Impact of Social Discrimination, Job Concerns, and Social Support on Filipino Immigrant Worker Mental Health and Substance Use

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Background *The personal and social impact of mental health problems and substance use on workforce participation is costly. Social determinants of health contribute significantly to health disparities beyond effects associated with work. Guided by a theory-driven model, we identified pathways by which social determinants shape immigrant worker health.*

Method *Associations between known social determinants of mental health problems and substance use (social discrimination, job and employment concerns, and social support) were examined using structural equation modeling in a sample of 1,397 immigrants from the Filipino American Community Epidemiological Study.*

Results *Social discrimination and low social support were associated with mental health problems and substance use (P < 0.05). Job and employment concerns were associated with mental health problems, but not substance use.*

Conclusions *The integration of social factors into occupational health research is needed, along with prevention efforts designed for foreign-born ethnic minority workers.* Am. J. Ind. Med. 56:1082–1094, 2013. © 2013 Wiley Periodicals, Inc.

KEY WORDS: *Filipino immigrant workers; mental health; substance use; social determinants; theory-driven multivariate model building; SEM*

INTRODUCTION

In middle- and high-income countries, mental health and substance use problems (depression and alcohol use disorders, in particular) are among the leading causes of disabilities [Wang et al., 2007], costing employers billions of dollars annually [Stewart et al., 2003; Birnbaum et al., 2010] with decreased work performance and increased risk for occupational injuries [Haslam et al., 2005; Wang et al., 2006]. Mental ill health and substance abuse also cost the U.S. healthcare system millions of dollars annually [Birnbaum et al., 2010] and the co-occurrence of these conditions is common [RachBeisel et al., 1999; Hasin et al., 2005; Swendsen et al., 2010]. Foreign-born ethnic minorities, compared to their native-born counterparts, experience greater mental health burdens [U.S. Department of Health and Human Services, 2001; Agency for Healthcare Research and Quality, 2010] that are likely to impact work performance as well as the general health and well-being of this critical segment of the U.S. workforce.

It is known that foreign-born immigrants' employment opportunities and work experiences are determined by

complexities of immigration policies; xenophobia versus acceptance in the host community; language, accent and cultural differences; immigration and citizenship status; knowledge of host country systems; transferability of training and experiences; and availability of personal and community resources [Reitz, 2007; Agudelo-Suárez et al., 2009; Smith et al., 2009]. The work that immigrants are able to obtain directly influences the types of occupational hazards and risks to which they are exposed. Compared to their native-born counterparts, foreign-born immigrant workers experience greater disparities in exposure to work-related hazards and in physical and mental ill health [McCauley, 2005; Ahonen et al., 2007; Premji et al., 2010; Schenker, 2010]. At the same time, foreign-born immigrant workers also experience greater difficulties in accessing quality health and mental health care [U.S. Department of Health and Human Services, 2001; Agency for Healthcare Research and Quality, 2010]. Thus, effective prevention efforts and new approaches to under-standing contributing factors are needed to eliminate occupational health disparities and ensure a healthy immigrant workforce.

With persistent health inequalities in the United States, evidence highlights the need for closer scrutiny of sociocultural factors that characterize environments in which individuals are born, live, learn, work, and age [Office of Disease Prevention and Health Promotion, 2012; World Health Organization, 2012]. Health disparities are linked to income distribution, social discrimination, social networks, and work environments [Berkman and Kawachi, 2000; Wilkinson and Marmot, 2003; Lipscomb et al., 2006; Williams et al., 2008]. Social determinants shape individual behavior and lifestyle, and strongly influence access to resources. This, in turn, influences health outcomes. As Krieger states [2010], "Understanding who and what drives occupational hazards and work-related health problems, and what can be done to prevent them, necessarily requires addressing how the larger societal context shapes who works under what conditions—both beneficial and adverse—and who needs to do what to promote occupational and health equity" (p. 105). Considering the emerging evidence, research that examines social determinants will be essential [Wilkinson and Marmot, 2003; Lipscomb et al., 2006; Williams et al., 2008; Office of Disease Prevention and Health Promotion, 2012; World Health Organization, 2012] to advancing the understanding of the mechanisms that contribute to health disparities faced by foreign-born immigrant workers and to provide relevant knowledge for designing effective occupational health interventions. We proposed a theory-driven model (see Fig. 1) positing the influence of social determinants on Filipino immigrant workers' mental health problems and substance use. We posited that social discrimination and job concerns are stressors positively linked to mental health and substance use problems; in the model, as a protective factor, social support

is inversely associated with mental health and substance use problems [Tsai and Salazar, 2009].

Social Determinants of Mental Health Problems and Substance Use

Social discrimination

The empirical evidence consistently shows that the experience of everyday discrimination is detrimental to mental health and is associated with substance use problems among both native- and foreign-born ethnic minorities [Pavalko et al., 2003; Williams et al., 2003; Schulz et al., 2006; Paradies, 2006; Borrell et al., 2007; Gee et al., 2009; Pascoe and Richman, 2009; Tran et al., 2010]. Race, class, and gender-based discrimination are the most profound forms of discrimination, manifested at both individual and system levels [Krieger et al., 1993]. Immigrant ethnic minorities also experience related and different forms of discrimination associated with their immigration status, citizenship, language, and accent [Goto et al., 2002; McCauley, 2005; Takeuchi et al., 2007]. Thus, psychosocial distress associated with discrimination is likely to be more profound for immigrant ethnic minorities than for their native counterparts as well as non-ethnic minorities, increasing the likelihood of mental health and substance use problems.

