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**Psychosocial predictors of first-onset depression
in Chinese Americans***

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Abstract *Background:* This study examines the longitudinal and concurrent risk factors associated with first-onset major depression in a community sample of 1747 Chinese Americans in Los Angeles. *Methods:* The relative contributions of demographic, health, psychiatric, psychosocial, and cultural variables were assessed in a series of longitudinal and concurrent hierarchical multivariable analyses. *Results:* Results of the longitudinal analyses indicated that the risk for experiencing a first major depressive episode at 18-months follow-up was higher for those who initially rated their health as poor, reported higher depressive symptoms, and perceived higher levels of social support. After controlling for prior health and psychiatric and psychosocial status at time 1, the results of the concurrent analyses indicated that the risk for experiencing a first major depressive episode at time 2 was higher for those who rated their health as poor, had at least one other psychiatric disorder, were bilingual, experienced high levels of life stress, and perceived themselves as having low and/or decreased social supports. *Conclusions:* The results of this study confirm previous evidence that psychosocial vulnerabilities, including higher acculturation, greater stress exposure and reduced social supports, are important predictors of risk for first-onset depressive episodes. Prevention and treatment implications are addressed, and future directions for research are offered.

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Introduction

Major depression is a highly prevalent and deleterious disorder that spans across ethnic and cultural boundaries. In a recent article published by Takeuchi et al. (1998), the prevalence rates of lifetime and 12-month current major depression in a community sample of Chinese Americans was found to be 6.9% and 3.4%, respectively. While considerable amounts of research examining the correlates and risk factors for depression have delineated the contribution of demographic, health, psychiatric, psychosocial, and cultural variables (Gotlib and Hammen 1992; Hammen 1997; Vega et al. 1998), comparatively less is known about the etiology and contributors to major depression in Chinese and Chinese Americans. Studies that do exist have been primarily descriptive in nature, or have focused on prevalence rates or diagnostic issues (Chen et al. 1993; Hwu et al. 1989; Kleinman 1982; Kleinman and Kleinman 1985; Takeuchi 1998; Zheng et al. 1997). To our knowledge, no study examining first-onset depression in Chinese or Chinese Americans has ever been conducted.

While researchers have been relatively successful in delineating the risk factors for major depression in general, few empirical studies differentiate between first episodes and subsequent episodes in their analyses. Those that do find that most people have had a prior depressive episode, and that a prior depressive episode places an individual at greater risk for subsequent episodes (Kendler et al. 1993; Kessler and Magee 1994; Lewinsohn et al. 1988). For example, in an examination of Epidemiologic Catchment Area (ECA) data, Kessler and Magee (1994) found that 91% of respondents who reported an episode of depression in the previous 12 months had a history of prior episodes. In another study, conducted by Lewinsohn et al. (1988), 76 out of 85 depressed cases (89%) experienced a prior depressive episode. Furthermore, Sorenson et al. (1991) found that most of the depressed people in their sample had been depressed more than once, with three episodes being the

median. These findings may be explained by the finding that most individuals experience a depressive episode by early adulthood (Coryell et al. 1992; Lewinsohn et al. 1986, 1994; Sorenson et al. 1991).

There are several reasons why it is important to examine risk factors for first onset. First, in order to understand the true etiology of any disorder, we need to differentiate between factors that operate in eliciting a first episode versus factors that operate to elicit a subsequent episode. For example, in a literature review conducted by Post (1992), he concludes that psychosocial stressors may contribute more to the first depressive episode than to subsequent ones.

Additionally, a prior episode of depression may have an undeterminable impact on factors that elicit a subsequent episode. Problems associated with studying risk factors of previously depressed people include disaggregating the reciprocal relationships between the predictors of depression and the nature and consequences of the disease. For example, in an analysis of ECA data, a prior history of depression had an odds ratio close to 40.0 in predicting a subsequent 12-month major depressive episode (Kessler and Magee 1994). Using history as a control variable, however, may lead to a reduction in the estimated effect of other risk factors, many of which may be mediated by the previous depressive episode. Conversely, failing to control for history underestimates the effect of history of depression on subsequent episodes and overestimates the effect of other adversities. If separate analyses for first onset and recurrent depression are not conducted, it becomes increasingly difficult to tease apart the interactive and cumulative effects of history of depression and risk factors over time.

Despite these difficulties, there are a handful of community studies that examine first onset depression in the general North American population (Bruce and Hoff 1994; Coryell et al. 1992; Gallo et al. 1993; Horwath et al. 1992; Lewinsohn et al. 1986; Sorenson et al. 1991). Although not always consistent, results from these studies indicate that demographic variables (female gender, younger age, low socioeconomic status, low and high educational achievement, rural residence, and separation or divorce) (Bruce and Hoff 1994; Coryell et al. 1992; Gallo et al. 1993; Lewinsohn et al. 1986; Sorenson et al. 1991), physical impairment (e.g., confinement to a bed or chair) (Bruce and Hoff 1994), psychiatric variables (nonaffective psychiatric history and depressive symptomatology) (Coryell et al. 1992; Horwath et al. 1992; Lewinsohn et al. 1988; Zonderman et al. 1993), psychosocial factors (social isolation) (Bruce and Hoff 1994), and cultural variables (being born in the United States) (Sorenson et al. 1991) may contribute to enhanced risk for a first episode of depression.

