



Cultural and social network predictors of drinking among Korean American women

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Abstract

This study estimated the association of cultural and social mechanisms with Korean American women's drinking behaviors. Data were drawn from telephone interviews with 591 Korean women selected from a random sample of households in California with Korean surnames during 2007. About 62% of eligible respondents completed the interview. Respondents reported any lifetime drinking (yes/no), drinking volume (typical number of drinks consumed on drinking days), level of acculturation, and described their social network by assessing who encouraged or discouraged drinking (drinking support) or drank (drinking models). Multivariable regressions were used for analyses. About 70% (95% confidence interval [95%CI]: 67, 74) of Korean American women reported any lifetime drinking and current drinkers drank 1.18 (95%CI: 1.07, 1.28) drinks on drinking days. Acculturation was not significantly associated with any lifetime drinking or drinking volume, whereas models and support for drinking were statistically significantly associated with a higher probability of any lifetime drinking and drinking more on drinking days. Each additional encourager, or one or fewer discourager, for drinking in women's social networks was associated with a 2% (95%CI: 1, 3) higher probability of any lifetime drinking and drinking 0.25 (95%CI: -0.53, 1.18) more drinks on drinking days. Each additional drinker in women's networks was associated with a 4% (95%CI: 1, 8) higher probability of any lifetime drinking and drinking 0.26 (95%CI: -0.05, 0.60) more drinks on drinking days. Korean American women's drinking appears to be strongly related to their social networks, although how women take on traits of their new environment was not. © 2010 Elsevier Inc. All rights reserved.

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Introduction

This study examined the association of cultural and social mechanisms with drinking behaviors among Korean women in California. Little is known about the correlates of alcohol use among Korean American women and most knowledge does not consider mechanisms that might be intervened on (Chi et al., 1989; Lubben et al., 1989; Nakashima and Wong, 2000; Weatherspoon et al., 2001). Epidemiological studies suggest non-Protestant status; not participating in sports; and frequenting bars, taverns, or nightclubs increases drinking among Korean women (Lubben et al., 1989; Weatherspoon et al., 1994). Based

on small nonprobability community samples with limited measures, 280 Koreans in Southern California (Lubben et al., 1989) and 72 Koreans in Hawaii (Weatherspoon et al., 1994), these findings suggest the need for additional studies concerning alcohol consumption. Estimates of Korean American women's drinking behaviors are also limited. One population-based study of 2,830 Korean Americans in California by Song et al. (2004) reported 50.7% of women were current drinkers, although they did not consider other drinking concepts. Moreover, we are unaware of studies that focus exclusively on the drinking behaviors of Korean American women.

Ecologic deductions for drinking

Plausible explanations for Korean American women's drinking may be guided by ecological models (Glass and

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McAtee, 2006; Hovell et al., 2002, 2009; McLeroy et al., 1988), which direct attention to individual, social, and environmental determinants. The Behavioral Ecological Model (BEM) differs from other approaches, using contingency concepts by borrowing from operant principles of behavior, among the most empirically validated theories for behavior change (DeGrandpre, 2000; Glenn et al., 1992). According to the BEM, learning is a function of both proximal reinforcers, those occurring closer to the individual in terms of social aggregation, and distal reinforcers, those occurring further from the individual (Hovell et al., 2002, 2009).

Distal reinforcers include cultural contingencies, such as public policies and practices in the larger society. Often implicit characteristics, distal reinforcers include sanctioned behavior for acquisition and adherence to national cultures on immigration. According to Landrine and Klonoff (2004), acculturation is the extent to which immigrants retain their indigenous culture or adopt the host culture as a result of operant learning, for example, rewards for English skills. Korean women often initiate risk behaviors, like smoking after acculturating to the United States (Hofstetter et al., 2004) and drinking may follow a similar pattern becoming more acceptable among acculturated versus traditional women. Many social situations in Western contexts involve drinking and there are near uniform cultural norms supporting drinking among nonpregnant women (Bloomfield et al., 2001). Drinking is portrayed as pleasurable, including a means of socialization, sexual relationships, and a sign of high social status (Beccaria, 2001; DuRant et al., 1997). Because drinking may be less supported by distal reinforcers among Korean women than American women, acculturation should increase drinking. The plausibility of this association is, weakly, supported by evidence that later generation Asian women perceive more relaxed drinking norms and drink more than their parents (Li and Rosenblood, 1994). Among Korean Americans in California, current drinking prevalence was highest among those more acculturated to U.S. lifestyles in comparisons with those who were bicultural or traditional, although the association was unadjusted for possible confounds (Song et al., 2004). We hypothesize (H_1) that acculturation increases the likelihood of any lifetime drinking and volume drunk on drinking days.

