Religiousness Among At-Risk Drinkers: Is It Prospectively Associated With the Development or Maintenance of an Alcohol-Use Disorder?*

TYRONE F. BORDERS, PH.D.,[†] GEOFFREY M. CURRAN, PH.D.,[†] RHONDA MATTOX, M.D.,[†] AND BRENDA M. BOOTH, PH.D.[†]

Department of Health Policy and Management, Fay W. Boozman College of Public Health, University of Arkansas for Medical Sciences, 4301 W. Markham Street, Slot 820, Little Rock, Arkansas 72205-7199

ABSTRACT. Objective: This study examined whether particular dimensions of religiousness are prospectively associated with the development or maintenance of an alcohol-use disorder (AUD) among at-risk drinkers or persons with a history of problem drinking. **Method:** A prospective cohort study was conducted among at-risk drinkers identified through a population-based telephone survey of adults residing in the southeastern United States. The cohort was stratified by baseline AUD status to determine how several dimensions of religiousness (organized religious attendance, religious self-ranking, religious influence on one's life, coping through prayer, and talking with a religious leader) were associated with the development and, separately, the maintenance or remission of an AUD over 6 months. Multiple logistic regression analyses were conducted to estimate the odds of developing versus not developing an

AUD and maintaining versus remitting from an AUD while adjusting for measures of social support and other covariates. **Results:** Among persons without an AUD at baseline, more frequent organized religious attendance, adjusted odds ratio (OR_{adj}) = 0.73, 95% CI [0.55, 0.96], and coping through prayer, OR_{adj} = 0.63, 95% CI [0.45, 0.87], were associated with lower adjusted odds of developing an AUD. In contrast, among persons with an AUD at baseline, no dimension of religiousness was associated with the maintenance or remission of an AUD. **Conclusions:** The findings of this study suggest that religious attendance and coping through prayer may protect against the development of an AUD among at-risk drinkers. Further research is warranted to ascertain whether these or other religious activities and practices should be promoted among at-risk drinkers. (*J. Stud. Alcohol Drugs*, 71, 136-142, 2010)

THE INFLUENCE OF RELIGIOUSNESS on personal health status and health behaviors has long garnered interest among philosophers, researchers, and health care practitioners (Levin et al., 1997). A large body of research has shown that frequent religious-service attendance protects against mortality (Bagiella et al., 2005; Gillum et al., 2008; Musick et al., 2004; Oman and Reed, 1998; Strawbridge et al., 1997), the incidence of chronic physical health conditions, such as hypertension (Gillum and Ingram, 2006), and engagement in unhealthy behaviors, such as cigarette smoking (Gillum, 2005). Recently, further attention has been devoted to measuring and studying the potential health ben-

efits of religious-service attendance and other dimensions of religiousness, including the importance of religion in one's life, private religious practices and prayer, and support from religious leaders (Fetzer Institute/National Institute on Aging Working Group, 1999).

A review of the literature provides some evidence of a relationship between religiousness and alcohol use, which we summarize here according to the decision to drink and the level of alcohol use among drinkers. Some religions, such as Islam and very conservative Christian denominations, explicitly prohibit drinking, whereas other religious groups, such as Roman Catholics, Jews, and Lutherans, use wine in religious ceremonies and practices (Bock et al., 1987; Michalak et al., 2007; Miller, 1998). Analyses of the National Alcohol Survey indicate that people from some religious denominations in particular (i.e., Mormon, Islam, Church of God, Pentecostal, and Baptist) are more likely to abstain from alcohol than persons with no religious affiliation and that other denominations (i.e., Jehovah's Witnesses, Lutheran, and Catholic) are more likely to drink (Michalak et al., 2007). In addition to religious affiliation, overall religiosity (the importance of religion in one's life) and religious proscription have been shown to be positively associated with abstinence (Degenhardt et al., 2007; Michalak et al., 2007).