Although no studies of first onset depression have been conducted on Chinese or Chinese Americans, studies have begun to establish the relationship between various risk factors and major depression in general. For example, Kleinman and Kleinman (1985) described

clinically depressed people in China as having severe work, family, and economic stressors. In addition, many of those who were depressed were more likely to be female and to suffer from a psychiatric condition. This is consistent with psychiatric epidemiological studies conducted in mainland China, Hong Kong, and Taiwan, which indicate significantly higher rates of neurotic disorders (anxiety and depressive disorders) in women (Chen et al. 1993; Cooper and Sartorius 1996; Hwu et al. 1989). However, this is inconsistent with findings from the Chinese American Psychiatric Epidemiological Study (CAPES), which found no association between gender and major depression (Takeuchi et al. 1998). Takeuchi et al. (1998) explored this relationship further and found that gender differences become more pronounced as Chinese immigrants became more acculturated. Nevertheless, research examining gender and other risk factors for major depression in Chinese and Chinese Americans remains scarce.

The Chinese American Psychiatric Epidemiological study (CAPES) provides a prime opportunity to examine factors associated with first-onset depression in Chinese Americans. It is the first and most sophisticated large-scale community study conducted on Chinese Americans using rigorous diagnostic criteria and a longitudinal design. In addition, this study went beyond examining traditional demographic, health, and psychiatric variables associated with first-onset major depression and examined the additional contributions of psychosocial and cultural risk factors. In doing so, we differentiate between antecedent and concomitant risk factors, as well as bivariate and hierarchical multivariable relationships that take into account the effect of other risk factors. To reduce complexity and increase clarity of presentation, risk factors well grounded in empirical literature were parsimoniously chosen.

Subjects and methods

Data collection

Participants in this study included 1747 Chinese immigrants and native-born residents of the United States (aged 18–65) who resided in Los Angeles County between 1993 and 1994, and who spoke English, Mandarin, or Cantonese.

Since Chinese Americans comprised less than 3% of the total population of Los Angeles County in 1990, census tracts composed of at least 6% (6–72.3%) Chinese Americans were selected to increase the probability of locating and screening a Chinese American household. This cost-effective design confined recruitment of participants to 158 census tracts. According to the 1990 census, the 149,513 Chinese living in these tracts represented approximately 61.1% of the 244,767 Chinese in Los Angeles County.

Although this sampling design is the most sophisticated method used for an Asian American community study, it has important limitations. The most obvious limitation is that it oversamples individuals who live in areas of higher ethnic density and undersamples people who live in locations of lesser ethnic density. The latter are more likely to be long-term residents, native born or more acculturated, and wealthier.

Sampling proceeded in three stages: (1) selection of tracts; (2) selection of blocks within tracts; and (3) selection of households

within blocks. One-hundred and fifty-eight tracts comprised of at least 6% Chinese were stratified by racial-ethnic composition, household income, and percentage of Chinese American households. A random selection of 12 blocks was chosen within each tract, four households were randomly selected within each block, and one eligible member was randomly selected within each household using the most recent birthday as the selection criterion. Selection in the first two stages was designed with probabilities proportional to size, and even though selection probabilities varied within each stage, the ultimate selection probabilities were the same for all Chinese households. Median income, educational attainment, and length of residence in the United States were taken into consideration when probability lattice sampling was applied (Jensen 1970). This sample is self-weighted, meaning that no respondent weights are necessary at the household level. At the respondent level, weights are inversely proportional to the number of persons eligible for interview in the household. Weights were applied to the sample data to adjust for demographic variables, non-response rates, and for the differential probabilities of selection within the household.

Bilingual interviewers, fluent in English and Mandarin or Cantonese, were recruited to administer the interviews. All interviewers were screened for proficiency in reading and writing in both languages, suitability for and style of interviewing, and access to transportation. Although none of the lay interviewers had formal training in clinical interviewing and diagnoses, all had at least some college education and were carefully trained to criterion in order to ensure the reliability and validity of findings.

The study was explained to the subject and written consent was obtained. Interviews were conducted in English, Mandarin, or Cantonese depending on the respondent's language preference, and lasted approximately 90 min. In the first wave of data collection (April 1993–August 1994), 16,916 households were visited and screened in order to obtain 1747 completed interviews. The response rate of 82% was comparable to that of the National Comorbidity Study (Kessler et al. 1994). At the 15-month follow-up interview, data from 1503 (86%) of the original respondents were collected. To account for potential biases that might have occurred due to attrition, analyses were conducted to compare differences between those who completed both waves of interviews and those who completed only the time 1 interview. Weighted chi-square analyses reveal that those who did not complete both waves of interviews were more likely to be between the ages of 18 and 29 and less likely to be over 50 [$\chi^2(2) = 16.229$, $P = 0.00$]; to be single [$\chi^2(1) = 3.82$, $P = 0.03$]; to be unemployed [$\chi^2(1) = 7.16$, $P = 0.01$]; to report better physical health [$\chi^2(1) = 5.51$, $P = 0.02$] and to report a lifetime or concurrent psychiatric disorder other than depression [$\chi^2(1) = 7.25$, $P = 0.01$]. Those who reported a lifetime or current depressive episode at time 1 were no more likely to drop out than those who reported no depressive episodes, [$\chi^2(1) = 0.15$, n.s.].

Longitudinal design

The goal of this study was to assess antecedent and concomitant factors associated with a first-onset depressive episode. This was tested using a longitudinal design that screened out respondents who were either currently depressed or experienced a depressive episode in their lifetime. Only the 1397 respondents who met these criteria and completed both waves of data collection (time 1 and time 2) were included in this study. The 12-month prevalence rate of first-onset depression for this sample was 3.1%. Prevalence rates for males ($N = 15$) and females ($N = 28$) were 2.3% and 3.8%, respectively. Depression, demographic variables, psychosocial factors and other aspects of psychopathology were assessed at both points in time, and 18 months elapsed between data collection points.