Proximal reinforcers include models that may be imitated and positive or critical feedback from network members. Social models of drinking are one of the most influential predictors of drinking uptake (Barnes et al., 1994; Borsari and Carey, 2001) and drinking volume (Rosenquist et al., 2010). Drinkers typically expect alcohol consumption to be a pleasurable social experience (Cooper et al., 1995). Interventions to decrease alcohol use are more effective when they operate at the level of peer relations (McKnight and McPherson, 1986). For the purposes at hand, social contingencies include social support for drinking and models of drinking. Discriminating between encouragement or discouragement and passive exposure

to drinking may capture the gradient of drinking's social mechanisms, where the latter is most often studied at the exclusion of the former (Andrews et al., 2002; Rosenquist et al., 2010; Urberg et al., 1997). The BEM suggests that more immediate proximal contingencies are more influential for behavior change. We hypothesize (H_2) that the more models of drinking and support for drinking will increase the likelihood of any lifetime drinking and volume drunk on drinking occasion.

Materials and methods

Data were drawn from a 2007, probability-based, telephone survey of California female adults (18 years and older, $N = 591$) of Korean descent and was conducted by closely supervised bilingual professional interviewers. California has the largest concentration of Korean immigrants in the nation, over 350,000 or one-third of the total United States Korean population (Yu et al., 2002).

The survey instrument was first developed in English and translated into Korean with the assistance of coinvestigators in Seoul, South Korea, and in the United States. The English–Korean translation process was repeated to optimize isomorphism between concepts in each language. Focus groups, lead by the interview supervisor, who had extensive experience working with Korean study participants, were used to ensure that the meanings of terminology were accurately rendered in the English and Korean translations. The final instrument was pilot tested and interviews were continuously monitored by the interview supervisor to make repairs if problems arose. The San Diego State University Institutional Review Board approved all procedures. All participants consented before beginning the survey.

The sample was randomly drawn from telephone numbers associated with residences of persons with Korean surnames purchased from a commercial firm and included both listed and unlisted numbers derived from a variety of sources, for example, subscriptions. Numbers with surnames that are common in other cultures (e.g., Cho, Ho, and so forth) that also had non-Korean but other Asian first names were deleted from the list, whereas Korean surnames that had Anglicized first names were retained in the list. Study participants were screened to ensure they were of Korean descent.

Interviews were conducted with the female of Korean descent aged 18 and older who had the most recent birthday. Up to seven callbacks were made to each number, and 62% of eligible respondents contacted completed interviews, meaning 953 Korean women were contacted and 591 agreed to be interviewed. Because no data were collected on persons who did not complete the interview, we estimated generalizability of the sample by comparing it with population estimates for Korean women in California. The sample closely approximated census demographics for women of Korean descent in California but slightly

overrepresented older and underrepresented younger populations.

Drinking characteristics

Any lifetime drinking was measured by responses to "Have you ever had more than a few sips of any kind of alcohol, beer, wine, or spirits, to drink?" coded 0 = abstainer and 1 = drinker. *Drinking volume* indicates the volume of alcohol consumption per drinking occasion among current drinkers, measured by responses to "About how many drinks containing alcohol do you have on a typical day when you have something to drink? A drink of alcohol was defined as "a 12 oz glass, can, or bottle of beer, a 4–5 oz glass of wine, a 12 oz can or bottle of wine cooler, or a shot or mixed drink with one shot of liquor (i.e., vodka, rum, whiskey, or soju)." Four additional measures allow us to make stronger descriptive inferences about Korean American women's drinking behaviors. Respondents reporting that they had ever had any kind of alcohol but reported not currently drinking were classified as *former drinkers*. Current drinkers estimated their *alcohol tolerance* by responses to "How many drinks can you hold, that is, until you feel sick or pass out?" and their *binge-drinking* habits by responses to "About how often during an average month do you have four or more drinks on a single occasion?" To capture women's drinking histories, respondents were asked when they "started drinking alcohol...once a week or more?"