Among drinkers, nationally representative surveys have shown that particular religious denominations (Baptist and Catholic) have an increased risk of heavy drinking, whereas

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[†]Correspondence may be sent to Tyrone F. Borders at the above address or via email at: tfborders@uams.edu. Geoffrey M. Curran and Brenda M. Booth are with the Department of Psychiatry, Division of Health Services Research, University of Arkansas for Medical Sciences, Little Rock, AR, and the Veterans Affairs Health Services Research & Development Center for Mental Healthcare Outcomes Research, Central Arkansas Veterans Healthcare System, Little Rock, AR. Rhonda Mattox is with the Robert Wood Johnson Foundation Clinical Scholars Program, University of California, Los Angeles, and the West Los Angeles Veterans Administration Medical Center, Los Angeles, CA.

others (Jewish) have lower odds of heavy drinking (Michalak et al., 2007). A study of younger adult African Americans found that attending church less than once monthly was positively associated with symptoms of alcohol abuse or dependence, although the association did not remain significant when adjusting for demographic factors (Bowie et al., 2006). Similarly, a cross-sectional study of approximately 3,000 adults in a single North Carolina community found that weekly church attendance and being "born again" were associated with lower odds of past-6-month and lifetime alcohol-use disorders (AUDs); praying several times weekly also was associated with lower odds of a past-6-month AUD (Koenig et al., 1994). However, in the same study, frequently watching religious television and listening to religious radio were associated with higher odds of past-6-month and lifetime AUDs, suggesting that not all dimensions of religious involvement and activity are related to alcohol use in the same fashion. Finally, a cross-sectional study of 1,900 twins in Virginia found that general religiosity, social religiosity (e.g., attending religious services for social reasons), involvement with God, perceiving God as a judge, and thankfulness for God were associated with lower lifetime odds of alcohol dependence (Kendler et al., 2003).

Although several cross-sectional studies have shown a relationship between religiousness and excessive alcohol consumption, very few longitudinal studies have examined whether religiousness is prospectively associated with the continuation or future development of an AUD. Research based on the same data source described in this paper, the Rural Alcohol Study, showed that an overall index of religiosity was associated with reduced alcohol intake over time and lower odds of having an AUD among problem drinkers who were not receiving any formal substance-use treatment (Booth et al., 2004).

Other longitudinal research has examined the relationship between alcohol use and a related but conceptually different construct, spirituality. A longitudinal, outpatient treatment-based study of persons with alcohol abuse or dependence found that greater daily spiritual experiences (or connection and closeness with God) and a sense of purpose in life were associated with lower odds of heavy drinking at 6 months (Robinson et al., 2007). However, the generalizability of the latter study is limited because the vast majority of persons with an AUD never access formal alcohol-treatment services (Cohen et al., 2007) but do manage to reduce their use of alcohol over time (Booth et al., 2000, 2001; Sobell et al., 1996).

The current study builds on our prior research (Booth et al., 2004) by examining whether specific domains of religiousness (organized religious attendance, religious self-ranking, the influence of religion on one's life, coping through prayer, and coping through talking with a religious leader) are associated with the odds of developing versus not developing an AUD and, separately, the odds of maintaining

versus remitting from an AUD over 6 months. To investigate whether the effect of religiousness differs among persons who have and have not already developed an AUD, we stratified the sample by baseline AUD status.

We also sought to determine if specific domains of social support confound the relationships between religiousness and the development or maintenance of an AUD, because our prior research showed that a summary index of social support was associated with the longitudinal odds of having an AUD (Booth et al., 2004), and other research has found social support to be correlated with both religious service attendance (Krause, 2002, 2006) and the course of alcohol use (Dobkin et al., 2002; Finney and Moos, 1992; Humphreys et al., 1997; McCrady, 2004).

Method

Sample

The study used data collected as part of the Rural Alcohol Study, which has been described in detail in previous articles (Booth and Curran, 2006; Booth et al., 1999, 2000, 2001, 2004). The overall objective of the Rural Alcohol Study was to describe and compare differences in drinking patterns and alcohol-treatment utilization among at-risk drinkers residing in rural and urban areas.

The sample was identified through telephone interview screenings of 12,348 households in six southeastern states of the United States (Arkansas, Alabama, Georgia, Louisiana, Mississippi, and Tennessee). Persons residing in rural areas were oversampled, with rural residence defined according to the U.S. Office of Management and Budget definition of a nonmetropolitan county (i.e., a county with fewer than 50,000 persons) (Ricketts et al., 1999). At-risk drinking was defined as having at least one lifetime criterion for alcohol abuse or dependence according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association, 1994), and at least one of the following in the prior 12 months: any current DSM-IV alcohol abuse or dependence criteria, a drinking episode of at least 12 drinks on one occasion for men (reduced to eight drinks for men reporting at least two lifetime DSM-IV criteria) or eight drinks for women, or frequent heavy drinking (at least five drinks for men or three drinks for women in a typical drinking day at least once a week in the past 12 months or on at least 21 of the prior 28 days) (Booth et al., 2000). Of the 960 persons identified during the screening as at-risk drinkers, 733 agreed to participate in a longitudinal, four-wave study, with telephone interviews conducted every 6 months.

