

Alcohol Impaired Driving Deaths and the Religious Composition of US Counties

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Abstract

Alcohol impaired driving stands as a central public health issue in the US with far reaching impacts. Even though cultural factors such as religion have been extensively linked to alcohol little remains known about the link between religion and impaired driving, particularly with respect to religious context. This paper extends the literature regarding alcohol use and religion by examining the association between county religious composition and alcohol impaired driving deaths. Results indicate that Conservative and Mainline Protestantism are both inversely related to rate of alcohol impaired driving deaths. These findings highlight the role of cultural factors in influencing alcohol impaired driving and suggest that policy-makers should consider local area cultural factors when implementing strategies aimed at reducing alcohol impaired driving.

Introduction

Despite profound decreases in the incidence of mortality due to alcohol impaired driving (i.e. blood alcohol content higher than 0.08) over recent decades, alcohol impaired driving remains a significant public health issue in the US. The enormity of consequences stemming from alcohol impaired driving are reflected in a 2010 report by the National Highway Traffic Safety Administration (NHTSA) that pegged the direct economic costs of alcohol impaired crashes at roughly \$44 billion (Blincoe et al. 2015). According to the same report, alcohol impaired traffic fatalities decreased by approximately half between 1982 and 2011. This decrease has persisted in spite of increases in heavy and binge drinking over part of this time period (Dwyer-Lindgren et al. 2015), indicating that impaired driving is a distinct dimension of alcohol consumption that merits its own consideration.

Research efforts in this regard have generally taken a policy-oriented approach by focusing on interventions such as taxes, pricing policies, public service announcement campaigns, drinking age and blood alcohol concentration laws, sobriety checkpoints, and location of alcohol purchase (Shults et al. 2001; Chalaloupka et al. 1993; Dejong and Atkin 1995; Wegenaar et al. 2010; Young and Bielinska-Kwapisz 2006; Cotti et al. 2014). Little research has explored cultural factors, such as religion, as a determinant of alcohol impaired driving deaths, despite a wealth of research identifying personal religiosity as correlate of alcohol consumption (Hill et al. 2012; Kelly et al. 2015; Michalak et al. 2007; Ellison et al. 2008). Less is known about religious context and alcohol, as adolescent social networks comprise the locus of the literature pertaining to religious contextual influences on alcohol use (Rivera et al. 2018; Hoffman 2014; Adamczyk and Palmer 2008), a glaring omission considering the recent renewed interest in religious contexts on the part of social science researchers (e.g. Drakeford 2018;

Stroope and Baker 2018; Clark and Stroope 2018; Jung 2018; Adameczyk and Valdimarsdóttir 2018). The current study addresses this gap in the literature by assessing the nature of the relationship between county religious composition and rate of alcohol impaired driving death rates. Presented results indicate that cultural factors such as religion are a correlate of alcohol impaired traffic fatalities.

Empirical and Theoretical Considerations

Religion and Alcohol

At the individual level, research has consistently highlighted an inverse relationship between different dimensions of religious practice and alcohol consumption (Hill et al. 2012; Kelly et al. 2015). Religious proscriptions against alcohol consumption maintain a salient component of this relationship (Michalak et al. 2007; Ellison et al. 2008), which is largely reflected in denominational differences in alcohol use. Studies assessing denominational differences have generally reported lower alcohol use among adherents of Conservative Protestant denominations, higher use among Catholics, and mixed results, typically a positive association or none at all, among Mainline Protestants (Bock et al. 1987; Michalak et al. 2007). In particular, religion provides a reference group to which adherents can draw upon for behavioral guidance in accordance with commonly held norms (Cochran et al. 1988). Although little research has focused on alcohol use at the county level, a look at the broader literature pertaining to religious practice suggests two key components in the link between county religious context and alcohol impaired driving deaths: social control and social integration.

Religious Context and Social Control

Understanding of religiously based social control can be informed by drawing upon the moral communities hypothesis. The moral communities hypothesis posits that religion is a

characteristic of social groups, and that whether religion acts as a function of social control depends primarily on whether a sufficient proportion of the social group consider religion as a valid basis for action (Stark 1996). Scholars have invoked the moral communities hypothesis across a variety of outcomes such as health and well-being (Stroope and Baker 2018; Drakeford 2018, Jung 2018), homicide (Lee and Bartkowski 2004), beliefs about sexual morality (Finke and Adamczyk 2008), gambling (Eitle 2011), theft, and minor adolescent delinquency (Regnerus 2003). Religiously derived social control offers two pathways linking religious context to alcohol impaired driving deaths: reduced alcohol consumption and reduced impaired driving among those who consume alcohol.