Job and employment concerns

Researchers, conducting studies primarily with non-immigrant workers, have demonstrated that job concerns (e.g., job insecurity, job demands, and negative work relationships) are associated with poorer mental health and higher alcohol consumption [Stansfeld et al., 1999; Ragland et al., 2000; Cheng et al., 2005; Faragher et al., 2005]. Immigrants are likewise concerned about job security and interpersonal relationships at work, and they experience heightened stress as the result of limited employment opportunities, discrimination, including ethnic stereotyping encountered in their work contexts [Magaña and Hovey, 2003; Kim-Godwin and Bechtel, 2004; de Castro et al., 2008; Tsai and Bruck, 2009]. Thus, some concerns are unique to immigrant workers and need to be incorporated in our measures to facilitate our understanding of the influence of job and employment concerns on immigrant worker health.

Social support

The protective effects of social support on mental health problems and substance use are well documented in the literature across social and work contexts [Stewart, 1989; De La Rosa and White, 2001; Marchand et al., 2005; Mulvaney-Day et al., 2007; Prati and Pietrantoni, 2010]. Intervention studies confirm that social support reduces emotional distress
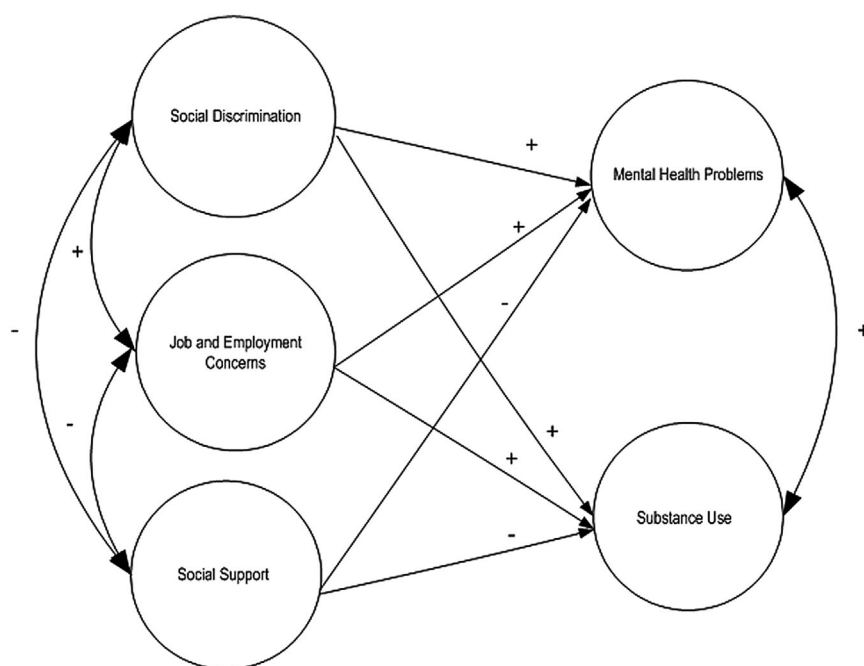
FIGURE 1. Theoretical model of social determinants of mental health and substance use problems. The straight single-headed arrows indicate the directional relationship between variables. The curved, double-headed arrow signifies a correlation between variables. The positive sign denotes a positive relationship between variables, whereas the negative sign indicates a negative relationship.

and alcohol use in non-immigrant populations [Thompson et al., 2001; Dobkin et al., 2002]. Immigrants, however, typically find their social networks attenuated due to the circumstances of migration. Moreover, they face specific sociocultural stressors, such as adjustment to a new culture and language, occupational accommodations required for economic survival, discrimination and prejudice toward "foreigners," and the need to develop an understanding about the host country's social systems [Aroian, 1990; Baker et al., 1994]. The ameliorating influence of support on the relationship between stressors and immigrant worker mental health and substance use, as suggested in qualitative studies [Aroian, 1992; Noh and Kaspar, 2003; Agudelo-Suárez et al., 2009], is thought to be vital for intervention effectiveness. We thus explored if the effects of social discrimination and job concerns varied based on different levels of social support, thereby testing the moderating influence of social support.

Asian Americans in the U.S. Workforce

In the United States, most Asian American adults are immigrants (8.77 million, 79.6%), representing at least 29 cultures. Over seven million employed Asian Americans represent 4.9% of the total U.S. workforce [U.S. Census Bureau, 2010]; the relative percentage is considerably larger in the more populous states of California, New York, and Texas [Hoeffel et al., 2012]. Filipinos are the second largest subgroup of Asian Americans, with 1.66 million (65.7%) being foreign-born adults [U.S. Census Bureau, 2010]. Despite the notable involvement of Asians in the U.S. workforce, this population is markedly underrepresented in health research [Ghosh, 2003]. Datasets including large numbers of Asian workers with data specific to different Asian cultures are rare. Thus, taking the advantage of the large Filipino American Community Epidemiological Study (fACES), this study examined the influence of social determinants on both mental health problems and substance use among one Asian subgroup, Filipino immigrant workers.