Drinking support and drinking models

The survey instrument included questions to collect egocentric social network data to identify social influences of drinking (Smith and Christakis, 2008). These network data treat the individual as the wheel hub where respondents are asked about persons with whom they have a relationship, and how these persons encouraged, discouraged, or modeled drinking using a pregenerated list of possible social relationships. Using these data, two scales of social contingencies for drinking were formed.

Support for drinking in respondents' social networks was estimated by the degree to which respondents were discouraged or encouraged to drink by spouse, parents, siblings, friends, and sons or daughters (Cronbach's $\alpha = 0.92$). Respondents were provided a list of persons and asked if these persons ever encouraged drinking, discouraged drinking, neither, or both. Less than one percent of respondents reported both encouragement and discouragement for any one source and these were treated as neither. The items were recoded; discourage (-1), neither (0), and encourage (1); and responses were summed. The range of possible values was -5 to 5. A 0 score indicates no net encouragement or discouragement to drink, positive scores indicate more encouragement for drinking than discouragement, and negative scores indicate more discouragement for

drinking than encouragement. Each unit change is an additional net encourager or discourager for drinking.

Drinking models were measured by counting the number of persons (spouse, parents, siblings, children, and friends) that respondents report "...regularly drinks alcohol." The range of possible values was 0–5, with each unit change being an additional person who modeled drinking.

Acculturation

The acculturation scale used in this study was adapted from the Suinn-Lew Asian self-identity acculturation to U.S. society scale (Suinn et al., 1987, 1995). Eleven items were designed to measure aspects of cultural preferences involving language, music, food, and self-identification, including how persons identified with the United States and Korea, father's identification, and social linkages, including ethnicity of peers and preferred associations. After conversion to a common metric (*z*-scores), a principal components analysis was computed. Although two components emerged from the analysis using the customary eigenvalue of one as a cutoff, a single general dimension explained 82% of the common and 50% of the total variance among items. For purposes of analysis, a general acculturation scale was formed by computing the mean of standardized items (mean = -0.02, standard deviation [S.D.] = 0.63, and Cronbach's $\alpha = 0.88$) after permitting up to four scores to be missing. Analyses demonstrated that the missing data treatment made no significant difference in findings.

Covariates

Education was measured as total years of formal education completed after subtracting overlapping years of education in South Korea and the United States. Work status indicated working outside the home (1) or not (0). Age was measured in years.

Analysis plan

Firstly, descriptive characteristics of the sample were appraised. In steps two and three, predictors for any lifetime drinking (using logistic regression) and drinking volume (using least squares regression) were evaluated for the drinking support and models scales and components of the scales separately. Right skewness in drinking volume was constrained by computing models for the natural logarithm (Carroll and Ruppert, 1988). Analysis of other drinking characteristics was not appropriate, for example, associating contemporary measures of the environment and social network with the age women began drinking regularly was not feasible. In step four, to assess the relative association of drinking support and drinking models by relationship, without considering the larger network context, equations were specified for spouses, siblings, parents, sons/daughters, and friends separately with dummy

variables for encouragement and discouragement for drinking (both relative to neither) and drinker (relative to abstainer), including adjustment for acculturation, education, working outside the home, marital status, and age to predict any lifetime drinking and drinking volume.

To ease interpretation, predicted quantities of interest, predicted probability of any lifetime drinking or expected value on the drinking volume scale, were calculated using the estimates from the multivariable analysis by simulation using 1,000 randomly drawn sets of estimates from a sampling distribution with mean equal to the maximum likelihood point estimates and variance equal to the variance covariance matrix of the estimates, with all other predictors held at their mean values (King et al., 2000). All tests were two tailed ($P < .05$).

Results

About 70% (95% confidence interval [95%CI]: 67, 74) of Korean American women reported any lifetime drinking,

with 10% (95%CI: 8, 12) reporting they had drank but did not presently drink, former drinkers (Table 1). Current drinkers, typically, drank about 1.18 (95%CI: 1.07, 1.28) drinks on drinking days ranging from “a sip” (coded: 0.01) to 10 drinks. Current drinkers also reported a typical tolerance of 2.02 (95%CI: 1.75, 2.30) drinks before “feeling sick or passing out,” ranging from a sip (0.01) to 12.50 drinks. Drinking four or more drinks on any one occasion was rare among current drinkers, occurring less than 1 day per month (Mean: 0.65; 95%CI: 0.33, 0.97), although the range, 0 to 28 days, indicate binge drinking may be common among some women. Regular drinkers, women who drank at least once per week, began drinking regularly at 22.07 (95%CI: 21.31, 22.82) years, with some beginning much earlier or later as indicated by the range from 15 to 53.

