direct knowledge of this culturally different construct supports the development of a scale from an emic approach that adequately and systematically considers the variations of content that are relevant to this construct. The cultural conceptualization of depression was revealed through the exploration of illness conceptions using Kleinman's (1980, 1988) "explanatory model of illness" interview (EM), and an adaptation of this framework, the Explanatory Model Interview Catalogue (Weiss, 1997). These interviews are intended to elicit the patient and family's conceptualization of the problem as a reflection of their sociocultural context (White & Marsella, 1982).

Two EM studies, one of immigrant women in the community, and the other of immigrants in primary care diagnosed with depression, found an integrated mind-body construct. In both studies, participants' explanations of illness combined psychological and physical causes and consequences (Yeung, Chang, et al., 2004; Ying, 1990, 2002). These findings are consistent with a cultural heritage rooted in traditional Chinese medicine (TCM), where mind, body and external forces interact dynamically, and there is no distinction between causes and symptoms (Chan, Ho, & Chow, 2001). The immigrant women's conceptions also demonstrated the presence of an interpersonal component of illness understanding. They all cited interpersonal conflict, not in the vignette, as a cause, chief problem, or most feared aspect of illness in their explanations. These findings reflect the Chinese cultural conception of the self as interdependent (Hsu, 1985), and the objective of socialization to avoid interpersonal conflict and social disapproval (Russel & Yik, 1996). The study of immigrant women furthermore distinguished two types of explanations. Regarding all elements of the interview—name, cause, consequence, impact, and course of illness—respondents presented an EM that was either primarily psychological (57%) or physical (30%). Nevertheless, every explanation contained an intermingling of psychological, somatic, and interpersonal elements. The somatic conceptualization may be associated with lower acculturation, considering that the study of EM in primary care (Yeung, Chang, et al., 2004) found lower acculturation to be associated with higher levels of somatic complaints.

Other areas of research strengthen the basic finding of a cultural conceptualization of depression. One area concerns somatization as a style of expression. Knowledge of a somatic component of Chinese expressions of distress began with Kleinman's observation that Chinese people somatized their psychological distress, and the seminal finding that 87% of neurasthenic patients could be reclassified with major depression (Kleinman, 1977). This observation stimulated a series of inquiries into the nature of somatization (Bridges & Goldberg, 1985; Gaw, 1974; Hsu & Folstein, 1997; Okazaki, 2000b; Tseng, 1975), including the EM studies of immigrants. Overall, several types of findings have negated the hypothesis that somatic reporting results from the denial or repression of emotional distress. Instead, these findings frame somatization as a cultural style of presentation. First, Kleinman himself clarified that the focus on physical symptoms represented an 'idiom of distress'—a socially sanctioned form of illness

behavior that occurs within cultural and political contexts (Kleinman, 1986). Second, body-related verbal expressions that are commonly used in Chinese language symbolize interpersonal disruptions, and are intended to communicate psychological distress metaphorically (Tung, 1994). Third, immigrants reported psychological content, particularly once a relationship was established with the clinician in psychotherapeutic settings (Sue, Zane, & Young, 2005), and in medical settings when directly queried with diagnostic instruments (Chen et al., 2006; Yeung Howarth, et al., 2002a; Yeung, et al., 2008).

With somatic complaints viewed as a style of expression, its importance in assessment of Chinese American immigrants is supported by the results of a major epidemiologic survey (Zheng et al., 1997), which also revealed an important relationship between somatic and psychological complaints, and the expression of neurasthenia (NT). Study findings included: (a) current depression, major depression (MD) or dysthymia, overlapped considerably with current NT (23.3% comorbidity); (b) NT was clinically salient with a 3.61% "pure" rate (i.e., not overlapping with any depressive or anxiety disorder); (c) the "pure" NT group scored significantly lower on psychological distress than the group with depression; and, (d) those with "pure" depression, comorbid depression and NT, and "pure" NT had similarly elevated somatization scores on the SCL-90-R somatization subscale. These findings highlighted the prominence of somatic content, especially a broad range of content, such as that found in the SCL-90-R somatization subscale. Second, measures that are lacking in somatic content, and strongly emphasize psychological symptoms may contribute to the under-recognition of mental illness, such as the "pure" NT group that is missed. For example, the BDI (Beck, 1961) and CES-D (Radloff, 1977) focus predominantly on depressed or negative affect, and minimally on interpersonal and somatic concepts, which are limited to agitation, appetite, and sleep disturbances (Shafer, 2006). However, this interpretation is based on an unsubstantiated hypothesis that NT may be a somatized, cultural expression of depression.

An area of literature that supports the social domain in the cultural conceptualization of depression concerns interdependent self-construal (Marsella, 1985; Markus and Kitayama, 1991). Marsella (1985) theorized the concept of self as the critical link between cultural variables and mental illness symptom manifestations. He characterized non-Western cultures as promoting an un-individuated self-structure which emphasizes interdependence in human relations, and a preference for conveying experiences with metaphorical language and images. Using Markus and Kitayama's (1991) framework of interdependent versus independent self-construal, researchers demonstrated the presence of an interdependent self-construal in Asian Americans, and its relationship to acculturation (Kwan, Bond, & Singelis, 1997; Singelis, Bond, Sharkey, & Lai, 1999). This literature examined self-construal in relationship to western measures of depression, social anxiety, and self-esteem for Asian Americans (Okazaki, 2002). Specifically, it was shown that relational concepts of subjective well being, as opposed to self-focused ones, were relevant for individuals from collectivistic cultures (Diener & Diener, 1995). For individuals who held an interdependent self-construal, relationship harmony across important dyadic relationships mediated life satisfaction (Kwan et al., 1999). Self-esteem concepts, which are individually oriented ideas, were less relevant for the interdependent self-construal group, as shown by their lower scores compared with individuals with independent self-construal (Singelis et al., 1999). Also, higher interdependent self-construal correlated weakly to moderately with social anxiety, which included fear of social evaluations and social avoidance (Okazaki, 1997). Thus, these findings demonstrated the experience of psychological distress in terms of social relationships especially for less acculturated Asian Americans.

The validity of a cultural conceptualization of depression is fundamentally related to the process of acculturation (Chen, Guarnaccia, & Chung, 2003; Takeuchi, Chun, Gong, & Shen, 2002; Ying, Lee, Tsai, Yeh, & Huang, 2000). It is less acculturated individuals who express higher levels of somatic complaints (Yeung, Chang, et al., 2004; Wong & Ujimoto, 1998), experience lower diagnostic recognition by physicians (Chung et al., 2003; Hicks, 2002), and are less likely to have sought help from specialty mental health services (Abe-Kim et al., 20072). Also, as acculturation proceeds, Asian immigrants pay more attention to affective rather than somatic experiences (Chen et al., 2003). Given that conceptualizations of illness change with increasing exposure to U.S. culture (Ying, 2002, 2000; Ying et al., 2000), the problem of construct validity applies to individuals who are little acculturated (Okazaki, 1997). The validity of the Western construct for more acculturated Chinese Americans may explain why U.S.-born Asian American women and Asian American men with higher English proficiency have higher rates of depressive disorders than immigrant women, and men with lower English proficiency, respectively, and also why second and later generations have rates similar to European Americans (Takeuchi et al., 2007). We reviewed a literature that regarded first generation Chinese Americans, and ethnic Chinese abroad that may inform assessment research for unacculturated Chinese Americans. However, the rate at which Chinese Americans will begin to express a construct of depression similar to that of Whites as they become exposed to U.S. society, and the clinical form of this process of change and its implications for culturally efficacious assessment are largely unknown (Takeuchi, 2007). Nevertheless, we expect that a cultural conceptualization is relevant for a large proportion of Chinese Americans, considering that over 68% are foreign-born, the vast majority (85% age 5 years and over) speaks Chinese at home, and half of adults speak English less than very well (U.S. Census Bureau, 2003). These indicators, and the fact that the majority of adults have little education (71% did not complete high school), suggest a slow process of acculturation.

ITEM RESPONSE MODELING

The item response modeling approach to constructing measures provided the logical steps and an item-based analytic method to develop a culture specific measure from an emic framework (Wilson, 2005). This approach serves the emic perspective by focusing the process of scale development on an explicit construct definition based on the cultural population's conceptualization. This definition then effectively guides the generation of items and responses, the composition of items for a meaningful empirical model, and the choice of items of the final brief measure. The approach entails four steps. This first is the definition of the theoretical construct that is the object of interest in the population. The construct is assumed to have a simple form of high to low, and considers the instrument's purpose and context of use. For example, in this study, the construct is the person's depression condition in the form of a range of severity. Its definition consists of a description of the persons who experience depression, the content that represents their experience, and the instrument's purpose to assess clinically salient depressive risk in community and primary care settings. This definition is presented visually in a construct map that shows the description and ordering of respondents and items. The second step is to design items that represent the theoretical description of content. The third step is the definition of an 'outcome space,' a set of possible responses to items that is meaningful for respondents and provides adequate information to discriminate respondents along the

measurement construct. The fourth step is to fit a model to the data that represents the defined theoretical construct.

Item response modeling provides many advantages for the analysis and measurement of psychological and behavioral constructs (Embretson & Reise, 2000; Wilson, Allen, & Li, 2006a, 2006b). We employed the PCM (Masters, 1982; Masters & Wright, 1996), one of the Rasch (1960) family of measurement models extended to polytomously scored items, to analyze the data. The Rasch model has demonstrated robustness in item discrimination for small samples (Bond & Fox, 2001; Linacre, 1994). This model places person ability and item difficulty on the same interval scale so that it is possible to make predictions about one variable from the other (Bond and Fox, 2001). It assumes unidimensionality for the practical purpose of creating a useful measurement model (Smith, 1996). All items that form the instrument support the measurement of the latent trait under study. The Rasch model also assumes local independence of responses to items, i.e., responses to a given item are independent from the responses to the other items in the instrument. This permits the production of objective measures of the latent trait that are neither dependent on the instrument, nor the participants of the study. If the data fit the model, then ordinal raw scores are transformed into objective measures expressed in linear units called 'logits' (logarithm of odds). This measurement unit has the property of maintaining the same size over the entire continuum, thus allowing the creation of an interval scale. The PCM is appropriate for analyzing Likert-scale responses to psychological phenomena because it assumes that each item has a unique structure of ordered response categories, or thresholds (Embretson & Reise, 2000). A 'threshold' is the point of equal probability of answering response options, such as '0' and '1' or above, on a 4-option Likert scale. For example, the distance between thresholds, or probabilities associated with answering 0, 1, 2, or 3, for an item on suicidal ideation is permitted to be different from the structure of thresholds for an item on concentration. The PCM estimates model parameters with an unconditional maximum likelihood estimation (MLE) procedure.

The empirical model is constructed through a process of iterative item reduction and recalibration to improve the model's measurement properties. The fit of the data to the Rasch model's expectations is evaluated at each step of item reduction through the analysis of residuals, the differences between the observed and expected answers to items by respondents. 'Infit' and 'Outfit' mean square statistics for items and threshold estimations are used to assess the fit of the data to the values expected by the model (Smith, 2000, Wright and Stone, 1979). Based on squared standardized residuals, this statistic is a transformation of the residuals to an expected value of 1.0, with a range from 0 to infinity. Values of 1.0 indicate that data meet the model's expectations. Values less than 1.0 indicate observations that are more predictable than the probabilistic model predicts, and values greater than 1.0 show unpredictability and, hence, noise. Infit statistics are weighted to give more value to on-target observations, and measures the match between patterns of responses to items and persons. Outfit statistics are unweighted estimates of the degree of fit of responses, and show the influence of off-target observations. It measures how precisely the item estimate predicts respondents' answers to the item. In Rasch modeling, aberrant infit values usually cause more concern than large outfit scores because they indicate a threat to the reliability and validity of the scale (Bond & Fox, 2001; Linacre, 2002). Reductions in deviance of the models and reliability coefficients also support the evaluation of improvements in relative fit as item reductions take place.