METHOD

Study Design

This study used data from the original fACES to conduct multivariate model testing. fACES is a cross-sectional, epidemiological study conducted in San Francisco, California and Honolulu, Hawaii, where the relative proportion of Filipinos is large compared to other U.S. cities. Three-stage probability sampling of Filipino households was used [see Gong and Gane, 2003; Mossakowski, 2003 for details]. One

person, 18 years or older in each eligible household was randomly selected for a 90-min interview. All interviewers were fluent in English and the Filipino languages of Tagalog or Ilocano; the interviews were conducted in either language according to the participant's preference. A total of 2,285 interviews were completed, with a 78% response rate.

Sample

The sample for this study included 1,397 of the fACES study participants who identified as foreign born and employed ("working") at the time of interview. Sixty percent (n = 838) were female, 40% were male. This ratio is similar to the proportion (57% foreign-born female) reported in the 2010 American Community Survey on the adult Filipino American population [U.S. Census Bureau, 2010]. The current study used de-identified data and thus was approved for exempt status by the Institutional Review Board of the investigators' affiliated university.

Measurement

Most survey questions were answered by study participants using Likert-type response scales that were coded such that higher scores represented higher levels of the measured variable. The latent variables and their respective indicators are listed in Table I, and also described below with results from the confirmatory factor analysis.

Dependent variables

Mental health problems were indexed using three separate indicators: psychological distress, somatic symptoms, and daily functioning. Psychological distress was measured using 21 items ($\alpha = 0.92$) that assessed the severity of negative feelings and emotions (e.g., feeling nervousness or shakiness inside, hopeless about the future) during the past 30 days prior to when the interview took place. The response format was a five-point Likert-type scale, ranging from 1 (not at all) to 5 (extremely). Somatic

TABLE I. Confirmatory Factor Analyses: Standardized Factor Loading for Mental Health Problems, Substance Use, and Predictor Variables in the Final Measurement Model[a]

Latent variables	Indicators	Factor loadings
Mental health problems	Psychosocial distress	0.88
	Somatic symptoms	0.70
	Daily functioning	0.36
Substance use	Number of non-medical use of drugs	0.44
	Experience of drug or alcohol abuse symptoms	0.66
	Severity of alcohol use	0.48
Social discrimination	Subtle discrimination	0.83
	Serious actions directed toward you	0.77
	Unfair treatment	0.47
	Social discrimination in the job context[b]	0.25
Job and employment concerns[c]		
General job/employment	Job security	0.69
Concerns	Interpersonal problems	0.75
	Disliking the job	0.66
Immigrant-specific job/	Job opportunity	0.73
Employment concerns	Economic impact on personal life	0.74
	Social discrimination in the job context	0.55
Social support	Perceived emotional support from family/relatives	0.78
	Perceived emotional support from friends	0.61

Analyses were adjusted for sample design using sampling weights. All loadings were statistically significant at $P < 0.05$. Correlated measurement errors were incorporated into the analysis between these pairs of indicators: daily function and somatic symptoms (r = 0.14); experience of drug or alcohol abuse symptoms and severity of alcohol use (r = 0.19); interpersonal problems and disliking the job (r = 0.16). Instrumental support had low variance, contributing little to the measurement model, and was eliminated to improve model fit.
[a]The CFA indicated acceptable fit indices of CFI = 0.96, NNFI = 0.94, RMSEA = 0.045 (95% CIs 0.041–0.050) and $\chi^2 = 383.14$ (df = 103, n = 1,323, $P < 0.001$).
[b]Social discrimination in job context was a shared indicator.
[c]Job and employment concerns is a second-order factor. Factor loadings of general job/employment concerns (reference indicator) and immigrant-specific job/employment concerns were 0.97 and 0.65, respectively.

symptoms (e.g., headache, chest pain) were measured using a 17-item Likert-type scale ($\alpha = 0.86$) to assess severity of somatic symptoms in the past 30 days. Item response options ranged from 1 (not at all) to 5 (extremely). Daily functioning was indexed by summing four items that captured whether somatic symptoms or emotional problems interfered with work or other regular daily activities in the past 4 weeks (1 = yes, 0 = no). It was correlated with psychological distress at r = 0.35 ($P < 0.001$) and with somatic symptoms at r = 0.38 ($P < 0.001$).

Substance use was operationalized using three separate indicators: number of drugs used for non-medical purposes, experience of drug or alcohol abuse symptoms, and severity of alcohol use. The number of drugs used in the past 12 months was the sum of the number of drugs used (1 = yes, 0 = no) across nine categories of prescription and non-prescription drugs. Drug or alcohol abuse symptoms were measured by summing positive responses (1 = yes, 0 = no) to 18 items ($\alpha = 0.89$) regarding the adverse effects of drugs or alcohol on daily functioning, personal safety, and physical health in the past 12 months. Severity of alcohol use was measured by the relative number of drinks per day (1 = 1–4 drinks, 2 = 5–11 drinks, 3 = 12–19 drinks, 4 = 20 or more drinks) weighted by frequency of drinking in the past 12 months.

