Exploring Religious Mechanisms for Healthy Alcohol Use: Religious Messages and Drinking Among Korean Women in California*

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ABSTRACT. Objective: This research identifies social reinforcers within religious institutions associated with alcohol consumption among Korean women in California. **Method:** Data were drawn from telephone interviews with female adults (N = 591) selected from a random sampling of persons in California with Korean surnames during 2007. Approximately 70% of attempted interviews were completed, with 92% conducted in Korean. Respondents were asked about any lifetime drinking (yes/no), drinking rate (typical number of drinks consumed on drinking days among current drinkers), and messages discouraging "excessive drinking" from religious leaders or congregants. Bivariable and multivariable regressions were used for analysis. **Results:** Approximately 70.4% of women reported any lifetime drinking, and drinkers drank a mean (SD) of 1.10 (1.22) drinks on drinking days. About 30.8% reported any exposure to religious leaders' messages discouraging excessive drinking, and 28.2% reported any exposure to similar messages from

congregants. Each congregant's message was statistically significantly associated with a 5.1% lower probability (odds ratio = 0.775, 95% confidence interval [CI]: 0.626, 0.959) of any lifetime drinking. Also, each congregant's message was associated with a 13.8% (B = -0.138; 95% CI: -0.306, 0.029) lower drinking rate, which was statistically significant after adjusting for covariates using a one-tailed test. Exposure to leaders' messages was not statistically significantly associated with any lifetime drinking or drinking rate. **Conclusions:** Social reinforcement in the form of religious messages may be one mechanism by which religious institutions influence drinking behaviors. For Korean women, messages from congregants had a unique impact beyond the traditional religiosity indicators. These social mechanisms provide public health interventionists with religious pathways to improve drinking behaviors. (*J. Stud. Alcohol Drugs* 70: 890-898, 2009)

ALCOHOL CONSUMPTION IS A RISK FACTOR for cirrhosis and cancers of the oropharynx, larynx, esophagus, and liver (Anderson et al., 1993; Blot, 1992; Klatsky et al., 1992; Stinson et al., 1992). Women are especially vulnerable to alcohol misuse. Inappropriate alcohol use among women may result in increased risk of fetal alcohol spectrum disorders as a result of prenatal alcohol consumption, risk of sexual victimization, fatality from alcohol-related motor vehicle crashes (National Institute on Alcohol Abuse and Alcoholism, 2005), and breast cancer (Rosenberg et al., 1993).

Numerous studies have addressed the negative association between religiosity and alcohol consumption (Bock et al.,

1987; Clark et al., 1991; Cochran et al., 1992; Koenig et al., 1994), but few studies have investigated this dynamic among Korean Americans (Lubben et al., 1989; Luczak et al., 2003). Previous investigations, regardless of their target population, have failed to identify specific mechanisms within religious organizations that promote healthy alcohol use. Using data from a 2007 survey of Korean women in California, this study evaluated one possible mechanism that may influence drinking behaviors—social reinforcement in the form of religious leaders' and congregants' messages discouraging excessive drinking.

Alcohol and Koreans

It is useful to appreciate the status of alcohol in Korea, because nearly all adult Koreans in the United States were born there. Modernization in Korea has been accompanied by increases in alcohol consumption from very low annual per adult capita rates, about 1.0 L, to rates similar to other developed nations, about 8.1 L (World Health Association, 2004). Drinking among Korean women is increasing (Park et al., 1998), although alcohol use, dependence, and abuse are far more common among men (Lee et al., 1990a, 1990b). Alcohol consumption and problems are likely greater among Korean American than Korean women (Weatherspoon et al., 1994), and alcohol use and abuse have been specifically linked to immigration (Kwon-Ahn, 2001).

Korean Americans may be at greater risk of excessive drinking than other Asian Americans because of genetic differences in response to alcohol. Some Asian groups present a physical "flushing response" to alcohol consumption that is mediated by a genetically determined inability to rapidly eliminate the alcohol metabolite, acetaldehyde. This response to alcohol may constrain alcohol consumption among these Asian groups. In contrast, Koreans have been shown to be more likely to demonstrate "low response" to alcohol, which is linked to an alcohol-metabolizing enzyme genotype that supports rapid elimination and, therefore, presents fewer physiologically noxious symptoms that might deter excessive drinking (Duranceaux et al., 2008).

Epidemiological studies of Korean Americans' drinking suggest male gender; non-Protestant status; not participating in sports; and frequenting bars, taverns, or nightclubs increases drinking (Lubben et al., 1989; Weatherspoon et al., 1994). These findings, however, were 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). The absences of larger studies suggest the need for additional investigations. We are aware of no studies that focus exclusively on the drinking behaviors of Korean women or the role of religion in Korean drinking.

