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Does cultural assimilation influence prevalence and presentation of depressive symptoms in older Japanese-American men? The Honolulu-Asia Aging Study

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Abstract

Objective—Sociocultural factors have been implicated in affecting prevalence, incidence, and diagnosis of depression but previous studies have included heterogeneous ethnic populations. We studied the influence of cultural assimilation on the prevalence and presentation of depressive symptoms in elderly Japanese-American men.

Method—This analysis was based on 3,139 Japanese-American men aged 71–93 years who were participants in the Honolulu-Asia Aging Study between 1991 and 1993. We created a Cultural Assimilation Scale (CAS) using 8 questions assessing the degree of Japanese identity and lifestyle compared to a Western one. Subjects were divided into tertiles of CAS score for analysis. Prevalence of depressive symptoms was measured using an 11-question version of the Centers for Epidemiologic Studies Depression Scale questionnaire (CESD-11), and presence of depressive symptoms was defined as score ≥ 9.

Results—Prevalent depressive symptoms did not reach a statistically significant association with CAS tertiles (Western 10.8%, Mixed 9.6%, Japanese 8.5%). However after adjusting for demographic, functional and disease factors, the most culturally Japanese group had significantly lower odds for prevalent depressive symptoms, compared to the most Western group. Among the subset of subjects with a high CESD-11 score, there were no significant differences in both mean psychological scores and mean somatic scores between the three Cultural Assimilation Scale groups.

Conclusions—Prevalent depressive symptoms were significantly lower among elderly Japanese-American men who were most culturally Japanese, compared to more Westernized men. Improving knowledge and understanding about the pathogenesis of depression will have important public health implications.

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The authors on this paper do not have any conflict of interest to report that is related to this publication.

Introduction

Depression is common, representing the 3rd leading cause of disease burden globally and 4.3% of total disability adjusted life years (1). Sociocultural factors have been implicated in affecting the prevalence, incidence, and diagnosis of depression. There have been many cross-national studies reporting differences in prevalent depressive symptoms among different countries (2–5). Unfortunately, it is difficult to compare studies across different countries given the disparities in health care systems, idioms of distress, and attitudes toward mental versus physical illness. Also, each culture has its own emotional lexicon that encodes socially and morally significant values and its own idioms of distress (2,6,7). In addition, participants in these studies have wide variations in ethnicities, ages, gender, immigration, cohort status and income, complicating the analysis of the association between culture and depression.

Asian-Americans represent a heterogeneous and rapidly growing group in the United States. However, there have been few published studies regarding the prevalence of depressive symptoms, with only two published large scale studies involving Asian-American ethnic groups (8,9). This study focuses on a population of Japanese-American men in Hawaii, representing homogeneity in age, cohort/immigration status, and even Japanese prefecture of origin. We hypothesized that the degree of acculturation would impact the prevalence and presentation of depressive symptoms, with higher Japanese cultural identification being associated with a lower rate of depressive symptoms.

Method

Study Sample

The Honolulu Heart Program (HHP) began as a prospective study of cardiovascular diseases in 8,006 men of Japanese ancestry living on the island of Oahu, Hawaii in 1965, born between 1900 and 1919. All men of Japanese ancestry identified by using World War II selective service registration cards were invited to participate (10). Since 1965, the full cohort has been examined nine more times and an eleventh exam cycle is in progress. The Honolulu-Asia Aging Study (HAAS) began with the fourth exam (1991–1993) of the Honolulu Heart Program cohort, to study depressive symptoms, cognitive function and other diseases of aging.

Data Collection

We performed a cross-sectional analysis using data from the fourth HHP-HAAS examination when 3,741 men aged 71–93 years participated (80% of the 4,676 survivors of the original HHP cohort). The fourth examination included collection of demographic information, medical and psychosocial questionnaires, assessment of cognitive function, fasting blood tests, a 2-hour glucose tolerance test, seated blood pressure and anthropometry measures that were collected in a standardized manner using strict research criteria. The study was approved by the Institutional Review Board (IRB) of Kuakini Medical Center. The procedures followed were in accordance with institutional guidelines and after complete description of the study to the subjects, written informed consent was obtained.