Women typically had two more discouragers than encouragers in their network as indicated by the mean, -2.50 (95%CI, -2.70, -2.31), of the drinking support indicator. Some reported that all their observed social ties

Table 1
Sample characteristics^a

Characteristic	Mean	95% Confidence Interval	Minimum	Maximum	N
Any lifetime drinking	0.70	0.67, 0.74	0.00	1.00	591
Drinking volume	1.18	1.07, 1.28	0.00	10.00	352
Former drinker	0.10	0.08, 0.12	0.00	1.00	591
Drinking tolerance	22.07	21.31, 22.82	15.00	53.00	184
Binge drinking	2.02	1.75, 2.30	0.00	12.50	201
Age began drinking	0.65	0.33, 0.97	0.00	28.00	255
Drinking support	-2.50	-2.70, -2.31	-5.00	5.00	591
Spouse encourage	0.09	0.06, 0.11	0.00	1.00	487
Spouse discourage	0.58	0.54, 0.63	0.00	1.00	487
Sibling encourage	0.05	0.03, 0.06	0.00	1.00	574
Sibling discourage	0.62	0.58, 0.66	0.00	1.00	574
Parent encourage	0.03	0.02, 0.05	0.00	1.00	466
Parent discourage	0.66	0.62, 0.71	0.00	1.00	466
Son/daughter encourage	0.04	0.02, 0.05	0.00	1.00	447
Son/daughter discourage	0.70	0.66, 0.74	0.00	1.00	447
Friend encourage	0.07	0.05, 0.09	0.00	1.00	586
Friend discourage	0.61	0.57, 0.65	0.00	1.00	586
Drinking models	0.95	0.86, 1.05	0.00	5.00	591
Spouse	0.33	0.29, 0.37	0.00	1.00	489
Sibling	0.22	0.18, 0.25	0.00	1.00	581
Parent	0.21	0.17, 0.25	0.00	1.00	467
Child	0.14	0.11, 0.18	0.00	1.00	442
Friend	0.19	0.16, 0.23	0.00	1.00	587
Acculturation	0.00	-0.05, 0.05	-0.84	3.02	591
Years education	15.24	15.01, 15.47	0.00	20.00	591
Married	0.38	0.34, 0.41	0.00	1.00	591
Work outside the home	0.78	0.74, 0.81	0.00	1.00	591
Age	46.06	44.90, 47.23	18.00	94.00	591

^aNumbers in cells are means (indicative of percent for a 0–1 variable) and associated 95% confidence intervals, range, and useful sample size for each concept. Useful sample size includes respondents who refused to answer or were ineligible, for example, nondrinkers for drinking questions. Drinking volume is the mean number of drinks per drinking occasion among current drinkers.

Table 2

Any lifetime drinking and drinking volume regressed on cultural and social reinforcers, 2007^a

Characteristics	Any lifetime drinking	Drinking volume
Drinking support	1.18*** (1.08, 1.28)	0.06* (0.01, 0.12)
Drinking models	1.23* (1.02, 1.48)	0.17** (0.06, 0.28)
Acculturation	0.96 (0.68, 1.36)	-0.08 (-0.32, 0.16)
Education	1.10** (1.03, 1.18)	-0.01 (-0.06, 0.04)
Work outside the home	1.42 (0.96, 2.11)	-0.06 (-0.34, 0.21)
Married	1.30 (0.81, 2.08)	-0.14 (-0.51, 0.23)
Age	0.99 (0.97, 1.00)	-0.01 (-0.02, 0.00)
Constant	—	0.45 (-0.60, 1.50)
Nagelkerke or adjusted R2	0.11	0.05
N	591	352

^aNumbers in cells are adjusted odds ratios or regression coefficients, 95% confidence intervals, and two-tailed probabilities * $P < .05$, ** $P < .01$, *** $P < .001$. Any lifetime drinking was coded 1 drinker and 0 abstainer. Drinking volume was the mean number of drinks per drinking occasion among current drinkers after taking the natural. Listwise deletion was used for analysis.

encouraged or discouraged drinking as indicated by the -5 to +5 range. By relationships, drinking encouragement was more common in spousal (Mean: 9%; 95%CI: 6, 11) or friendship (Mean: 9%; 95%CI: 5, 9) ties and discouragement was more common in parental (95%CI: 66% [62, 71]), son/daughter (Mean: 70%; 95%CI: 66, 74), and sibling (Mean: 62%; 95%CI: 58, 66) ties. The typical woman had one social tie that drank, as indicated by the mean for the drinking models indicator, 0.95 (95%CI: 0.86, 1.05), ranging from no (0) to all of their ties (5) drinking. By relationships, spouses (Mean: 33%; 95%CI: 29, 37) were statistically significantly more likely to drink than all other social ties.