Item response modeling provides a tool, the analysis of differential item function (DIF), for developing a measure with minimal bias for subgroups of interest within the population that the

measure targets. This tool also aids in understanding variables that influence the expression of the measurement construct. DIF refers to differences in endorsability of an item between subgroups after controlling for their abilities (Bond & Fox, 2001). For example, men, compared to women who have the same level of depression, may find 'crying' much more difficult to endorse, and, as a result, score much lower on this item than women. These differences can be understood substantively as differences in experiences, willingness to report, or other factors concerning the meaning or relevance of the symptom to the construct of depression for the subgroup. In essence, the item response approach estimates DIF by calibrating a separate model for each subgroup in order to observe: (a) significant differences in estimated item locations, and (b) differences in logit values between subgroups as an indicator of effect size. Thus, this analytic tool provides information on an item's DIF, such that the item can be reformulated, discarded, or considered as information about variables that influence the expression of the construct, called a 'theory of DIF' (Wilson, 2005).

The use of an item-based measurement approach provides many advantages for developing a brief scale that assesses a cultural conceptualization of illness. First, item location estimates provide information about items and content domains associated with different ranges of severity. This permits an understanding of the nature of each domain and their interrelationships. For example, it is possible to identify social items that express the same level of severity as a specific psychological item, or whether somatic items estimate a specific range of severity or fall along the entire continuum. Second, item fit statistics give information about the appropriateness of the symptom concept or the verbal expression used to capture the concept, or both, to the construct. If an item has poor fit to the model, it is possible to remove it, use another that represents the same concept or severity location, or revise the verbal expression. Third, the comparison of estimated with theorized item locations aids in targeting content to the defined construct. For example, if an item is estimated as an indicator of severe depression, but was theorized to represent mild depression, then the item misfits the intended construct and needs to be reconsidered. Fourth, estimation of item locations permits the selection of only those items that target the range of severity that is relevant to clinical distress. Fifth, item locations enable informed choices when composing a brief measure. For example, it is possible choose culture-specific versus Western items, or items that may be more acceptable for the screening purpose than another item that estimates the same severity. Sixth, DIF analysis supports the development of a screening measure that is effective for important subgroups within the population. Finally, objective estimates of item properties can be obtained from an unrepresentative sample, which is important for obtaining reliable results with a small sample, and understudied populations.

METHOD

Sample

The sample consisted of 103 (45.4%) diagnosed outpatients and 124 (54.2%) community members, of whom 104 (45.8%) were males and 123 (54.2%) females. The clinical sample had a smaller proportion of males than females (36.9% vs. 63.1%, n=38 vs. n=55), and the community sample a smaller proportion of females than males (46.8% vs. 43.2%, n=58 vs. n=66). All participants resided in the San Francisco metropolitan area. Clinical participants were outpatients from organizations that served predominantly Chinese American immigrants. This clinical

sample was recruited from: community mental health agencies (20.4%), non-profit mental health clinics (19.4%), non-profit medical centers (14.6%), a job training program for persons with mental illness (13.6%), social services organizations (8.7%), a traditional Chinese medicine (TCM) clinic (6.8%), private psychotherapists (1.9%), and unknown sources (7.8%). The remaining proportion (6.8%) consisted of community members who disclosed their clinical status at the time of participation. The majority of community participants (70.2%) were recruited through a non-profit social services organization. They were clients, acquaintances of clients and employees, and individuals attending a community fair. The remainder of the community sample consisted of persons recruited by: a community child development center (11.3%), an employment program (4.8%), a private TCM doctor (4.8%), a mental health support group for family members (3.2%), a health clinic waiting room (1.6%), and individuals who had participated in the study (4.0%).

Table 1 summarizes demographic characteristics of the sample. There were no significant differences within the clinical and community samples, except women had lower English ability than men in the clinical sample. Significantly more women reported a poor level (46.2% vs. 22.2%), and fewer reported fair (36.9% vs. 41.7%) and very good to excellent (16.9% vs. 36.1%) levels ($\chi^2 = 7.252$, $d.f. = 2$, $p = .027$). Participants were predominantly low-income: 69.8% earned less than $20,000 per year, 13.1% earned $20,000-$29,999, 10.4% earned $30,000-$49,999, and 6.8% earned $50,000 or more. Concerning nativity and language, the sample consisted of persons born in China (74.4%), Hong Kong (17.6%), Taiwan (4.8%), and other countries (2.7%). The large majority of participants was Cantonese-speaking, and knew both Cantonese and Mandarin. Participants reported Cantonese (70.9%), Mandarin (18.9%), and other dialects (10.1%) as their most fluent dialect. The majority (75.9%) of Cantonese speakers also spoke Mandarin, less than one-half (41.8%) of Mandarin speakers spoke Cantonese, and those who reported other dialects as their most fluent also knew either Mandarin (52.2%) or Cantonese (47.8%). Over half (56.8%) knew two dialects, and the remainder, one (21.1%), three (19.8%), or four (2.3%) dialects..

The clinical sample (N=103) reported their diagnoses as: major depression (41.7%), dysthymia (8.7%), 'diagnosis of depression, but don't know the name' (40.8%), and 'no diagnosis' (8.7%), although recruited by a clinician. About one-third (34.3%) reported comorbid or past diagnoses as: anxiety disorder (13.7%), schizophrenia (12.7%), bipolar disorder (3.9%), 'other mental disorder, but don't know the name' (2.0%), and neurasthenia (1.0%). We did not eliminate any participants from the clinical sample because of indications of symptom occurrence at the time of interview. Five individuals (4.6%) who scored in the sub-diagnostic range, less than five points, of the PHQ-9 reported occurrence of a mild level of symptom experience at the time of interview (i.e., they answered, 'Yes, mildly,' when asked at the time of interview, 'Do you believe you are experiencing depression now?") Eight individuals (7.9%) reported absence of symptoms at the time of interview, but seven of these scored in the diagnostic range of the PHQ-9. Three scored above 10, which indicates major depression, and four from 5-9, which indicates 'minimal symptoms' requiring support. Only one male participant's score of one on the PHQ-9 was consistent with his own report of current symptom experience.

Procedures

Research assistants obtained written informed consent and then administered the 47-item pilot scale, PHQ-9, Neurasthenia Questionnaire, ASQ-11, and a demographics questionnaire to the participant in the clinic or community organization in which the individual had been recruited. Approximately half of the sample answered the pilot scale first and the other half the PHQ-9 first. Research assistants administered the questionnaires to participants in Cantonese, Mandarin, or Toishanese dialects of Chinese. They did not provide interpretations of items when participants expressed difficulties, but reread the question and encouraged the participant to apply his or her own meaning that came to mind. Participants received $40. Research assistants were undergraduate students in the biological and behavioral sciences. Data collection took place from spring of 2008 through spring of 2009. The study methods and consent forms were reviewed and approved by the University of California at Berkeley Committee for the Protection of Human Subjects.

During data collection, research assistants identified items on the pilot scale and PHQ-9 on which participants repeatedly expressed difficulty understanding. These items became the object of think aloud investigations, also called 'cognitive labs' (American Institutes for Research, 2000), in interviews with other participants. In think alouds, research assistants asked the participant to talk aloud about what they were thinking while they were actually responding to the item. Research assistants also made observations of participants' overall difficulties on the pilot scale and PHQ-9 after each interview.

47-item Pilot Scale

We developed the 47-item pilot scale by following the first three steps of the item response modeling approach. In accordance with an emic approach, we obtained the descriptive data to define the construct and design items through a bottom-up, qualitative approach of self-report and clinical observation across diverse intervention and community settings. We interviewed 34 adults (18 women, 16 men), ages 25-59, 26 of whom were diagnosed with major depression and 8 with dysthymia. This group's median years of residence in U.S. was 15, and median years of education was 9. We also interviewed 29 clinical experts (9 clinical social workers, 2 family therapists, 2 psychologists, 8 psychiatrists, 5 primary care and internal medicine physicians, and 3 TCM physicians). All were Chinese and provided treatment to a predominantly Chinese immigrant clientele. Clinical participants and experts were recruited from community and non-profit mental health and medical clinics, a health maintenance organization, and private practice.

Clinical participants and experts gave either an interview to provide an explanatory model of illness narrative (Kleinman, 1988), or to generate items by evaluating a symptom list. The symptom list consisted of 60 symptom concepts compiled from seven measures that were researched in ethnic Chinese in the U.S. and abroad: PHQ-9 (Chen et al., 2006), CES-D, CBDI (Yeung, Neault, et al., 2002; Zheng et al., 1988), CHQ-12 (Cheng, 1985; Cheng & Williams, 1986), CDI (Zheng & Lin, 1991), CDS (Lin, 1989), and the Short Depression Scale (North East Medical Services, unpublished instrument). Eighteen clinical participants gave EM interviews. Nine clinicians who provided treatment to 14 participants confirmed and complemented their client's interviews by answering the same questions from their patients' perspective, and explaining discrepancies and changes in symptom experiences over time. Fourteen clinical participants and 20 experts gave item generation interviews. Clinical participants spontaneously identified current symptoms, and past symptoms in the period when they began to expression depression, and then evaluated the relevance of symptoms on the list that they had not identified

spontaneously. Experts rated the symptoms as rare, common, or very common for their clientele. Then, they observed differences in frequency of use between men and women, the typical Chinese verbal expressions used for the item concept, if the western one was inappropriate, and any other symptom concepts that were not listed.

The definition of the theoretical construct that underlies the design of items is presented under 'Results.' We designed items by: (a) counting the symptoms expressed in the EM narratives and item generation interviews; (b) using experts' ratings of item relevance; and (c) composing a focus group of 4 clinical experts to determine the single most appropriate Chinese verbal expression for each symptom concept. We thus composed a 47-item pilot scale in Chinese language. This pilot scale contained English translations and Cantonese dialect text for consistency of administration to Cantonese speakers. Based on a pre-test of the scale with eight community participants, in which exit interviews were conducted, we adjusted the text of five items to express stronger severity. Finally, with the assistance of five other experts, we ordered the items into severity groupings, and categorized items by content domains. Figure 1 displays the construct map with the ordered items.

We defined a 4-option Likert scale as the outcome space based on the literature and (lukewarm or forced) approval by the focus group of four experts. The literature suggests that Chinese immigrants are able to understand the 4-option Likert scale when assisted by a researcher and in self-administration, although some difficulties were observed for those with low levels of education. Researchers of the CBDI, containing 21 items, each of which has four unique responses, concluded that a shorter and simpler measure would address the very high refusal rate they experienced in their primary care study. Researchers of the PHQ-9 also noted very high refusal rates by primary care patients who were asked to self-administer in a waiting room, but did not report whether the 4-option Likert scale contributed to this problem. Although we preferred the simplicity of a dichotomous or 2-option response scale, this would likely not provide adequate information to discriminate persons along the severity continuum. We therefore chose the 4-option scale. We used the PHQ-9 and CES-D's diagnostic definition of frequency of occurrence over the past two weeks, which is based on DSM-IV criteria for depression. There is one item stem for all questions: "Over the past two weeks, were you bothered by the following problems? If so, how much?" The response options are: 0-*not at all/no days (0 days)*, 1-*a little bit/a few days (1-3 days)*. 2-*quite a bit/about half the time (4-10 days)*, and, 3-*extremely/nearly every day (11-14 days*). The use of number of days has the advantage of being unambiguous. Also, the use of frequency, along with intensity, is consistent with the construct definition of the respondents' location on the severity continuum.