Given the positive relationship between both binge drinking and heavy alcohol consumption (Quinlan et al. 2005), discouraging alcohol consumption stands as a direct link between religious context and alcohol impaired driving deaths. Studies of religious environmental influences on alcohol and substance use have typically revolved around integration in moral communities at the social network level. Findings in this regard point to integration in religious social networks being inversely related to marijuana use and binge drinking (Rivera et al. 2018; Hoffman 2014; Adamczyk and Palmer 2008). While these results indicate network-based informal social control, religious context offers more formal social control of alcohol use through mechanisms such as local area ordinances to control the availability of alcohol. Much like the relationship between religion and alcohol use at the individual level, there is a denominational element to religious contextual influences on alcohol use. Social control of alcohol that coincides with religious context operates in accordance with religious beliefs pertaining to alcohol use (Welch et al. 1991), suggesting that religiously based

social control of alcohol will only occur when there is a sufficient level of adherents to those denominations that offer proscriptions against alcohol.

Additionally, religious context offers potential social control of alcohol impaired driving deaths by discouraging impaired driving among those who do consume alcohol. Scholars have noted the risk averse nature of religious behavior (Miller and Hoffman 1995), a point that is reflected in the propensity of religious individuals to avoid risky sexual behaviors (Simons et al. 2009), as well as engage in lifestyle behaviors that appear to be based in part on mitigating risk with regards to health (Hill et al. 2012). In this vein, social control of impaired driving could result in instances in which aspects of the religious environment enhance norms centered on mitigating risk. For instance, instead of attempting to discourage alcohol use completely, communities comprised largely of those denominations that do not strictly prohibit alcohol use may alleviate the problem of alcohol impaired driving deaths by fostering norms about responsible alcohol consumption. Accordingly, rather than attempting to control alcohol consumption, such religious environments can instead promote modes of responsible behaviors including the use of alternate forms of transportation, such as designated drivers, public transportation, taxicabs, or ride-sharing services where available. In a similar fashion interventions aimed at the promotion, and not prohibition, of responsible undertaking of sexual behaviors have shown to be effective at reducing the prevalence of adolescent pregnancies (Kohler et al. 2008; Santelli et al. 2006). However, the extent to which religious contextual influences discourage impaired driving among those who use alcohol remains murky in light of findings revealing that alcohol ameliorates some of the prosocial aspects of religion (Duke and Giancola 2013).

Since sanctioning represents a vital element of social control, an additional avenue of religious contextually-based social control of alcohol impaired driving deaths lies in the enforcement of laws aimed at discouraging impaired driving. Although most laws, along with the prescribed penalties, are generally enacted at the state level, in many instances states provide broad ranges of potential penalties. As a result, there is a great deal of discretion in sentencing outcomes at the local level. In this vein, a limited line of inquiry has indicated that there are, indeed, religious contextual effects on criminal sentencing. Relative to county religious composition, many of the findings in this regard pertain to the prevalence of Conservative Protestantism. Though some researchers have argued that Conservative Protestantism is not influential on criminal justice outcomes (Ulmer et al. 2008), others, drawing upon wider geographical contexts, have noted that county level Conservative Protestant adherence rates are a moderator of gender disparities in criminal sentences (Kim et al. 2018) as well as a determinant of the form of punishment imposed in criminal sentencing (Fearn 2005). Moreover, various aspects of Conservative Protestantism have been tied to punitive ideologies (Baker and Booth 2016; Grasmick et al. 1993). These results are steeped in Conservative Protestant views of morality that center on perceptions of wrongdoing as a personal flaw (Curry 1996; Grasmick and McGill 1994). Consequentially, the connection between potential pathways focused on enforcement of impaired driving laws and alcohol impaired driving deaths relative to religious context are primarily expected to coincide with the adherence rate of Conservative Protestants.

Religious Context and Social Integration

Considering that stress emanating from general life stressors correlates with alcohol use, including binge drinking (Keyes et al. 2012; Grzywacz and Almeida 2008), the integrative

function of religion presents a relevant factor for alcohol impaired driving deaths. Different domains of religious practice have been linked with stress buffering (Bradshaw and Ellison 2010; Ellison and Henderson 2011), a point likely arising from the promotion of social ties and integration that has been observed among the religious (Bradley 1995; Ellison and George 1994). Consistent with this premise, studies have highlighted social support as a mediating factor of the association between religious service attendance and mental health (Nooney and Woodrum 2002). In this vein, religiously-based social resources present a resource in dealing with a variety of stressors. Carried further, this would suggest that communities with high rates of religious adherence offer greater social resources for residents. Jointly considering that contextual social resources have been shown to be protective against binge drinking (Wietzman and Kawachi 2000) and that binge drinkers are more likely to drive impaired, as outlined above, it follows that religious context offers a potentially ameliorative effect on alcohol impaired driving deaths by providing resources that aid in buffering stress.