Any lifetime drinking

Consistent with hypothesized expectations, any lifetime drinking was more likely when women had more drinking encouragement, or less discouragement, and drinking was more common in their social networks. Each encourager, or one fewer discourager, of drinking was associated with a 18% higher odds (adjusted odds ratio [AOR] = 1.18; 95% CI: 1.08, 1.28) of any lifetime drinking (Table 2). Similarly, each additional drinker in their network was associated with a 23% higher odds (AOR = 1.23; 95%CI: 1.02, 1.48) of any lifetime drinking among women. Regardless of whether a network member drank or encouraged drinking, the odds of drinking similarly increased, suggesting an additive impact for modeling and encouraging drinking.

Probabilities of any lifetime drinking by levels of drinking support and drinking models were calculated holding other predictors in the logistic equation at their means (Fig. 1A). Each additional encourager, or a decrease of one discourager, for drinking was associated with a 2% (95%CI: 1, 3) higher probability of any lifetime drinking. Consider, women who encountered only drinking discouragement (-5) had a 63% (95%CI: 58, 68) probability of

any lifetime drinking versus 90% (95%CI: 83, 94) when encountering only drinking encouragement (+5). Women who had equal discouragement and encouragement for drinking (0) had an 80% (95%CI: 75, 83) probability of any lifetime drinking. Each additional drinker in women's networks was associated with a 2% (95%CI: <1, 5) higher probability of any lifetime drinking. Women who reported none of their network members drank had a 68% (95% CI: 63, 72) probability of any lifetime drinking versus 85% (95%CI: 75, 92) when all their social ties drank.

Contrary to hypothesized expectations greater acculturation was not statistically significantly associated with a higher odds of drinking (AOR = 0.943; 95% CI: 0.667, 1.336), with the practical effect size being close to zero (Table 1). Each additional year of education was associated with 10% higher odds (AOR = 1.10; 95%CI: 1.03, 1.18) of any lifetime drinking. Working outside the home, marital status, and age were not statistically significantly associated with differences in the odds of any lifetime drinking.

Drinking volume

Drinking support was positively associated with drinking more drinks on drinking days ($B = 0.06$; 95%CI: 0.01, 0.12) among Korean American women (Table 2). For the logged dependent variable, each unit change in the predictor variable may be interpreted as the percent difference in drinking volume (Wooldridge, 2003). This interpretation strategy suggests that for each additional encourager, or fewer discouragers, in their social network, women drinkers drank 6% (95%CI: 1, 12) fewer drinks on drinking days. Each additional drinker in women's social networks was associated with women drinking 17% more drinks on drinking occasion ($B = 0.17$; 95%CI: 0.06, 0.28).

Expected values of drinking volume by levels of drinking support and drinking models were calculated holding other predictors in the regression at their means (Fig. 1B). Women who encountered only discouragement for drinking (-5) drank 1.41 (95%CI: 1.14, 1.81) drinks on drinking days versus 2.68 (95%CI: 1.87, 3.93) when encountering only encouragement (+5). A woman with equal discouragement and encouragement (0) was expected to drink 1.94 (95%CI: 1.60, 2.40) drinks on drinking days. Women who had no drinkers in their social network were expected to drink 1.40 (95%CI: 1.12, 1.74) drinks on drinking days versus 3.36 (95%CI: 2.15, 5.00) with all drinkers in their social network.

Consistent with the results for any lifetime drinking, although contrary to hypothesized expectations, acculturation was not statistically significantly associated with a higher drinking volume (Table 2). Drinking volume, among current drinkers, was similar among single and married, less and more educated, working and nonworking, women. It is possible that the adjusted analyses controlled away the association between acculturation and drinking.