Alcohol and religion

Researchers have consistently found a positive relationship between religious participation and healthy outcomes across multiple religions, settings, and populations (Chatters, 2000; Ellison et al., 1998; George et al., 2000; Koenig et al., 2001). Various explanations have been proposed, but the likely source of religion's positive impact is differences in health behavior. The assumptions are twofold: (1) Some religious faiths explicitly prescribe good health habits and prohibit smoking, excessive or any alcohol use, sex outside of marriage, and overeating, and (2) most faith groups, if not all, teach that the body is a temple for the soul and that it should be treated with respect and appreciation (Chatters, 2000; Ellison et al., 1998; George et al., 2002).

Many studies have found that religiosity (participation, identification, and importance) reduces heavy or light drinking (Gorsuch, 1995; Koenig et al., 1994; Poulson et al., 1998). For instance, Michalak and colleagues (2006) found denomination or sect moderated the association between church attendance and choosing to drink or heavy drinking. Study participants who attended churches whose doctrine favored abstention (e.g., Mormons) were less likely to consume alcohol. How religiosity is connected with drinking behaviors beyond doctrine remains largely unknown.

The connection between religion and alcohol consumption may be both doctrinal and social. Doctrine influences reinforcers among congregants about many topics, manifested

in religious commitment and beliefs, which has been nearly the exclusive mechanism in previous studies. In addition, social reinforcing mechanisms within churches may be at work. The most probable of these reinforcers are messages from leaders and congregants discouraging excessive alcohol use. For some vulnerable populations that depend on social structures in religious institutions, like Korean-American immigrants, social mechanisms within religious institutions may be more critical than doctrine.

Significance of Koreans, alcohol consumption, and religion

Persons of Korean descent constitute a rapidly growing minority in the United States (Yu et al., 2002). Nearly all are recent immigrants or first generation, and about 70% attend church at least once a week (Kwon et al., 2001). For most Koreans, religion plays a more prominent role after immigration. A regional survey of Koreans in Chicago found that 21% of respondents were affiliated with a Christian church in Korea, compared with 77% in the United States (Hurh et al., 1990). Estimates suggest an accelerated growth of Korean churches in the United States (Hurh et al., 1990). There were at least 3,500 Korean churches in the mid-1990s, about 1 church for every 350 Koreans (Kim et al., 1995).

Koreans often experience downward social mobility upon arrival in the United States (Kwon et al., 1997). The social system and messages within the church are often aimed at assuaging problems that accompany immigration (Hurh et al., 1990; Kwon et al., 1997). Kwon and colleagues (1997) suggest that many Korean churches preserve ethnic identity, offer fellowship, supply social services, and provide status rewards. Although only a modest number of Koreans (13%) in a Chicago study reported social reasons for their religious practice (Hurh et al., 1990), it is probable these are partially responsible for many conversions.

Associations between Korean religiosity and health are rarely reported. The most recent studies have largely focused on tobacco and obesity (Ayers et al., in press; Hofstetter et al., in press). Among Korean Americans, Lubben and colleagues (1989) reported that religious affiliation, especially among Protestant denominations, was related to lower levels of alcohol consumption. Luczak and colleagues (2003) found that excessive drinking among Korean-American college students was negatively related to religiosity. However, these studies, like those among general populations, did not focus on mechanisms that lead to decreased alcohol use, nor did they eliminate the possibility of differential selection in church participants.

Religious organizations as social networks may be essential to the well-being of immigrants when there is a lack of access to health care and social services (Kunitz, 2004). Besides social mobility, religious messages may reinforce health behaviors among Koreans. Steinman and colleagues

(2008) suggested that mainstream churches incorporate health messages and programs with some regularity, but the association between these messages and health behaviors remains largely untested.

Adapting the Behavioral Ecological Model for religious influence

Investigation of the social dynamics of drinking in religious institutions may be guided by reliance on ecological models for behavior (Glass et al., 2005; Hovell et al., 2002; McLeroy et al., 1988). These models presume that determinants of behavior are multisourced. The Behavioral Ecological Model, developed by Hovell and colleagues (2002), differs from other ecological models by emphasizing social contingencies as identified by social learning theory. This model assumes that drinking is a function of both proximal and distal social reinforcers.