Several considerations point to the presence of a theological component to the distribution of social resources in highly religious locales. Homogeneity, or similarity in composition, remains an integral characteristic of social networks, particularly with respect to religious identities (McPherson et al. 2001; Marsden 1998). Even though the establishment of social ties across religious boundaries is relatively common (Olson and Perl 2011; Vargas and Loveland 2011), researchers have noted the tendency of social support to be intrareligious (Merino 2014). This point is especially relevant with regard to theologies, such as those associated with Conservative Protestantism, that emphasize themes of network exclusivity (Scheitle and Adamczyk 2009). Accordingly, while lower rates of alcohol use and impaired driving are expected among the religious, in contexts largely comprised of religious

congregations that place a premium on network exclusivity the irreligious stand at a disadvantage of being more prone to alcohol use leading to impaired driving. This premise is consistent with the secular stigma thesis, which holds that the nonreligious face distinct pernicious effects from residence in highly devout contexts (Stroope and Baker 2018).

Expectations regarding the role of religiously based social integration on alcohol impaired driving deaths are further compounded when considering forms of social integration such as civic engagement. Although the link between religious activity and civic engagement has been well documented (Whitehead and Stroope 2015; Schwadel et al. 2016; Becker and Dhingra 2001; Park and Smith 2000), there is strong evidence of a theological component to this relationship. In particular, by focusing their volunteer efforts in support of their own congregations (Hoge et al. 1998; Wilson and Janoski 1995), Conservative Protestants are less likely to engage in community organization participation and the purveyance of social services (McClure 2015; Whitehead and Stroope 2015; Ammerman 2002, 2005; Chaves 2004). In a harkening back to 19th century social activism that called for engagement with the secular world (Regnerus and Smith 1998), Catholics and Mainline Protestants are more likely to partake in forms of outreach that engage more broadly with the community (Beyerlein and Hipp 2006; Wuthnow 2002,2004). Consequentially, this results in a pathway to alcohol impaired driving deaths in that residents in communities with high adherence rates of Catholicism and Mainline Protestantism may be less prone to maladaptive coping such as binge drinking as a result of more formal modes of social capital.

Summary of Research Aims

The purpose of the present study is to assess religious contextual influences on the rate of alcohol impaired driving deaths at the county-level. A review of the literature highlights strong

considerations suggesting that the relationship between alcohol impaired driving deaths and religious context differs across the three primary US religious traditions: Conservative Protestantism, Catholicism, and Mainline Protestantism. Although the link between religion and alcohol impaired driving has remained relatively unexplored, an abundance of evidence has illustrated a relationship between religious practice and alcohol use, a point leading to the first hypothesis:

Hypothesis 1: there will be a significant relationship between the adherence rates of Conservative Protestantism, Catholicism, and Mainline Protestantism and rate of alcohol impaired driving deaths.

Several considerations, though, impede the ability to formulate firm hypotheses regarding the direction of this association. For instance, even though Catholicism and Mainline Protestantism are not as proscriptive of alcohol use as Conservative Protestantism, their tolerance of alcohol use could promote responsible consumption, a message which may fail to resonate in highly Conservative Protestant contexts that attempt the discouragement of alcohol use completely. Thus, there stands the contradiction that proscriptions against alcohol use can deter alcohol impaired driving through lower rates of alcohol use, while leading to higher rates of impaired driving by not encouraging responsible use among those who do choose to consume alcohol. Similarly, tolerance of alcohol among Catholics and Mainline Protestants offers potentially higher impaired driving as a result of higher rates of alcohol use, but also offers hindrance of impaired driving by focusing on responsibility in the consumption of alcohol.

In a similar vein, theological differences in social integration and civic involvement offer a social resource based conduit linking religious context to alcohol impaired driving deaths. Excessive forms of alcohol use, such as binge drinking, have positive correlations with both

stress and impaired driving. Accordingly, the promotion of social resources and support promoted by religious practice has implications for alcohol impaired driving deaths by alleviating maladaptive coping such as excessive alcohol use. Implications of theological differences arise in this regard similarly to those already outlined. Specifically, while religion is positively associated with social resources, the composition of the religious environment is integral to how those resources are distributed. With respect to Conservative Protestantism, informal social support is more likely to be provided to other Conservative Protestants. Moreover, volunteer efforts of Conservative Protestants are likely to be for the benefit of congregations. As such, while Conservative Protestants should be less likely to engage in excessive drinking as a maladaptive coping behavior in heavily Conservative Protestant communities, non-Conservative Protestants may be predisposed to maladaptive alcohol use. Contrarily, high levels of Catholic and Mainline Protestant adherence rates should coincide with increased informal social support and civic outreach that transcends religious boundaries. Resultant from this distinction is that the potential for lowered excess drinking, and by extension lower impaired driving, stemming from alcohol use as a coping mechanism. In sum, there are reasons why each of the primary religious traditions should be inversely or positively related to alcohol impaired driving deaths, a point that leads to the first research question:

Research Question 1: what is the nature of the relationship between the adherence rates of Conservative Protestantism, Catholicism, and Mainline Protestantism and alcohol impaired driving deaths?