For the current study, we first restricted the analytical sample to the 658 persons who completed the baseline and 6-month follow-up interviews. Because the religiousness variables were collected during the baseline interview only

and prior research indicates that religiousness can change over time among persons receiving treatment for an AUD (Robinson et al., 2007), we chose to limit the analysis to the baseline and 6-month follow-up interviews. To avoid selection bias, we also excluded from our analytical sample 44 persons who reported receiving formal substance-use treatment in the 6 months preceding or following the baseline interview; other research has shown such bias can arise because substantial differences exist between persons receiving and not receiving alcohol treatment (Fortney et al., 1998).

To focus comparisons between the two largest racial groups represented in the sample (Whites and African Americans), we also excluded an additional 23 persons of other races/ethnicities (Asian, Native American, Hispanic, or other). These exclusions culminated in a final analytical sample of 591 at-risk drinkers.

Finally, we stratified the sample into two separate groups based on their baseline AUD status (one group of 250 persons with an AUD and a second group of 341 persons without an AUD at baseline), thereby allowing us to examine prospectively whether religiousness was differentially associated with the maintenance/remission or development of an AUD among at-risk drinkers.

Measures

Alcohol-use disorder. Recent (past-6-month) alcohol abuse or dependence was assessed at baseline and the 6-month interview by administering a structured diagnostic interview, the Composite International Diagnostic Interview—Substance Abuse Module (Cottler and Keating, 1990; Cottler et al., 1989).

Religiousness. In prior analyses of the Rural Alcohol Study, a summary index based on five items adapted from a community-based study of religiosity and psychological distress (Neff and Hoppe, 1993) was found to be associated with several alcohol-use indicators (Booth et al., 2004). For the current analyses, we treated each of the five items as separate, continuous, independent variables. The response options for each question corresponded to a 1-5 scale, with responses coded so that a higher number represents a greater degree of religiousness.

The first item assessed organized religious attendance by asking, "At present, about how often do you attend religious services?" with responses ranging from never/almost never to once or more weekly. The second item was a self-ranking of overall religiousness, which stated, "How religious would you say you are?" with responses ranging from not at all to very. The third item assessed the influence of religion on one's life by asking, "How would you say that your religion influences the way you live your life?" with responses ranging from none to a great deal. The fourth item assessed coping through prayer by asking, "How often do you pray when you are troubled or need help in working out a prob-

lem?" with responses from never to very often. The fifth item assessed coping through talking with a religious leader by asking, "How often do you talk with a priest, minister, or rabbi when you are troubled or need help in working out a problem?" with responses from never to very often.

Covariates. We adjusted for several dimensions of functional social support (emotional/informational, tangible, affectionate, and positive social interactions) using four composite scores from the Medical Outcomes Study Social Support Survey (Sherbourne and Stewart, 1991). We also adjusted for several demographic, social, economic, and other factors that have been shown in prior research to be associated with an AUD (Booth et al., 2004).

Demographic factors included age (continuous), sex (female vs. male), and race, which was categorized as White or Black/African American. Social and economic factors included marital status (married vs. not married), educational attainment (a high school degree/equivalency or greater education vs. less than a high school degree/equivalency), currently working versus not working, and rural versus urban residence. Self-reports of past-6-month use of marijuana, cocaine, stimulants, psychedelics, opiates, and sedatives were assessed and categorized into any versus no recent illicit drug use. A past-6-month diagnosis of an Axis I disorder (a diagnosis of depression, panic disorder, or generalized anxiety disorder) and a lifetime diagnosis of an antisocial personality disorder were assessed by the Diagnostic Interview Schedule (Booth et al., 2004; Robins et al., 1981). All covariates were assessed at the baseline interview.