Distal reinforcers include general social contingencies, broader environmental norms, and established practices in social groups. They are often implicit characteristics of groups that include sanctioned behavior for genders, high- and low-education groups, and religious and nonreligious persons. Proximal reinforcers include primarily social support for a behavior and the existence of models whose behavior can be imitated and copied. They involve immediate experiences people have in ongoing social networks (e.g., peer groups), relations with family and friends, and, as we test, within churches and among church members.

Religion provides a set of distal reinforcers identified by religious beliefs and commitment. As a result, the expectation is that, as doctrine becomes more restrictive of drinking, congregants will drink more conservatively. Proximal reinforcers may also be at work. Religious leaders may discourage drinking among parishioners explicitly, which may influence drinking and reduce exposure to drinking. Congregants may be another source of criticism for drinking. The Behavioral Ecological Model would assume that proximal (or direct) contingencies would be more influential than doctrinal or other social contingencies. As a result, congregants' messages may be more effective at changing behaviors than leaders' messages. A sufficient density of reinforcing opposition to excessive drinking may prevent heavy drinking and increase abstention. These expected relationships lead to the following hypotheses: (1) Religious leaders' messages discouraging "excessive drinking" will increase abstention and reduce alcohol consumption among drinkers, and (2) congregants' messages discouraging "excessive drinking" will increase abstention and reduce alcohol consumption among drinkers.

Method

Data were drawn from a 2007 telephone survey of Californian female adults (18 years of age or older; $N = 591$) of Korean descent. The sample was drawn randomly from tele-phone numbers associated with persons having Korean surnames. The numbers were purchased from a commercial firm and included listed and unlisted numbers that were derived from a variety of sources (e.g., White Pages, membership lists, subscriptions, warranty information). Interviews with the female Korean adult (ages 18 and older) who had the most recent birthday were conducted by closely supervised, bilingual (English and Korean) professional interviewers. Respondents were debriefed and informed consent received immediately after determining eligibility for the study. Up to seven callbacks were made to each number, and 70% of eligible respondents contacted completed interviews, of which about 92% were conducted in Korean. Data quality was monitored throughout the data collection and entry process. One hundred percent of data was double entered, and software to catch for range and logic errors was used to minimize errors in recording responses. The sample approximated census demographics for women of Korean descent in California, although it somewhat overrepresented older women. Data were weighted by age to match the California census distribution for analyses reported herein, although results were consistent with those for unweighted data. Data collection and analysis were approved by the San Diego State University institutional review board.

Measures

Alcohol consumption. Any lifetime drinking was measured by responses to "Have you ever had more than a few sips of any kind of alcohol, beer, wine, spirits, to drink?" coded 0 for abstainer and coded 1 for drinker. Drinking rate was measured from 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 ounce glass, can or bottle of beer, a 4-5 ounce glass of wine, a 12 ounce can or bottle of wine cooler, or a shot or mixed drink with 1 shot of liquor (i.e., vodka, rum, whiskey, or soju)" after respondents who reported zero drinks on drinking days were excluded. To facilitate multivariable analysis, the natural logarithm of the drinking rate was computed to constrain right skewness.

Self-reports of alcohol consumption appear to be valid, although they may underestimate consumption when questions fail to aid recall or cue respondents to consider social desirability (Embree et al., 1993). The alcohol consumption questions used in this study were not limited by these features. For example, recall was aided by providing respondents with a formal definition of a drink that included culturally specific types of alcohol and explicitly defined recall time frames such as ever drank and drinking on a typical day. The wording of questions for these items did not cue respondents to consider the social desirability of drinking. In addition, the order of the questions was not problematic, because respondents were asked about their own drinking habits before any

questions about health or the social consequences of heavy drinking.

Leaders' and congregants' messages. Exposure to religious leaders' messages was measured by responses to "About how many times during an average month does the Christian minister, Father, Buddhist priest, Muslim priest, or counselor in your religious institution include any message against…excessive drinking of alcohol?" Exposure to congregants' messages was measured by responses to "About how many times during an average month do acquaintances who are not church officials at your religious institution discourage excessive drinking?" To constrain right skewness, leaders' and congregants' messages were coded as 0 for no messages, 1 for at least one message, 2 for at least two messages, and 3 for at least three messages.

Religious commitment. Religious commitment summarizes the frequency of the following three items: (1) religious service attendance, "About how often do you attend religious services during an average month?"; (2) prayer, "How many days during a typical month do you pray or meditate?"; and (3) reading a holy text, "How many days during a typical month do you spend time reading your religion's primary text?" (after methods previously used by Ayers and Hofstetter [2008] and by Hofstetter and colleagues [2008] among diverse religious groups). Responses to each item were first standardized (mean [SD] = 0.0 [1.0]) and then summed to form a composite measure (Cronbach's α = .623).