The overall sample characteristics at time 1 consisted of slightly more females (52.5%). Respondents were mostly between the ages of 30 and 49 (57.8%), had at least some college education (62.7%), were married (67.3%), and the vast majority were employed (93.9%). In addition, the majority of respondents immigrated

between the ages of 21 and 40 years old (56.9%), and spoke mostly or only Chinese (61.2%). Unweighted frequencies and weighted percentages of first-onset depressed and nondepressed individuals at time 2 are presented separately in Table 1.

Analysis procedures

Binomial and multivariable logistic regressions were used to estimate the relative association of various risk factors to first-onset depression at time 2. Logistic regressions were the primary tool of analysis for both antecedent (time 1) and concurrent risk factors (time 2).

Measures

Diagnostic measure

The University of Michigan's version of the Composite International Diagnostic Interview (UM-CIDI) was used as the major diagnostic instrument (Kessler et al. 1994). The UM-CIDI is a structured interview schedule based on the Diagnostic Interview Schedule (DIS) and designed to be used by trained non-clinician lay interviewers. The DIS has shown good reliability and validity for most diagnoses when modified for a Chinese sample (Hwu et al. 1986a, b, 1989). The CIDI was originally designed to estimate the prevalence of specific disorders across different countries and is particularly useful in ascertaining the co-occurrence of two or more

Table 1 Characteristics of nondepressed and first-onset depressed groups (time 2) – unweighted frequencies and weighted percentages (S/W/D separated/widowed/divorced)

Time 2 variable	Nondepressed group (%) <i>n</i> = 1354 (96.9%)	Onset group (%) <i>n</i> = 43 (3.1%)
Gender		
Female	706 (49.2%)	28 (62.1%)
Male	648 (50.8%)	15 (37.9%)
	0 missing	0 missing
Age		
18–29	270 (27.0%)	6 (10.1%)
30–49	758 (50.7%)	26 (64.5%)
50–65	272 (22.3%)	8 (25.4%)
	54 missing	3 missing
Marital status		
Single	330 (28.2%)	7 (13.1%)
S/W/D	90 (4.7%)	7 (15.2%)
Married	931 (66.9%)	29 (71.7%)
	3 missing	0 missing
Education		
Less than 12 yrs	249 (20.8%)	13 (32.9%)
Some college	848 (59.2%)	27 (60.0%)
High school	255 (20.0%)	3 (7.1%)
	2 missing	0 missing
Employment status		
Unemployed	79 (6.4%)	4 (6.0%)
Employed/other	1275 (93.6%)	39 (94.0%)
	0 missing	0 missing
Age of immigration		
21–40 yrs	725 (51.2%)	29 (60.7%)
41–65 yrs	183 (15.8%)	8 (26.8%)
0–20 yrs	374 (33.1%)	6 (14.0%)
	72 missing	0 missing
Language usage		
Both equally	301 (21.3%)	12 (30.3%)
Most/only English	219 (16.0%)	4 (7.3%)
Most/only Chinese	821 (62.7%)	26 (62.5%)
	13 missing	1 missing

disorders (Robins et al. 1988). The CIDI has demonstrated good inter-rater reliability (Semler et al. 1987), test-retest reliability (Spengler and Wittchen 1989), and validity for almost all diagnoses (Janca et al. 1992; Spengler and Wittchen 1989). One noticeable difference between the UM-CIDI and the original CIDI is the placement of the lifetime review section at the beginning of the diagnostic section before any probes are asked. This modification is in response to a common finding that respondents may under-report stem questions when they recognize that positive responses lead to more detailed questioning (Kessler et al. 1994).

A shortened version of the UM-CIDI based on the results of the National Comorbidity Survey was used at time 2 (R. C. Kessler and D. K. Mroczek, personal communication, April 13, 1993). Optimal cut-off points recommended by Kessler and Mroczek (personal communication, April 13, 1993) were applied to all diagnostic areas. For a major depressive episode, the recommended optimal cut-off point was to classify all respondents with three or more symptom criteria as probable cases and those with scores of zero through two as probable noncases. In order to increase the validity of caseness and decrease the probability of type I error, we raised the optimal classification rule to a four symptom criterion, raising the probability of CIDI caseness to over 80%. It is important to note that the use of the shortened version of the UM-CIDI at time 2 is not without limitations. Cut-off points were selected by means of after-the-fact analysis of reports by people who were administered the full set of UM-CIDI items. Whether response patterns would have been the same if participants had only been administered the short form is uncertain. Furthermore, fatigue, order effects, and context effects of being administered a long interview (UM-CIDI) rather than a short interview could influence the relationships between the short-form items and the true diagnosis. Finally, changes were also made in the presentation of the short-form items. All items were presented in a 12-month recall framework, and in the major depressive episode section, the episode to probe was determined by asking people to think of their worst episode in the past 12 months. The CIDI, in comparison, asked respondents to think of the episode with the largest number of symptoms and administers all symptom questions first.

Lifetime prevalence of agoraphobia, dysthymia, general anxiety disorder (GAD), simple phobia, and social phobia was used as a measure of psychiatric history. In addition, the 12-month prevalence of at least one of these disorders was used to determine comorbidity.

Demographic variables

Information on gender, age, marital status, education, and employment status was collected.

Self-rated health

Subjects were asked to rate their own physical health on a five-point scale, ranging from 1 (poor) to 5 (excellent). Individuals who reported fair/excellent overall physical health were compared to those who reported poor overall health.

Depressive symptomatology

The SCL-90-R contains 90 items grouped into nine factors (Derogatis 1977). Depressive symptomatology was measured using the depressive symptoms subscale of the SCL-90. Respondents were asked to rate how much these symptoms had bothered them during the past 7 days on a five-point scale ranging from 1 (not at all) to 5 (extremely). The Chinese translation of the SCL-90 has been validated in Hong Kong, mainland China, and Taiwan (Bech et al. 1992; Takeuchi et al. 1989; Zheng et al. 1986). This measure evidenced good reliability in our sample (Cronbach α coefficient = 0.83). The cut-off point between high and low depressive symptomatology was made at one standard deviation above the mean at time 1 (mean = 0.22, SD = 0.31).