Predictor Variable - Cultural Assimilation Scale

We created a cultural assimilation scale using 8 questions that assessed the degree of Japanese identity and lifestyle compared to a Western one. Questions included: religion, birth place, years of schooling in Japan, ability to read or write Japanese, ability to speak Japanese, diet preference, media preference, and first language learned. Data about religion and birth place were obtained from the first examination (1965–1968) and the other data

were obtained from exam four (baseline for this analysis). Each question was assigned different scores and the total score was calculated by adding all the points (Table 1). If data were missing for more than one of the eight individual questions, the subject was excluded from the analysis. Scores on the Cultural Assimilation Scale ranged from 0–28, with 0 being most Western and 28 being most Japanese. We divided subjects into tertiles of Cultural Assimilation Scale scores for analysis (Table 2). The Cultural Assimilation Scale was created using items from the Ethnic Identity Scale (11–14), Suinn-Lew Asian Self Identity Acculturation Scale (SL-ASIA) (15) and Japanese Cultural Scale (16). Acculturation scales used for other ethnic populations were also taken into consideration (17,18). Ethnic Identity Scale focused on one's ability to read and speak Japanese to measure the assimilation level (11). The SL-ASIA is a 21-item multiple-choice questionnaire that assesses personal life history. Questions include one's cultural identity, place of birth, generational status, as well as food, clothing, language, and friendship preferences. Acculturation level was calculated by summing across all items and divided by 21. The validity of the SL-ASIA was evaluated by comparing the participants' acculturation level with national identification, generational status, and duration of U.S. residency. It showed high concurrent validity coefficients and Cronbach's alpha was calculated to be 0.88 (15). The Japanese Cultural Scale included ability to speak and understand Japanese, participation in celebrations and religious practices specific to Japanese culture, lifestyle preferences including dietary habits, and participation in Japanese organizations such as art and music (16). The Acculturation Scale for Mexican-American populations used items such as language spoken, language thought, self-ethnic identity and birthplace (17). The Acculturation Scale for Filipino Americans focused on language spoken and read, language thought, media preference, and language preference during childhood (18).

Outcome Variables - Prevalent Depressive Symptoms

Participants were screened for depressive symptoms using an 11-question version of the Centers for Epidemiologic Studies Depression (CES-D) Scale questionnaire (see Supplemental Digital Content 1). Questions for the 11 item version were chosen from the 20-question full scale CES-D. Each question was assigned a score ranging from 0 to 3, 0 without symptoms and 3 with most severe symptoms. The total score was calculated by adding all the points. Participants who did not answer three or more of the 11 depression questions were excluded from this analysis. Shortened forms of the CES-D Scale have been found to be comparable with the full scale version except for its cut-off score (20,21). The standard CES-D Scale uses a cutoff of 16 points for depressive symptoms (19). In this 11-question version, a score of 9 or greater was used to define depressive symptoms (determined by extrapolation; 16/20X11=8.8, rounded up to 9), resulting in 304/3139 participants (9.7%) having depressive symptoms.

To avoid potential confounding, subjects taking antidepressants (n=24, taking tricyclic antidepressants, non-tricyclic antidepressants, tricyclic antidepressants plus antipsychotic combinations, or selective serotonin reuptake inhibitors) at exam four were excluded. It was unclear whether medications were used for depression, insomnia, anxiety or chronic pain, and cultural attitudes towards antidepressants may be a source of bias.

A secondary analysis was performed in order to determine the effect of cultural assimilation on somatic vs psychological symptoms on the CES-D. The CES-D is a scale that has been shown to measure both somatic and psychological depressive symptoms (22). This scale has been replicated in several populations and validated with meta-analytic methods (23). The 11-question version represents 6 somatic symptoms and 5 psychological symptoms. For the secondary analysis, participants who did not answer one or more of the 6 somatic questions, and those who did not answer one or more of the 5 psychological questions, were excluded. The total somatic symptom score ranged from 0 to 18, while the total psychological

symptom score ranged from 0 to 15. For this analysis, only subjects who met study criteria for prevalent depressive symptoms were included. Among the 304 subjects with CESD-11 ≥ 9, 33 were excluded who did not have a valid total somatic or psychological score, leaving 271 for analysis.

Key Variables

Covariates were selected because of their potential relationship with cultural assimilation or depressive symptoms (8,24).

Demographic factors included age, years of education, marital status, income level, and social support. For income level, greater than or equal to $20,000/year was used as a cut-point. Social support level was measured by using the Lubben social network scale (LSNS) which is composed of 10 questions from 5 domains (Family networks, Friends networks, Confidant relationships, Helping others, and Living arrangements). The total LSNS score ranges from 0–50 by adding scores from each of the 10 individual items (25) with 0 being least supported and 50 being most supported.