Predictor variables

Social discrimination was defined as unfair treatment and hassles experienced by an individual due to her/his skin color, accent, immigration status, or other social characteristics. Social discrimination was measured using four indicators: subtle discrimination, serious actions directed toward the person, unfair treatment, and social discrimination in the job context. A measure of everyday discrimination, adapted by fACES from the Detroit Area Study [Williams et al., 1997], assessed the frequency of unfair treatment or hassles experienced in the past month ($\alpha = 0.85$) or subtle discrimination (e.g., treated with less courtesy). Five items ($\alpha = 0.75$) captured serious actions directed toward the person (e.g., being called names or insulted). The item response format for these two indicators was a five-point scale, ranging from 1 (never) to 5 (very often). Unfair treatment was measured with three items (1 = yes, 0 = no) that assessed the occurrence of unjust or inequitable treatment due to race/ethnicity, speaking a different language, or speaking with an accent, which correlated with subtle discrimination and serious actions toward the person (r = 0.39 and 0.32, $P < 0.001$, respectively). Social discrimination in the job context was measured using four items ($\alpha = 0.57$) describing racial stereotypes and discrimination faced by immigrants in the workplace. The item response options, rated on a four-point Likert-type scale, ranged from 1 (not at all) to 4 (a lot).

Job and employment concerns had two elements, general job/employment concerns and immigrant-specific job/employment concerns. General job/employment concerns measured the frequency of distressful events experienced by the individual in work situations. Nine items were rated using a four-point Likert-type scale, ranging from 1 (not at all) to 4 (a lot). Item responses were summed creating the three indicators: job security (three items, $\alpha = 0.78$), interpersonal problems (four items, $\alpha = 0.80$), and disliking the job (two items, r = 0.47). Correlation among indictors ranged from r = 0.45 to 0.58 ($P < 0.001$). Immigrant-specific job/employment concerns were characterized by the frequency of concerns related to immigrant status or racial stereotypes in the work context, such as "I had problems with my legal status that have prevented me from getting a good job," or "Since I am Filipino, I'm expected to work harder." The indicators of job opportunity (four items, $\alpha = 0.51$), economic impact on personal life (three items, $\alpha = 0.52$), and social discrimination in the job context (four items, $\alpha = 0.57$) were rated using response options based on a four-point Likert-type scale, ranging from 1 (not at all) to 4 (a lot). Correlations among the three indicators ranged from r = 0.46 to 0.55 ($P < 0.001$). General job/employment concerns and immigrant-specific job/employment concerns were highly correlated at r = 0.65. Job and employment concerns was then treated as a second-order factor, measured by general and immigrant-specific job/employment concerns as two first-order factors.

Social support was operationalized using two indicators based of perceived instrumental support and emotional support from family and from friends. Instrumental support was the sum of six items rated on a five-point Likert-type scale ranging from 1 (very unlikely) to 5 (very likely). Emotional support was based on the sum of six items, with response options ranging from 1 (not at all) to 4 (a lot). For this study sample, the internal consistency ranged from $\alpha = 0.91$ to 0.94.

The measurement model

Confirmatory factor analysis (CFA) was used to establish the measurement model that specified the specific indicators (i.e., observed or measured variables) for each latent variable designated as circles in Figure 1. The latent variables and their respective indicators are summarized in Table I. In the first column are the names of the latent variables; in the second column are the respective indicators for each latent variable; and in the last column is the "factor loading" for each indicator with respect to its latent variable. The factor loadings were moderate to large, ranging from $\lambda = 0.25$ to 0.88. The smallest loading was associated with social discrimination in the job context that was a shared indicator for both social discrimination ($\lambda = 0.25$) and immigrant-specific job/employment concerns ($\lambda = 0.55$).

The CFA also revealed that measures of emotional and instrumental support were separate latent variables; in this sample the variance for instrumental support was extremely low and created unstable parameter estimates, and thus was removed from the measurement model. One indicator, social discrimination in the job context, emerged as a shared indicator of social discrimination and immigrant-specific job/employment concerns. This sometimes happens when an item on one scale is conceptually linked with another construct in the model.

Control variables

For all analyses, demographic and background variables (gender, English proficiency, physical health, education level, income, and occupational sector) were used as control variables in the model because of their known relationships with the main study variables [Williams et al., 2003; Faragher et al., 2005; Takeuchi et al., 2007]. Gender was coded 0 for female and 1 for male. English proficiency was measured using a single item asking about how well the person understood English when it was spoken (1 = not at all to 4 = very well). Physical health was captured by a single item rated on a five-point Likert-type scale (1 = poor to 5 = excellent) to assess respondents' evaluation of their overall physical health. Education level was measured with 20 incremental response options, from no formal education (0) to professional degree (20). Income was coded into seven contiguous categories, higher numbers indicating higher levels of annual household income. For this study, occupational sector referred to one of three broad categories: manual/services, sales/transportation/warehouse/utilities, and health/social services. The information was originally captured by fill-in questions in the fACES dataset. For this study, the classification was first coded using the North American Industry Classification System (NAICS) groupings [U.S. Census Bureau, 2012], and recoded into occupational sectors based on the U.S. National Institute for Occupational Safety and Health sectors [National Institute for Occupational Safety and Health, 2006] to reduce number of categories. Dummy variables were used to represent occupational sectors, with the manual/services variable serving as the reference category.

