Structural equation modeling of mediating latent constructs associated with attribution of mental health ailments on older Mexican Americans’ depressive symptom burden.

Angelica P. Herrera, DrPH1,2, Ipsit V. Vahia, MD1,2, Alvaro Camacho, MD1,3,4, William Raichman, MD, Javier Escobar, MD, Dilip V. Jeste, MD, and Bernardo Ng, MD1,3,4

[tentative authorship]

1 Division of Geriatric Psychiatry, Department of Psychiatry, University of California, San Diego
2 Sam and Rose Stein Institute for Research on Aging, University of California, San Diego
3 Sun Valley Behavioral Medical Center, Imperial, California
4 Sun Valley Research Center, Imperial, California

Corresponding Author:
Angelica P. Herrera, DrPH
Division of Geriatric Psychiatry
Department of Psychiatry
8950 Villa La Jolla Drive, Suite B122
La Jolla, CA 92037

Email: apherrera@ucsd.edu

(619) 417 -7735
INTRODUCTION

Depressive disorders are the leading cause of burden of disease in high-income countries such as the United States (WHO, 2008). Providing appropriate care to the rapidly growing number of older adults in the U.S. with neuropsychiatric conditions represents a major public health challenge (Jeste et al, 1999). This is particularly true for older Latino adults, who are not only the fastest growing sub-population of older American adults (Angel & Whitfield, 2007; U.S. Census Bureau, 2003), but also have significantly higher rates of unipolar depressive disorders compared to non-Hispanic Whites (Aranda, Lee, & Wilson, 2007; Brennan, Vega, Garcia, Abad & Friedman, 2005; Gonzalez, Haan, & Hinton, 2001; Mier et al, 2008; Pratt & Brody, 2008; Raji, Reyes-Ortiz, Kuo, Markides, & Ottenbacher, 2007; Sorkin, Pham & Ngo-Metzger, 2009). Depressive symptoms can also be present in other psychiatric illnesses such as bipolar disorder and dementia, and are a common comorbidity of chronic conditions such as diabetes, which also affects older Latinos disproportionately (Hayward & Heron, 1999; Mier et al, 2008; Wallace and Villa, 2003).

The primary mental health concern reported by older Latinos is depression (Barrio et al, 2007). However, although the prevalence of depression is higher in the Latino population they are thought to be less likely to have psychotic disorders, such as bipolar depression and psychosis, compared to non-Hispanic Whites (Ortega, Rosenheck, Alegria & Desai, 2000). This trend is significantly affected by acculturation, with U.S. born and/or highly acculturated Latinos having higher rates of psychotic disorders as well as mood and anxiety disorders compared to their less acculturated and/or foreign-born counterparts (Alegria et al, 2007; Grant et al, 2004; Vega, Kolody, Aguilar-Gaxiola & Catalano, 1999). This has been attributed to the breakdown of traditional family networks as well as the socio-economic stress of conforming to U.S. culture (Alegria et al, 2007;
Escobar, Hoyo Nervi, & Gara, 2000). In addition, discrimination has also been linked to higher depressive symptoms in Latinos (Finch, Kolody, & Vega, 2000).

The effect of acculturation on the prevalence, diagnosis and treatment of mental health disorders within the older Latino population is complex and may depend on both structural and cultural barriers. Latinos, particularly those of Mexican-descent, are the ethnic minority group least likely to use mental health services (Blanco et al, 2007; Cabassa, Zayas & Hansen, 2006; Gonzalez et al., 2010). Factors which are particularly associated with decreased mental health service use include limited English proficiency (Sentell, Shumway & Snowden, 2007; Folsom et al, 2007) and being foreign-born (Vega et al, 1999). In contrast, acculturation has been associated with a greater likelihood of receiving mental health treatment (Vega et al, 1999; Grant et al, 2004). Besides language barriers, the under use of services may stem from differences in cultural views about mental health issues and treatment. Within the general population, depression is a stigmatized condition (Halter, 2004). This is especially pertinent in ethnic minority groups including Latinos where a significantly higher percentage report concerns about stigmatization compared to non-Hispanic Whites, which may prevent them from seeking treatment (Gary, 2005; Nadeem et al, 2007; Nadeem, Lange & Miranda, 2009).

In addition to understanding the factors that affect mental health service use it is also important to understand patients’ cultural beliefs and practices in the context of assigning an appropriate diagnosis and treatment (Dein, 2007; Bhui et al, 2007). For example, cultural adaptation of evidence-based programs in mental health services has been shown to provide more effective treatment (Whaley & King, 2007; Griner & Smith, 2006). Attention to psychosocial treatment approaches is particularly salient when working with Latino populations, as Latinos tend to prefer them more often than pharmacotherapy (Cabassa et al, 2008; Cooper et al, 2003).
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Much of the current literature identifies intra-ethnic differences in the burden of depression by simply correlating traditional measures of acculturation, such as language proficiency or nativity, with variations in the incidence of depression. This does not explain, however, the mechanism through which acculturation influences the prevalence of depression. The few studies that have tried to explain the modifying effects of acculturation factors on mental health outcomes have only skinned the surface of this complex interaction. Although changes in family structure, discrimination and stigma obviously play a role in modifying Latino’s mental health status and use of mental health services, there remain many unknowns. Of particular importance is the relationship between acculturation and the perceived causes of depressive symptoms as this may influence symptomatology and the patient’s decision to seek treatment.