Other Instruments

PHQ-9. The PHQ-9 is the depression scale of the Patient Health Questionnaire, a self-administered version of a diagnostic instrument called *PRIME-MD* (Kroenke, Spitzer, Williams, 2001). Its validity and reliability for assessing depression severity and monitoring treatment response in American samples are well established. For Chinese American immigrants, the PHQ-9 was found to have high reliability, with Cronbach's α of .79 (Huang et al., 2005) and .91 (Yeung et al., 2008), and strong predictive probabilities (e.g., sensitivity of 0.81-.92 and correct classification of 0.97) for detecting depression in primary care patients, with criterion validation based on diagnostic interview schedules (Yeung, et al., 2008; Yeung et al., 2006). The PHQ-9's items are based directly on the nine diagnostic criteria for major depressive disorder in the DSM-

IV. It is scored on a 4-option Likert scale, from 0-*not at all* to 3-*nearly every day* during the past two weeks. Total scores ranges indicate: 0-4, no symptoms; 5-9, minimal symptoms; 10-14, mild MD or dysthymia; 15-19, moderate MD; 20 or higher, severe MD (Spitzer et al., 1994). We used the bilingual version developed through a translation-back translation method that was used in a previous study (Huang et al., 2005).

ASQ-11. We developed the 11-item Acculturative Stress Questionnaire for this study with the same item response modeling procedure as the CADS-9. Fourteen pilot items were generated based on the concepts in Ying's (2005) Migration-Acculturation Stressors Scale, which included physical environmental, biological, social, and cultural variables (Berry, Kim, Minde, & Mok, 1987) that were identified in the acculturative stress literature (Ben-Sira, 1997; Church, 1982; Juffer, 1987; Pedersen, 1995; Ryan & Twibell, 2000; Ritsner, Modai, & Ponizovsky, 2000; Stephen & Stephen, 1993; Van Tilburg, Vingerhoets, & Van Heck, 1996; Yeh & Inose, 2003; Ying, 1996; Ying, Lee, & Tsai, 2000). We retained 11 items with acceptable fit statistics (Infit, 0.86 – 1.22) that discriminated the middle to upper levels of stress severity. The PCM model had moderately high reliability (MLE = 0.845, EAP/PV = 0.866). All items have the stem: "How much is… a current stressor?" Response options were: 0-*not at all*, 1-*very little*, 2-*sometimes*, and 3-*always*. These items ask about: dealing with differences in Chinese and American cultures (e.g., cultural differences in values and behaviors), work and/or academic situation of family members, housing and safety, transportation, maintaining health (having adequate food, rest, exercise, and leisure), having illness, being able to obtain needed health care, missing your native country, missing family and friends in your native country, having a social support network of family and friends in the U.S., and dealing with racial discrimination. We removed the three that were the easiest to endorse, predicting minimal levels of stress. These inquired about the respondent's language, work and/or academic situation, and financial situation.

Neurasthenia Questionnaire. This questionnaire is a diagnostic measure of current *shenjing shuairuo* ('weakness of nerves'), or neurasthenia as defined in the CCMD-2. We translated an English version developed as a supplement to the SCIDP (Version 1.0) (Zheng et al., 1992; Paralikar, Sarmukaddam, Agashe, & Weiss, 2007). A diagnosis is given if at least three of five groups of symptoms are present over three months, and one of three conditions met. The five symptom groups are: (i) weakness: mental fatigue, lack of energy, slowness of thinking, poor memory, or difficulty in concentration; (ii) emotional: easily worried, or annoyed or irritable; (iii) excitement (mental agitation): recalling or thinking too much, and difficulty stopping oneself from remembering past unhappy events; (iv) nervous pain: myalgia or tension headaches; and, (v) sleep disturbance. The three conditions are: (i) symptoms have interfered with daily activities; (ii) experience of significant and persistent distress; or (iii) help or treatment has been sought.

Analysis Strategy

Our strategy entailed five steps. First, we developed the construct map. Second, we used Rasch PCM analysis to develop a reliable and valid unidimensional model of the latent construct. We also conducted a substantive review of the model by comparing the theoretical description of items in the construct map with the estimated item locations of the full measurement model, CADS-42. Second, we examined DIF by gender, age, time of residence in U.S., English language ability, and education. Third, we chose nine items to form a screening instrument, CADS-9, that is unbiased by gender, and minimizes bias by other grouping variables. Fourth, we

examined the validity of CADS-9 in comparison with the PHQ-9 and correlation with other external measures. We used *ACER ConQuest* software (Wu, Adams, Wilson, & Haldane, 2007) to conduct item response analyses, and *PASW Statistics* software for all other analyses.

Step 1 - Construct Map. We developed the construct map with the description and ordering of 'respondents' and 'responses to items,' the theorized item locations, along the severity continuum based on qualitative data from explanatory model of illness narratives and expert contributions described earlier. This mapping represented a theoretical conception of a scale model that was the basis for composing the measurement model with the aid of empirical IRT analyses. We used it to guide the validation of the empirical models on a substantive basis.

Step 2 - Estimation and Substantive Review of the Full Model. Through an iterative process of item reduction and recalibration, we developed a reliable unidimensional measurement model based on the Rasch PCM. We calibrated the models with the mean of item difficulty estimates set to 0.0 logits. At each step, we assessed item fit, the overall fit of the model, reliability of the measures, and whether response categories were used as intended. First, even though a variety of ranges have been proposed to indicate adequate fit, we considered items to fit the model if the Infit and Outfit values were in the range of 0.66 to 1.33. Considering the importance of retaining items based on substantive rationale (Wilson, 2005), we applied a more lenient rule of 0.5 to 1.5, which may still be productive for measurement (Linacre, 2005; Linacre & Wright, 1994), when justified. We attributed primary importance to Infit, and used Outfit only as a secondary indicator if more information to determine item removal was needed. We also attributed more importance to eliminating items whose fit statistics were greater than 1.33, which are considered 'misfitting,' than those which were less than 0.66, which indicated 'overfitting.'

Second, to examine overall fit, we observed reductions in total deviance across models and evaluated reliability coefficients. The Rasch reliability coefficient is analogous to Cronbach's alpha. Reliability estimates the stability of person scores under hypothetical replications of equivalent tests. Cronbach's alpha is sometimes noticeably higher than Rasch reliability because it models perfect and zero scores to be exact, i.e., without error variance. In contrast, Rasch reliability recognizes extreme scores as containing little information, i.e., with large error variance, and lowering reliability (Sitgreaves, 1961). We considered adequate reliability to be .80-.90, and optimal to be greater than .90. We interpreted EAP/PV and MLE reliability coefficients because the former provides higher accuracy, and the latter less accuracy for small sample sizes. Third, we reviewed category usage for infrequently and irregularly used response options, and fit statistics of response option step estimates (Masters & Wright, 1996). We also verified that average measures of item difficulty and respondent ability, and the step calibration of each response option all advanced monotonically with each advance in response option (Linacre, 2005). [*Note.* EAP/PV (expected a posteriori/plausible values) reliability is the explained (expected a posteriori) variance according to the estimated model divided by total persons' variance. Plausible values, or multiple imputations are draws from the posterior of each respondent's ability parameter to allow more accurate estimation of distributional quantities, especially upper and lower quartiles, when samples and numbers of items are small. MLE estimates will generally yield very poor estimates of these distributional quantities due to overestimating the standard deviation (see Das and Zajonc, in press).]

We conducted a substantive review of the full measurement model with the aid of a 'Wright Map,' a diagram that displays the distribution of respondents and ordered locations of items. With this visual tool, we compared item locations estimated by the model with the theoretical locations of items presented in the construct map. Specifically, we examined the degree of

difference of estimated item locations and theorized locations in order to identify problematic items and assess the construct validity of the measurement model. We also examined locations of content domains to assess validity and gain information about the latent construct itself.

***Step 3 - Analysis of DIF*.** We examined DIF by gender, education, English level, years of residence in the U.S., and age. We generated subgroups substantively based on empirical analysis of cutoff values for grouping variables that maximize detection of significant DIF while maintaining adequate subgroup sample sizes. We tested differences in item difficulty for significance at $\alpha = 0.05$ by using the joint standard errors to calculate a t-statistic. We considered the effect size of DIF, or logit difference in item estimates between subgroups, to be large when greater than .638 logits, intermediate when in the range of .426-.638 logits, and small when below .426 logits, which is based on a standard of categorization of effect sizes for Rasch models (Longford, Holland, and Thayer, 1993; Paek, 2002).

With these estimates of items with significant DIF and size of effect, we assessed the overall impact on the measurement model in terms of numbers and types of items that were biased, and on composing a brief screening measure. We also examined the relationship of the biased items to the theoretical construct, and explored patterns across types of items to generate an initial 'theory of DIF' (Wilson) for each grouping variable. We considered education, English level, years of residence in the U.S. and age as one interpretative unit given the influence of these variables on acculturation.

***Step 4 - Development of a Screening Measure*.** With the aid of the Wright Map, we composed different sets of nine items that cover the upper range of the person distribution that is relevant to risk of clinical depression. For each set, we chose items that were neither repetitive conceptually nor in location, did not display DIF by gender, minimized DIF by the other grouping variables, and, if possible, overlapped with the DSM-IV criteria for MD. To choose one of these sets, we referred to the construct definition. Our main concern was to ensure targeting of the scale's intended objective for screening in community and medical settings, and not only its effectiveness for detecting clinically relevant depression. We also engaged clinical experts to confirm the set with highest content validity for screening based on face assessment. We thus chose one set of 9-items, CADS-9, and calibrated it. We assessed the fit of items, the use of response options as intended, and reliability of the overall model. We also analyzed DIF as an exploratory step even though its results are reliable because CADS-9 was not administered as a stand-alone measure. For purposes of comparison, we also calibrated and evaluated validity of one of the alternative 9-item scales that experts considered as having poorer viability for screening, but contained items that covered a higher range of severity. Only general results for this alternative 9-item scale are reported.

Step 5. Validation. To assess concurrent validity, we compared the performances of CADS-9 and PHQ-9 across indicators of criterion, predictive, convergent, and content validity. To assess validity, we conducted receiver operating characteristic (ROC) analysis (Swets, 1995). We compared the area under the ROC (AUC) between measures and establish cutoff scores that optimize sensitivity and specificity for the depression criterion (i.e., clinical versus community samples). Given the objective of a measure that is effective for men and women, we compared a unique cutoff value and separate cutoffs to determine the cutoff that achieves optimal predictive values for both genders. With the cutoff(s), we calculated rate of correct classification, sensitivity, specificity, and positive and negative predictive values. We evaluated criterion validity with the rate of correct classification and point biserial correlation (r_{bp}) of scores with the depression criterion. We evaluated content validity with qualitative assessment by clinical

experts information from the think aloud investigations and research assistants' post-interview observations, and comparison of participants' self-evaluations of current symptom manifestations and CADS-9 scores. Finally, we assessed convergent validity by correlation with acculturative stress scores, and point biserial correlation with diagnosis of neurasthenia.

RESULTS

Construct Map

The construct map is shown in Figure 1. The description of respondents contains four elements. First, 'reduction in efficiency and functional activity' refers to losses in efficiency with regard to work, study, maintaining family and social relationships, home and self-care, and daily life tasks. Second, 'maladaptation to environment' refers to the impact of difficulties in social, economic, cultural, physical, and religious or spiritual adjustment and integration into U.S. society, especially with regard to immigration, acculturation, and past traumatic experiences such as the Cultural Revolution and family events. Third, 'doubt and despair concerning social role and existence' concern painful experiences of self-criticism, hopelessness, not belonging socially, and impulses of self-destruction that are basic aspects of human experience. In Chinese culture, this is experienced through the lens of difficulties and failure in one's family or social role, and an experience of shame and loss of face whose origin is interdependent rather than individually derived. Finally, 'likelihood of family history of depression' refers to a genetic component that is frequently implicated in the person's mental illness. This description applies throughout the continuum of severity. Respondents who have more severe depression tend to experience these four components strongly, and those who have less severe depression tend to experience these weakly. These experiences may occur episodically, persistently, or permanently all along the continuum of severity.