Statistical analysis

Descriptive statistics (means and percentages) were calculated for the analytical sample as a whole and by baseline AUD status. Bivariate logistic regression analyses (in which a single independent variable is used to predict the dependent variable) were conducted to estimate the unadjusted relationship between each religiousness variable, social support variable, and the odds of an AUD at 6 months after baseline. Multiple logistic regression analyses were then conducted to estimate odds ratios while adjusting for social support and other potential confounders of the relationships between religiousness and an AUD after stratifying on AUD status at baseline.

Results

Sample characteristics

Table 1 describes religiousness, social support, and other characteristics among persons with and without an AUD at the baseline interview. Approximately 58% (341) of the 591 total subjects did not have an AUD at study entry. Religiousness differed little by baseline AUD status, with the excep-

TABLE 1. Sample characteristics at baseline by alcohol-use disorder (AUD) status

Variable	No AUD at baseline (<i>n</i> = 341)	AUD at baseline (<i>n</i> = 250)
Religiousness, <i>M</i> (<i>SD</i>)		
Religious attendance	2.70 (1.48)	2.57 (1.50)
Religious self-ranking	3.28 (1.01)	3.27 (1.08)
Religious influence	3.40 (1.22)	3.21 (1.20)
Coping through prayer	3.74 (1.33)	3.59 (1.32)
Talking with religious leader*	1.71 (1.13)	1.52 (0.95)
Social support, <i>M</i> (<i>SD</i>)		
Tangible*	4.18 (1.03)	3.99 (1.14)
Emotional/informational	4.17 (0.98)	4.03 (1.01)
Positive social interactions	4.32 (1.00)	4.20 (0.99)
Affectionate*	4.31 (1.08)	4.12 (1.12)
Age, in years, <i>M</i> (<i>SD</i>)	33.45 (10.62)	30.65 (10.76)
Sex, %		
Female	35.19	30.00
Male	64.81	70.00
Race, %		
White	83.58	84.80
Black	16.42	15.20
Marital status, %*		
Married	45.16	33.60
Not married	54.84	66.40
Educational status, %		
High school education	89.44	84.00
<High school education	10.56	16.00
Working status, %		
Currently working	66.67	65.99
Not currently working	33.33	34.01
Rural/urban residence, %		
Rural	46.33	47.60
Urban	53.67	52.40
Past-6-month illicit drug use, %*		
Yes	17.35	29.60
No	82.65	70.40
Past-6-month Axis I disorder, ^a %*		
Yes	13.20	20.80
No	86.80	79.20
Lifetime ASP disorder, %*		
Yes	7.33	16.40
No	92.67	83.60

Notes: ASP = antisocial personality. ^aMajor depression, panic disorder, or generalized anxiety disorder.

**p* < .05 from chi-square or *t* test.

tion of talking with a religious leader, which was higher among persons with no AUD at baseline. Tangible and affectionate support composite scores were higher (indicating stronger support) among persons with no AUD at baseline.

Both groups were relatively young, but persons with no AUD were slightly older than those with an AUD at baseline. Both groups were also predominantly White and male. Being married was more common among persons with no AUD than among those with an AUD at baseline. Educational attainment, working status, and rural/urban residence did not differ by baseline AUD status. Relative to those with no AUD at baseline, a higher percentage of persons with an AUD reported past-6-month illicit drug use; had a current major depressive, panic, or generalized anxiety disorder; and had a lifetime antisocial personality disorder.

Unadjusted and adjusted odds of developing versus not developing an alcohol-use disorder

Table 2 displays the unadjusted and adjusted odds of having an AUD at 6 months by baseline AUD status. Among persons with no AUD at baseline, more frequent organized religiousness attendance was prospectively associated with lower unadjusted odds of developing an AUD by the 6-month interview (odds ratio [OR] = 0.77, 95% CI [0.62, 0.96]). This association remained significant even after adjusting for other religiousness items; social support; and demographic, social, and clinical covariates (adjusted OR [OR_{adj}] = 0.73, 95% CI [0.55, 0.96]).

Higher coping through prayer scores were associated with lower unadjusted odds of developing an AUD (OR = 0.78, 95% CI [0.63, 0.97]). This association became more pronounced after adjusting for other factors (OR_{adj} = 0.63, 95% CI [0.45, 0.87]). None of the four social support variables was associated with the unadjusted or adjusted odds of developing an AUD. Of the other covariates included in the multiple logistic regression analysis, being married was associated with lower adjusted odds of developing an AUD (OR_{adj} = 0.33, 95% CI [0.15, 0.72]).