Age of immigration

Participants were asked how old they were when they first came to the United States. Responses were grouped into three categories: those who immigrated between the ages of 0 and 20, those who immigrated between the ages of 21 and 40, and those who immigrated between the ages of 41 and 65.

Language usage

Participants were asked to indicate what mix of languages they spoke in their daily life along a five-point scale (English only, mostly English, both equally, mostly Chinese, and Chinese only). Responses were then grouped into three categories: those who spoke both languages equally, those who spoke most/only English, and those who spoke most/only Chinese.

Daily hassles

A modified version of the Daily Hassles Scale was used to measure 16 areas of everyday strains including job hassles, interpersonal conflicts, and inconveniences typical of urban living such as traffic, pollution, crime, inter-racial conflict, and physical conditions of the neighborhood over the past month (Kanner et al. 1981). The Daily Hassles Scale evidenced good reliability in our sample (Cronbach α coefficient = 0.82). Respondents who reported eight or more hassles were grouped as high and respondents who reported seven or fewer hassles were grouped as low. This cut-off was made by examining the hassles distribution and setting the cut-off at one standard deviation above the mean.

Recent negative events

Ten negative events that occurred within the past 12 months, such as being robbed, having a relationship breakup, and being in trouble with the law, were assessed (McGonagle and Kessler 1990). Respondents who experienced two or more negative events were classified as high stress and those who experienced one or fewer negative events were classified as low stress.

Social support and social conflict

Social support and social conflict were measured using the UM-CIDI's modified version of Positive and Negative Social Interactions Scale (Kessler et al. 1994; Schuster et al. 1990). This scale was originally derived from a scale developed by Turner et al. (1983). It measures three types of perceived support and conflict: friend, family or relatives, and spouse. Scores were computed for each source of support and conflict by taking the sum of validated items and linearly transforming them to range from 0 to 1. For the purposes of this study, the family and friend support and conflict subscales were combined to create global measures of social support and social conflict. Alpha coefficients for family support and conflict and friend support and conflict were 0.88, 0.84, 0.90, and 0.79, respectively. The α coefficient for combined family and friend support was 0.89, and for family and friend conflict it was 0.87. Cut-off points for low and high support and conflict were made at one standard deviation above or below the mean of each scale at time 1 (mean support = 0.66, SD = 0.16; mean conflict = 0.08, SD = 0.11), based on the direction of skewness (i.e., positive or negative).

Results

Predictive analyses

The overall incidence rate of 12-month current first-onset depression was 3.1%. Incidence rates for males

($N = 15$) and females ($N = 28$) were 2.3% and 3.8%, respectively. Bivariate logistic regressions were used to assess the predictive relationships between each inde-

pendent variable and first-onset depression at time 2. Table 2 displays the odds ratios and confidence intervals for time 1 bivariate relationships between predictor

Table 2 Bivariate logistic regressions, time 1 (T1) and time 2 (T2) variables: odds ratios (OR), 95% confidence intervals (CI) and significance (Sig.) values (*Hx* history, *Sx* symptoms)

	T1 OR (95% CI) Sig.	T2 OR (95% CI) Sig.
Demographic variables		
Gender		
Female	1.69 (0.90–3.12) 0.10	1.69 (0.90–3.12) 0.10
Male		
Age		
18–29 yrs	0.27 (0.09–0.87) 0.03**	0.33 (0.10–1.04) 0.06*
30–49 yrs	1.08 (0.52–2.24) 0.83	1.12 (0.54–2.33) 0.77
50–65 yrs		
Marital status		
Single	0.37 (0.15–0.92) 0.03**	0.43 (0.17–1.08) 0.07*
S/W/D	1.97 (0.69–5.60) 0.20	3.03 (1.25–7.36) 0.01***
Married		
Education		
Less than 12 yrs	4.47 (1.27–15.70) 0.02**	4.47 (1.27–15.70) 0.02**
Some college	2.86 (0.86–9.54) 0.09	2.86 (0.86–9.54) 0.09
High school		
Employment status		
Unemployed	0.40 (0.06–2.61) 0.34	0.93 (0.26–3.39) 0.92
Employed/other		
Health/psychiatric history		
Physical health rating		
Poor	5.84 (2.33–14.66) 0.00***	21.31 (10.32–44.01) 0.00***
Fair/excellent		
Psych Hx ^a		
At least 1	3.78 (1.54–9.23) 0.00***	3.78 (1.54–9.23) 0.00***
No history		
Comorbidity ^a		
At least 1	3.61 (0.84–15.44) 0.08*	12.12 (6.43–22.86) 0.00***
No history		
Depressive Sx		
High	3.49 (1.81–6.72) 0.00***	
Low		
Psychosociocultural variables		
Age of immigration		
21–40 yrs	3.13 (1.22–8.01) 0.02**	3.13 (1.22–8.01) 0.02**
41–65 yrs	4.48 (1.58–12.71) 0.00***	4.48 (1.58–12.71) 0.00***
0–20 yrs		
Language usage		
Both equally	0.74 (0.33–1.65) 0.46	1.43 (0.72–2.84) 0.31
Most/only English	0.55 (0.15–1.67) 0.26	0.46 (0.14–1.52) 0.20
Most/only Chinese		
Daily hassles		
High	1.42 (0.69–2.91) 0.34	3.75 (1.78–7.88) 0.00***
Low		
Recent negative event		
High	1.87 (0.76–4.50) 0.17	3.82 (1.70–8.56) 0.00***
Low		
Social conflict		
High	0.95 (0.38–2.38) 0.92	1.25 (0.56–2.79) 0.58
Low		
Social support		
Low	0.47 (0.16–1.37) 0.17	4.32 (2.20–8.47) 0.00***
High		