Religious belief. Religious belief summarizes doctrinal orthodoxy: "Of the following, which best describes your view of the Bible…the Bible is the actual word of God and is to be taken literally" (coded as 1 for "conservative"), otherwise coded as 0; and religious salience as, "Would you say your religion provides little guidance in your day-to-day living, some guidance, or a great deal of guidance in your day-to-day life?" (coded as 1 for "a great deal"; otherwise coded as 0). Responses to each item were summed to form a single composite measure (Kuder-Richardson Formula 20 = .660). We did not include measures of religious beliefs for other faiths. However, the vast majority of Koreans are practicing Christians (Kwon et al., 2001). Of the total sample, about 44% were Presbyterian, 12.8% Catholic, 7.8% Baptist, 4.3% Methodist, 4.3% nondenominational, 13% miscellaneous Christian, 3.1% Buddhist, and 10.6% reported no religious preference. Seventh-day Adventists and Mormons are groups with strong health behavioral convictions, but only 12 respondents reported affiliation with these groups. Literal interpretations of the Bible, coupled with religious importance, are assumed to be associated with negative beliefs about alcohol use. The measure also captures the variation of religious influence by doctrine with greater accuracy than does the denomination of a respondent's church, because churches of the same denomination may have differing doctrines (Green et al., 1996).

Drinking models. Drinking models was computed by counting the number of persons (e.g., spouse, parents, parents-in-law, siblings, friends, children) who respondents reported "…regularly drinks alcohol at least once a week." Each unit increase indicates an additional drinking model.

Drinking support. Drinking support was measured by responses to "Do/did any of the following people regularly encourage (coded as 3) you to drink alcohol, discourage (coded as 1) you from drinking, both encourage and discourage (coded as 2) you from drinking, or neither encourage nor discourage (coded as 2) you from drinking alcohol...spouse, parents, siblings, friends, children, and other persons?" Responses were averaged to form a composite wherein higher values indicate more drinking support; for example, 3 indicates complete drinking support and 1 indicates complete drinking discouragement (Cronbach's α = .917).

Acculturation. The acculturation scale used in this study was adapted from the Suinn-Lew Asian Self-Identity Acculturation Scale to a U.S. society for telephone administration (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 1.0 as a cutoff, a single general dimension explained 82.0% of the common variance and 50.2% of the total variance among items. Wording of items, item loadings, communalities, and proportion of total variance explained are available in a methodological appendix. For analytical purposes, a general acculturation to U.S. society scale was formed by computing the mean of standardized items (mean = -.020 [.630]; Cronbach's α = .878) after permitting up to four scores to be missing. Analyses demonstrated that the missing data treatment made no significant difference in findings.

Covariates. Education, work status, age, and marital status were measured by self-report. Education was indicated by years of total education completed in both Korea and the United States once overlapping attainment had been eliminated. Work status was measured by reports of working outside the home (coded as 1, otherwise coded as 0). Marital status was coded as 1 if currently married or cohabiting; otherwise, it was coded as 0.

Analysis strategy

First, descriptive characteristics of the sample were reported. Second, bivariable and multivariable logistic regression of any lifetime drinking by religious reinforcement and covariates was explored. Third, bivariable and multivariable least-squares regression of the natural logarithm of drinking rate by religious reinforcement and covariates was explored.

Diagnostics found no major model violations. All tolerances except that for age were greater than .711. Leaders' and congregants' messages ($r = .368$), married and acculturation ($r = -.366$), and acculturation and age ($r = -.564$) were correlated. However, the associated errors for these variables were not excessively high, suggesting that multicolinearity did not confound our analytic strategy. In addition, the bivariable and controlled relationships appeared to be relatively consistent. Two-tailed and one-tailed tests were used for hypothesis testing, because the direction was hypothesized for the primary hypotheses. Computations were made using SPSS Version 16.0 (SPSS Inc., Chicago, IL), and postestimation routines were computed in STATA Version 10.0 (StataCorp LP, College Station, TX).

Results

Approximately 96.3% of respondents were born in Korea. The mean age of respondents was 46 (14.4) years, ranging from 18 to 82 years. Mean years of formal education in Korea was 12.6 (4.8) and 2.4 (4.4) in the United States. Mean religious commitment was 0.22 (2.25) and religious beliefs was 1.39 (0.81) on the standardized scale. Respondents reported about 0.96 (1.16) drinking models and 1.41 (0.52) drinking support, thus meaning, on average, that respondents encountered more discouragement than encouragement. Mean acculturation was -0.20 (0.63) on the standardized scale. About 37.6% of subjects reported working outside the home, and 78.0% were married, as reported in Table 1.