Analyses

Descriptive statistics were used to examine the distributional properties of variables, out-of-range values, outliers, and the extent and patterns of missing data. Due to skewed distributions for the indicators of substance use, square root transformations were employed. Social discrimination, social support, and income had between 3% and 7% missing data; regression imputation was used to replace missing values to minimize parameter estimate bias [Allison, 2002, 2003].

Reliability (Cronbach's α) and validity of scales were assessed.

Structural equation modeling (SEM) was used to test the hypothesized effects of social discrimination, job concerns, and social support on Filipino immigrant worker mental health and substance use problems. Unlike ANOVA, multiple regression or path analysis, SEM has the capacity to incorporate multiple indicators of theoretical constructs (as described above), to adjust for random measurement errors in the variables, and to simultaneously evaluate the hypothesized effects of social determinants on more than one dependent variable [Schumacker and Lomax, 1996; Kline, 1998]. Thus, SEM allowed us to expand methodological approaches in this area of occupational health and health disparities research that have been based primarily on bivariate associations or single predictor models.

SEM was used to simultaneously estimate the effects of three social determinants on mental health problems and substance use, while controlling for key confounding variables. Both general and specific (e.g., residual analyses) indicators of fit, including chi-square (χ^2), non-normed fit index (NNFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) [Schumacker and Lomax, 1996; Kline, 1998; Hooper et al., 2008], were used to assess model fit. The estimates for each of the hypothesized paths were evaluated using P-value at 0.05. Sampling weights developed in the original fACES study were used to adjust the analyses for the survey sampling design.

To explore for the potential moderating influence of social support using SEM, we divided sample into high and low support groups and compared the model for both groups simultaneously. We compared two models, one in which the model paths were constrained to be equal across the high/low support groups and the other in which the paths were unconstrained, or not assumed to be equal. Differences in the two models would indicate potential moderating effects of social support. We found no model differences after dividing the sample by the median support score. To distinguish the high and low support groups, we also divided the sample into quartiles and compared the highest and lowest quartiles.

RESULTS

Demographic Characteristics

The sample characteristics are summarized in Table II. On average, study participants had resided in the United States 15.3 years (SD = 10). The majority of participants (n = 1,033, 74%) were proficient in English though only 64% (n = 892) were naturalized U.S. citizens. The mean age was 42.7 years (SD = 11.8). At least 71% (n = 994) had a high school education, and 55% (n = 769) had a household income below $50,000. Sixty-seven percent of participants

TABLE II. Participant Characteristics (N = 1,397)

Variables	n	%
Sex		
Female	838	60
Male	559	40
Age (years)		
18–25	133	9.5
26–35	263	18.8
36–45	401	28.7
46–55	370	26.5
56–65	230	16.5
Highest education		
No formal education	168	12
Grades 1–11	235	16.8
High school graduate	218	15.6
Vocational / technical training	12	0.9
College (≥1 year)	700	50.1
Graduate school/professional degree	64	4.6
English proficiency[a]		
Not at all	1	1
Not much	84	6
Some	278	19
Very well	1,033	73.9
Daily language[a]		
Filipino language	470	33.6
English language	132	10.2
Filipino and English languages	783	56
Industries where participants were employed[b]		
Manual, services	929	66.4
Sales, transportation, warehouse, utilities	236	16.9
Health and social services	229	16.4
Annual household income		
Less than $25,000	329	23.6
$25,000–$49,999	440	31.5
$50,000–$99,999	456	32.6
$100,000–$199,999	135	9.7
$200,000–$299,999	24	1.7
$300,000–$499,999	8	0.6
$ 500,000 and more	5	0.4

[a]Missing data = 1 (0.1%).
[b]Missing data = 3 (0.2%).

(n = 925) were employed in manual/service industries, such as accommodation and food services, finance, and insurance. Seventeen percent of participants (n = 236) were employed in sales/transportation/warehouse/utilities.

Results of Model Testing

Figure 2 shows the results from the SEM using the weighted sample, with addition of selected correlated errors [Schumacker and Lomax, 1996; Kline, 1998]. Individual indicators for each latent variable are not illustrated, but are summarized in Table I. Indices reflecting the fit between the empirical data and the hypothesized model met statistical standards ($\chi^2 = 714.65$, 187 df, $P < 0.01$; NNFI = 0.90, CFI = 0.93, RMSEA = 0.046). Mental health problems and substance use, as hypothesized, were correlated (r = 0.17, $P < 0.05$), reflecting their co-morbidity. Social discrimination had a significant positive association with mental health problems ($\beta = 0.12$, $P < 0.05$) and substance use ($\beta = 0.18$, $P < 0.05$). Job and employment concerns showed a strong association with mental health problems ($\beta = 0.50$, $P < 0.05$), but not with substance use. As predicted, social support had a significant inverse association with both mental health problems and substance use ($\beta = -0.08$ and -0.09, $P < 0.05$).