Unadjusted and adjusted odds of maintaining versus remitting from an alcohol-use disorder

In contrast to the findings among persons without an AUD at baseline, none of the religiousness variables was associated with the maintenance of an AUD at the 6-month follow-up among those who had a current AUD at study entry. Moreover, none of the measures of social support was associated with the odds of an AUD at 6 months. Among those with an AUD at baseline, only the use of any illicit drugs in the past 6 months was associated with the adjusted odds of continuing to have an AUD at 6 months (OR_{adj} = 2.57, 95% CI [1.38, 4.79]).

Discussion

Several studies have found religiousness to be associated with the decision to drink alcohol (Degenhardt et al., 2007; Michalak et al., 2007) and heavy drinking (Bowie et al., 2006; Kendler et al., 2003; Koenig et al., 1994; Michalak et al., 2007) among the overall adult population. However, very little research has investigated whether religiousness is prospectively associated with the development or maintenance of an AUD among at-risk drinkers.

In prior work using data from all four waves of the Rural Alcohol Study, an overall index of religiosity was associated with a lower average number of drinks, higher odds of drinking at safe levels, and lower odds of having a recent AUD (Booth et al., 2004). For the current paper, we conducted further analyses of the Rural Alcohol Study to examine how

TABLE 2. Religiousness, social support, and odds of an alcohol-use disorder (AUD) at 6 months, by baseline AUD status

Variable	Persons (<i>n</i> = 341) with no AUD at baseline		Persons (<i>n</i> = 250) with AUD at baseline	
	OR [95% CI] ^a	OR _{adj} [95% CI] ^b	OR [95% CI] ^a	OR _{adj} [95% CI] ^b
Religiousness items				
Organized religious attendance	0.77 [0.62, 0.96]	0.73 [0.55, 0.96]	0.98 [0.83, 1.15]	0.99 [0.80, 1.24]
Religious self-ranking	0.91 [0.70, 1.19]	1.18 [0.82, 1.72]	0.85 [0.67, 1.07]	0.81 [0.56, 1.16]
Religious influence	0.92 [0.73, 1.16]	1.30 [0.92, 1.86]	0.86 [0.71, 1.07]	0.83 [0.60, 1.15]
Coping through prayer	0.78 [0.63, 0.97]	0.63 [0.45, 0.87]	1.04 [0.86, 1.26]	1.27 [0.95, 1.71]
Talking with religious leader	0.91 [0.69, 1.19]	1.22 [0.86, 1.75]	0.92 [0.70, 1.19]	0.89 [0.66, 1.21]
Social support composites				
Tangible	0.80 [0.62, 1.03]	0.86 [0.58, 1.28]	0.96 [0.77, 1.19]	0.76 [0.54, 1.06]
Emotional/informational	0.79 [0.60, 1.03]	0.72 [0.43, 1.21]	1.10 [0.86, 1.42]	1.32 [0.89, 1.97]
Positive social interactions	0.78 [0.60, 1.00]	0.98 [0.59, 1.62]	1.19 [0.92, 1.54]	1.38 [0.87, 2.20]
Affectionate	0.84 [0.66, 1.07]	1.27 [0.81, 2.00]	0.93 [0.74, 1.16]	0.81 [0.54, 1.22]
Covariates				
Age	—	0.97 [0.93, 1.00]	—	0.99 [0.96, 1.01]
Female (vs. male)	—	0.88 [0.44, 1.78]	—	0.57 [0.29, 1.12]
White (vs. African American)	—	1.17 [0.46, 2.93]	—	0.95 [0.43, 2.10]
Married (vs. not married)	—	0.33 [0.15, 0.72]	—	1.57 [0.80, 3.05]
High school (vs. <high school)	—	0.65 [0.25, 1.70]	—	1.34 [0.60, 3.00]
Working (vs. not working)	—	0.81 [0.42, 1.56]	—	0.59 [0.32, 1.07]
Rural (vs. urban)	—	1.20 [0.64, 2.26]	—	0.91 [0.52, 1.59]
Illicit drugs past 6 mo. (vs. no)	—	1.07 [0.48, 2.38]	—	2.57 [1.38, 4.79]
Past-6-month Axis I disorder ^c (vs. none)	—	0.82 [0.30, 2.19]	—	1.71 [0.81, 3.59]
Lifetime ASP disorder (vs. none)	—	1.01 [0.75, 1.35]	—	1.01 [0.84, 1.21]