Approximately 70.4% of the sample reported any lifetime

TABLE 1.   Sample characteristics

Indicator	%	n
Any lifetime drinking	70.4	591
Any leaders' message(s)	30.8	591
Any congregants' message(s)	28.2	591
Work outside the home	37.6	591
Born in Korea	96.3	591
Parents born in Korea	99.0	591
Interviewed in Korean	92.3	591
Married	78.0	587
	Mean (SD)	n
Drinking rate	1.10 (1.22)	354
Leaders' messages	0.54 (0.94)	591
Congregants' messages	0.54 (0.98)	591
Religious beliefs	1.39 (0.81)	591
Religious commitment	0.22 (2.25)	514
Drinking models	0.96 (1.16)	591
Drinking support	1.41 (0.52)	588
Acculturation	-0.20 (0.63)	591
Age of respondent	46.0 (14.4)	591
Years resident in Korea	28.2 (13.40	591
Years resident of United States	17.5 (10.1)	591
Years education in Korea	12.6 (4.8)	581
Years education in United States	2.4 (4.4)	589
Household annual income	$65,428 ($36,869)	327

Notes: Numbers in cells are percentages or means and standard deviations, and *n*'s.

drinking, and drinkers averaged about 1.10 (1.22) drinks on drinking days. Compared with the Behavioral Risk Factor Surveillance System 2005 (Centers for Disease Control and Prevention, 2005) subsample of Asian female respondents in California ($n = 194$), drinking appears to be more common among Koreans, but Korean drinkers drank less. Around 40.2% of female Asian adults in California reported any drinking in the past 30 days, and drinkers reported drinking about 1.54 (1.08) drinks on days they did drink.

About 30.8% of the total sample reported exposure to religious leaders' messages discouraging excessive drinking, and 28.2% reported exposure to similar messages from congregants. Among those who reported any religious service attendance, about 38.8% reported exposure to religious leaders' messages concerning alcohol, and 35.3% reported exposure to these messages from congregants. Using our continuous measure of religious messages, mean exposure among the total sample was 0.54 (0.94) for leaders' and 0.54 (0.98) for congregants' messages, suggesting the typical respondent heard one message against excessive drinking about every 2 months.

Any lifetime drinking

The bivariable associations among the predictors and any lifetime drinking are displayed in the first data column of Table 2. Contrary to hypothesized expectations, reports of religious leaders' messages discouraging excessive drinking were associated with abstention (odds ratio [OR] = 0.851, 95% confidence interval [CI]: 0.711, 1.019), but this was not statistically significantly. However, messages from congregants were statistically significantly associated with abstention (OR = 0.702, 95% CI: 0.592, 0.833), meaning that each message was associated with an approximate 30% reduction in the odds of any lifetime drinking. Religious beliefs and more conservative views of the Bible were strongly associated with a greater likelihood of abstention (OR = 0.464, 95% CI: 0.355, 0.606). However, religious commitment appeared to be statistically unrelated (OR = 0.941, 95% CI: 0.868, 1.021) to any lifetime drinking.

Among other bivariable associations, more drinking models (OR = 1.373, 95% CI: 1.155, 1.633), more drinking support (OR = 3.007, 95% CI: 1.985, 4.555), more education (OR = 1.126, 95% CI: 1.058, 1.198), employment outside the home (OR = 1.687, 95% CI: 1.149, 2.477), and younger age (OR = 0.985, 95% CI: 0.974, 0.996) were statistically significantly associated with any lifetime drinking. The Behavioral Ecological Model interpretation for education, employment outside the home, and age is that these represent markers for society-level contingencies related to culture or class, wherein higher cultured or class individuals obtain less criticism for drinking at all.