To test for the hypothesized moderating effects of social support, we split the sample into high versus low support. The fit for the unconstrained model was $\chi^2 = 579.95$, 310 df, $P < 0.01$; NNFI = 0.82, CFI = 0.88, RMSEA = 0.048; and for the fully constrained model was $\chi^2 = 616.20$, 328 df, $P < 0.01$; NNFI = 0.82, CFI = 0.87, RMSEA = 0.048. The test of the moderating effects was based in the difference between these two models; the $\chi^2_{\text{diff.}}$ was statistically significant ($P < 0.05$), but the confidence intervals for the parameter estimates in both models overlapped indicating that there were no substantive differences in the model for high versus low support groups. We also tested for moderating effects of social support using interaction terms between social support and social discrimination and between social support and job and employment concerns. Using multiple regression, we tested for the significance of these interaction terms. Consistent with the SEM analysis, none of the interaction terms were statistically significant. Thus, although social support had a direct association with the dependent variables, it did not serve to moderate the effects of social discrimination or job and employment concerns for this sample.

Several control variables revealed significant associations with the dependent variables. Gender (being male) was inversely associated with reporting of mental health problems ($\beta = -0.16$, $P < 0.05$) and positively associated with substance use ($\beta = 0.37$, $P < 0.05$). English proficiency was weakly associated with mental health problems and substance use ($\beta = 0.07$ and 0.10, $P < 0.05$, respectively). Physical health was negatively associated with mental health problems ($\beta = -0.22$, $P < 0.05$), but not with substance use. Education level had a small positive association with mental health problems ($\beta = 0.08$, $P < 0.05$), but not with substance use. Annual household income had a positive association with substance use ($\beta = 0.15$, $P < 0.05$). Compared to the manual/services (the reference category), working in sales/transportation/warehouse/utilities was weakly associated with mental health problems ($\beta = 0.06$, $P < 0.05$).
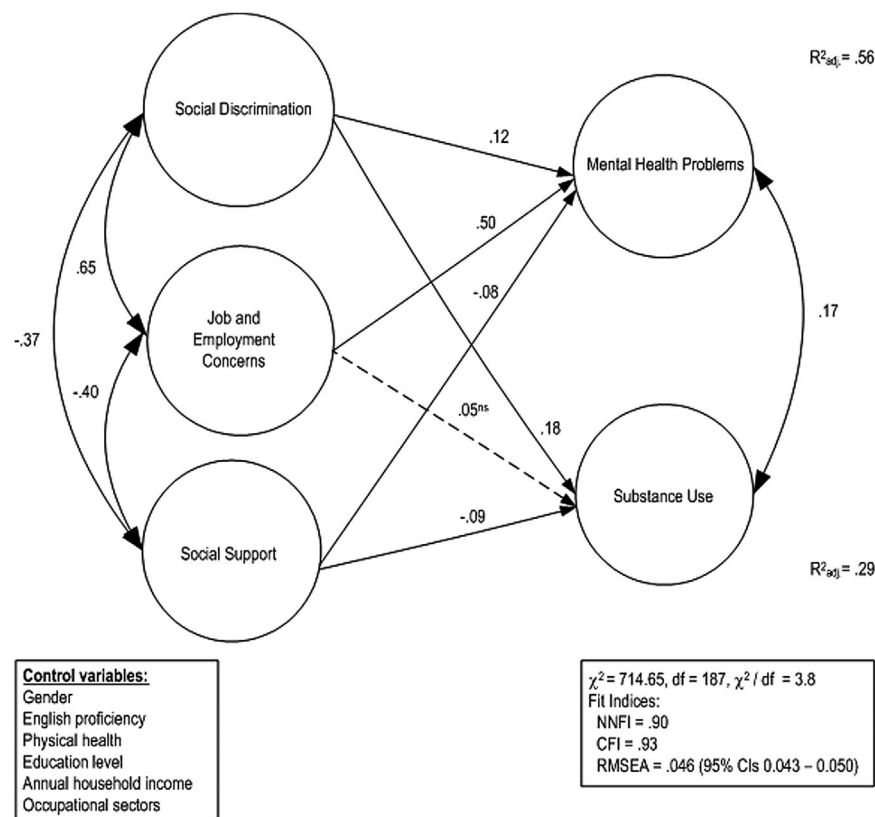
FIGURE 2. Estimated structural model depicting the direct effects of social determinants on foreign-born Filipino American workers' mental health problems and substance use. Analysis adjusted for sampling design and correlated errors. Paths with solid lines are significant at $P < 0.05$.

DISCUSSION

The hypothesized model was consistent with the empirical data. Associations between mental health problems and substance use; between social discrimination and social support and both mental health problems and substance use; and the association of job and employment concerns with mental health problems were all statistically significant. Contrary to the hypothesized model, however, job and employment concerns were not associated with substance use. The relative size of associations varied from small to moderate, with job and employment concerns demonstrating the strongest association with mental health problems.