* $P < 0.08$; ** $P < 0.05$; *** $P < 0.01$

^a Agoraphobia, dysthymia, general anxiety disorder (GAD), simple phobia, social phobia

Table 3 Hierarchical multivariable logistic regression: time 1 variables predicting time 2 first-onset depression

Variable	Step 1 OR (95% CI) Sig.	Step 2 OR (95% CI) Sig.	Step 3 OR (95% CI) Sig.	Step 4 OR (95% CI) Sig.	Step 5 OR (95% CI) Sig.
Gender					
Female	1.46 (0.73-2.93) 0.28	1.44 (0.72-2.89) 0.31	1.44 (0.71-2.90) 0.31	1.27 (0.62-2.59) 0.51	1.08 (0.52-2.26) 0.84
Male					
Age					
18-29 yrs	0.34 (0.07-1.63) 0.18	0.41 (0.08-2.01) 0.27	0.37 (0.07-1.87) 0.23	0.37 (0.07-1.86) 0.23	0.89 (0.12-6.42) 0.91
30-49 yrs	1.10 (0.48-2.50) 0.82	1.27 (0.54-2.98) 0.58	1.27 (0.54-2.98) 0.59	1.33 (0.57-3.14) 0.51	1.96 (0.58-6.60) 0.28
50-65 yrs					
Marital status					
Single	0.85 (0.25-2.84) 0.79	0.85 (0.25-2.85) 0.80	0.92 (0.27-3.09) 0.89	0.94 (0.27-3.22) 0.91	0.94 (0.26-3.32) 0.92
S/W/D	1.09 (0.27-4.43) 0.91	1.02 (0.24-4.26) 0.98	0.99 (0.23-4.20) 0.99	0.96 (0.22-4.12) 0.96	1.12 (0.26-4.90) 0.88
Married					
Education					
Less than 12 yrs	3.22 (0.88-11.79) 0.08*	3.26 (0.88-12.07) 0.08*	2.96 (0.79-11.07) 0.11	2.51 (0.67-9.47) 0.17	2.93 (0.77-11.23) 0.12
Some college	3.16 (0.93-10.70) 0.07*	3.77 (1.08-13.28) 0.04**	3.63 (1.04-12.68) 0.04**	3.43 (0.99-11.94) 0.05**	3.28 (0.92-11.71) 0.07*
High school					
Employment status					
Unemployed	0.47 (0.07-3.16) 0.44	0.32 (0.04-2.30) 0.26	0.32 (0.04-2.37) 0.26	0.28 (0.04-2.22) 0.23	0.41 (0.06-3.05) 0.39
Employed/other					
Physical health rating					
Poor		7.67 (2.42-24.33) 0.00***	7.02 (2.12-23.30) 0.00***	5.52 (1.61-18.90) 0.01***	6.83 (1.93-24.18) 0.00***
Fair/excellent					
Psychiatric history					
At least 1			1.63 (0.33-8.02) 0.55	1.35 (0.27-6.64) 0.71	1.47 (0.29-7.38) 0.64
No history					
Comorbidity					
At least 1			2.20 (0.26-18.75) 0.47	1.65 (0.19-14.44) 0.65	1.29 (0.14-11.93) 0.82
No history					
Depressive symptomatology					
High				2.87 (1.30-6.36) 0.01***	3.15 (1.36-7.27) 0.01***
Low					
Age of immigration					
21-40 yrs					2.10 (0.62-7.09) 0.23
41-65 yrs					3.95 (0.74-21.11) 0.11
0-20 yrs					
Language usage					
Both equally					1.13 (0.45-2.83) 0.80
Most/only English					1.28 (0.31-5.22) 0.73
Most/only Chinese					
Daily hassles					
High					1.95 (0.87-4.37) 0.11
Low					

Recent negative events	
High	0.86 (0.23-3.27) 0.83
Low	
Social conflict	
High	1.12 (0.39-3.23) 0.82
Low	
Social support	
Low	0.23 (0.06-0.80) 0.02**
High	

* $P < 0.08$; ** $P < 0.05$; *** $P < 0.01$

variables and first-onset major depression. Those who became depressed were more likely to be older, to be married, to not have graduated from high school, to report poor physical health, to have a psychiatric history, to report high depressive symptoms, and to have immigrated as a young or older adult.

Hierarchical multivariable logistic regressions were used to assess the relationships between independent variables and first-onset depression at time 2. Multivariable analyses provided the advantage of examining the contributory effects of independent variables, while controlling for the effects of other independent variables in a step-wise fashion. Table 3 presents the association between antecedent variables (time 1) and first-onset depression (time 2). Demographic variables were entered at step 1, physical health rating was entered at step 2, psychiatric variables were entered at step 3, depressive symptomatology was entered at step 4, and psychosocial and cultural variables were entered at step 5.

Unlike bivariate analyses, multivariable analyses indicated that demographic variables did not play a significant role in predicting a first episode of depression. Instead, those who were most likely to become depressed were those who reported poor physical health and high depressive symptomatology. In addition, contrary to expectation, individuals who reported low social support were at lower risk for developing a first depressive episode than those who reported high social support. Both prior psychiatric history and later age of immigration, which were found to be predictive at the bivariate level, were no longer significant when other factors were taken into account.