The second data column of Table 2 reports the adjusted ORs, 95% CIs, and *p* values for a multivariable model in

TABLE 2. Logistic regression of any lifetime drinking on respondents' exposure to religious messages

Predictors	Bivariable	Multivariable
Leaders' messages	0.851 (0.711, 1.019)	0.996 (0.802, 1.237)
Congregants' messages	0.702‡ (0.592, 0.833)	0.775* (0.626, 0.959)
Religious beliefs	0.464‡ (0.355, 0.606)	0.448‡ (0.302, 0.667)
Religious commitment	0.941 (0.868, 1.021)	0.978 (0.889, 1.078)
Drinking models	1.373‡ (1.155, 1.633)	1.246* (1.006, 1.544)
Drinking support	3.007‡ (1.985, 4.555)	1.154* (1.045, 1.275)
Acculturation	1.139 (0.862, 1.506)	0.745 (0.490, 1.134)
Education	1.126‡ (1.058, 1.198)	1.136‡ (1.051, 1.230)
Work outside the home	1.687* (1.149, 2.477)	1.712* (1.098, 2.669)
Married	1.064 (0.730, 1.552)	1.238 (0.756, 2.029)
Age	0.985* (0.974, 0.996)	0.992 (0.977, 1.009)
Nagelkerke R^2	–	.223

Notes: Cases with missing values were omitted from the final analysis in the multivariable model resulting in $n = 523$ for the final calculations. Numbers in cells are odds ratios, 95% confidence intervals, and two-tailed probabilities.
*$p < .05$; ‡$p < .001$.

which all the predictors were entered into a single logistic equation. Results for the multivariable model were similar to the bivariable model for religious leaders' and congregants' messages. Controlling for other predictors, exposure to leaders' messages opposing excessive drinking was practically and statistically unrelated to any lifetime drinking (OR = 0.996, 95% CI: 0.802, 1.237). Congregants' messages were statistically associated with about a 23% reduction in the odds of lifetime drinking (OR = 0.775, 95% CI: 0.626, 0.959). Religious beliefs were statistically significantly associated with abstention (OR = 0.448, 95% CI: 0.302, 0.667), and religious commitment appeared to be practically and statistically unrelated to any lifetime drinking (OR = 0.978, 95% CI: 0.889, 1.078).

In accordance with expectations from the Behavioral Ecological Model, women who reported more drinking models (OR = 1.246, 95% CI: 1.006, 1.544), more drinking support (OR = 1.154, 95% CI: 1.045, 1.275), more education (OR = 1.136, 95% CI: 1.051, 1.230), and employment outside the home (OR = 1.712, 95% CI: 1.098, 2.669) were statistically more likely to report any lifetime drinking.

To clarify the adjusted associations among religious predictors, probabilities of drinking were calculated for the mean and the mean + 1 SD of each predictor when all other predictors in the logistic equation were set to their means (Long et al., 2005). The change in probabilities can be interpreted as the controlled association for each predictor for the otherwise "average" respondent (Long, 1997) using a common metric: standard deviation units.

If a hypothetical respondent was exposed to about 1 SD more messages (about 1 message [0.952] from other congregants), the likelihood of any lifetime drinking decreased by about 5.1%. The association suggests that, for the average person, increasing interpersonal reinforcement in churches may increase abstention even more so than nonreligious

social reinforcement (e.g., a 1 SD increase in drinking support increased the likelihood of drinking by approximately 4.8%). However, contrary to our expectations, indicators of distal reinforcement by religious beliefs were associated with a 10.1% decreased probability in any lifetime drinking, the largest for any predictor, including the proximal messages from congregants.

Drinking rate

The next step evaluated the amount of drinking among women who drank any amount, as indicated by the average number of drinks on drinking days ($n = 354$). The first data column of Table 3 reports the bivariable regression coefficients for the natural log of drinking rate. Social reinforcement from fellow congregants was negatively associated with drinking rate ($B = -0.153$, 95% CI: -0.304, -0.002). To interpret the effect on a logged dependent variable, each unit change in the predictor variable may be interpreted as the percent change in drinking rate (Wooldridge, 2002). In this case, for each additional congregant message discouraging excessive drinking, respondents drank 15.3% less (-.153 = [exponentiate (-.153) − 1]), a statistically significant result ($p < .05$).

However, messages from leaders were statistically unrelated to drinking rate ($B = -0.052$, 95% CI: -0.204, 0.100), as was the case for religious beliefs ($B = -0.114$, 95% CI: -0.278, 0.050) and religious commitment ($B = 0.081$, 95% CI: -0.020, 0.120). Among other bivariable associations, drinking models ($B = 0.204$, 95% CI: 0.093, 0.314), drinking support ($B = 0.452$, 95% CI: 0.194, 0.710), and younger age ($B = -0.013$, 95% CI: -0.023, -0.003) were significantly associated with an increased drinking rate.