Methods

Data

The current study draws upon data aggregated from several sources. Data on traffic related driving deaths come from the Fatality Analysis Reporting System (FARS) maintained by the NHTSA. Additional data for key determinants and covariates come from the 2012-2016 5-year American Community Survey (ACS) estimates, the 2016 County Business Patterns (CBR) dataset, 2010 Religious Congregations and Membership Survey (RCMS), 2010 decennial Census, 2016 atlas of presidential election data, and 2018 County Health Rankings and Roadmap (CHRR) data.

Measures

Outcome

The outcome measure of interest is the rate of alcohol impaired driving deaths calculated at the county level. Data on traffic fatalities were extracted from FARS for the years 2012-2016 for each US county. The total number of fatalities in accidents with an impaired driver were then totaled and divided by five, resulting in the average yearly alcohol impaired driving deaths over this period. This approach helps produce stable estimates, a particular concern among smaller counties prone to wild fluctuation in rates. The five-year average number of alcohol impaired driving deaths was divided by population benchmarks drawn from ACS data, resulting in a rate corresponding to the number of alcohol impaired driving deaths per 100,000 residents. Analysis of residual plots indicated a non-linear relationship that was addressed through a natural-log transformation. Since a small number of counties (67) had no alcohol impaired driving deaths over this time period, this measure was calculated by taking the natural log of the rate of alcohol impaired driving deaths plus a small constant (0.01).

Key Determinants

The primary explanatory variables assess county level religious composition. RCMS reports the number of adherents, individuals actively engaged with a congregation, across 236 distinct religious denominations. In addition to denominational measures, RCMS aggregates data on adherents into religious families consistent with the RELTRAD classification scheme (Steensland et al. 2000). RCMS data is reported by number of adherents per 1,000 county residents. To make interpretation more intuitive, this was rescaled into number of adherents per 100 residents, or the percent of county residents actively engaged with a congregation corresponding to each of the RELTRAD traditions. Variables assessing the percent of residents engaged with denominations associated with the Conservative Protestant, Mainline Protestant, and Catholic traditions were used to assess religious composition. Studies have validated RCMS assessment of religious affiliation as compared to other data sources.

In addition to religious composition, several measures assess key determinants of alcohol impaired driving deaths. CBP data was used to create additional indicators of number of mental health and substance abuse treatment locations, retail alcohol outlets, and alcohol drinking places per 1,000 residents. Finally, CHRR data provided estimates of county-level excessive drinking (in percent) based upon the 2016 Behavioral Risk Factor Surveillance System (BRFSS). BRFSS defines excessive drinking as either prior month binge drinking, or drinking an average of more than one (for women) or two (for men) drinks per day, in line with Centers for Disease Control definitions.

Covariates

Covariates based upon ACS data controlled for a range of relevant factors. Demographic composition was assessed through continuous measures indicating the percent of county residents across factors such as sex (male), race (Non-Hispanic white, Non-Hispanic black, Non-

Hispanic other race, Hispanic), education (less than high school, high school, some college, bachelor degree or higher), and age (less than 15, 15-18,19-20,21-29,30-39,40-49,50-59,60+). Consistent with the potential role of social relations, I also add a measure of the distribution of households. Based upon Stockdale et al. (2007), calculation of this variable entailed dividing the amount of residents per square mile by the number of occupied housing units per square mile for each respective county. Consequentially, this measure provides an indication of the number of residents per occupied housing unit relative to geospatial density, resulting in an assessment of potential social integration opportunities. Census data controlled for percent of county residents residing in rural areas, while political orientation was assessed by the percent of votes for the republican presidential candidate in 2016. Finally, counties were categorized in one of four regions corresponding to the Census Bureau's four-point regional categorization (northeast, Midwest, south, west). Finally, FARS data were used to assess the rate of non-alcohol impaired driving deaths. This measure is similar in construction to alcohol impaired driving death rates, except it was calculated by subtracting the number of alcohol impaired driving deaths from the total number of driving deaths. Accounting for non-alcohol impaired driving deaths addresses several relevant factors including driving skill, highway conditions, and traffic enforcement that would otherwise be difficult to measure. As with the rate of alcohol impaired driving deaths, this measure was transformed by taking the natural log of the rate.