Notes: Significant associations ($p < .05$) are shown in **boldface**. ASP = antisocial personality; OR = odds ratio; OR_{adj} = adjusted OR. ^aUnadjusted ORs for an AUD at 6 months and corresponding 95% CI; ^badjusted ORs for an AUD at 6 months and corresponding 95% CI; ^cmajor depression, panic disorder, or generalized anxiety disorder.

particular dimensions of religiousness are associated with the odds of developing an AUD and, separately, the odds of maintaining or remitting from an AUD over 6 months.

Although our prior research showed that stronger overall religiousness was negatively associated with the odds of continuing to have or developing an AUD over time, the results from this study suggest that particular dimensions of religiousness are prospectively associated with the development of an AUD. More specifically, two dimensions of religiousness, organized religious attendance and praying to cope with personal problems, were negatively associated with the odds of developing an AUD.

We offer several explanations for these findings. First, church-based social support has been shown to be more strongly associated with overall health than support from other social networks (Krause, 2002). At-risk drinkers who frequently attend church or other religious services may also have unique social networks that enable them to cope more effectively with their drinking problems than other sources of social support. However, the plausibility of this explanation is weakened by the fact that we included measures of four different types of social support in our analysis, none of which was found to be associated with the development or maintenance of an AUD in either multivariate or bivariate analyses. Alternatively, attending religious services could expose at-risk drinkers to a peer group that looks down on drinking alcohol excessively and, in turn, contributes to reductions in alcohol use (Degenhardt et al., 2007).

The finding regarding prayer warrants further investigation, but prayer could offer seclusion and time for introspective thought about one's problems, thereby enabling persons to better control their drinking.

In contrast, no dimension of religiousness was associated with remission from an AUD over the 6-month follow-up period among those persons identified as having alcohol abuse or dependence at the baseline interview. Although religious attendance, coping through prayer, and talking with a religious leader may yield other health or social benefits, our findings suggest that these and other aspects of religiousness may not help persons remit from an AUD. We also point out that the only significant predictor of the maintenance of an AUD was recent illicit drug use at the baseline interview, which underscores the potential need for polysubstance treatment among many persons with alcohol abuse or dependence.

Because this study is based on observational data, we caution the reader against inferring any cause-effect relationships between religiousness and the development of an AUD. However, the findings have potential implications for alcohol treatment, particularly during a phase of greater federal funding for faith-based social programs (Graddy and Ye, 2006). Although additional evidence is needed before developing formal guidelines, our findings suggest that the promotion of religious service attendance and prayer could benefit some persons who have drinking problems but do not meet formal criteria for an AUD. On the other hand, our findings

raise questions about whether these or other dimensions of religiousness should be promoted among persons who have already developed an AUD.

A key strength of this study is its prospective design, which facilitates causal inferences but does not prove causation. A second major strength of the study is that the sample was selected through telephone screening of adults in the general population, as opposed to a treatment-based sample, which broadens the external validity of the findings because many people with AUDs never receive formal treatment (Cohen et al., 2007).

However, this study is not without several limitations that should be acknowledged when interpreting the results. Because we were interested in assessing the association between religiousness and the most proximal follow-up point (6 months), we did not conduct analyses of the odds of an AUD at 12 months. However, it is possible that additional persons who had an AUD at baseline fully remitted after an additional 6 months of follow-up. We also note that persons who reduced their alcohol consumption by the 6-month interview may have also experienced a reduction in alcohol-induced symptoms of major depression, panic disorder, or generalized anxiety disorder.

One potential limitation is the reliance on self-reports to discern AUD status and other behaviors, but this is a weakness of many similar studies. We also acknowledge that the associations between particular dimensions of religiousness and an AUD may be especially strong among at-risk drinkers in the southeastern United States, where this study was conducted and where conservative churches are common, and may not generalize to other parts of the United States where persons are relatively less religious. Finally, although stratifying our analysis allowed us to test whether the effects of religiousness differed by baseline AUD status, stratification also resulted in a reduction in the power to detect significant associations between the independent and dependent variables.