The associations among religious predictors and drinking rate from the multivariable model, in which all the predic-

TABLE 3. Natural logarithm of drinking rate regressed on respondents' exposure to religious messages

Predictors	Bivariable	Multivariable
Leaders' messages	-0.052 (-0.204, 0.100)	-0.020 (-0.180, 0.139)
Congregants' messages	-0.153* (-0.304, -0.002)	-0.138 (-0.306, 0.029)
Religious beliefs	-0.114 (-0.278, 0.050)	-0.092 (-0.308, 0.124)
Religious commitment	0.081 (-0.020, 0.120)	0.082* (0.007, 0.158)
Drinking models	0.204‡ (0.093, 0.314)	0.170* (0.048, 0.293)
Drinking support	0.452‡ (0.194, 0.710)	0.163 (-0.127, 0.454)
Acculturation	0.120 (-0.100, 0.339)	0.105 (-0.187, 0.398)
Education	-0.018 (-0.072, 0.036)	-0.034 (-0.094, 0.024)
Work outside the home	-0.115 (-0.401, 0.170)	-0.105 (-0.409, 0.198)
Married	-0.206 (-0.508, 0.096)	-0.064 (-0.445, 0.318)
Age	-0.013* (-0.023, -0.003)	-0.017* (-0.030, -0.003)
(Constant)	–	0.905 (-0.343, 2.152)
Adjusted R^2		.083

Notes: Cases with missing values were omitted from the final analysis so the multivariable model resulted in $n = 293$ for the final calculations. Numbers in cells are least squares regression coefficients, 95% confidence intervals, and two-tailed probabilities.
*$p < .05$; ‡$p < .001$.

tors were entered into a single regression equation, appeared similar to the bivariable associations as detailed in the second data column of Table 3. Exposure to the leaders' messages opposing excessive drinking was not statistically significantly associated with drinking rate. Congregants' messages were negatively associated with drinking rate, reducing drinking by 13.8% for each congregant message (B = -0.138, 95% CI: -0.306, 0.029). This association was statistically significant using a one-tailed test, appropriate because direction was hypothesized. The multivariable association was only modestly weaker than the bivariable association that was statistically significant using a two-tailed test.

Religious beliefs (B = -0.092, 95% CI: -0.308, 0.124) had no independent statistical association with drinking rate. More religious commitment modestly increased drinking (B = 0.082, 95% CI: 0.007, 0.158). Drinking models (B = 0.170, 95% CI: 0.048, 0.293) and younger age (B = -0.017, 95% CI: -0.030, -0.003) were statistically significantly associated with a higher drinking rate.

This analysis may mask associations that exist under specific conditions but are not true of the entire sample. For instance, the efficacy of religious reinforcement may be moderated by religious beliefs or commitment. Those with a belief structure consistent with religious messages or more committed to religion may respond to messages differently than those with conflicting beliefs and less commitment. In addition, those who attend Korean immigrant churches may respond to reinforcement differently than those who attend more socially heterogeneous churches. We evaluated these claims following procedures by Kraemer and colleagues (2006) and found that neither religious commitment, beliefs, nor Korean immigrant versus nonimmigrant church structures moderated the association among leaders' or congregants' messages with any lifetime drinking or drinking rate.

Discussion

Previous studies have focused on the differences in drinking behaviors among religious groups and denominations. As Michalak and colleagues (2006) note, these efforts fail to account for the specific mechanisms by which religious institutions promote safe drinking habits, and unfortunately, modification of these aspects through intervention is unfeasible. Understanding the social reinforcers, in addition to doctrine, within religious settings may lead to effective interventions and the advancement of the investigation of religion in public health.

Although the Korean community appears to be a religious community, this study was the first population-based study of Korean women's drinking behaviors and their religiosity. These findings suggest that direct interpersonal religious reinforcers from congregants may promote abstention and less drinking among drinkers. The absence of any statistically significant moderation of the association between congregants'

messages and drinking behaviors by religious beliefs, commitment, or immigrant representation in the place of worship suggests that messages against excessive drinking are equally effective for all Korean women exposed, regardless of their religiosity or the immigrant make-up of other congregants. This points toward the strength of social mechanisms as social learning theory and the Behavioral Ecological Model would note. Also, the association among congregants' messages and drinking was relatively robust after controlling for nonreligious social reinforcement from family and friends (e.g., models and support of drinking), which could possibly be an extension of religious reinforcement.

Contrary to expectations, and regardless of model specifications, leaders' messages appear to have fallen on deaf ears. Although an interventionist may wish to rely on the platform that leaders use to ensure that messages against excessive drinking reach the widest audience, it appears that, for Korean women, the message that counts is the one that comes from fellow congregants, not leaders.

More broadly, our findings suggest that the positive associations between religious indicators and drinking behaviors may partially result from social reinforcement within religious institutions and not exclusively the commitment or beliefs of the congregants themselves. Our study fits into a growing body of work that attempts to identify social aspects of religiosity in explaining the religion and health connection.