Frailty factors included self-perceived health, disability in Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs), body mass index (BMI), and cognitive function. Self-perceived health was assessed by asking “How would you rate your general health at the present time?” Answers were dichotomized into “Excellent or Good” versus “Fair or Poor”. Disability was assessed by self-report using a 17-item questionnaire. Disability in ADLs was defined as needing assistance in any one of the following: dressing, bathing, toileting, walking around in the house, and transferring out of bed/chair. Disability in IADLs was defined as needing assistance in any one of the following: light house work (washing or drying dishes, making a bed), shopping, preparing meals, managing money (paying bills or writing checks), and using the telephone. BMI was defined as weight in kilograms divided by height in meters squared. Cognitive function was measured with the Cognitive Abilities Screening Instrument (CASI) (26), which is a global measure of cognitive function that was developed for cross-cultural and cross-national studies of dementia.

Chronic disease factors included prevalent diabetes mellitus, coronary heart disease, cerebrovascular accidents, and cancer. Diabetes mellitus was defined by World Health Organization (WHO) criteria, by history (as told by the subject to a physician), by taking medications (insulin or oral hypoglycemics), by a fasting glucose level of 126 mg/dl or more, or by a 2-hour postload glucose of 200 mg/dl or more. Prevalent coronary heart disease was defined by prevalence of myocardial infarction, coronary insufficiency, angina pectoris, cardiovascular surgery (coronary angiography, coronary bypass surgery, and coronary angioplasty) and silent myocardial infarction at exam four. A diagnosis of stroke was made when a neurologic deficit was accompanied by blood in the cerebrospinal fluid or by evidence of an infarct or hemorrhage. Possible strokes and transient focal neurological deficits were not included. All diagnoses were confirmed by a study neurologist and a trained physician panel using standard criteria. Further details on the diagnosis of coronary heart disease and stroke are provided in earlier publications (27–30). Cancer prevalence was defined as any cancer which occurred before or on the exam four date.

Statistical analysis

We divided subjects into tertiles of Cultural Assimilation Scale scores for analysis (Table 2). At baseline, 3,741 men participated in exam four. We excluded the following: 545 men who did not have a valid CESD-11 (defined as missing 3 or more questions), 24 on

antidepressants, and 33 with missing data from the Cultural Assimilation Scale. This left 3,139 men for analyses.

General linear models were used to compare mean values of covariates among the Cultural Assimilation Scale tertiles. T-tests were used to compare means of covariates among those with and without prevalent depressive symptoms. The final covariates for the multivariate models were chosen based on a combination of factors used in previous studies (8,24) and results from our own bivariate analyses about baseline characteristics (Table 3).

We used multiple logistic regression models to calculate odds ratios and 95% confidence intervals for prevalent depressive symptoms. We created dummy variables based on the tertiles of cultural assimilation scale score, using the most Western group as reference.

To compare the presentation of depressive symptoms among those with a high CESD-11 score (>=9), mean somatic scores and mean psychological scores were compared across the tertiles of Cultural Assimilation Scale using general linear models (GLM). For this analysis, only subjects who met study criteria for prevalent depressive symptoms were included.

Results

The prevalence of depressive symptoms showed a dose response relationship among the Cultural Assimilation Scale tertiles (Table 3). Comparing baseline characteristics between tertiles of the Cultural Assimilation Scale, those who were most culturally Japanese were significantly older, less educated, and had lower incomes. They had significantly lower body mass index, lower cognitive test scores and lower rates of prevalent diabetes. Comparing baseline characteristics between those with and without prevalent depressive symptoms, subjects with prevalent depressive symptoms were significantly less likely to be married, had lower incomes, a lower rating on social support, worse self-perceived health, lower body mass index, and more disabilities in both ADLs and IADLs.

Using unadjusted logistic regression, with the most culturally Western group as reference, those who were most culturally Japanese had lower odds for prevalent depressive symptoms (Table 4). The lower odds of depressive symptoms occurred despite advanced age which was associated with greater Japanese acculturation. After adjusting for age, the corresponding odds ratio declined and reached statistical significance (Table 4). The strength of the latter association persisted after further adjustment for other factors. In the final multiple logistic regression model after adjusting for age, education, marital status, income level, social support, self perceived health, disability (ADLs, IADLs), BMI, cognitive function, prevalent diabetes, and prevalent coronary heart disease, those who were most culturally Japanese had a significantly lower odds for prevalent depressive symptoms (Table 4).