Concurrent analyses

In addition to running predictive analyses, concurrent analyses of the same set of risk factors (controlling for factors that were significantly predictive at time 1) were conducted to provide a better clinical picture of those depressed and as an aid in understanding the processes that occur during the development of a first depressive episode. Bivariate logistic regressions for time 2 concurrent variables indicated that those who were most likely to be concurrently depressed were more likely to be older, to be separated, widowed, or divorced, to not have graduated from high school, to report poor physical health, to have experienced a prior psychiatric disorder, to be concurrently experiencing another psychiatric disorder, to have immigrated at a later age, to report more daily hassles, to report experiencing more recent negative life events, and to have low social support.

Time 1 antecedent variables (physical health rating, depressive symptomatology, and social support) that significantly predicted first-onset depression in predictive multivariable analyses were included as controls in the second set of hierarchical multivariable logistic regressions. In the second set of analyses, demographic

Table 4 Hierarchical multivariable logistic regression: time 2 variables predicting time 2 first-onset depression (controlling for time 1 significant predictors)

Variable	Step 1 OR (95% CI) Sig.	Step 2 OR (95% CI) Sig.	Step 3 OR (95% CI) Sig.	Step 4 OR (95% CI) Sig.	Step 5 OR (95% CI) Sig.
Gender					
Female	1.39 (0.69-2.79) 0.36	1.50 (0.71-3.15) 0.28	1.16 (0.53-2.57) 0.71	1.02 (0.45-2.32) 0.96	0.96 (0.39-2.38) 0.93
Male					
Age					
18-29 yrs	0.48 (0.10-2.32) 0.36	0.69 (0.11-4.24) 0.69	0.47 (0.06-3.43) 0.45	0.48 (0.07-3.55) 0.48	1.94 (0.14-27.22) 0.62
30-49 yrs	1.28 (0.56-2.95) 0.56	2.68 (0.98-7.36) 0.06*	2.21 (0.75-6.46) 0.15	2.24 (0.76-6.59) 0.14	4.09 (0.67-24.79) 0.13
50-65 yrs					
Marital status					
Single	0.97 (0.28-3.36) 0.98	1.05 (0.26-4.18) 0.95	1.15 (0.25-5.23) 0.86	1.13 (0.25-5.17) 0.87	1.33 (0.27-6.67) 0.73
S/W/D	2.18 (0.74-6.45) 0.16	2.23 (0.70-7.19) 0.18	2.07 (0.61-6.98) 0.24	2.04 (0.61-6.83) 0.25	1.85 (0.42-8.27) 0.42
Married					
Education					
Less than 12 yrs	3.22 (0.88-11.72) 0.08*	1.92 (0.48-7.63) 0.36	1.26 (0.29-5.44) 0.76	1.12 (0.26-4.90) 0.88	1.06 (0.20-5.64) 0.95
Some college	3.00 (0.88-10.19) 0.08*	3.65 (1.00-13.29) 0.05**	3.54 (0.90-13.96) 0.07*	3.39 (0.87-13.17) 0.08*	2.68 (0.59-12.28) 0.20
High school					
Employment status					
Unemployed	0.65 (0.14-2.98) 0.58	0.37 (0.07-2.00) 0.25	0.53 (0.11-2.67) 0.44	0.57 (0.11-2.88) 0.50	0.94 (0.17-5.10) 0.94
Employed/other					
Physical health rating T1					
Poor		0.08 (0.19-3.88) 0.85	0.89 (0.17-4.59) 0.89	0.85 (0.16-4.48) 0.85	1.41 (0.23-8.68) 0.71
Fair/excellent					
Physical health rating T2					
Poor		42.37 (13.76-130.49) 0.00***	25.10 (7.62-82.60) 0.00***	22.88 (6.91-75.77) 0.00***	23.88 (6.29-90.57) 0.00***
Fair/excellent					
Psychiatric history					
At least 1			1.91 (0.52-7.08) 0.33	1.50 (0.38-5.92) 0.56	1.92 (0.40-9.28) 0.42
No history					
Comorbidity					
At least 1			8.79 (4.00-19.30) 0.00***	8.58 (3.89-18.95) 0.00***	9.35 (3.73-23.43) 0.00***
No history					
Depressive symptomatology					
High				1.87 (0.71-4.90) 0.21	1.28 (0.39-4.17) 0.69
Low					
Age of immigration					
21-40 yrs					2.03 (0.48-8.59) 0.34
41-65 yrs					6.02 (0.62-58.52) 0.12
0-20 yrs					
Language usage					
Both equally					3.23 (1.19-8.78) 0.02**
Most/only English					0.31 (0.04-2.80) 0.30
Most/only Chinese					

Daily hassles		
High		5.89 (2.13-16.25) 0.00***
Low		
Recent negative events		
High		2.53 (0.81-7.90) 0.11
Low		
Social conflict		
High		0.73 (0.21-2.59) 0.63
Low		
Social support T1		
Low		0.22 (0.05-0.95) 0.04**
High		
Social support T2		
Low		3.12 (1.13-8.61) 0.03**
High		

* $P < 0.08$; ** $P < 0.05$; *** $P < 0.01$

variables were entered at step 1, time 1 and time 2 physical health ratings were entered at step 2, psychiatric variables were entered at step 3, time 1 depressive symptoms were entered at step 4, and psychosocial and cultural variables were entered at step 5 (see Table 4).

Similar to the findings from the predictive multivariable analyses, demographic variables were not concurrently associated with first-onset depression. Even after controlling for time 1 self-reported health, those who reported poor physical health at time 2 were 23.88 times more likely to be depressed than respondents who reported fair/excellent health.

Unlike the predictive multivariate analyses, concurrent analyses revealed that those who reported a concurrent psychiatric disorder were more likely to be depressed than those who did not report a concurrent disorder. Also, those who were more likely to be depressed reported more daily hassles and reported speaking both Chinese and English equally in their daily lives.