[Table 1 about here]

Results

Descriptive statistics for all variables are presented in Table 1. The mean logged alcohol impaired driving rate was 1.7, which was surpassed by the mean logged non-alcohol impaired driving death rate (2.4). The mean availability of mental health and substance abuse treatment

(0.1) and retail availability of alcohol (0.1) were near even, while counties, on average, had greater availability of alcohol drinking places (0.2). Counties tended to be more heavily Conservative Protestant (22.3%), with similar rates of adherence observed among Catholic (13.0%) and Mainline Protestant (11.6%) congregations.

[Table 2 about here]

Analysis then commenced through the estimation of multivariate models estimating alcohol impaired driving deaths, the results of which are presented in Table 2. Model 1 includes all covariates and the religious composition measures, with other key determinants omitted. As indicated, the adherence rates of Conservative and Mainline Protestants both have statistically significant ($p < 0.01$) relationships with alcohol impaired driving deaths. Specifically, the results show inverse relationships with Conservative ($b = -0.006$) and Mainline ($b = -0.015$) Protestant adherence rates. In order to assess potential mediating effects, I then enter each of the additional key predictors one at a time in order to check for changes in the estimated coefficients of the religious composition variables. The key determinants are each entered one at a time through Models 2-6. As shown, there are no significant changes in the estimated effect of the religious composition measures as each determinant is entered. Moreover, the coefficients for each of Conservative and Mainline Protestant adherence rates hold through each model.

[Figure 1 about here]

Finally, Model 6 presents the full model with all measures. Consistent with the other models, the estimated inverse relationship between both Conservative and Mainline Protestant adherence rates and alcohol impaired driving deaths remains significant ($p < 0.01$). In order to more readily understand both relationships, they are presented graphically in Figure 1. For Figure 1, the results of Model 6 in Table 1 were used to estimate the predicted logged alcohol

impaired driving death rate relative to adherence rates ranging from zero to the 95th percentile Conservative (54%) and Mainline Protestant (32%). For further clarity, the predicted values were exponentiated back into the rate of alcohol impaired driving deaths. As indicated, counties with Conservative and Mainline Protestant adherence rates of zero are estimated to have an alcohol impaired driving death rate of approximately 7 per 100,000 residents. As each respective rate increases, a decrease in the expected rate of alcohol impaired driving deaths coincides. For Conservative Protestant adherence, the expected rate of alcohol impaired driving deaths decreases to around 5 per 100,000 residents at the 95th percentile value. A similar change is observed with respect to Mainline Protestant adherence rates, which are expected to decrease to approximately 4.5 deaths per 100,000 residents.

Discussion and Conclusion

The present study assessed the relationship between religious context, as indicated by the religious composition of counties, and alcohol impaired driving deaths. It was hypothesized that the rate of alcohol impaired traffic deaths would be associated with the adherence rates of Conservative Protestants, Catholics, and Mainline Protestants. This hypothesis was partially supported with the finding of significant relationships between alcohol impaired driving death rates and the adherence rates of Conservative and Mainline Protestant denominations. Presentation of the findings helped answer research questions pertaining to the nature of the relationship between religious composition and alcohol impaired driving deaths. Specifically, the broad associations between alcohol impaired driving deaths and both Conservative and Mainline Protestantism are inverse in nature. Furthermore, moderating effects were found with respect to mental health and substance abuse treatment, number of drinking establishments, and rate of excessive alcohol consumption.

Given the lower rates of alcohol use commonly observed among Conservative Protestants (Bock et al. 1987; Michalak et al. 2007), the inverse relationship between Conservative Protestantism and alcohol impaired driving deaths is not altogether unexpected. Further, it is reflective of the moral communities hypothesis that centers on religious context as a key determinant of social control (Stark 1996), and is consistent with other findings regarding the role of religious context on attitudes and behaviors (Lee and Bartkowski 2004; Finke and Adamczyk 2008; Eitle 2011; Regnerus 2003). cursory consideration would suggest social control of alcohol consumption, partly through local ordinances concerning the sale of alcohol, as a key driver of this relationship. However, the analysis found little evidence of a mediating effect of alcohol availability or rate of excessive drinking on the relationship between Conservative Protestant adherence rates and alcohol impaired driving deaths. The lack of a mediating effect in this regard is suggestive of a different element of social control in this relationship.

Sanctioning represents a vital dimension of social control that likely comprises a salient portion of this relationship. The link between Conservative Protestantism and views on punitiveness (Grasmick et al. 1993; Baker and Booth 2016) is reflected in studies highlighting the role of Conservative Protestant contexts on criminal sentencing (Kim et al. 2018; Fearn 2005). Although potential impaired driving penalties are determined by states, there is discretion at the county-level in the actual penalties imposed, as well as the level of traffic enforcement used in attempting to catch impaired drivers. Samples used in the bulk of studies on religious contextual effects on criminal sentencing tend to be comprised largely of drug, property, and violent offenders (Kim et al. 2018; Fearn 2005). Thus, little is known regarding the influence of religious context on low-level offenses such as first-time impaired driving offenders.