We performed secondary analysis comparing the presentation of depressive symptoms among the subset of subjects with a high CESD-11 score (≥9) (Table 5). There were no significant differences in both mean psychological scores and mean somatic scores between the three Cultural Assimilation Scale groups.

Discussion

We found significant associations between cultural assimilation and prevalent depressive symptoms, with lower prevalent depressive symptoms among those most culturally Japanese. The most culturally Japanese men had a 28% decrease in odds of depressive symptoms, which is clinically meaningful. We did not find any association between cultural assimilation and both prevalent psychological and somatic complaints. Older Japanese-

American men who were more culturally Japanese had fewer depressive symptoms than those who were more westernized.

To our knowledge, this is the first study to investigate the association of cultural assimilation with prevalence and presentation of depressive symptoms in a relatively homogeneous Japanese-American sample. The participants in the Honolulu-Asia Aging Study are mostly from a rural western prefecture in Japan. Majority are second generation Japanese-American men, born in Hawaii, while 5.7% are immigrants who came to Hawaii to work in agriculture. As a result, there is likely similarity in the biological background. No studies involving culture has used such a homogeneous group.

The few studies focusing on Japanese populations showed mixed results (3,31–33). Kinzie (1973) showed that female Japanese-American students had significantly higher depressive symptoms than female Caucasian students. Among male students, there was no difference. This study involved a younger population and there was no analysis of the level of acculturation.

Waza et al. found that Japanese patients complained of more somatic symptoms compared with American patients. Krause et al. reviewed previous nationwide surveys in the United States, Japan and Taiwan, which used the CES-D to evaluate depressive symptoms in populations 60 years of age or older. They found the lowest overall levels of depressive symptoms among Japanese, which is consistent with our results. Interestingly, they also found that Americans had higher scores than Asian groups on somatic complaints, different from most studies. Our study did not show a strong relationship between Japanese cultural identification and somatic symptoms.

Swenson et al. compared depressive symptoms among Hispanic and non-Hispanic elderly males and did not find ethnic differences in prevalent depressive symptoms, despite stratification for acculturation. However the Hispanic community represents various ethnicities such as Cubans, Mexicans and Puerto Ricans with wide differences in immigration and acculturation. In the United States, one-year prevalence of major depression varied within the Hispanic population, ranging from 2.5% for Cuban Americans to 6.9% among Puerto Ricans (34).

We have a number of hypotheses regarding the significantly lower prevalence of depressive symptoms in the most Japanese group. The CES-D is a self-reported questionnaire, so the more culturally Japanese group may mask their problems, refuse to answer questions regarding depression, or manifest depressive symptoms differently similar to Japanese nationals (35). This is in contrast to those more assimilated to Western culture who may be more open to discuss psychiatric symptoms. Individuals who identify as more Japanese may have a network of extended families typically seen in Japan, which can ameliorate the development of depression. Individuals who identify as Japanese may be more comfortable with being bicultural, deriving strengths from being Asian in an American society. Lastly, depressive symptoms in Japan are much less common than in the United States or other countries (2), participants in this study may be merely reflecting these differences.

Limitations and Strengths

This study has some limitations, but also many strengths. One limitation is that the Cultural Assimilation Scale that was used is self-constructed and is not a validated instrument. However we selected individualized questions from previously validated scales. Participants in this longitudinal cohort study were not asked questions on some potentially valuable cultural assimilation variables, such as the language the participant used to think. We also did not directly ask individuals whether they identified with Japanese or American society

and culture, or both. Individuals who identified with Japanese culture may be more "bicultural" than individuals who only identified with American culture. Studies involving Mexican adolescents showed that bicultural individuals had better psychological health (36). There is significant controversy in the literature regarding the definition of cultural assimilation. Authors often disagree about the definition, especially regarding the association between mental health and cultural assimilation. This paper notes one aspect of cultural assimilation.

Cultural assimilation may exert a strong effect on mental health, especially with specific living circumstances (much in the way genes and environments tend to interact). Although the cross-sectional design of this study, the measures employed and the analyses done are not ideal, we felt that in this elderly age group, cultural identity would be well established and unlikely to further change with time.

Lack of generalizability is also a limitation. We cannot extrapolate the results to other ethnicities, women, other age groups, or even Japanese groups who live in the continental United States. However, the "problem" could also be seen as a strength of this study, since it provided a relatively homogeneous sample and we were able to focus on cultural assimilation and depressive symptoms. In Hawaii the Japanese are well integrated and account for a significant percentage of the population compared with the mainland U.S. Thus they may have less acculturative stress and discrimination which would usually adversely affect mental health.