Due to cultural and linguistic complexities and the relatively small population size of each group within the larger Asian American population, datasets with substantial representation of any Asian subgroup are scarce. The fACES data, however, provided a unique opportunity to test the proposed social determinants model specific to the second largest Asian workforce in the United States.

Co-Morbidity of Mental Health Problems and Substance Use

Mental health problems and substance use are debilitating problems often experienced as co-morbid conditions [RachBeisel et al., 1999; Hasin et al., 2005; Swendsen et al., 2010]. Our finding, that mental health problems and substance use were associated, is highly relevant for Filipino immigrant workers because the prevalence of mental health problems is substantial in this population. In the first nationwide epidemiological study using a nationally representative sample of Asian Americans, the National Latino and Asian American Study (NLAAS) [Takeuchi et al., 2007], estimated that 9% of native- and foreign-born Filipino Americans had experienced depression, anxiety disorders or substance-related disorders in the past 12 months prior to the interview, and 17% had life-time experience with one of these problems. Also relevant is the fact that Asian Americans experience disparities in access to and quality of available mental health services [U.S. Department of Health and Human Services, 2001; Alegría et al., 2008]. A recent meta-analysis [Martin et al., 2009] showed the efficacy of

workplace mental health interventions for reducing depression and anxiety. In effect, the workplace or other community venues could serve as alternative settings for the prevention and early detection of mental health problems and substance use for immigrant workers. Translation research is needed to assess the adaptation of existing interventions or the development of new programs for Filipino immigrant workers, and to understand the challenges that might hinder program implementation.

Social Discrimination and Job and Employment Concerns as Risk Factors

The study results highlighted the role of social discrimination and job and employment concerns in shaping mental health problems and substance use among Filipino immigrant workers. Discrimination exists at the individual and institutional levels [Krieger et al., 1993]. Both forms of discrimination create social conditions and stress that impact on racial/ethnic minorities in everyday contexts. Studies have shown robust relationships between discrimination and psychosocial problems among racial/ethnic minorities [Williams et al., 2003; Paradies, 2006; Gee et al., 2009; Pascoe and Richman, 2009]. Research focused on Asian Americans, both foreign- and U.S.-born, however, remains limited. Critical aspects of the immigrant experience with discrimination—those linked to language, accent, immigration and citizenship status, and nativity—are infrequently included in discrimination research [Gee et al., 2009]. This study, however, addressed this gap by using measures that captured immigrant-based discrimination. Moreover, the results demonstrated that Filipino immigrant workers' exposure to discrimination across social contexts independently contributed to both mental health and substance use problems. These findings extend the purview of disparities research in occupational health by incorporating contextual factors beyond the workplace that influence worker well-being, occupational injury risks, and work performance [Haslam et al., 2005; Wang et al., 2006].

Job and employment concerns, when examined simultaneously with other social determinants of mental health, had the strongest influence on Filipino immigrant worker mental health problems. Qualitative research [Aroian, 1990; Lipson and Omidian, 1997] shows that occupational accommodation for economic survival places a critical demand on immigrants' psychosocial adaptation in a host country. Job and employment concerns are likely to confer immediate and persistent stress on immigrant workers, which may explain why job and employment concerns had a stronger association with mental health problems than did social discrimination. The job concerns literature is based primarily on data from non-immigrant populations [Stansfeld et al., 1999; Ragland et al., 2000; Cheng et al., 2005; Faragher et al., 2005]. This study provides new and compelling evidence regarding the negative influence of job and employment concerns on immigrant worker mental health. More importantly, general and immigrant-specific job and employment concerns were tightly woven in the perspectives of these immigrants as evidenced by their strong association with each other. This finding suggests that while research attempts to understand how work contributes to health disparities [Lipscomb et al., 2006], researchers need recognize the complexities of social contexts that immigrant workers face and include measures and methods to capture the stress derived from such complexities in future studies.

Unexpectedly, job and employment concerns were not associated with substance use. The measure of social discrimination in the job context, however, was a shared indicator for both job and employment concerns and social discrimination. They were analyzed simultaneously in the model. This overlap between indicators may have contributed to the moderate correlation between job and employment concerns and social discrimination, attenuating the association of job and employment concerns with substance use. Additionally, the rate of substance use was low in this study sample. Examination of national epidemiological studies showed lower rates of illicit drug and alcohol uses than tobacco use among Filipino Americans [Price et al., 2002]. Tobacco use, not included in this study, has been associated with stress and used to cope with stress [Pomerleau and Pomerleasu, 1991; Guthrie et al., 2002; Kouvonen et al., 2005; Maxwell et al., 2007]. The addition of tobacco use as an indicator of substance use might increase the sensitivity of the substance use measures.