Additionally, little is known about how religious context impacts other characteristics of the criminal justice system such as police staffing levels and enforcement of traffic laws. Future research in this direction can help provide further insight into this finding.

Since the relationships that have been found between Mainline Protestantism and alcohol use generally tend to be positive (Bock et al. 1987; Michalak et al. 2007), the inverse relationship with alcohol impaired deaths does seem a little contradictory. It is likely that more permissive attitudes towards alcohol among Mainline Protestants allows for a focus on responsible alcohol consumption among those who do choose to drink alcohol. A similar occurrence has been observed among adolescents such that promotion of responsible sexual activity has coincided with decreased rates of adolescent pregnancies as compared to prohibitions against sexual activity (Kohler et al. 2008; Santelli et al. 2006). Tolerance of alcohol shifts the focus towards the importance of substitutes to driving impaired, such as designated drivers, public transportation, taxicabs, and ride-share services, which is consistent with the risk averse nature of religion (Miller and Hoffman 1995). The interactive effect between Mainline Protestant adherence and rate of excessive drinking provides evidence that Mainline Protestantism does indeed influence the behaviors of those who consume alcohol. However, this effect recedes at higher levels of excessive alcohol use, a point of consistency with prior research noting the diminishment of religiously-based prosociality that coincides with alcohol use (Duke and Giancola 2013).

In addition to promoting responsible alcohol use, Mainline Protestantism also offers social integration that could inhibit impaired driving. Stress is a primary driver of excessive alcohol consumption (Keyes et al. 2012; Grzywacz and Almeida 2008), which in turn predicts impaired driving (Quinlan et al. 2005). Consequentially, the social support function of religion

represents a salient component with respect to impaired driving. Social integration and support associated with religious activity (Bradley 1995; Ellison and George 1994) is an explanatory factor in the link between religion and mental health (Nooney and Woodrum 2002). Contrary to the tendency of Conservative Protestant to focus volunteer efforts on their congregations (Hoge et al. 1998; Wilson and Janoski 1995; Wuthnow 1999) rather than the community at large (McClure 2015; Whitehead and Stroope 2015; Ammerman 2002, 2005; Chaves 2000), Mainline Protestant outreach is more likely to engage the community (Beyerlein and Hipp 2006; Wuthnow 2001, 2004). Accordingly, communities with high adherence levels of Mainline Protestant denominations should have a wider range of different forms of social support that can help alleviate stress that contributes to forms of alcohol use that are correlated with impaired driving. In some regards, it seems inimical that Conservative and Mainline Protestantism share similar relationships with alcohol impaired driving deaths. After all, they have diverging views pertaining to alcohol use and engagement with the broader community. The similarities in their associations with alcohol impaired driving deaths are reflective of a dynamic and multi-pronged relationship. A key distinction between the Conservative and Mainline branches of Protestantism is the potential that their impacts are differentially experienced by various portions of the populace. For instance, given the prominence of network exclusivity among Conservative Protestants (Scheitle and Adamczyk 2009), social integration aspects of Conservative Protestantism is likely to vary between Conservative Protestants and non-Conservative Protestants, which stands in contrast to the integrative functions of Mainline Protestantism that should more vigorously cross religious boundaries.

Likewise, there are expected differences in social control. With respect to both Conservative and Mainline Protestantism, formal social control should act similarly, while

informal social control may operate differently. Continuing with consideration of exclusivity in social networks among Conservative Protestants, non-Conservative Protestants may not receive as much network-based informal social control of impaired driving that has been noted relative to other alcohol and substance use behaviors (Rivera et al. 2018; Hoffman 2014; Adamczyk and Palmer 2008). A key drawback to the present study is that the focus on county-level outcomes inhibits the ability to ascertain *for whom* religious context influences impaired driving.

Unfortunately, few data sets jointly ask respondents about impaired driving and religious practices, much less contain geocoded identifiers. Integration of impaired driving habits and religious practices in future data collection efforts will allow for clearer understanding of this relationship, particularly so if it is done in such a manner as to facilitate multilevel modeling.

In conclusion, this study has highlighted the relationship between religious context and alcohol impaired driving deaths. Religious composition was found to be a salient component in alcohol impaired driving deaths. Two primary implications arise from these results. First, researchers studying the social impacts of alcohol use need to consider behaviors that are ancillary to alcohol consumption. Secondly, great efforts have been made at reducing impaired driving. These results suggest that policy-makers and other stakeholders need to consider the religious composition of communities during the planning and enactment of interventions aimed at discouraging impaired driving.