Although we had a large sample, the sample size dropped when we excluded men who did not have a valid CESD-11 score, men on antidepressants, and those with missing data from the Cultural Assimilation Scale. However this still left 3139 subjects for analysis. The number of participants being treated with antidepressants was extremely small and represented less than 1% of the cohort. We were able to eliminate the potential confounding effect of antidepressants, since it was unclear whether they were taking these medications for depression, insomnia, anxiety or chronic pain, and cultural attitudes towards antidepressants may be a source of potential bias. Finally individuals with variability in depressive symptoms could have died prior to the examinations. Unfortunately, baseline depressive symptoms were not measured at the beginning of the study in 1965.

Conclusions

In summary, we found significant associations between cultural assimilation and prevalent depressive symptoms, with lower prevalent depressive symptoms among those who were most culturally Japanese when compared to those who are most westernized. Our study confirmed the hypothesis that depressive symptoms were significantly associated with socio-cultural factors in a relatively homogenous population of Japanese-American elderly men in Hawaii, a group not previously studied. We feel that the difference in depressive symptoms associated with acculturation was clinically significant. There was no association between cultural assimilation and presentation of depressive symptoms (stratified into psychological and somatic symptoms). If our findings are replicated in other population-based studies, it will increase our knowledge and understanding about the impact of cultural factors in the pathogenesis of depression, which could have important public health implications given the expected increase in minority elders in the United States in the next few decades.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Development of Cultural Assimilation Scale.

Variables used to develop scale		Score	N	%
Composite Cultural Assimilation Scale (total)		0–28	3139	100
Religion	Christian	0	725	26.9
	Buddhist/Shinto	4	1967	73.1
Birth place	United States	0	2968	94.6
	Japan	3	170	5.4
Years of schooling in Japan	0	0	2494	79.5
	1–3 years	1	112	3.6
	4–6 years	2	138	4.4
	7–9 years	3	168	5.4
	10–12 years	4	135	4.3
	13–35 years	5	89	2.8
Ability to Read/Write Japanese	No	0	1756	55.9
	A lot of difficulty	1	418	13.3
	Some difficulty	2	536	17.1
	Without difficulty	3	429	13.7
Ability to speak Japanese (How often?)	Never	0	220	7.0
	Rarely (once a year)	1	706	22.5
	Occasionally (once a month)	2	755	24.1
	Often (once a week)	3	494	15.7
	Every day or almost every day	4	964	30.7
Diet	Western	0	186	6.0
	Mixed	2	2284	73.3
	Oriental	4	643	20.6
Media preference (last time you read a Japanese-language book, magazine, or newspaper)	Never	0	1630	51.9
	More than 30 years ago	1	463	14.9
	Less than 30 years ago	2	303	9.7
	Still do	3	742	23.6
First language learned	English	0	709	22.6
	English & Japanese at the same time	1	830	26.5
	Japanese	2	1595	50.9

Table 2

Cultural Assimilation Scale Tertiles.

	N (total=3139)	Percent	Mean score	Standard Deviation	Score range
Most Western (Tertile1)	1122	35.7	5.69	±1.90	0–8
Mixed (Tertile 2)	942	30.0	10.39	±1.10	9–12
Most Japanese (Tertile 3)	1075	34.3	17.56	±3.83	13–28

Table 3

Prevalent Depressive Symptoms by Cultural Assimilation Scale Tertiles and Baseline Characteristics at Exam 4 (1991–93) by Cultural Assimilation Scale Tertiles and by Prevalent Depressive Symptoms.