Finally, after controlling for time 1 predictors, those who experienced low levels of social support at time 2 were 3.12 times more likely to be depressed than those who reported high levels of social support. Time 1 social support retained its significant association with depression at time 2, but in the opposite direction. More specifically, individuals who reported low social support at time 1 were 0.22 times less likely to be depressed than individuals who reported high social support. To account for this discrepancy, repeated-measures analysis of variance (ANOVA) and chi-square analysis were used to determine whether those who became depressed at time 2 experienced a greater decrease in level of social support than those who did not become depressed. Results reveal that those who became depressed for the first time were significantly more likely to experience decreases in perceived social support than those who did not become depressed. [$F(1, 1247) = 13.30, P < 0.00$; $\chi^2(2, N = 1325) = 43.03, P = 0.00$]. This was true whether social support was assessed as a continuous or dichotomous variable.

Discussion

The goal of this study was to examine the relationships between various risk factors and first-onset major depression in Chinese Americans. More specifically, we wanted to

1. Identify factors that predict or antedate a first depressive episode, and
2. Identify factors that co-occur with a first depressive episode in order to help us understand the processes that occur during the development of a depressive episode

Several interesting findings were revealed in our analyses. First, the overall rate of 12-month current first-onset depression was 3.1% (2.3% for males and 3.8%

for females). Although these rates are higher than those reported in the two ECA studies of first-onset depression (1.4% and 1.9% overall; 1.0% and 1.49% for males; 1.7% and 2.3% for females) (Bruce and Hoff 1994; Horwath et al. 1992), this finding is not surprising when we take into account the fact that CAPES uses the same diagnostic instrument as the National Comorbidity Study (NCS), which reported higher lifetime and current prevalence rates of major depression than the ECA (Blazer et al. 1994; Kessler et al. 1994). Because of sample, site, and methodological differences between the ECA and NCS studies, it is unclear whether the higher rates in the NCS are real and may reflect a generational effect, or whether they are an artifact of the measurement and/or the samples used.

It is important to note that despite these differences, the incidence rate of major depression in this study are still high, given that rates of major depression in China and Taiwan have been reported to be many times lower than in the United States (Chen et al. 1993; Hwu et al. 1989). It is possible that depression is being underdiagnosed in Asian countries, or that as immigrant Chinese come to the United States they experience increased amounts of stress, which places them at greater risk for becoming depressed, and/or that important cultural protective factors are lost or become attenuated. Increased risk for major depression as immigrants become more acculturated has been found among other ethnic groups (Burnam et al. 1987; Escobar 1998; Golding et al. 1990; Kessler et al. 1994; Vega et al. 1998).

Second, in terms of demographic variables, no significant multivariable relationships were found at the antecedent or concurrent levels. For example, contrary to expectation, women were not found to be at significantly higher risk for becoming depressed than men. This is consistent with the finding for overall depression in the Chinese American Epidemiological Study (Takeuchi et al. 1998), but inconsistent with epidemiological studies conducted in mainland China, Hong Kong, and Taiwan (Chen et al. 1993; Cooper and Sartorius 1996; Hwu et al. 1989), and studies conducted in the United States (Bruce and Hoff 1994; Coryell et al. 1992; Gallo et al. 1993). Although it seems that gender differences become more pronounced as Chinese immigrants become more acculturated (Takeuchi et al. 1998), it may be that immigrant Chinese Americans differ in risk from Chinese in Asia.

In terms of health status, our findings identify self-reported physical health status as the most powerful predictor and concurrent associate of first-onset depression. More specifically, individual reports of poor physical health both predated and occurred concomitantly with their first depressive episode. This finding is not surprising given that researchers have hypothesized and documented cultural variations in the phenomenology of distress and somatic idioms of depression in Chinese and Chinese Americans (Uba 1994; Zheng et al. 1997). In addition, this finding provides support for the fact that those who become depressed for the first time

feel unhealthy before the episode occurs. The work of Judd et al. (1994, 1997) points out that subclinical depressive symptoms and/or subsyndromal depression, which are commonly characterized by vegetative complaints, can be prodromal to major depression for some respondents. However, it is also possible that their depression is in part a reaction to their poor health. The importance of prevention and early intervention before a first episode of depression occurs is also underscored by the fact that, as cited in many studies, a prior depressive episode places an individual at greater risk for developing a subsequent episode of depression (Kendler et al. 1993; Kessler and Mage, 1994; Lewinsohn et al. 1988).

Another finding that may have important implications for early intervention and treatment is that depressive symptomatology was a strong antecedent predictor of first-onset depression even after controlling for demographic, health, and other psychiatric variables. This finding is consistent with other community studies of first-onset major depression and major depression in general (Horwath et al. 1992; Lewinsohn et al. 1988; Zonderman et al. 1993). It also underscores the possibility that pre-clinical manifestations of depressive symptoms typically signal the onset of an impending depressive episode. It would be interesting to determine whether there is a symptom threshold that is specifically predictive of a future episode and whether this threshold differs across ethnic groups.

In terms of psychiatric history, no significant relationship was found at the multivariable level. Although a nonaffective psychiatric history has been found to be associated with first-onset depression in one study of first-onset depression (Coryell et al. 1992), the lack of significant association found in the present study is not surprising when we take into account the fact that we are studying first-onset major depression, and that many of those who become depressed for the first time have had no prior psychiatric history. Nevertheless, we did find a strong association between having a concurrent psychiatric disorder and becoming depressed for the first time. Studies of the co-occurrence between depression and other psychiatric disorders in both adolescents and adults indicate that depression is more likely to occur after the onset of another disorder than to precede it (Kessler et al. 1997; Lewinsohn et al. 1991; Rohde et al. 1991). Research on Chinese and Chinese Americans also indicates that a high degree of comorbidity exists between depression and other psychiatric disorders (Kleinman and Kleinman 1985; Zheng et al. 1997), but the order of onset has yet to be examined.