The description of 'responses to items,' or the content of the experiences and states suffered by the respondents, contains the psychological, somatic, and social domains of symptomatic experiences that indicate the depression condition. The psychological domain concerns internally derived and experienced emotional disturbances and cognitive states, with a cultural emphasis on one's ability to control these disturbances. The somatic domain encompasses concerns and experiences of diminished physical and mental functioning (e.g., concentration and decision making) and functioning. The social domain covers affective, cognitive, and behavioral experiences that concern negative changes and perceptions of oneself with regard to one's social relationships, especially difficulties in fulfilling one's social role.

We theorized that the psychological and social domains are represented along the whole continuum, whereas the somatic domain is predominant in the moderate range. Five experts categorized the 47 pilot items into five severity groups. (Figure 1 omits the five items that did not fit the Rasch PCM, which are discussed in the next section.) The items belonged to the three domains as follows: 15 psychological, 11 somatic, 9 social, 5 psychological/social, 1 psychological/somatic, and 1 social/somatic. Experts had strong agreement on the classification of the severe and mild items, and some disagreement regarding the moderate range. The five items that crossed psychological and social domains encompass a strong feeling or cognition about one's self-worth, and the negative state of one's ability to fulfill one's social role (items 19, 35, 37, 43, and 44). The item that is psychological and somatic concerns a fear of health

problems (item 15). The item that is both social and somatic concerns a fear of being unable to fulfill one's social role due to loss of functioning (item 39). The experts who participated in item generation interviews identified six items as having differential usage by gender in the context of clinical practice. Men more commonly expressed 16-*angry*, 18-*bored*, and 36-*norespect*, whereas women more commonly emphasized 8-*memory*, 22-*crying*, 42-*ownfault*, and 43-*meaningless*.

Estimation and Substantive Review of the Full Model

Estimation of the Full Model. We conducted four calibrations to arrive at a 42-item full model. The first calibration of 47 items estimated five poor fitting items, with Infit from 1.34-1.50: *sleepmore* ("You always want to sleep and don't want to get out of bed"), *headaches* ("You have headaches"), *addiction* ("You drink or gamble to make yourself feel comfortable"), *family problems* ("You are severely bothered by family relationships or matters"), and *stomach* ("You have stomach pains or discomfort"). We first removed only *addiction* given its high Infit (1.44) and extremely high Outfit (10.12). The second calibration of 46 items revealed the same poor fit of the four items that had not been removed. We removed all but *stomach* given its nearly acceptable Infit (1.34). In the 43-item model, the Infit of *stomach* (1.42) increased slightly. We removed it and calibrated a 42-item model, which contained one item, appetite ("You have poor appetite") with Infit (1.35) just beyond the desired range. We kept this item since it is a DSM-IV core criterion of major depression, and considered cross-culturally to be a basic somatic indicator of emotional distress. The Infit of the other 41 items ranged from 0.67-1.31. (Also, Outfit ranged from 0.58-1.43, except for 22-*crying* and 47-*psychotic*, with poor Outfit of 4.21 and 1.78. We ignored these high values given the acceptable Infit of 1.06 and 1.24, respectively, and experts' evaluation of crying as a common expression of depressed mood in women, and an indicator of high severity for men, and psychotic experience as a principal sign of severe depression and other mental disorders.) Figure 2 displays the Wright Map.

The 42-item model had significantly better overall fit than the 47-item model (χ^2_{diff} = 2176.102, *d.f.* = 15, $p < 0.00001$), and similar reliability (MLE coefficient of .957 for both models, and EAP/PV coefficients of .984 and .988 for the 42-item and 47-item models, respectively). We found no misusage of response categories. The average measure of respondent ability and step calibrations of each response option advanced monotonically. The Infit statistics of the step calibrations for all items fell within an acceptable range of 0.67-1.35. The three items located at the highest severity, 45-*self-harm*, 46-*suicidal*, and 47-*psychotic*, all had one infrequently used response option. The first two items had counts of four, and 47-*psychotic* a count of six for response option 3. However, their Infit of 1.16, 1.24, and 0.83, respectively, indicated that these low counts were sufficient for estimation of acceptable fit.

The counts for one item, 47-*psychotic*, were unexpectedly high, with 23.2% of participants affirming options 1, 2, or 3. We confirmed the clarity and appropriateness of the verbal expression and explored the meaning of responses with participants through a think aloud investigation. Respondents expressed meanings other than the intended western concept of auditory or visual hallucinations. These included: (a) revisiting a dreamt experience when awake, (b) imagination and fantasy, and (c) confusion over whether an experience had occurred or had been imagined or dreamt. Thus, this concept concerned the union and differentiation of dream, imagination, and lived experience, as well as difficulties with thinking clearly. Although no unusual pattern of counts was observed for 25-*irritated*, a think aloud investigation showed that a few persons with very low level of education did not understand its basic meaning.

Substantive Review. We compared estimated and theoretical item and symptom domain locations with the aid of the construct map (Figure 1) and the Wright Map (Figure 2). Overall, items represented the intended symptom concepts and global construct adequately. Also, the estimated item locations covered the upper half of the distribution of persons, i.e., those experiencing depressive distress, as expected. Based on a visual inspection, we classified each item estimate into one of three categories: excellent match (16 items, 38.1%), near match (20 items, 47.6%), and poor match (6 items, 14.3%) with the theoretical mapping. The majority of that were an 'excellent match' occupied the very severe and very mild ends of the continuum. The severe items were all 'red flag' items, 46-*suicidal*, 45-*self-harm*, and 47-*psychotic*, along with 22-*crying*, 17-*blaming*, and 44-*burden*. The mild items were: 18-*bored*, 1-*stressed*, 23-*worried*, and 4-*troubled*. In the moderate range, the well matching items were: 19-*hopeless*, 35-*useless*, 14-*bodyaches*, 16-*angry*, and 40-*hideprobs*. 'Near match' items were those approximately one level from their theoretical mapping. All but one of these concerned the central range. The exception was 2-*fatigue*, theorized to be mild-to-moderate, but estimated as the mildest item. Four of the six items that matched poorly were social items: 36-*norespect*, 41-*lostface*, 42-*ownfault*, and 43-*meaningless*. The experts rated these as mild or mild-to-moderate, but these were estimated to be moderate-to-severe. The remaining two items that matched poorly were 4-*interest* and 21-*ruminate*. These were theorized to be moderate-to-severe, but estimated to be mild-to-moderate.

These results show two important patterns regarding interactions of content domains. First, psychological domain items occupied the entire continuum, as theorized. However, there were relatively fewer psychological items in the moderately severe range, which was dominated with social domain items. Social items were not present on the entire continuum as theorized, but rather occupied the moderate and moderately severe ranges exclusively. Second, the somatic domain generally occupied a moderate range, as theorized, but this range was very broad, extending to moderately severe, with 3-*appetite* as the most severe somatic item, to very mild, with 2-*fatigue* as the lowest item on the continuum. Many somatic items, especially relating to thought, were located in the mild-to-moderate range. Bodily experiences, such as 3-*appetite*, *12-heartpalp*, and 14-*bodyaches*, represented the more severe somatic items.

Analysis of DIF

Grouping Variables. Table 2 shows the subgroups used in the analysis of DIF. For education, we placed the cutoff at 'less than high school' based on experts' evaluation of the less educated group's strong maintenance of traditional Chinese values and beliefs, and slower acculturation to U.S. society. For English level, we placed the cutoff at less than a fair level, based on participants self-reported speaking, understanding, and reading levels on a 4-option scale, with 0-*very poor*, 1-*fair*, 2-*good*, and 3-*excellent*. We established the cutoff of seven years or fewer of U.S. residence after empirical testing of 5 and 9 years, which showed fewer items with significant DIF. Also, seven years corresponds to time of residence required for naturalization. We considered those whose average score was less than 1.0 as 'very poor', and 1.0 or greater as 'fair to excellent.' We set the cutoff for 'age' at 40 years with consideration of the difficulties that middle aged and older adults encounter with assimilating to a new culture.

Overall Results. Table 4 shows items with significant DIF by gender. Table 5 reports items with significant DIF by acculturation-related variables. Twenty-nine of 42 items (69.0%) showed significant DIF, of which 36 items (85.7%) had a small effect size, and 6 items (14.3%) had

intermediate (1 item) or 'large' effect sizes (5 items). Considering gender alone, nine items (21.4%) showed significant DIF by gender of which one item (22-*crying*) had a large effect size. For age only, 8 items (19.0%) had significant DIF, of which one item (22-*psychotic*) had a large effect size. Considering the three acculturation-related variables alone, 27 items (64.3%) displayed significant DIF, of which 5 (11.9%) had intermediate (45-*self-harm*) or large (46-*suicidal*, 44-*burden*, 47-*psychotic*, 31-*lessable*) effect sizes. Also, considering all five variables, DIF affected all content domains significantly: only 7 of 21 psychological items, 5 of 15 social items, and 2 of 13 somatic items did not have significant DIF. Although relatively few items displayed intermediate or large effect sizes, the presence of many items with small effect sizes influenced by the same variable can affect bias in the total scores if they make up a significant part of the same measure. Also, the finding that 27 items showed DIF by one or more of these three variables suggested an important social and acculturative division within the first generation with regard to the expression of depressive distress. Given these results, we restricted our aim to reduce bias in the final screening measure by focusing principally on gender, a variable the literature has recognized as a potential problem of assessment bias given men's tendency to score lower on depression measures.

DIF by Gender and Age. All three items that women endorsed more easily than men (8-*memory*, 22-*crying* and 43-*meaningless*) agreed with experts' predictions. Women referred to meaninglessness with regard to difficulties over fulfilling their social responsibilities, particularly as mother, and responsibility for family difficulties. It was also a euphemism for thoughts about ending one's life. Also, women emphasized concern for poor memory in daily tasks with an underlying worry about accomplishing their social role, and crying was a very common presentation in clinical practice. Two of six items (18-*bored* and 36-*norespect*) that men endorsed more easily than women agreed with experts' predictions. The verbal expression 'bored' describes a state of being unable to find a way out of current problems and get along with the environment; it is an experience of helplessness and, figuratively, being unable to breathe because there is no movement of air around one's heart. For men, it is used in lieu of direct and stronger emotional expressions. Men experienced a problem of respect due to their lowered social status in the U.S. While women maintained roles as mothers and acculturated more quickly, men frequently had lower status jobs and faced pressures as head of family and racial discrimination. The remaining four items showed two patterns. First, 34-*nottalk* and 33-*lonely* suggested avoidance of social judgment, isolation, and lack of understanding. Second, 3-*appetite* and 5-*sleep*, basic somatic indicators of psychological distress, suggested the social acceptability of expressing distress somatically, or the somatization of psychological distress. Also, a global pattern regarded men's emphasis on somatic and social concepts.

Analysis of DIF by age revealed patterns related to life phases. Those who were younger emphasized concepts more relevant to a younger life phase in social and physical terms. These were 18-*bored*, 33-*lonely*, 2-*fatigue*, and 10-*getstarted*. In this light, younger immigrants attributed a prominent experience of being stuck and helpless with regard to the environment, isolated yet needing to show strength, and strongly affected by fatigue and changes in one's ability to accomplish tasks. Similarly, two items, 14-*bodyaches* and 31-*lessable*, reflected physical and functional concerns of older persons, and 47-*psychotic* and 37-*fate* suggested more cultural traditionalism of older persons.