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Table 1: Descriptive Statistics

| | Mean/Pct. | Std. Dev. | Min. | Max. |
|--|------------------|------------------|-------------|-------------|
| Log Alc. Driving Death Rate | 1.67 | 1.20 | -4.61 | 5.17 |
| Pct. Male | 49.98 | 2.20 | 43.97 | 78.49 |
| Pct. White NH | 77.44 | 19.63 | 0.76 | 99.57 |
| Pct. Black NH | 8.47 | 13.90 | 0.00 | 86.18 |
| Pct. Other NH | 4.77 | 7.22 | 0.00 | 86.83 |
| Pct. Hispanic | 9.32 | 13.93 | 0.00 | 98.96 |
| Pct. Less than High School | 14.02 | 6.41 | 2.08 | 51.48 |
| Pct. High School Diploma | 34.39 | 7.06 | 8.19 | 54.64 |
| Pct. Some College | 30.49 | 5.00 | 11.91 | 47.43 |
| Pct. Bach. Deg. Or Higher | 21.10 | 9.12 | 5.15 | 73.66 |
| Pct. Below Poverty | 16.29 | 6.33 | 3.73 | 48.67 |
| Pct. Age Below 15 | 18.66 | 2.94 | 1.49 | 34.79 |
| Pct. Age 15-18 | 3.965 | 0.61 | 0.88 | 10.92 |
| Pct. Age 19-20 | 4.00 | 1.92 | 0.07 | 34.69 |
| Pct. Age 21-29 | 10.87 | 2.73 | 2.83 | 30.61 |
| Pct. Age 30-39 | 11.60 | 1.80 | 3.60 | 22.51 |
| Pct. Age 40-49 | 12.30 | 1.53 | 3.38 | 19.52 |
| Pct. Age 50-59 | 14.45 | 1.76 | 6.44 | 24.36 |
| Pct. Age 60+ | 24.16 | 5.42 | 8.72 | 63.26 |
| Home Occupancy | 2.62 | 0.28 | 1.83 | 5.24 |
| Pct. Republican Votes | 62.71 | 15.54 | 4.08 | 92.03 |
| Pct. Rural Population | 56.02 | 30.84 | 0.00 | 100.00 |
| Region | | | | |
| Northeast | 7.50 | | | |
| Midwest | 35.01 | | | |
| South | 43.80 | | | |
| West | 13.68 | | | |
| Log Non-Alc. Driving Death Rate | 2.38 | 0.68 | -0.16 | 5.39 |
| MH/SA Service Avail. | 0.10 | 0.10 | 0.00 | 1.06 |
| Retail Alc. Avail. | 0.11 | 0.12 | 0.00 | 1.54 |
| Drinking Establishments | 0.18 | 0.28 | 0.00 | 5.43 |
| Pct. Adults Excessive Drink | 16.68 | 3.31 | 8.60 | 27.30 |
| Conservative Prot. Adh. | 22.99 | 16.09 | 0.00 | 130.87 |
| Catholic Adh. | 13.00 | 13.34 | 0.00 | 99.96 |
| Mainline Prot. Adh. | 11.61 | 9.81 | 0.05 | 83.54 |