Variables SD=Standard Deviation	General Linear Models**				T-tests***			
	Cultural Assimilation Scale Tertiles			p	Prevalent Depressive Symptoms		p	df
	T1(W)	T2(M)	T3(J)		No	Yes		
Prevalent Depressive Symptoms (%)	10.8	9.6	8.5	0.0722	---	---	---	---
SD	±31	±30	±28					
Age (years) *	76.0	76.9	78.7	<0.0001	77.2	77.5	0.1697	3137
SD	±3.5	±3.9	±4.9		±4.3	±4.4		
Education (years) *	11.5	10.7	9.9	<0.0001	10.7	10.8	0.5985	3137
SD	±3.1	±3.1	±3.1		±3.2	±3.2		
Marital status (% married) *	82.6	85.0	82.4	0.9177	83.9	77.4	0.0102	346
SD	±38	±36	±38		±37	±42		
Income level (% less than $20,000) *	36.2	43.3	52.5	<0.0001	43.1	50.7	0.0155	2846
SD	±48	±50	±50		±50	±50		
Social support (Lubben Social Network Scale score) *	28.7	28.9	28.4	0.3743	29.0	26.3	<0.0001	3137
SD	±8.1	±7.6	±7.8		±7.8	±8.1		
Self perceived health (% fair/poor) *	30.2	31.9	32.5	0.2399	29.8	47.0	<0.0001	3035
SD	±46	±47	±47		±46	±50		
Disability in ADLs (%) *	5.0	4.8	4.4	0.5188	3.8	14.2	<0.0001	3137
SD	±22	±21	±21		±19	±35		
Disability in IADLs (%) *	14.7	13.8	15.8	0.4814	13.8	24.0	<0.0001	3137
SD	±35	±35	±37		±35	±43		
BMI (kg/m^2) *	23.8	23.6	23.2	<0.0001	23.6	23.1	0.0139	3032

Variables SD=Standard Deviation	General Linear Models**				T-tests***			
	Cultural Assimilation Scale Tertiles			p	Prevalent Depressive Symptoms		p	df
	T1(W)	T2(M)	T3(J)		No	Yes		
SD	±2.97	±3.07	±3.23		±3.1	±3.0		
Cognitive function (CASI score) *	80.1	77.8	76.7	0.001	78.5	76.0	0.1486	142
SD	±14.6	±17.3	±15.7		±15.6	±18.5		
Prevalent Diabetes Mellitus (%) *	32.2	28.3	27.8	0.0259	29.6	28.6	0.7042	3005
SD	±47	±45	±45		±46	±45		
Prevalent coronary heart disease (%) *	19.4	20.0	16.7	0.1082	18.3	22.0	0.1259	3137
SD	±40	±40	±37		±39	±41		
Prevalent Stroke (%)	3.3	2.5	2.9	0.5834	2.7	4.7	0.1176	333
SD	±18	±16	±17		±16	±21		
Prevalent cancer (%)	13.7	14.0	12.4	0.3844	13.1	15.5	0.2494	3137
SD	±34	±35	±33		±34	±36		

* Variables with * used for adjustment in final model.

** General Linear Models, contrast test for trend, F(df=1,3139).

However due to missing values in some variables, number varies slightly for each GLM model.

*** T-tests: df described in the table.

If variances between the two groups were not significantly different, we used Pooled method for t-tests.

If variances between the two groups were significantly different, we used the Satterthwaite method for t-tests.

Table 4

Multiple logistic regression models – Prevalent Depressive Symptoms.

	Prevalent depressive symptoms				
	df	**Odds Ratio**	**95% CI**	**Wald χ^2**	**p**
T2 (mixed) vs T1 (Western)	1	0.90	0.68 – 1.21	0.47	0.493
T3 (Japanese) vs T1 (Western)	1	0.77	0.57 – 1.02	3.24	0.072
T2 (mixed) vs T1 (Western) *	1	0.88	0.66 – 1.18	0.72	0.395
T3 (Japanese) vs T1 (Western) *	1	0.71	0.52 – 0.96	5.08	0.024
T2 (mixed) vs T1 (Western) **	1	0.86	0.63 – 1.18	0.92	0.339
T3 (Japanese) vs T1 (Western) **	1	0.72	0.52 – 0.997	3.91	0.048

Multiple logistic regression models: N=3139

* Adjusted for age.

** Adjusted for age, education, marital status, income level, social support, self perceived health, disability (ADLs, IADLs), BMI, cognitive function, prevalent diabetes, and prevalent coronary heart disease.

Table 5

General Linear Models – Mean somatic and psychological scores by Cultural Assimilation Scale tertiles.

	Culture Assimilation Scale Tertiles			p
	T1 (W)	T2 (M)	T3 (J)	
Mean prevalent somatic score (SD)	6.00 (±2.37)	5.82 (±2.42)	6.80 (±2.95)	0.061
Mean prevalent psychological score (SD)	5.66 (±2.55)	5.56 (±2.38)	5.66 (±2.47)	0.992

General Linear Models, contrast test for trend, F(df=1,256).

Adjusted for age, education, marital status, income level, social support, self perceived health, disability (ADLs, IADLs), BMI, cognitive function, prevalent diabetes, and prevalent coronary heart disease.

SD: Standard deviation