Steinman and Bambakidis (2008) concluded that churches incorporate health messages and programs with some regularity. Using the case of Korean women and alcohol use, we developed measures for religious mechanisms, leaders' and congregants' messages against "excessive drinking," and evaluated the presence and association of these with some drinking behaviors. In prior studies, we have shown that congregants' messages on healthy diet and exercise conditioned on leaders' messages were associated with a reduced likelihood of being overweight or obese (Ayers et al., in press). Given their small minority status and corresponding difficulty to reach, in large numbers, a host of interventions have relied on churches to contact large numbers of Korean immigrants. For example, interventions among Koreans have used churches to increase hepatitis B virus vaccination (Juon et al., 2008), mammography screening (Kim and Sarna, 2004), and Pap smear screening (Juon et al., 2003). In most cases, these interventions have only been "faith placed," taking advantage of the clustering of Koreans in Korean churches, but did not attempt to alter existing social mechanisms in churches. A focus on social mechanisms, as in this study, means interventionists can take advantage not only of the clustering of minority and immigrant groups in religious settings but also the aspects of religiosity that already promote safe drinking.

Workshops developed in cooperation with religious institutions that are designed to increase the clarity and frequency

of the congregants' messages about drinking could increase abstinence and/or decrease the amount of drinking that occurs when parishioners drink alcohol. Such programs may wish to establish rules about drinking for which congregants act as the enforcing mechanism, thereby increasing congregants' messages. Furthermore, programs may wish to engage congregants at the lowest possible aggregation, "small or core groups," wherein parishioners often receive the most immediate spiritual and nonspiritual resources (Kwon et al., 1997). Classes on alcohol behaviors within these groups encouraging congregants to discuss healthy drinking and enforce healthy habits may stimulate future messages. Campbell and colleagues (2007) argue that religious interventions should follow a similar model; however, they note that too little is known of the social and environmental contexts within churches that reinforce behaviors. This study is an early step in examining this scholarly gap among Koreans or any other population based on our literature review.

This study provides scholars interested in religion and drinking behaviors with new theoretical and empirical perspectives. Researchers should consider applying behavioral logic and measures that emphasize the social mechanisms of religion to their investigations of drinking behaviors. Religious institutions, like other organizations, are network driven. Previous studies found that persons attending religious services have more social ties and interact with these ties more than nonchurchgoers (Ellison and George, 1994); but exactly how these ties translate into better health has not been well advanced in the research. Focusing on specific mechanisms that flow through network pathways in religious settings may be the next step in religion and health research. This investigation may provide a model for those interested in religion and drinking behaviors.

Limitations

Cross-sectional data do not provide strong evidence of causation, and no strong claims were made. Less than one third of respondents were exposed to leaders' and congregants' messages, and larger samples may be necessary to fully explore their association with drinking behaviors and moderators of these associations. However, low levels of exposure suggest that there are ripe opportunities for interventions to expand exposure by increasing the frequency of religious messages against excessive drinking.

It is possible that findings may be a result of selection biases for religious service attendees. However, the findings generally blend with a well-specified theory that indicates how mechanisms of social reinforcement may operate. Moreover, replication showed that the effects of religious reinforcement measured by messages remained when the sample was restricted to attendees. It is also possible that religious persons underreported drinking behaviors, although considerable variance in amount of drinking was clear in the data. If drinking were underreported among strong religious adherents, we would expect a strong association between religious commitment and not drinking, which did not occur.

In some cases, statistical significance of associations among religious reinforcement and alcohol consumption were judged using one-tailed tests where appropriate. Because they were in the predicted direction, it is likely that most of the associations that were near statistical significance would have been significant with a somewhat larger sample. The estimates in the multivariable model controlled for drinking models and drinking support from respondents' friends and family that may, in part, also be a religious component.

Data did not allow for alcohol-use problems to be evaluated. It is possible that variables predictive of any lifetime drinking and drinking rate may be different from those predictive of alcohol abuse and dependence, and this awaits future analysis.

Future research should evaluate the influence of religious social reinforcement on health behaviors as the mechanisms within churches rather than relying solely on measures of religiosity. We have used the Behavioral Ecological Model to identify contingencies of social reinforcement within religious settings in the form of messages, although it is likely that the types and presentations of social mechanisms in religious institutions are more varied than we observed. Future investigations may wish to use formative research to identify mechanisms related to alcohol use in religious institutions.

Acknowledgments

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