DIF by Acculturation. The other three variables intended as proxies for acculturation—education, English, and years in U.S.—contributed to patterns of DIF related to acculturation, and showed distinct influences. For those who were more acculturated, four patterns emerged

concerning items that were easier to endorse. First, this group emphasized distress due to outside-oriented social factors in the items 36-*respect*, 1-*stress*, 34-*nottalk*, and 41-*lostface*. These concerned the need for respect from others, stress and pressures from the environment, and avoidance of judgment and misunderstanding by others. The more educated likely experience a more significant drop in social status and ongoing struggle with maintaining a sense of social worth. Also, the concept of loss of face was influenced specifically by years in the U.S., which suggests an immigration process where failure is easier to acknowledge after a number of years of struggle. Second, this group gave stronger expression to three bodily symptoms, 12-*heartpalp*, 3-*appetite*, and 2-*fatigue*. In light of the externally oriented concepts that this group expressed easily, these bodily symptoms hint at processes of somatic internalization or expression of distress. Third, the stronger attribution of self-harm, as in 46-*suicidal* and 45-*self-harm* by persons with higher English level in particular is consistent with the literature regarding the inappropriateness of suicidal expressions in Chinese culture. Fourth, this group more easily endorsed anhedonia, 4-*interest*, which suggests this group's stronger attribution of meaning to a range of pleasurable activities compared with persons with lower education and English level.

For those with lower acculturation, three patterns were observed in items that were easier to endorse. First, there was a lack of control and resignation over one's negative social situation, and a self-oriented anxiety and fear of further loss of functioning and social role. This is seen in 44-*burden(others)*, 30-*thinkslow*, 39-*fearability(loss)*, 21-*ruminate*, 38-*notgood(asothers)*, 43-*meaningless*, 31-*lessable*, 35-*useless*, 37-*fate*, and 19-*hopeless*. Those with less education in particular referred to the consequences of being a burden to one's family, loss of meaning due to not contributing adequately to one's family, and poor self-concept in comparison with others. They also gave importance to an internal and self-focused state of low-grade anxiety in the expression of rumination. Those with very poor English, in particular, emphasized decreased efficiency and lack of self-efficacy, as indicated by worry over work ability, thinking slowly, and being useless, hopeless, and helpless and the victim of bad fate. We excluded 14-*bodyaches* from this pattern given its likely relationship to manual labor performed by most of this group. Second, 47-*psychotic* and 8-*memory*, both more easily endorsed by those with longer residence in the U.S., suggested a form of mental confusion, aside from the more restricted western meanings. Given that 47-*psychotic* can refer to a self-attribution of confusion with regard to what one imagined, dreamt or experienced, it is an expression of distress and a manner of coping and understanding experience of those who are less educated, older, and have resided longer in the U.S.

Years in the U.S. showed a distinct influence on the expression of depression. First, those who had resided less time emphasized distress related to an adaptation phase of recent immigrants. This group more easily endorsed 1-*stress*, 29-*decisions*, 18-*bored*, 33-*lonely*, and 16-*angry*. These reflected anger over the decision to immigrate and resulting life difficulties and stressors, feelings of uncertainty, and helplessness (reflected in the expression 'bored'), and lack of a social network. Second, those who had resided longer emphasized experiences that reflected a prolonged period of struggle to adapt to U.S. society. These were 45-*self-harm*, 47-*psychotic*, 45-*lostface*, and 8-*memory*. 45-*self-harm* reflected a learned sense of social appropriateness with regard to a form of expression that is inappropriate in Chinese culture. 45-*lostface* suggested distress over failure as an immigrant, and 47-*psychotic* and 8-*memory* suggested an attribution to problems of one's mind.

Development of a Screening Measure

Choice of 9 items and Recalibration of Model. We excluded items with significant DIF by gender, and included two items (16-*angry* and 45-*self-harm*) that had significant DIF by English level and years in the U.S. We chose 16-*angry* as item of moderately high severity because of: (a) a lack of other available items in that range and it's small DIF effect size, (b) the relevance of irritability in the Chinese construct of depression, and (c) experts' evaluation that men are able to disclose this symptom even when they are inhibited from expressing other concepts. We chose 45-*self-harm* although it had an intermediate DIF effect size because: (a) it had the smallest DIF effect size among the three items located at the highest severity; (b) it would be less culturally inappropriate than 47-*suicidal* and thus had better fit to the screening objective; (c) it is a DSM-IV criterion of MD. The remaining seven items were: 20-*worried*, 9-*concentration*, 15-*fearhealth*, 20-*unhappy*, 40-*hideprobs*, 27-*afraid*, and 32-*notsocialize*. We chose these items based on five experts' confirmation of their higher viability for screening. (This is discussed under content validity below.) Table 4 reports the item parameters. Appendix A contains CADS-9. Four items (9-*concentration*, 20-*unhappy*, 32-*notsocialize*, and 45-*self-harm*) represented DSM-IV criteria. Three of these four items, except for 32-*notsocialize*, also overlapped conceptually with PHQ-9 items.

The calibration of CADS-9 showed that all items had acceptable fit (Infit of 0.77-1.24). We confirmed that the response options were used as intended, and steps had acceptable fit statistics (Infit of 0.78-1.26). Average measures of item difficulty and respondent ability, and the step calibration of each response option all advanced monotonically with each advance in response option. CADS-9 had strong reliability near .900 (MLE: 0.846; EAP/PV: .904; Cronbach's alpha: .912). These values were very similar to those of the PHQ-9 (0.842, 0.907, and .925, respectively). Analysis of DIF showed no significant DIF by gender, and four items had significant DIF by other variables. These were: 15-*fearhealth* and 32-*notsocialize*, easier to endorse for those with less English; 16-*angry*, easier to endorse for those with less time in the U.S.; and 45-*self-harm*, easier to endorse for those with longer residence in the U.S. and higher English level. All four of these items had small DIF effect sizes (.216-.404).

An Alternative 9-item Model. We composed and calibrated an alternative 9-item version, CADS-9A, which contained mostly culture-specific items that assessed the higher severity range more closely. Its items were: 45-*self-harm*, 17-*blaming*, 44-*burden(others)*, 12-*heartpalp*, 42-*ownfault*, 41-*lostface*, 35-*useless*, 39-*fearability(loss)*, and 37-*fate*. The estimated locations of these items can be seen in Figure 2. All items had acceptable Infit values and response options were used as intended. (A summary evaluation of this scale is reported under the validation and content validity sections below.)

Validation

Criterion and Concurrent Validity. The very high and similar rates of prediction and correlation with the depression criterion between CADS-9 and PHQ-9 demonstrated criterion and concurrent validity of both instruments mutually. In ROC analysis, the optimal cutoff score was 9 for males, and 10 for females for CADS-9. For PHQ-9, the optimal cutoff was 9 for both males and females. The CADS-9 lower cutoff for men explains the lower mean raw scores of men compared to women in the clinical (13.9, SD = 6.70 vs. 14.7, SD = 6.04) and community (5.68, SD = 5.02 vs. 6.74, SD = 5.90) samples. For the PHQ-9, having the same cutoff for men and

women in the PHQ-9 is consistent with men's higher mean scores relative to women's in the clinical sample (15.2, *SD* = 7.02 vs. 14.7, *SD* = 6.72) and lower mean scores of men compared to women in the community sample (5.15, *SD* = 4.72 vs. 5.72, *SD* = 5.54). We did not compare overall score differences since these are biased due to unequal subgroup sample sizes by gender and case criterion. We identified cases as those who scored equal to or greater than the cutoff value.

For the overall sample, CADS-9 probabilities were slightly lower than those of the PHQ-9. (See Table 6.) These differences were generated from the male sample where CADS-9 indicators were all lower than those of the PHQ-9. All indicators were equal for women between the two measures. Applying these two scales to detection in the community sample, CADS-9 and PHQ-9 estimated nearly equal rates of depression (25.0% vs. 24.2%). Both measures classified 25.9% of females as depressed, and CADS-9 detected a slightly higher rate in men than the PHQ-9 (24.2% vs. 22.7%). Figure 4 shows the CADS-9 distribution of total raw scores for clinical and community samples. Approximately one quarter (24.3%, *n* = 15 out of 103) of the clinical sample is below the cutoff, and one quarter (25.0%, *n* = 31 out of 124) of the community sample above. Given the study criterion of depression as it occurs in the natural setting rather than a concurrently administered diagnostic interview, the sensitivity values for the clinical sample are likely underestimated due to the presence of persons who are asymptomatic. Also, higher rates of correct classification, and specificity and predictive values, which involve the community sample, are similarly unreliable since the rate of true 'caseness,' i.e., the presence of persons with undiagnosed depression is unknown. Thus, lower specificity, such as CADS-9 compared to PHQ-9 in males, although it actually indicated the detection of a higher rate of depression in community males, has unknown accuracy.

The application of gender specific cutoffs rendered specificity between males (.789) and females (.785) near parity. Without separate cutoffs, the CADS-9 overall cutoff would be 10, which reduces the specificity for men from .789 to .711, by detecting three fewer cases out of 38, and reduces case detection of males in the community from 24.2% to 19.7%. Thus, lower scoring by men did not indicate a lower rate of depression. Rather, even though items function equivalently for both genders, men endorsed items at lower levels. This may be due to weaker awareness, intensity, or attribution of symptomatic experiences, or lower ability or willingness to report.

Complementing these predictive analyses, the AUC of CADS-9 was lower than that of PHQ-9 for males (0.844 vs. 0.877), females (0.825 vs. 0.843), and overall (.837 vs. .860). ROC curves for males and females are shown in Figure 3. CADS-9 scores correlated moderately with the clinical criterion (Raw r_{bp} = .577; Logit r_{pb} = 0.560), and slightly lower than the PHQ-9 (Raw r_{bp} = 0.622; Logit r_{bp} = 0.594). The high correlation of total scores between CADS-9 and PHQ-9 (Raw: .885; Logit: 879) is another indication of concurrent validity.

CADS-9A had slightly higher rate of correct classification, predictive probabilities, and AUC than both CADS-9 and PHQ-9. Its convergence with the ASQ-14 was lower than that of CADS-9 and higher than that of PHQ-9. Finally, its convergence with diagnosis of neurasthenia was slightly lower than both CADS-9 and PHQ-9.

Content Validity. Five clinical experts separately judged CADS-9 to have better content validity than CADS-9A and PHQ-9 for screening depression with immigrants in primary care and community settings. They viewed its content to be representative of a mild and moderate range of depression that focuses on one's internal experiences and behaviors rather than critical cognitive evaluations about oneself or one's social relationships. Such content promotes ability

to complete the measure given its coverage of topics that: (a) are more commonly shared in daily social life, (b) require easily accessible levels of self-awareness, (c) are easy to understand, and (d) excludes more shameful and stigmatized experiences. These experts considered the content of CADS-9A to be valid for assessing a more severe range of depression. However, it was too difficult for both self-administration, such as in a waiting room context, and administration by someone unknown to the respondent. Its inquiry of very self-critical and relationship focused difficulties would require a deeper level of reflection and willingness to disclose. Research assistants' post-interview observations confirmed that some participants showed strong discomfort with very personal questions about shame and family relations; these participants paused at the difficult questions and said they did not know how to answer. Also, the self-report of depressive distress to a stranger is an emotionally burdensome and heavily stigmatized process that is difficult to achieve. Some participants stopped answering in the middle of the 47-item pilot scale due to the emotional distress elicited by the series of questions. Some participants expressed repeated fears of their completed questionnaires being released to others.

The experts also found CADS-9 more valid than the PHQ-9 for screening depression quickly and efficiently because the former: (a) uses simple language expressions that cover one distinct concept per item, and (b) contains only culturally valid concepts. (Appendix B contains the PHQ-9.) In contrast, the majority of PHQ-9 items encompass two or three related concepts, such as: 2-*Feeling down, depressed, or hopeless*; 3-*Trouble falling asleep or staying asleep, or sleeping too much*; 5-*Poor appetite or overeating*; and, 8-*Moving or speaking so slowly that other people could have noticed. Or, the opposite–being so fidgety or restless…* The experts considered overeating and agitation as culturally invalid because Chinese do not tend to view these behaviors as problematic. This evaluation is complemented by research assistants' think aloud investigations, some less educated persons and women said they did not know how to answer the sleep and appetite items because they understood opposite questions. They were able to answer once the research assistant indicated the presence of the word 'or.' Also, with regard to psychomotor retardation and agitation, many respondents of all backgrounds consistently demonstrated difficulty due to not understanding whether the question asked if they felt restless or other people noticed they became slow or restless, or not knowing how others noticed their behaviors since they had not heard from others about this.