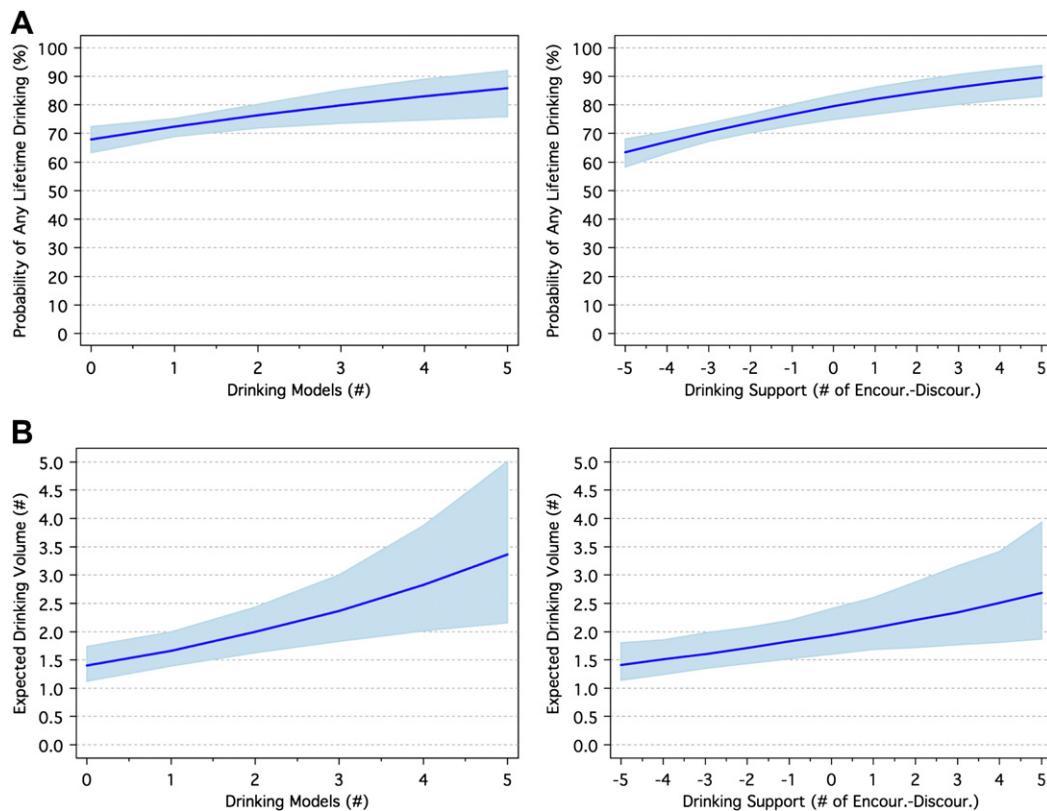


Fig. 1. Social support and models for drinking are associated with more drinking. (A) The predicted probability of any lifetime drinking by drinking support and models is shown. (B) The expected value of drinking volume by drinking support and models is shown. These patterns were derived from the statistical models reported in Table 2.

The bivariable associations, however, were consistent with the adjusted associations for any lifetime drinking ($OR = 1.23$; 95%CI: 0.92, 1.64) and drinking volume ($B = 0.02$; 95%CI: -0.19, 0.22).

Social reinforcers by relationship type

Consistent with the high reliability of the drinking support and model scales, the association of encouragement, discouragement, or models were similar across relationship types. The association of encouragement on any lifetime drinking or drinking volume, however, did not differ from zero for any relationship, likely because encouragement was rare in any one relationship and are not discussed in detail.

Discouragement from all relationships was statistically significantly associated with a lower probability of any lifetime drinking (Fig. 2A). Discouragement from spouses, on average, was associated with a 11% (95%CI, 2, 20) lower probability of any lifetime drinking, about half-as-much of that for other relationships, including friends, parents, siblings, and sons/daughters. On the other hand, in isolation of each other, drinking in any relationship was not statistically significantly associated with a higher probability of any lifetime drinking, although all were in the predicted direction.

The patterns for drinking volume were similar for drinking discouragement (Fig. 2B). Again, spousal discouragement had the weakest association, with the difference in drinking volume not significantly varying across any or no spousal discouragement. Discouragement from friends, parents, siblings, and sons/daughters was associated with a lower drinking volume, ranging from drinking 0.59 (95%CI: 0.02, 1.21) to 0.89 (95%CI: 0.25, 1.64) fewer drinks on drinking days for siblings and friends, respectively. Drinking models, unlike any lifetime drinking, were associated with increases in drinking volume when the modelers were likely similar in demographic traits, for example, siblings and friends. If their sibling drank, women drank 0.80 (95%CI: 0.08, 1.59) more drinks on drinking days. If their friend drank, women drank 0.70 (95%CI: 0.01, 1.58) more drinks on drinking days.