**PURPOSE** This study applied structural equation modeling to determine the pathways between cultural factors (e.g. English-language proficiency, nativity, country of origin) and depressive symptom burden in older Mexican American patients attending a rural mental health clinic near the U.S.-Mexico border. First, exploratory and confirmatory factor analysis was used to identify latent constructs associated with patients’ attribution of their mental health ailments. We then employed structural equation modeling to investigate the mediating role of these emerging latent constructs (i.e. Internal Forces, Family & Home Life, and Supernatural Causes) on the relationship between cultural factors and depressive symptom burden, adjusting for covariates (e.g. psychiatric illness and sociodemographic factors).
METHODS

Study sample

This cross-sectional study employs secondary data for 457 Mexican American psychiatric patients (age ≥ 55 years) who sought care at the Sun Valley Behavioral Medical Center, a rural mental health clinic in Imperial County, California. Individual-level data was compiled from a combination of sources between 2004 and 2005: self-administered brief intake forms and face-to-face interviews by research staff during a single visit, and medical chart reviews by psychiatrists, and face-to-face interviews. At intake, 2,577 patients (age ≥ 21 years), of multiple ethnic backgrounds voluntarily completed a 15-minute self-administered behavioral health survey in their primary language (English or Spanish) to ascertain depressive symptom burden, personal views regarding the source of their mental health ailments, cultural orientation, and sociodemographic profile. The present study draws on 457 subjects who were identified as being of Mexican descent and aged 55 years or older.
Figure 1. Hypothesized path model depicting the influence of cultural factors on depressive symptom burden, when mediated by perceptions of mental health ailments.

Measures

*Depressive symptom burden.* Depressive symptom severity was assessed using the 20-item Center for Epidemiological Studies Depression Scale (CES-D). The CES-D is a commonly used measure of depressive symptom severity in community samples (Mosciki et al., 1989; Radloff, 1977), with higher scores reflecting greater depression symptomatology. The CES-D appears psychometrically valid among Latinos, with one report of Cronbach’s $\alpha = 0.89$ (Chung et al, 2003).

*Cultural factors.* …… acculturation was not directly tested. Instead, we used number of years in the U.S.; country of birth (U.S. or Mexico); and English-language proficiency, as measured by a 5-item scale (continuous), [Description of Q’s?] . These measures are readily used as proxies for acculturation, and all three are desired, given the potential limited variance in this population, given
the proximity of this patient population to the U.S.-Mexico border and frequent cross-border travel, and homogeneity of this border-town community. (  

Perception of mental health ailments. On a 3-point Likert Scale (0=‘no’, 1=‘maybe’, and 2=‘yes’), patients rated their level of endorsement of 13 possible causes of their mental health ailments. These were collapsed into 3 latent constructs using exploratory and confirmatory factor analyses, described in further detail below.

1. Problem with significant other  
2. Problem with family member  
3. Curse or spell  
4. The way you are  
5. Hereditary  
6. Problems with job  
7. Supernatural causes  
8. How you get along with others  
9. Brain or mind  
10. Financial problems  
11. Spiritual problems  
12. Lack of nutrients  
13. Alcohol or drugs  

Sociodemographic variables. Demographic information collected from each patient included age (continuous); marital status (married/common-law, widowed, separated/divorced, never married/single); and educational attainment (number of years of education completed).

Psychiatric disorders. Primary psychiatric diagnoses for each subject were grouped into 10 diagnostic categories: depressive, anxiety, bipolar, psychotic, dementia, somatoform, attention, alcohol/drug, adjustment, and other. (see Table 1). Reliability (Cohen’s kappa = , in SPSS) between two providers’ primary diagnoses from randomly sampled patient charts (for Hispanic age 65+), until each provided at least 10 cases in each of the major diagnoses.

Clinical investigators reviewed the medical charts of Mexican American patients with a completed survey and using a combination of patient-reported symptoms and psychiatrists’ diagnoses assigned a primary psychiatric illness to each patient. Survey data and major psychiatric illnesses were then entered into SPSS v17. Thereafter, all personally identifying patient information
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was removed, including medical record numbers. The dataset is currently securely housed at the Sun Valley Research Center in Imperial, Valley. Collection and confidentiality of patient data conforms to HIPAA regulations. [IRB approval]

Analyses

We employed recursive structural equation modeling (SEM) to analyze the hypothesized paths between model variables, and testing the fit of our latent constructs.
RESULTS

Table 1. Sociodemographic profile of older Mexican American psychiatric patients (n=457).