The comparison of participants' self-evaluations of current symptoms and CADS-9 severity groups also confirmed the content validity of CADS-9. (See Table 7.) Clinical participants were asked, "Are you experiencing depression now?" Response options were 'no' and 'yes,' with options of mild, moderate, and severe. Community participants were asked, "Do you believe you have ever experienced depression?" Those who said 'yes' were also asked, "Are you experiencing depression now?" Response options were: 'no,' 'yes,' and 'not sure,' with options of mild, moderate, and severe. We combined 'yes' and 'not sure' categories although the majority (66%) of those who said 'not sure, but, if so mildly' scored in the mild or moderate MD groups, compared to only one-third (35.7%) of those who said 'yes, mildly.' Total scores were classified into groups based on a severity structure that paralleled that of the PHQ-9. The groups for men and women were, respectively: Insignificant (<4 and <5), minimal symptoms (4-8 and 5-9), mild M.D. (9-13 and 10-14), moderate M.D. (14-18 and 15-19), and severe M.D. (≥19 and ≥20). The table shows a high concordance between self-evaluations and severity groups. In the clinical and community samples respectively, the self-evaluations of 13.9% (14 of 101) and 11.7% (14 of 120 participants) did not match their CADS-9 severity group within one level

below or above. Also, 8.9% (9 of 101) and 10.0% (12 of 120) were detected as more severe by CADS-9 than one's own prediction.

Convergent Validity. Table 8 reports intercorrelations between CADS-9 and external measures. The high correlation of total raw scores between CADS-9 and PHQ-9 (Raw: .885; Logit: 879) is an indication of concurrent validity, and suggests that the two scales roughly measure the same construct. CADS-9 converged much more strongly than the PHQ-9 (.691 vs. .593) on acculturative stress, and a bit more strongly on a diagnosis of neurasthenia (r_{bp} of .705 vs. .681). There was also significant diagnostic overlap between classification of depression by CADS-9 and neurasthenia. In the community sample, 33.33% had either or both depression and neurasthenia. Considered separately, 24.3% were classified as depressed and 26.8% as neurasthenic. Considering "pure" and overlapping groups, 6.5% of the sample had "pure" depression, 8.9% pure NE, and 17.9% qualified for both. In the clinical group, among those who were classified with either or both depression and neurasthenia (86.3% of the sample), 6.8% had "pure" depression, 9.0% "pure" NE, and 84.1% qualified for both (i.e., overlapped).

DISCUSSION

The case criterion used in this investigation permitted an examination of depression as it occurred in a natural setting. One of the study objectives was to contribute to knowledge of cultural aspects of depression and its effective treatment for men and women. With an emic approach where the clinical sample consisted of individuals who were receiving treatment after diagnosis by a Chinese clinician in the community, it was possible to see that men required a lower cutoff in order to achieve more accurate detection of their clinical status. This finding suggests that the lower rates of depression commonly found for men may be due to a lower experience or awareness of symptoms, or willingness to report that impacts the expression of the construct on an overarching level.

The use of an item response modeling approach to explore symptoms developed through a bottom-up, qualitative method provided information about the role of culture specific and Western items in the assessment of depression. We found that cultural concepts in the social and somatic domains were a significant part of the construct. We also confirmed that core Western concepts of the psychological domain (e.g., unhappiness, anhedonia, concentration, suicidal ideation) are valid. However, other emotional symptoms related to irritation (e.g., angry, bothered, worried) and anxiety (e.g., rumination, nervous, afraid) also integrate this construct, even though they are commonly viewed as distinctive of anxiety syndromes by DSM-IV criteria. Furthermore, while some social domain concepts overlapped with important Western cognitive symptoms of depression, particularly those about self worth and social avoidance (e.g., not as good as others, don't want to socialize, hopelessness), there were culturally distinctive interpersonally-oriented items (e.g., blaming family, no respect, burden to family and society). In addition, the estimation of locations of symptom domains raised questions about the processes of illness progression, such as the evolution of affective experiences, interpersonal and somatic distress, internally and externally focused interpretations, and cognitions and behaviors as one's condition develops. Furthermore, the analysis of DIF provided insight into the complexity and subtlety of depression expression within a first generation immigrant group. These findings highlighted important implications of the influence of gender, age, socioeconomic status, life phase, and stage of immigration and acculturation for effective intervention.

Using item-based measurement, it was possible to compose a brief measure whose content was not redundant, minimized bias, overlapped with core western symptom concepts, and included culture-specific and western items that were expected to have cultural acceptability for screening. We thus developed a new scale that performed comparably to the PHQ-9 for discriminating clinical status. It was also possible to construct an alternative 9-item scale with mostly culture-specific content from social and somatic domains that also performed similarly well. In this process, we made two important observations. First, many possible combinations of nine items from among a large pool of items could have comprised a measure that discriminated adequately well. Second, individuals who were moderately or severely depressed were easily detected since it was not difficult for this group to score a value far above the cutoff, given that only 9 or 10 points out of a possible 27 points are required. These observations raised the critical implication that a screening measure must be most discriminant in the low range of depression, i.e., near the cutoff value. It must also consider the illness processes that influence expression at this range. Thus, a next step is to explore the construct in this range, that is, examine the conceptualizations of individuals in this range, especially those who are not detected. In this study, these were the 21.4% of the clinical group who scored below the cutoff, especially those (16.8%) who reported current mild or moderate depression. In the community group, these were the 25.9% who self-evaluated as having mild and moderate current symptoms but had never been diagnosed, and the 24.2% who self-evaluated as never having experienced depression, but scored as having at least minimal symptoms. These statistics suggest a lack of clarity about what is happening in this range and overall, and that the validity indicators found for CADS-9 and PHQ-9 are not as favorable as they appear.

The validation of CADS-9 by comparison with the PHQ-9 had methodological obstacles because the design of the latter did not permit a complete understanding of its validity using an item based approach. The combination of more than one symptom concept in the majority of PHQ-9 items rendered uncertainty about the results. It was not possible to know which concept the respondent was affirming, and thus which of the concepts fit the construct. Also, the PHQ-9 includes two concepts and one term that were excluded during the design of the 47 pilot items. Experts viewed agitation and overeating as culturally invalid, and the expression ‘depressed’ as relevant to a narrower, more educated audience. Regarding DIF, it was also not possible to tease out the concept or expression that was the source of DIF in the five that showed significant DIF. Furthermore, although no PHQ-9 item exhibited DIF by gender, two items contained concepts (not sleeping well and poor appetite) that showed significant DIF in the 42-item model. To validate CADS-9 more rigorously, it would be necessary to untie each concept contained in the PHQ-9 into its own item. Nevertheless, the PHQ-9 has demonstrated usefulness in primary care settings for Chinese immigrant adults, and provided an important point of comparison for the construction of a new cultural scale.

This study presented a viable new scale, based on a face assessment by clinical experts, and raised a number of new research questions that may have important implications for screening and other forms of intervention. However, it had the limitation of a small sample size. Given the public health objective in the U.S. to reduce mental health disparities, the further study of the role of culture in intervention, with emic-based qualitative methods and modern empirical tools, may hold the key to reducing suffering and the social costs of depression of one ethnic minority group.

Figure 1. Construct map: Theoretical description of respondents and 42 items of full model.

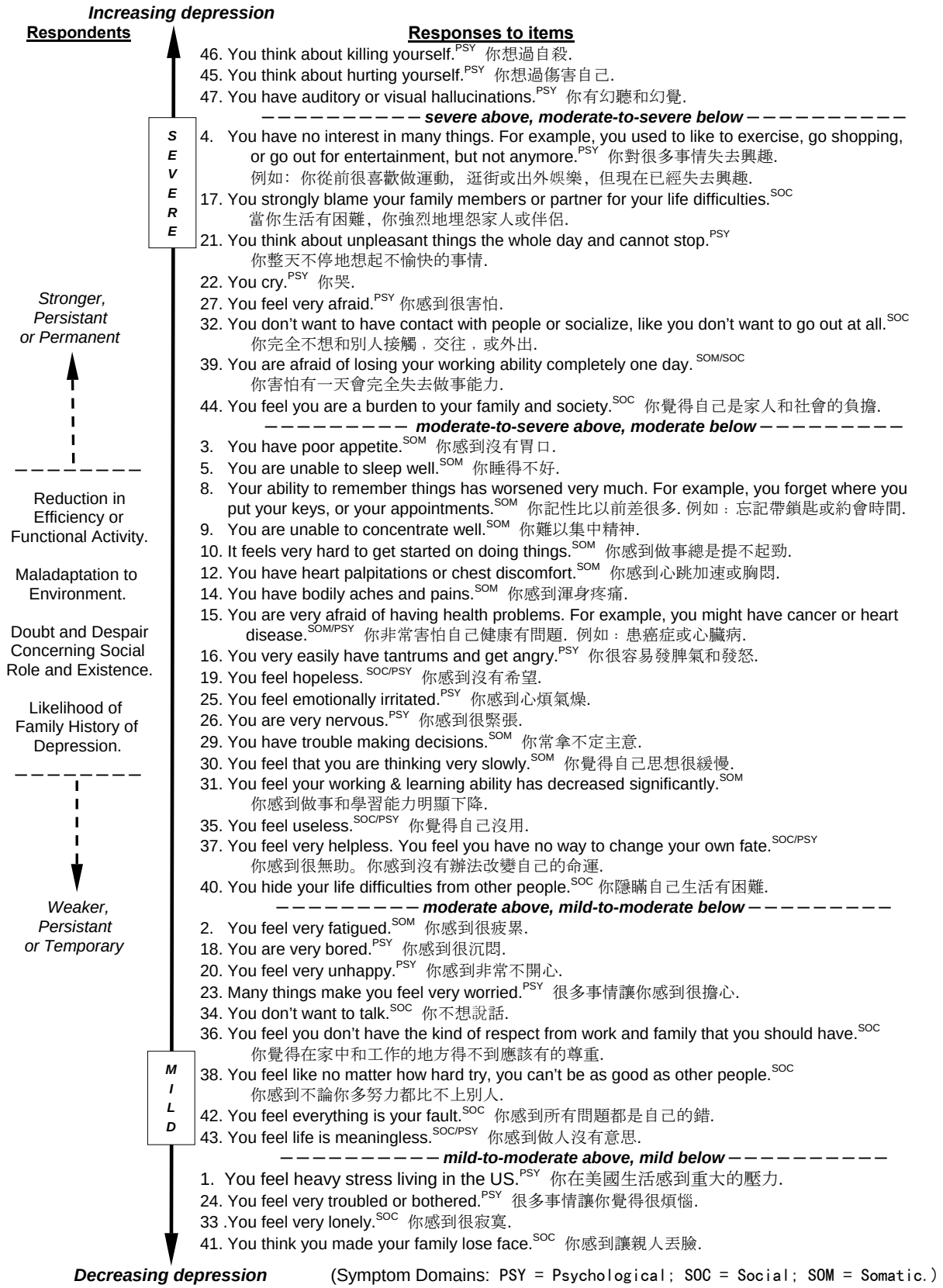

Figure 2. Wright map: Distribution of persons and item parameter locations on logit scale.

Note. CADS-9 items are bolded and italicized. Each 'X' represents 1.5 persons. Domain abbreviations: PSY = Psychological; SOC = Social; SOM = Somatic.

Figure 3. CADS-9 and PHQ-9 ROC curves for males & female subsamples.