Conclusions

In summary, the findings of this study suggest that the benefits of religiousness may be confined to at-risk drinkers who do not currently have an AUD. Specifically, organized religious attendance and coping through prayer appear to be negatively associated with the development of an AUD in the near term, or over 6 months. Further research is warranted to either confirm or refute these findings and to guide the development of evidence-based guidelines about the potential promotion of religious activities and practices among at-risk drinkers.

References

Bagiella, E., Hong, V., & Sloan, R. P. (2005). Religious attendance as a predictor of survival in the EPESE cohorts. *International Journal of Epidemiology*, 34, 443-451.

- Bock, E. W., Cochran, J. K., & Beeghley, L. (1987). Moral messages: The relative influence of denomination on the religiosity-alcohol relationship. *The Sociological Quarterly*, 28, 89-103.
- Booth, B. M., & Curran, G. M. (2006). Variations in drinking patterns in the rural South: Joint effects of race, gender, and rural residence. *American Journal of Drug and Alcohol Abuse*, 32, 561-568.
- Booth, B. M., Curran, G. M., & Han, X. (2004). Predictors of short-term course of drinking in untreated rural and urban at-risk drinkers: Effects of gender, illegal drug use and psychiatric comorbidity. *Journal of Studies on Alcohol*, 65, 63-73.
- Booth, B. M., Fortney, S. M., Fortney, J. C., Curran, G. M., & Kirchner, J. E. (2001). Short-term course of drinking in an untreated sample of at-risk drinkers. *Journal of Studies on Alcohol*, 62, 580-588.
- Booth, B. M., Kirchner, J., Fortney, J., Ross, R., & Rost, K. (2000). Rural at-risk drinkers: correlates and one-year use of alcoholism treatment services. *Journal of Studies on Alcohol*, 61, 267-277.
- Booth, B. M., Ross, R. L., & Rost, K. (1999). Rural and urban problem drinkers in six Southern states. *Substance Use and Misuse*, 34, 471-493.
- Bowie, J. V., Ensminger, M. E., & Robertson, J. A. (2006). Alcohol-use problems in young black adults: Effects of religiosity, social resources, and mental health. *Journal of Studies on Alcohol*, 67, 44-53.
- Cohen, E., Feinn, R., Arias, A., & Kranzler, H. R. (2007). Alcohol treatment utilization: Findings from the National Epidemiologic Survey on Alcohol and Related Conditions. *Drug and Alcohol Dependence*, 86, 214-221.
- Cottler, L. B., & Keating, S. K. (1990). Operationalization of alcohol and drug dependence criteria by means of a structured interview. In M. Galanter (Ed.), *Recent Developments in Alcoholism: Vol. 8. Combined alcohol and other drug dependence* (pp. 69-83). New York: Plenum Press.
- Cottler, L. B., Robins, L. N., & Helzer, J. E. (1989). The reliability of the CIDI-SAM: A comprehensive substance abuse interview. *British Journal of Addiction*, 84, 801-814.
- Degenhardt, L., Chiu, W. T., Sampson, N., Kessler, R. C., & Anthony, J. C. (2007). Epidemiological patterns of extra-medical drug use in the United States: Evidence from the National Comorbidity Survey Replication, 2001-2003. *Drug and Alcohol Dependence*, 90, 210-223.
- Dobkin, P. L., De, C. M., Paraherakis, A., & Gill, K. (2002). The role of functional social support in treatment retention and outcomes among outpatient adult substance abusers. *Addiction*, 97, 347-356.
- Fetzer Institute/National Institute on Aging Working Group. (1999). *Multi-dimensional measurement of religiousness/spirituality for use in health research*. Kalamazoo, MI: Fetzer Institute.
- Finney, J. W., & Moos, R. H. (1992). The long-term course of treated alcoholism: II. Predictors and correlates of 10-year functioning and mortality. *Journal of Studies on Alcohol*, 53, 142-153.
- Fortney, J., Booth, B., Zhang, M., Humphrey, J., & Wiseman, E. (1998). Controlling for selection bias in the evaluation of Alcoholics Anonymous as aftercare treatment. *Journal of Studies on Alcohol*, 59, 690-697.
- Gillum, R. F. (2005). Frequency of attendance at religious services and cigarette smoking in American women and men: The Third National Health and Nutrition Examination Survey. *Preventive Medicine*, 41, 607-613.
- Gillum, R. F., & Ingram, D. D. (2006). Frequency of attendance at religious services, hypertension, and blood pressure: The Third National Health and Nutrition Examination Survey. *Psychosomatic Medicine*, 68, 382-385.
- Gillum, R. F., King, D. E., Obisesan, T. O., & Koenig, H. G. (2008). Frequency of attendance at religious services and mortality in a U.S. national cohort. *Annals of Epidemiology*, 18, 124-129.
- Graddy, E. A., & Ye, K. (2006). Faith-based versus secular providers of social services—differences in what, how, and where. *Journal of Health & Human Services Administration*, 29, 309-335.
- Humphreys, K., Moos, R. H., & Cohen, C. (1997). Social and community