<table>
<thead>
<tr>
<th>Demographic factors</th>
<th>n</th>
<th>%</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>49.30</td>
<td>18.40</td>
<td>70.88 (SD=9.13)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>494</td>
<td>43.50</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>276</td>
<td>57.50</td>
<td></td>
</tr>
<tr>
<td>Education (years)</td>
<td></td>
<td></td>
<td>10.16(5.27)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married / common law</td>
<td>236</td>
<td>51.60</td>
<td></td>
</tr>
<tr>
<td>Separated / divorced</td>
<td>47</td>
<td>10.30</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>134</td>
<td>29.30</td>
<td></td>
</tr>
<tr>
<td>Never married / single</td>
<td>40</td>
<td>8.80</td>
<td></td>
</tr>
<tr>
<td>Cultural factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English-language proficiency</td>
<td>2.23</td>
<td>1.55</td>
<td>1.52 (1.17)</td>
</tr>
<tr>
<td>Nativity (years)</td>
<td></td>
<td></td>
<td>43.23(22.49)</td>
</tr>
<tr>
<td>Country of Origin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>312.00</td>
<td>69.00</td>
<td></td>
</tr>
<tr>
<td>U.S.</td>
<td>140.00</td>
<td>31.00</td>
<td></td>
</tr>
<tr>
<td>Primary psychiatric disorder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressive</td>
<td>302</td>
<td>66.50</td>
<td></td>
</tr>
<tr>
<td>Dementia</td>
<td>69</td>
<td>15.20</td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>37</td>
<td>8.10</td>
<td></td>
</tr>
<tr>
<td>Bipolar</td>
<td>20</td>
<td>4.40</td>
<td></td>
</tr>
<tr>
<td>Psychotic</td>
<td>13</td>
<td>2.90</td>
<td></td>
</tr>
<tr>
<td>Somatoform</td>
<td>9</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>Other (attention, sleep, adj)</td>
<td>4</td>
<td>0.90</td>
<td></td>
</tr>
</tbody>
</table>

CES-D= 15.00 (SD=18.11)
Dep (184, 40.9%) vs. not depressed (266, 59.1%)
Exploratory and Confirmatory Factor Analyses

First, an exploratory factor analysis was conducted to identify major components, and remove variables not loading significantly (loading < 0.50, \( \alpha = 0.05 \)). Principal Component Analysis with rotated varimax was used to determine major constructs. 5 components explained 56.5% of the variability in the original 13 variables. These were used to construct a priori theoretically driven latent variables, resulting in 3 items: (1) Internal Forces, (2) Home and Family Life, and (3) Supernatural Causes.

**Internal Forces** (Cronbach’s \( \alpha = .622 \)) was comprised of (a) the way you are (b) hereditary, (c) getting along with others, (d) problems with brain, and (e) spirituality. **Home and Family Life** (Cronbach’s \( \alpha = 446 \)), which included (a) problems with significant other, (b) family problems, and (c) financial problems. The final emerging latent construct was **Supernatural Causes** (Cronbach’s \( \alpha = .614 \)) consisted of (a) supernatural causes and (b) curses and spells. Three items did not adequately load onto a specific component and were excluded from further analyses: problems related to work, alcohol/drug use, and nutrition. This may be partly attributed to the low number of older adults reporting alcohol/drug use as their primary psychiatric diagnosis or of those attributing their mental
health ailments to alcohol/drug use. In addition, it is likely that given our older adult (age 55+) study population, only few were actively employed to warrant significant responses regarding their attribution of mental health symptoms to problems at work.

A confirmatory factor analysis (CFA) and structural equation modeling (SEM) with LISREL 8.80 (Joreskog & Sorbom, 2009) was used to assess the strength of measurement of latent factors: (a) Internal Factors, (b) Supernatural Causes, and (c) Home and Family Life.

Our root mean square error of approximation (RMSEA) = .053 (p=.38) is considered to have a moderate to good model fit. Typically, values of .05-.06 and lower indicate good fit, while those between .06 and .08 indicate moderate fit. The ratio of Chi-square to the degrees of freedom should also be < 3. (Ours …70.22/32=2.19), meets criteria.
Figure 2. Confirmatory Factor Analysis of latent constructs: Internal Forces, Home & Family Life, and Supernatural Causes.

Degrees of Freedom = 32
Full Information ML Chi-Square  = 70.22 (P = 0.00011)
Root Mean Square Error of Approximation (RMSEA) = 0.053
90 Percent Confidence Interval for RMSEA = [0.036 ; 0.069]
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.38

**still working on learning the aesthetics of this program!**

Final Structural Equation Model (Next)
References


Angelica P Herrera, DrPH


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