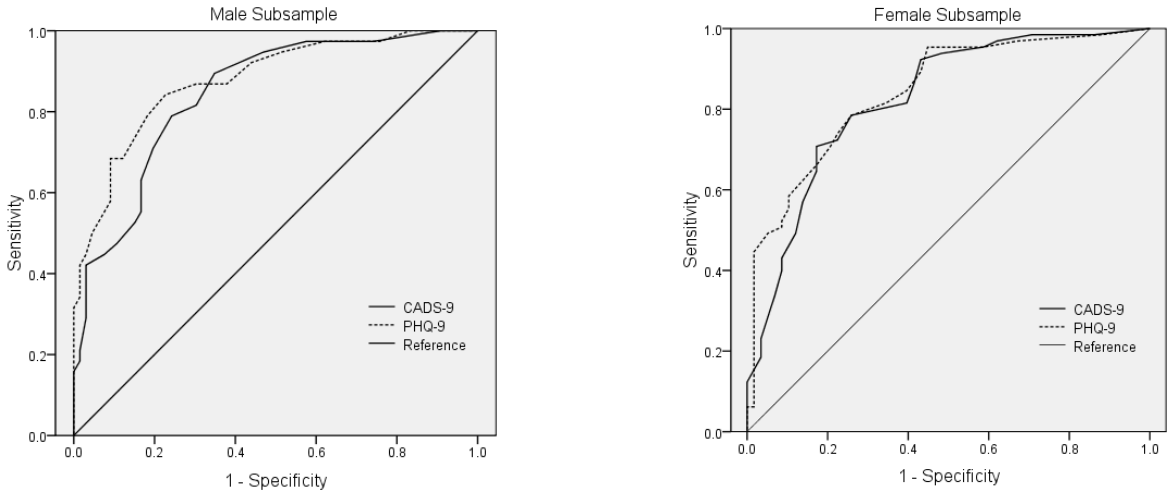

Figure 4. Distribution of CADS-9 total raw scores in clinical and community samples.

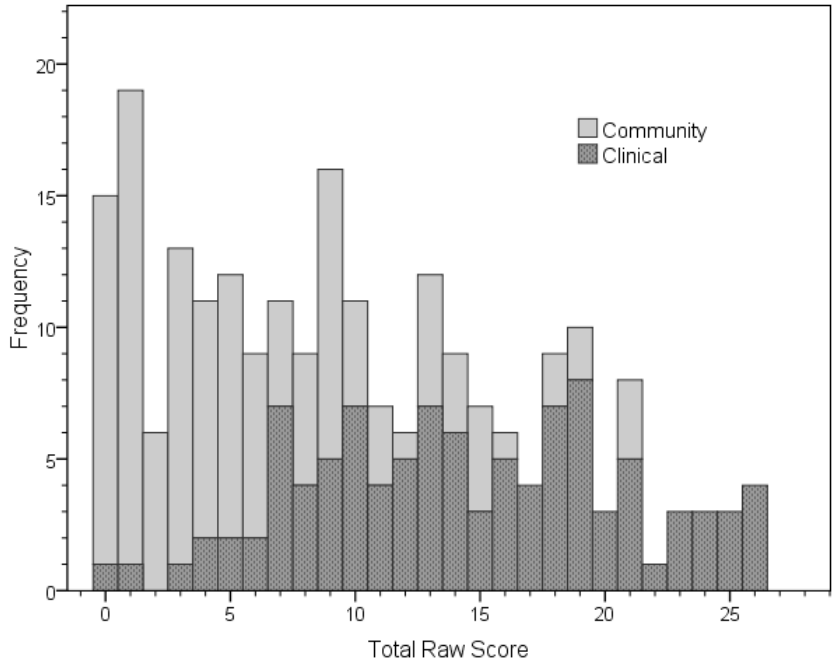

Table 1.

Sample Characteristics

	Clinical	Community	Total
N			
f	103	124	227
%	45.4%	54.6%	100.0%
Age in years			
Mean	45.3	44.0	44.6
(SD)	(10.6)	(11.2)	(10.9)
Age at immigration			
Mean	30.2*	34.7*	32.6
(SD)	(13.0)	(11.7)	(12.5)
Years in U.S.			
Mean	15.1**	9.2**	11.9
(SD)	(10.6)	(8.0)	(9.7)
English language (%)			
Very Poor	37.6%	38.2%	37.9%
Fair	38.6%	48.8%	44.2%
Very good/Excellent	23.7%	13.0%	17.8%
Total	*100.0%*	*100.0%*	*100.00%*
Education (%)			
Elementary School	12.6%	6.5%	9.3%
Middle school	20.4%	15.3%	17.6%
High school	42.7%	54.8%	49.3%
AA or higher	23.3%	23.4%	23.3%
Total	*100.00%*	*100.00%*	*100.00%*

AA: Associate of Arts degree equivalent to the first two years of a four-year college or university.
$^{*}p < .01$. $^{**}p < .001$.

Table 2.

Subgroups Used in Analysis of Differential Item Functioning

	f	%
Gender		
Male	104	45.8%
Female	123	54.2%
Education		
Less than HS	61	26.9%
HS or above	166	73.1%
Years in U.S.		
7 or fewer	93	41.0%
Over 7	134	59.0%
English		
Very Poor	101	45.1%
Fair or better	123	54.9%
Age		
40 or under	78	34.4%
Over 40	149	65.6%

Note. Percentages are based on valid frequency. HS: High school.

Table 3.

Analysis of Differential Item Functioning of CADS-42 by Gender and Age: Ease of Endorsability and Effect Size

Item No./Label		Gender		Age	
Easier to endorse for males or younger adults:					
18	bored[PSY]	M > F	0.376	Y > O	0.214
34	nottalk[SOC]	M > F	0.288		
36	norespect[SOC]	M > F	0.252		
3	appetite[SOM]	M > F	0.252		
5	sleep[SOM]	M > F	0.242		
33	lonely[SOC]	M > F	0.220	Y > O	0.216
2	fatigue[SOM]			Y > O	0.236
10	getstarted[SOM]			Y > O	0.224
Easier to endorse for females or older adults:					
22	crying[PSY]	**F > M**	**0.724**		
8	memory[SOM]	F > M	0.260		
43	meaningless[SOC/PSY]	F > M	0.222		
47	psychotic[PSY]			**O > Y**	**0.792**
14	bodyaches[SOM]			O > Y	0.354
31	lessable[SOM]			O > Y	0.268
37	fate[SOC/PSY]			O > Y	0.224

Notes. This table contains items with significant differences of item logit estimates between groups at $p < .05$ based on t-test of the logit estimate divided by the pooled standard error. M = males; F = females. Y = younger (<= age 40); O = older (> age 40). '>' indicates ease of endorsability. For example, 'M > F' means the item is easier to endorse, and thus scored higher by males than females who have the same location on the severity continuum (i.e., same level of depressive distress). Effect sizes are in logits. Bolded text indicates a large effect size that is greater than .638 logits. Domains: PSY = Psychological; SOM = Somatic; SOC = Social.

Table 4.

Differential Item Functioning by Education, English, and Years in U.S.: Ease of Endorsability and Effect Size

Item No./Label		Education		English		Years in U.S.	
Generally easier to endorse for more acculturated:							
36	norespect^{SOC}	M > L	0.420	M > L	0.412		
1	stress^{PSY}	M > L	0.318			L > M	0.312*
4	interest^{PSY}	M > L	0.300	M > L	0.216		
12	heartpalp^{SOM}	M > L	0.238				
3	appetite^{SOM}	M > L	0.224				
2	fatigue^{SOM}	M > L	0.222				
34	nottalk^{SOC}	M > L	0.220	L > M	0.246*		
46	suicidal^{PSY}			**M > L**	**0.616**		
45	self-harm^{PSY}			***M > L***	***0.452***	M > L	0.270
41	lostface^{SOC}					M > L	0.416
8	memory^{SOM}					M > L	0.216
Generally easier to endorse for less acculturated:							
44	burden$^{SOC/PSY}$	**L > M**	**0.552**				
47	psychotic^{PSY}	L > M	0.418			**M > L**	**0.526***
30	thinkslow^{SOM}	L > M	0.322	L > M	0.318		
39	fearability$^{SOM/SOC}$	L > M	0.254	L > M	0.250		
21	ruminate^{PSY}	L > M	0.252				
38	notgoodas^{SOC}	L > M	0.242				
14	bodyaches^{SOM}	L > M	0.236				
43	meaningless$^{SOC/PSY}$	L > M	0.232				
31	lessable^{SOM}			**L > M**	**0.570**		
35	useless$^{SOC/PSY}$			L > M	0.288		
37	fate$^{SOC/PSY}$			L > M	0.230		
19	hopeless$^{SOC/PSY}$			L > M	0.222		
29	decisions^{SOM}					L > M	0.418
18	bored^{PSY}					L > M	0.366
33	lonely^{SOC}					L > M	0.284
16	angry^{PSY}					L > M	0.282

Note. This table contains items with significant differences of item logit estimates between groups at $p < .05$ based on t-test of the logit estimate divided by the pooled standard error. L = less (less than completed high school education, <= 7 years in U.S., or very poor English level); M = more (completed high school or more, > 7 years in U.S., or fair to excellent English level). '>' indicates ease of endorsability. For example, 'M > L' means the item is easier to endorse, and thus scored higher by those with more education than those with less education, and who have the same location on the severity continuum (i.e., same level of depressive distress). Effect sizes are in logits. Bolded text indicates a large effect size that is greater than .638 logits, and bolded and italicized text indicates an intermediate effect size that is .426-.638 logits. Domains: PSY = Psychological; SOM = Somatic; SOC = Social. *Direction of endorsability does not match; effect size belongs with those in the other direction.

Table 5.

CADS-9: Item Difficulty Estimates, Fit Statistics, and Symptom Domain

Item	Logit Estimate	Error	Outfit	Infit	Symptom Domain
1. Very Worried	-0.994	0.069	0.85	0.77	Psychological (anxiety)
2. Concentration[a b]	-0.577*	0.195	0.87	0.96	Somatic (thinking/concentration)
3. Fear of Health Problems	-0.443	0.066	1.19	1.07	Somatic (somatic preoccupation)
4. Very Unhappy[a b]	-0.326	0.067	0.75	0.80	Psychological (depressed mood)
5. Angry and Tantrums	-0.117	0.069	1.21	1.24	Psychological (irritability)
6. Hide Life Difficulties	-0.038	0.066	1.32	1.24	Social (shame/loss of face)
7. Very Afraid	0.160	0.067	0.64	0.77	Psychological (anxiety)
8. Don't Want to Socialize[a]	0.350	0.068	1.10	1.12	Social (loss of face/avoidance); Psychological (anhedonia)
9. Self-Harm[a b]	1.985	0.078	0.85	1.05	Psychological (self-harm)

Note. Items are ordered top to bottom from mild to severe. 'Logit estimate' is the Rasch model's estimated distance in logits of the item from the mean of items on the depression construct. The mean of items was set to 0 in the calibration. 'Infit' and 'Outfit' are item fit statistics based on mean squared standardized residuals. Their expected value is 1.0, which indicates the data meet the model's expectations. High values above 1.0 suggest more randomness than expected, and low values below 1.0 indicate predictability. Infit is the overall agreement of the item's prediction with the model's prediction. Outfit is how precisely the item estimate predicts respondents' answers to the item.
[a]Matches a DSM-IV criterion. [b]Overlaps conceptually with a PHQ-9 item.

Table 6.

Correct Classification and Predictive Probabilities for CADS-9 and PHQ-9 by Gender

	Correctly Classified	Discriminant		Predictive	
		Sensitivity	Specificity	PPV	NPV
Overall					
CADS-9	0.766	0.786	0.750	0.723	0.809
PHQ-9	0.780	0.806	0.758	0.735	0.825
Male					
CADS-9	0.769	0.789	0.758	0.652	0.862
PHQ-9	0.798	0.842	0.773	0.681	0.895
Female					
CADS-9	0.764	0.785	0.741	0.773	0.754
PHQ-9	0.762	0.785	0.741	0.773	0.754

Note. Sensitivity is likely underestimated due to the presence of asymptomatic individuals in the clinical sample. Correct classification, specificity, PPV, and NPV are similarly biased due to the presence of undiagnosed individuals in the community sample.