Social Support as a Protective Factor

The study findings indicate that emotional support from family and friends, as hypothesized, was associated with both Filipino immigrant worker mental health and fewer substance use problems. Foreign-born ethnic minorities have unique and compounded sociocultural stressors (e.g., immigration and citizen status, language, network change, xenophobia) that increase their vulnerability for poor health, including occupation-related health outcomes. Identification of protective factors that could reduce immigrant worker mental health and substance use problems is critical to immigrant worker health promotion interventions. Importantly, social support is conceptualized and operationalized in a variety of ways that characterize different aspects of this construct such as sources of support, functions of support, and perceived or actual support behaviors [Broadhead et al., 1983; Lin, 1986; Sarason et al., 1987; Haber et al., 2007]. A meta-analysis [Schwarzer and Leppin, 1989] showed that a weighted average effect size for social support and self-reported

somatic symptoms (e.g., pain, headache) was $r_w = -0.08$, which was lower than the effect size for social support and affect variables such as depression ($r_w = -0.20$ to -0.30). A recent meta-analysis on social support and mental health [Prati and Pietrantoni, 2010] demonstrated that the effect size of perceived social support ($r = 0.31$) was significantly larger than received support ($r = 0.22$). In other words, different dimensions of social support could have differential effects on health outcomes. Workplace support, not assessed in the original fACES, should be incorporated in future research to determine how support outside versus inside the workplace influences immigrant worker mental health and substance use. The information would be valuable for determining what support resources are needed to promote aspects of worker mental health.

Despite evidence for the buffering effects of social support suggested in qualitative research findings with immigrant populations [Aroian, 1992; Noh and Kaspar, 2003; Agudelo-Suárez et al., 2009], we did not observe buffering in this study. We explored the potential moderating effects of social support, but found none for the posited relationships between social discrimination and job and employment concerns on immigrant worker mental health problems or substance use. Thus, the evidence of social support functioning to mitigate the effects of stressors on mental health remains mixed [Cassel, 1976; Karasek et al., 1982; Dressler, 1985; Gee et al., 2006; Ajrouch et al., 2010]. As mentioned above, investigators recognize the need to understand the specific mechanisms by which different dimensions of social support affect health outcomes [Sarason et al., 1987; Schwarzer and Leppin, 1989; Haber et al., 2007; Nurullah, 2012]. While perceived emotional support from family and friends shows direct influences on reducing Filipino immigrant worker mental health problems and substance use, it is plausible that this kind of support alone is not sufficient to buffer the stress effects of social discrimination and job and employment concerns. Rather, other forms or sources of support such as actual assistance from supervisors, coworkers, labor unions, worker centers or community agencies [Lee and Krause, 2002; de Castro et al., 2006; Chinese Progressive Association, 2010] might be more effective given the nature of these social stressors. For interventions designed to reduce occupational health-related disparities, further investigations are needed to examine more dimensions of support and identify potential moderators to mitigate the stress generated from a broader sociocultural context and work environment for immigrant workers.

Practice and Research Implications

Occupational health education and research usually focuses on prevention and treatment of physical injuries or medical illnesses, but recently researchers and practitioners have advocated for increasing research on worker mental health [Felton, 2000; Wilhelm et al., 2004]. The co-morbidity of mental health problems and substance use identified in the literature, and supported by this study's findings, indicate that assessment and interventions should focus not only on mental health problems such as depression and anxiety, but also on substance use problems in occupational health education and services.

Importantly, the study findings call for collaborative and 'upstream' systems approaches [Wilkinson and Marmot, 2003; Williams et al., 2008; Jones et al., 2009; World Health Organization, 2012] to eliminate occupational health disparities. Social discrimination and job and employment concerns are stressors rooted in the systems that create everyday living and work contexts that shape immigrant workers' employment opportunities, work hazards exposure, access to resources, and ultimately health and work performance [Krieger, 2010]. Social discrimination and job and employment concerns, compared to emotional support, have relatively large influences on immigrant worker mental health. Thus, system level approaches and collaborative efforts are needed to generate effective interventions. This means, working across researchers, practitioners and work sectors to create a broader awareness of the influence of discrimination on the differences in exposure to risks and opportunities; working collectively on policy, structural, and cultural changes to promote equity; and engaging in research that identifies ways to directly minimize the effects of discrimination and structural disadvantages that immigrant workers face. Examples described in Baron et al.'s [2013] comprehensive review of integrated approaches to reduce occupational health disparities could serve as models to address these broad societal issues.

Study Limitations and Strengths

The cross-sectional nature of the data used in this investigation limits the interpretation of causality and potential longitudinal effects implied in the proposed model of social determinants. We were unable to overcome the limitations of self-reported data or common method variance for this secondary analysis. Some procedural remedies used in the original study and this study partially mitigate problems associated with self-report or common method variance, including the anonymity of data, the use of trained bilingual and bicultural interviewers, the used multiple indicators to increase measure reliability, and correction for measurement error [Podsakoff et al., 2003].

Strengths of this study include the large immigrant sample, the use of robust survey methods, high participation rates, and low levels of missing data. The study also used a sophisticated multivariate statistical method to test a model based on the integration of separate lines of research from occupational health and other disciplines. The findings

provide a strong foundation for designing longitudinal research necessary to understand the plausible pathways by which social determinants impose on healthy adaptation by immigrant workers. Ultimately such research could be extended to the study of work injuries and work performance as well as the economic impact on businesses and society.

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