One goal of this study was to go beyond the examination of traditional demographic, health, and psychiatric variables and assess the relationship between psychosocial and cultural variables and first-onset depression. Although prior research supports the relationship between negative life events and depression (Billings and Moos 1982; Thoits 1983), our findings reveal that recent negative events were only associated with first-onset depression at a concurrent level, and lost

their significance when other risk factors were taken into account. Instead, daily hassles were found to have a strong concurrent association with first-onset depression. It may be that chronic stress burdens play a larger role in instigating a first depressive episode, or that negative life events exert their deleterious effects mainly under conditions of high stress. Although the relationships between daily hassles and poor mental and physical health has been established among Chinese and Americans (Chan and Lee 1992; Delongis et al. 1982; Kanner et al. 1981; McGonagle and Kessler 1990; Monroe 1983), it is important to remember that the relationship between hassles and life events is dynamic and complex.

In terms of cultural variables, when we examine those who became depressed for the first time, those who spoke both English and Chinese were found to be at greatest risk at the concurrent level. Bilingual language use is often considered the best proxy for degree of acculturation among immigrants. Previous studies of acculturation and mental health among Asian Americans contradict our findings and indicate that, because immigrants undergo a number of economic and social stressors, those who are foreign-born or less acculturated are at greatest risk for psychological difficulties (Abe and Zane 1990; Kuo 1984; Ying 1988). However, epidemiological data on psychiatric disorders in Mexican Americans indicate otherwise and are congruent with the findings in the present study. Specifically, as Mexican American immigrants become more acculturated, their risk for experiencing depressive symptoms or a diagnosable psychiatric disorder such as major depression increases (Burnam 1987; Escobar 1998; Golding et al. 1990; Kessler et al. 1994; Vega 1998). In addition non-Hispanic Whites and Mexican Americans born in the United States also have an earlier age of onset for depression than Mexican American immigrants. Nevertheless, it is important to point out that, although immigrants may be faced with more stress and difficulties, elements in their original culture may serve as protective agents in preventing the development of psychiatric difficulties. Such protective factors may be attenuated or lost as one becomes more acculturated. Although our study does not deal with these issues directly, the finding that bicultural individuals were at greatest risk for developing a first depressive episode underscores the importance of examining the multidimensional nature of acculturation and exploring the possibility that being bicultural carries along with it its own set of vulnerabilities.

Finally, our results indicate an unexpected finding: individuals with higher social support at time 1 were at greater risk for developing a first depressive episode at time 2. Taken by itself, this finding appears to be counterintuitive. However, when we examine the relationship between time 2 social support and first-onset depression while controlling for the effects of time 1 social support, we find that those who have less support are at greater risk for being concurrently depressed, and

that time 1 social support remained significant in the opposite direction, with individuals who reported high social support being at greater risk. In order to explain this relationship, we hypothesized and confirmed that those who became depressed were more likely to have experienced decreases in social support regardless of whether we examined social support as a continuous or categorical variable. It is possible that those who became depressed were at greater risk for depleting their social support resources and/or experienced stressors that exceeded their available resources. Researchers have posited and confirmed that social support deterioration may be the result of the deleterious effect of stress (Barrera 1986; Ensel and Lin 1991), and that depressed individuals may evoke aversive reactions from others (Coyne 1976; Potthoff et al. 1995). Social support deterioration as a result of stress has also been found to occur in a community sample of Chinese Americans (Lin 1979). Although some studies have found no significant main effect for social support (Furnham and Li 1993; Ying and Liese 1991, 1994), the majority of studies on Chinese and Chinese Americans indicate that social support is associated with better mental health either directly or indirectly (Bagley 1993; Krause and Liang 1993; Kuo and Tsai 1986; Lin et al. 1979; Lu 1995).

Although our study presents a number of interesting findings, several limitations deserve attention. First, although the UM-CIDI has demonstrated good reliability and validity for Chinese, the shortened version of the UM-CIDI, which was used at time 2, has yet to be validated in this population. Differences between the short-form and long-form versions could affect the validity of diagnoses.

Second, a 6-month gap between time 1 12-month current depression and time 2 12-month current depression existed because of the 18-month time lag between time 1 and time 2 interviews. Although the gap was small, it is possible that individuals could have had a first-onset depressive episode during this period of time.

Third, as with any epidemiological study, there is the possibility of false incidence. More specifically, diagnoses are based on people's retrospective accounts of their experiences and recall of symptoms that occur early in life may be especially problematic for older adults. However, one noticeable difference between the UM-CIDI and the original CIDI is the placement of the lifetime review section at the beginning of the diagnostic section before any probe questions are asked. This modification, which was made because respondents may under-report stem questions when they recognize that positive responses lead to more detailed questions, may have helped in reducing the possibility of false-incidence. Nevertheless, the possibility of false-incidence is exacerbated by the fact that we reassessed for 12-month current depression at time 2 without reassessing lifetime history of depression.

Fourth, it is possible that some risk factors were not found to be significant because of the small number of first-onset depressed individuals. The small number of

depressed individuals, also meant we were unable to examine specific interactions and within-group differences. Furthermore, we were unable to assess whether other factors, such as personality and biology, play a role in eliciting a first episode of depression.

Despite the aforementioned limitations, CAPES is the largest and most sophisticated study to be conducted on any Asian American group. We believe that our findings make several important contributions to our current understanding of depression in Chinese and Chinese Americans. As with any risk factor study, the ultimate goal is to use the knowledge obtained to develop effective intervention and prevention programs. The goal of this study was to identify factors that both antedate and co-occur with a first depressive episode. Specifically, we wanted to identify characteristics of the person and their sociocultural environment that might place them at greater risk for developing a first episode of depression.

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