Table 7.

Comparison of Self-Evaluation of Current Symptoms and CADS-9 Severity Group

Self-Evaluation	*f*	%	Insignificant Symptoms	Minimal Symptoms	Mild MD	Moderate MD	Severe MD
Clinical Sample:							
None	8	7.9%	**2** (25.0%)	**3** (37.5%)	2 (25.0%)	0 (0.0%)	1 (12.5%)
Mild	52	51.5%	2 (3.8%)	**14** (26.9%)	**20** (38.5%)	**10** (19.2%)	6 (11.5%)
Moderate	30	29.7%	0 (0.0%)	1 (3.3%)	**7** (23.3%)	1**3** (43.3%)	**9** (30.0%)
Severe	11	10.9%	0 (0.0%)	0 (0.0%)	2 (18.2%)	**3** (27.3%)	**6** (54.5%)
Total	*101*	*100.0%*	*4 (4.0%)*	*18 (17.8%)*	*31 (30.7%)*	*26 (25.7%)*	*22 (21.8%)*
Community Sample:							
Never[a]	7	64.2%	**48** (62.3%)	**20** (26.0%)	5 (6.5%)	2 (2.6%)	2 (2.6%)
None	12	10.0%	**2** (16.7%)	**7** (58.3%)	2 (16.7%)	1 (8.3%)	0 (0.0%)
Mild	29	24.2%	2 (6.9%)	**12** (41.4%)	**10** (34.5%)	**5** (17.2%)	0 (0.0%)
Moderate	2	1.7%	0 (0.0%)	0 (0.0%)	0 (0.0%)	**2** (100.0%)	0 (0.0%)
Total	*120*	*100.0%*	*52 (43.3%)*	*39 (32.5%)*	*17 (14.2%)*	*10 (8.3%)*	*2 (1.7%)*

Notes. For exploratory purposes, we created severity groups by total score based on the diagnostic or severity structure of the PHQ-9. MD = major depression. These groups for men and women, respectively, were: Insignificant (<4 and <5), minimal symptoms (4-8 and 5-9), mild MD (9-13 and 10-14), moderate MD (14-18 and 15-19), and severe MD (≥19 and ≥20). Bolded numbers indicate a match between self-evaluation and CAD-9 severity group, with match defined as within one group of the self-evaluation. Two clinical and four community participants are missing from this analysis. The clinical participants scored one each in the mild MD and severe MD groups. The community respondents scored one each in the minimal symptoms, mild MD, moderate MD, and severe MD groups. Totals and percentages are by self-evaluation classifications, i.e., by row.

[a] 'Never' refers to community participants who reported that they had never experienced depression symptoms.

Table 8.

Intercorrelations of CADS-9 and PHQ-9 with Acculturative Stress and Neurasthenia

	ASQ-14[a]	Neurasthenia[b]
CADS9		
Raw	0.691	.705
Logit	0.660	.685
PHQ-9		
Raw	0.593	.681
Logit	0.612	.681

Notes. ASQ-14 is a measure of acculturative stress developed for this study. Neurasthenia was diagnosed with CCMD-2 criteria. 'Raw' refers to scores based on participants' answers to the 4-option Likert scale. 'Logit' refers to the Rasch model's estimated score in logits (logarithm of odds).

[a]Pearson product-moment correlation of total scores (r).

[b]Point biserial correlation ($r_{bp)}$ with diagnosis of neurasthenia.

美國華人移民心理健康問卷

Chinese American Depression Scale (CADS-9)

姓名：NAME: _____ 日期：DATE: _____

在過去*兩星期*？？是否被以下事情所困擾？如果是？被困擾多少天？請？讀？題並圈上最合適的答案。 Over the last *two weeks*, were you bothered by the following problems? If so, how many days? Please read each statement carefully and circle the most appropriate answer.	完全沒有/沒有一天（0天） Not at all/ No days	非常少/幾天（1–3天） A little bit/ A few days	有時/大約一半時間（4–10天） Quite a bit/ About half the days	經常是/差不多？天（11–14天） Extremely/ Nearly every day
1. 很多事情讓？感到很擔心。 Many things make you feel very worried.	0	1	2	3
2. ？難以集中精神。 You are unable to concentrate well.	0	1	2	3
3. ？非常害怕自己健康有問題。例如？患癌症或心臟病。 You are very afraid that you have health problems. For example, you might have cancer or heart disease.	0	1	2	3
4. ？感到非常不開心。 You feel very unhappy.	0	1	2	3
5. ？很容易發脾氣和發怒。 You have tantrums and get angry very easily.	0	1	2	3
6. ？隱瞞自己生活有困難。 You hide your life difficulties from other people.	0	1	2	3
7. ？感到很害怕。 You feel very afraid.	0	1	2	3
8. ？完全不想和別人接觸？交往？或外出。 You don't want to have contact with people, socialize, or go out at all.	0	1	2	3
9. ？想過傷害自己。 You have thought about hurting yourself.	0	1	2	3

合計：
ADD COLUMNS: _____ + _____ + _____

總計：
TOTAL: _____

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How to use CADS-9

Chinese American Depression Scale

- ***Eligibility:*** CADS-9 is for adults, ages 21-60, who consider Chinese as their primary culture, or consider themselves as bicultural, and speak and understand Chinese fluently. It is intended for the screening of symptoms associated with depression in medical clinics and social services agencies.

- ***Directions:*** CADS-9 is a self-report instrument that may be administered by a health or social services provider, or self-administered by the patient or client. Read each item as written. For example, do not change "very worried" to "extremely worried." Make sure that the respondent understands the meaning of the respective answers (0, 1, 2 and 3) in terms of the number of days over the past two weeks. Also, encourage the respondent to answer each item with his or her own understanding and judgment.

- ***Cutoff Score:*** A total score of 10 or more points for women, and 9 or more points for men, indicate risk of major depression or dysthymia. Use CADS-9 as an initial screen, rather than a means of clinical diagnosis.

- ***Severity Levels:*** Higher total scores indicate more severe depression.

    - Minimal symptoms: 5-9 *women*, 4-8 *men*.
    - Mild: 10-14 *women*, 9-13 *men*.
    - Moderate: 15-19 *women*, 14-18 *men*.
    - Severe: 20+ *women*, 19+ *men*.

  Provide referral to mental health assessment and treatment to individuals who score "mild," "moderate," and "severe." Provide education and follow-up to individuals who have "minimal symptoms."

- ***Other Information:*** The first items indicate milder depression, and the last items indicate more severe depression. For example:

    - Mild: 1-*worry*, 2-*poor concentration.*
    - Moderate: 3-*health concerns*, 4-*unhappiness*, 5-*anger*, 6-*hiding difficulties.*
    - Severe: 7-*fear*, 8-*social avoidance,* 9-*self-harm*.

  An individual may be at risk of major depression or dysthymia even if his or her total score is very low, such as below the cutoff score. Consider providing further screening and referral to anyone who answers:

    - 2 (quite a bit) or 3 (extremely) to several of the nine items, or
    - 1 (a little bit), 2 (quite a bit), or 3 (extremely) to 8-*social avoidance* or 9-*self-harm*.

- ***Scale Development:*** CADS-9 was developed with a sample of 227 Chinese immigrant adults in the San Francisco metropolitan area during 2008-09. Study participants were persons diagnosed with major depression or dysthymia, and community members. As a new scale, CADS-9 will need to be researched with more samples to confirm its validity and effectiveness. Rose Wong, Ph.D. candidate in the School of Social Welfare of U.C. Berkeley developed CADS-9 as part of her dissertation research. The National Institute of Mental Health (5R36MH080607), Chinese Community Health Care Association of San Francisco, and Fahs-Beck Fund for Research and Experimentation provided research grants.

Patient Health Questionnaire (PHQ-9)

在過去兩星期中，以下的情況煩擾？有多少？ Over the last two weeks, how often have you been bothered by any of the following problems?	完全沒有 Not at all	有的時候（1-3天） Several days	一半以上的時間（4天以上） More than half the days	幾乎？天 Nearly every day
1. 失去興趣做事情 Little interest or pleasure in doing things	0	1	2	3
2. 感到情緒低落，生活沒有希望 Feeling down, depressed, or hopeless	0	1	2	3
3. 難入睡，或易醒，或睡得過多 Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. 感到很疲倦或沒有精力 Feeling tired or having little energy	0	1	2	3
5. 胃口差或吃得過多 Poor appetite or overeating	0	1	2	3
6. 覺得自己很差，是個失敗者，或讓自己和家人失望 Feeling bad about yourself–or that you are a failure or have let yourself or your family down	0	1	2	3
7. 很難集中精神做事(如看報或看電視) Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. 別人注意到？的動作或？話很緩慢（或相反？？變得比平日更愛動，坐立不安，心情煩燥） Moving or speaking so slowly that other people could have noticed. Or the opposite–being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. 想過活著還不如死了好或有傷害自己的想法 Thoughts that you would be better off dead, or of hurting yourself in some way	0	1	2	3
	完全沒有困難 Not difficult at all	有一點困難 Somewhat difficult	很困難 Very difficult	極度困難 Extremely difficult
10. 如果？有經？以上任何情形，這些情形給日常工作，生活以及與人交往帶來多大困難？ If you checked off *any* problems, how *difficult* have these problems made it for you to do your work, take care of things at home, or get along with other people?	0	1	2	3

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CONCLUSION

This research found indications of cultural elements that were important for effective intervention with Chinese immigrants. Study 1 revealed the nature and relative significance of socially based expressions of distress, which were centered on the struggle to fulfill one's social role in face of adverse life events, including those posed or heightened by immigration. The analyses showed a breadth of symptom experiences that contained a social interpretation of the self; the expression of some emotional concepts with direct reference to the social self; and a relatively less frequent manifestation of typical Western psychological symptoms. Study 2 detected a multidimensional structure of depression, with distinct psychological, somatic, and social dimensions. These dimensions were highly intercorrelated, and each predicted the study's clinical criterion similarly well. However, there were clear dimensional patterns of expression, which showed that an individual might report one or two dimensions much more severely compared to another individual with the same overall level of distress. Study 3 identified a spectrum of culturally based and Western content relevant to the measurement construct, from which items that were valid for the screening objective were chosen. Its results indicated the importance of considering gender and acculturation in order to achieve measurement equivalence within a first generation population.

These findings affirmed the need of further research on the cultural manifestation of depression, and the role of cultural factors in successful prevention, assessment, and treatment of depression in Chinese American immigrants. Study 1, aside from disclosing a social component of depressive distress, also suggested a process of illness progression beginning with an experience focused on external causes and somatic discomfort to an understanding of one's condition as internal. This study showed the importance of qualitative, emic research to further knowledge of the essential cultural factors and processes that underlie depression and how these may be targeted in interventions. Study 2 pointed to the need to confirm a culturally based multidimensional construct and to investigate interventions that address the diverse forms of illness experience and presentation that are represented within this construct. The findings of Study 3 indicated a next step of validating CADS-9 in a screening intervention, and further examining the role that culturally based symptom concepts can play in effective assessment.

This dissertation research contributed to a long-standing question about the cultural nature of depression. Considering repeated reports of disparities in illness recognition and utilization of mental health services, and cultural barriers to obtaining care, this question underlies a glaring public health problem that regards a cultural minority group. This research provided initial knowledge of the cultural content and structure of depression, with major implications for assessment. Its results corroborate previous findings concerning cultural conceptualizations, styles of expression, and non-equivalence of measurement constructs. This research elaborated the nature of a cultural construct of depression with the aid of an emic research method and the modern psychometric technique of item response analysis. If these findings, based on a small sample size, are confirmed, then numerous pathways toward culturally efficacious intervention will be opened. This research has the potential to stimulate further investigation of the cultural aspects of depression that will support the improved health and well being of Chinese American immigrants.