Discussion

This analysis points toward an emerging avenue of investigation that attempts to develop explanations for disease and morbidity from proximal and distal mechanisms using ecological frameworks. Our analysis suggests Korean American women's drinking was associated with their microsocial context but not necessarily conformity to the larger cultural context. Contrary to expectations,

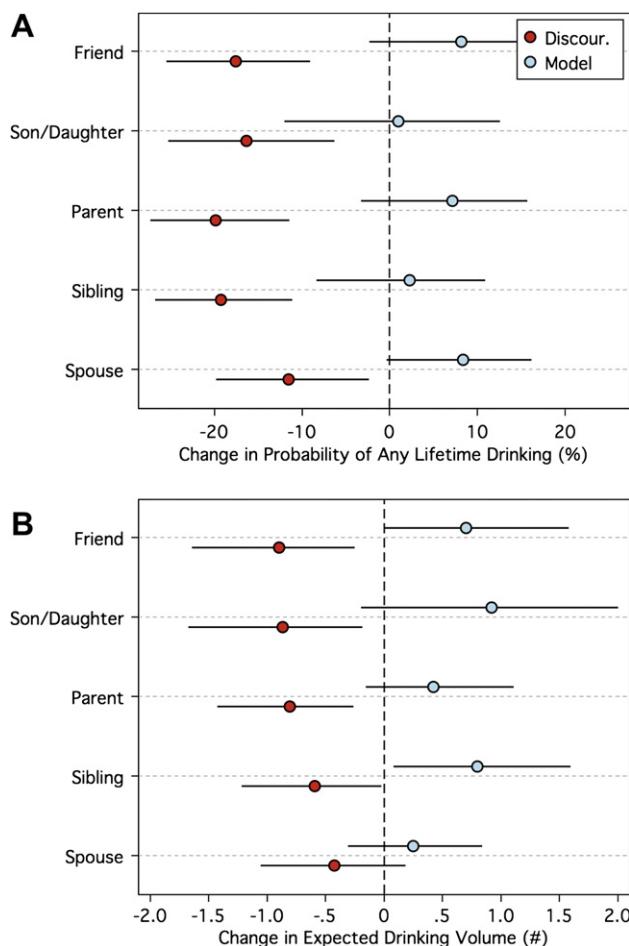


Fig. 2. Specific drinking social influences by relationship type. (A and B) The mean effect sizes and 95% confidence intervals are displayed. Each source represents a separate multiple regression adjusting for acculturation, education, work status, marital status, and age. Drinking encouragement was omitted from the figure to improve presentation because individually the confidence intervals for these indicators were large and none were statistically significant.

acculturation was not statistically significantly associated with either any lifetime drinking or drinking volume. This relationship contradicted our hypotheses derived from prior investigations that posit acculturation should promote risky behaviors (Hofstetter et al., 2004; Song et al., 2004). Consistent with expectations, Korean American women were more likely to have drank alcohol and current drinkers drank more on drinking occasions as a function of drinking encouragement, or lack of discouragement, and drinkers in their social network. Relationships characterized by similarities, siblings and friends, typically had a stronger association with women's drinking behaviors. Spouses may be the closest relationships; however, their drinking traits typically had the weakest associations with women's drinking.

Strengths and weaknesses

This is likely the only population-based sample of Korean American women that documents acculturation,

social network traits, and drinking patterns. Another strength is the reliable multifaceted acculturation index. This measure is preferred to surrogate measures, such as language traits that in isolation of other acculturative traits may produce large inferential biases, making our null conclusions regarding acculturation robust (Ayers, 2010). However, the measures of social contingencies used a pre-generated list of family and friends and excluded other possible social influences of drinking behaviors. Other relationships like mothers-in-law, cousins, and the closeness of friendship ties may be important but could not be explored in this study. The alcohol questions were embedded in a long health surveillance study, by necessity they were brief and were not clinical measures. However the six items used assessed very concisely the critical variables—any lifetime drinking, drinking quantity (binging), drinking frequency (number of binges per month), alcohol tolerance, and signs of alcohol abuse. The rarity of some drinking behaviors restricted our multivariable analysis to any lifetime drinking and drinks consumed per drinking day. The influence of social contingencies and acculturation on other drinking measures, like addiction, may be different from that observed in this study.