- resources and long-term recovery from treated and untreated alcoholism. *Journal of Studies on Alcohol*, 58, 231-238.
- Kendler, K. S., Liu, X. Q., Gardner, C. O., McCullough, M. E., Larson, D., & Prescott, C.A. (2003). Dimensions of religiosity and their relationship to lifetime psychiatric and substance use disorders. *American Journal of Psychiatry*, 160, 496-503.
- Koenig, H. G., George, L. K., Meador, K. G., Blazer, D. G., & Ford, S. M. (1994). Religious practices and alcoholism in a southern adult population. *Hospital and Community Psychiatry*, 45, 225-231.
- Krause, N. (2002). Church-based social support and health in old age: Exploring variations by race. *Journal of Gerontology Series B. Psychological Sciences & Social Sciences*, 57, S332-S347.
- Krause, N. (2006). Exploring the stress-buffering effects of church-based and secular social support on self-rated health in late life. *Journal of Gerontology Series B. Psychological Sciences & Social Sciences*, 61, S35-S43.
- Levin, J. S., Larson, D. B., & Puchalski, C. M. (1997). Religion and spirituality in medicine: Research and education. *Journal of the American Medical Association*, 278, 792-793.
- McCrary, B. S. (2004). To have but one true friend: Implications for practice of research on alcohol use disorders and social network. *Psychology of Addictive Behaviors*, 18, 113-121.
- Michalak, L., Trocki, K., & Bond, J. (2007). Religion and alcohol in the U.S. National Alcohol Survey: How important is religion for abstinence and drinking? *Drug and Alcohol Dependence*, 87, 268-280.
- Miller, W. R. (1998). Researching the spiritual dimensions of alcohol and other drug problems. *Addiction*, 93, 979-990.
- Musick, M. A., House, J. S., & Williams, D. R. (2004). Attendance at religious services and mortality in a national sample. *Journal of Health & Social Behavior*, 45, 198-213.
- Neff, J. A., & Hoppe, S. K. (1993). Race/ethnicity, acculturation, and psychological distress: Fatalism and religiosity as cultural resources. *Journal of Community Psychology*, 21, 3-20.
- Oman, D., & Reed, D. (1998). Religion and mortality among the community-dwelling elderly. *American Journal of Public Health*, 88, 1469-1475.
- Ricketts, T. C., 3rd, Johnson-Webb, K. D., & Randolph, R. K. (1999). Populations and places in rural America. In T. C. Ricketts, 3rd (Ed.), *Rural health in the United States* (pp. 7-24). New York: Oxford University Press.
- Robins, L. N., Helzer, J. E., Croughan, J., & Ratcliff, K. S. (1981). National Institute of Mental Health Diagnostic Interview Schedule: Its history, characteristics, and validity. *Archives of General Psychiatry*, 38, 381-389.
- Robinson, E. A., Cranford, J. A., Webb, J. R., & Brower, K. J. (2007). Six-month changes in spirituality, religiousness, and heavy drinking in a treatment-seeking sample. *Journal of Studies on Alcohol*, 68, 282-290.
- Sherbourne, C. D., & Stewart, A. L. (1991). The MOS social support survey. *Social Science & Medicine*, 32, 705-714.
- Sobell, L. C., Cunningham, J. A., & Sobell, M. B. (1996). Recovery from alcohol problems with and without treatment: Prevalence in two population surveys. *American Journal of Public Health*, 86, 966-972.
- Strawbridge, W. J., Cohen, R. D., Shema, S. J., & Kaplan, G. A. (1997). Frequent attendance at religious services and mortality over 28 years. *American Journal of Public Health*, 87, 957-961.