Relationship with prior work

A number of factors justified the need to investigate drinking behaviors among Korean American women. Women, who consume similar amounts of alcohol as men, after adjusting for body weight, are more susceptible to poor health outcomes (Rahav et al., 2006; Wilsnack et al., 2000). For example, moderate alcohol consumption may be associated with breast cancer (Smith-Warner et al., 1998), although some evidence suggests otherwise positive effects for cardiovascular disease (Fuchs et al., 1995). Women are also more socially vulnerable to alcohol, such as increased risk of intimate partner violence (Rahav et al., 2006; Wilsnack et al., 2000), than men. Korean American women may have greater social risks for drinking than other women given their dual immigrant minority status and a traditional culture that supports male hegemony (Min, 2001). Korean American women also differ from other Asian women by genetic differences in alcohol response. Some have a physical "flushing response" to alcohol mediated by a genetically determined inability to rapidly eliminate the alcohol metabolite, acetaldehyde. In contrast, Koreans demonstrate "low response" to alcohol and therefore present fewer physiologically noxious symptoms that might otherwise deter drinking (Duranceaux et al., 2008). At the time of this report, very little was known of drinking behaviors among Korean American women because their minority status precludes their inclusion in most health surveillance. This study provided the first, although limited, population-based estimate of drinking patterns among Korean American women.

Consistent with several recent studies of Koreans and Korean Americans (Ayers et al., 2010; Hofstetter et al., 2004, 2010b), social contingencies via network mechanisms were fundamental to the social contagion of drinking among Korean American women. This in combination with the high reliability of the drinking support and model scales suggest Korean American women drinkers are embedded in more supportive drinking clusters similar to that found for drinking in the Framingham study (Rosenquist et al., 2010). When we considered the association of specific drinking encouragements, or discouragement, and drinking models outside of their general network scales, their leverage reduced dramatically. This pattern suggests that there may be a collective network mechanism greater than the sum of its individual parts.

We distinguished between the associations for drinking models and explicit drinking support and found additive effects for each. These findings imply that social contingencies for drinking are not only solely communicated by modeling a behavior but also by how persons are motivated by explicit encouragement or discouragement for drinking. Studies that only observe the associations for drinking models may potentially underestimate network effects by as much as half, as would have been the case in this study. It is possible that social contingencies interact so that a drinking model may be more efficacious when it follows drinking encouragement and less efficacious when it follows drinking discouragement. Testing of this hypothesis yielded insignificant results for all sources but such analysis should not be neglected in future studies.

Implications

The advantage of using theories and analysis strategies focused on reinforcers, such as the BEM, is that they can be manipulated using interventions for behavior change. Interventions focused on social contingencies that reduce drinking support and drinking models may reduce the likelihood of drinking onset and decrease the volume of alcohol consumed when drinking. Specifically, programs that focus on social influence and the willingness to reproach persons may be most appropriate given the present findings. Such programs may wish to use health educators within the Korean American community to design workshops, which encourage social support for healthy drinking, directing interventions to the peers or social network members of all Korean immigrants irrespective of their own drinking behaviors. This is a marked departure from the biomedical model, where the person at risk or already overdrinking will be provided education or counseling to change in isolation of factors outside the individual. Indeed, Alcoholics Anonymous serves as one such example for individuals suffering from alcohol dependence and addiction, where individuals are embedded in new social networks and follow a schedule to change the dynamics of their preexisting network. Social network interventions among Korean American women

may be more effective than among other populations because Asian cultures view individuals as part of a collective rather than as purely autonomous actors (Markus and Kitayama, 1991). In these cases, women are more likely to choose behaviors that are consistent with the desires of others than in a culture where rugged individualism predominates, as may be the case in the United States.

Future research

This analysis sets the stage for continued investigation of Korean American, men and women, drinking behaviors. Within this aim, the relevance of this work is a bequest to do so using ecological models that focus on factors outside the individual, such as individuals' interaction with the larger culture and their social networks. Future research may find it useful to model our strategy across populations, but investigations of Korean American women need to be improved by identifying additional network mechanisms and apply these to models with clinical measures of alcohol misuse.

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