N=2,865

Table 2: OLS Models Estimating Alcohol Impaired Driving Deaths

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | | Model 6 | |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | b | Std. Err. | b | Std. Err. | b | Std. Err. | b | Std. Err. | b | Std. Err. | b | Std. Err. |
| Covariates | | | | | | | | | | | | |
| Pct. Male | 0.004 | 0.015 | 0.004 | 0.015 | 0.006 | 0.015 | -0.001 | 0.015 | -0.002 | 0.015 | -0.002 | 0.015 |
| Pct. NH Black | -0.001 | 0.003 | -0.001 | 0.003 | -0.000 | 0.003 | -0.001 | 0.003 | -0.001 | 0.003 | 0.000 | 0.003 |
| Pct. NH Other Race | 0.010* | 0.004 | 0.010* | 0.004 | 0.010** | 0.004 | 0.009* | 0.004 | 0.010* | 0.004 | 0.010** | 0.004 |
| Pct. Hispanic | 0.005 | 0.003 | 0.005 | 0.003 | 0.005 | 0.003 | 0.005 | 0.003 | 0.005 | 0.003 | 0.005 | 0.003 |
| Pct. Less than High School | -0.015 | 0.008 | -0.015 | 0.008 | -0.013 | 0.008 | -0.014 | 0.008 | -0.015 | 0.008 | -0.013 | 0.008 |
| Pct. Some College | -0.004 | 0.006 | -0.004 | 0.006 | -0.003 | 0.006 | -0.005 | 0.006 | -0.008 | 0.006 | -0.006 | 0.006 |
| Pct. Bach. Deg. Or Higher | -0.022*** | 0.005 | -0.022*** | 0.005 | -0.020*** | 0.005 | -0.021*** | 0.005 | -0.023*** | 0.005 | -0.020*** | 0.005 |
| Pct. below Pov. Line | -0.000 | 0.006 | -0.000 | 0.006 | 0.000 | 0.006 | 0.001 | 0.006 | 0.003 | 0.006 | 0.003 | 0.006 |
| Pct. Age 15-18 | 0.143* | 0.055 | 0.143* | 0.055 | 0.137* | 0.055 | 0.154** | 0.056 | 0.149** | 0.055 | 0.149** | 0.056 |
| Pct. Age 19-20 | 0.013 | 0.020 | 0.013 | 0.020 | 0.012 | 0.019 | 0.014 | 0.020 | 0.009 | 0.020 | 0.010 | 0.020 |
| Pct. Age 21-29 | 0.005 | 0.020 | 0.005 | 0.020 | 0.003 | 0.020 | 0.005 | 0.020 | 0.002 | 0.020 | 0.001 | 0.020 |
| Pct. Age 30-39 | 0.053* | 0.024 | 0.053* | 0.024 | 0.053* | 0.024 | 0.056* | 0.024 | 0.051* | 0.024 | 0.054* | 0.024 |
| Pct. Age 40-49 | -0.027 | 0.022 | -0.027 | 0.022 | -0.029 | 0.022 | -0.025 | 0.022 | -0.029 | 0.022 | -0.029* | 0.022 |
| Pct. Age 50-59 | 0.055** | 0.021 | 0.055** | 0.021 | 0.054** | 0.021 | 0.053* | 0.021 | 0.053* | 0.021 | 0.052 | 0.021 |
| Pct. Age 60+ | 0.001 | 0.013 | 0.001 | 0.013 | 0.001 | 0.013 | 0.003 | 0.013 | 0.002 | 0.013 | 0.003 | 0.013 |
| Housing Occupancy | -0.381** | 0.143 | -0.380** | 0.143 | -0.403** | 0.143 | -0.332* | 0.144 | -0.373** | 0.143 | -0.353* | 0.145 |
| Pct. Republican Votes | -0.001 | 0.003 | -0.001 | 0.003 | -0.000 | 0.003 | 0.000 | 0.003 | -0.000 | 0.003 | 0.001 | 0.003 |
| Pct. Rural | 0.002 | 0.001 | 0.002 | 0.001 | 0.002* | 0.002 | 0.002 | 0.001 | 0.002 | 0.001 | 0.002 | 0.001 |
| Region^A | | | | | | | | | | | | |
| Northeast | -0.354** | 0.106 | -0.355** | 0.106 | -0.296** | 0.108 | -0.341** | 0.106 | -0.382*** | 0.107 | -0.314** | 0.109 |
| Midwest | -0.289*** | 0.075 | -0.289*** | 0.075 | -0.269*** | 0.075 | -0.300*** | 0.075 | -0.340*** | 0.078 | -0.316*** | 0.078 |
| West | -0.265** | 0.095 | -0.267** | 0.096 | -0.254** | 0.095 | -0.299** | 0.096 | -0.275** | 0.095 | -0.293** | 0.097 |
| Non-Alc. Driving Dths. | 0.504*** | 0.043 | 0.504*** | 0.043 | 0.516*** | 0.043 | 0.495*** | 0.043 | 0.509*** | 0.043 | 0.511*** | 0.004 |
| Key Determinants | | | | | | | | | | | | |
| MH/SA Treatment Avail. | | | 0.026 | 0.232 | | | | | | | 0.085 | 0.232 |
| Alc. Retail Avail. | | | | | -0.523** | 0.180 | | | | | -0.469* | 0.181 |
| Alc. Drink Places | | | | | | | 0.240** | 0.091 | | | 0.184 | 0.094 |
| Pct. Excessive Alc. Use | | | | | | | | | 0.023* | 0.010 | 0.017 | 0.010 |
| Cons. Prot. Adh. | -0.006** | 0.002 | -0.006** | 0.002 | -0.006** | 0.002 | -0.006** | 0.002 | -0.006** | 0.002 | -0.006** | 0.002 |
| Catholic Adh. | -0.001 | 0.002 | -0.001 | 0.002 | -0.001 | 0.002 | -0.002 | 0.002 | -0.002 | 0.002 | -0.003 | 0.002 |
| Main. Prot. Adh. | -0.015** | 0.003 | -0.015*** | 0.003 | -0.015*** | 0.003 | -0.017*** | 0.003 | -0.015*** | 0.003 | -0.016*** | 0.003 |
| Constant | 0.643 | 1.230 | 0.638 | 1.231 | 0.545 | 1.229 | 0.562 | 1.229 | 0.641 | 1.229 | 0.477 | 1.229 |
| R² | 0.178 | | 0.178 | | 0.181 | | 0.180 | | 0.180 | | 0.183 | |

*p<0.05 **p<0.01 ***p<0.001

N=2,865 for all models

A: reference category is South

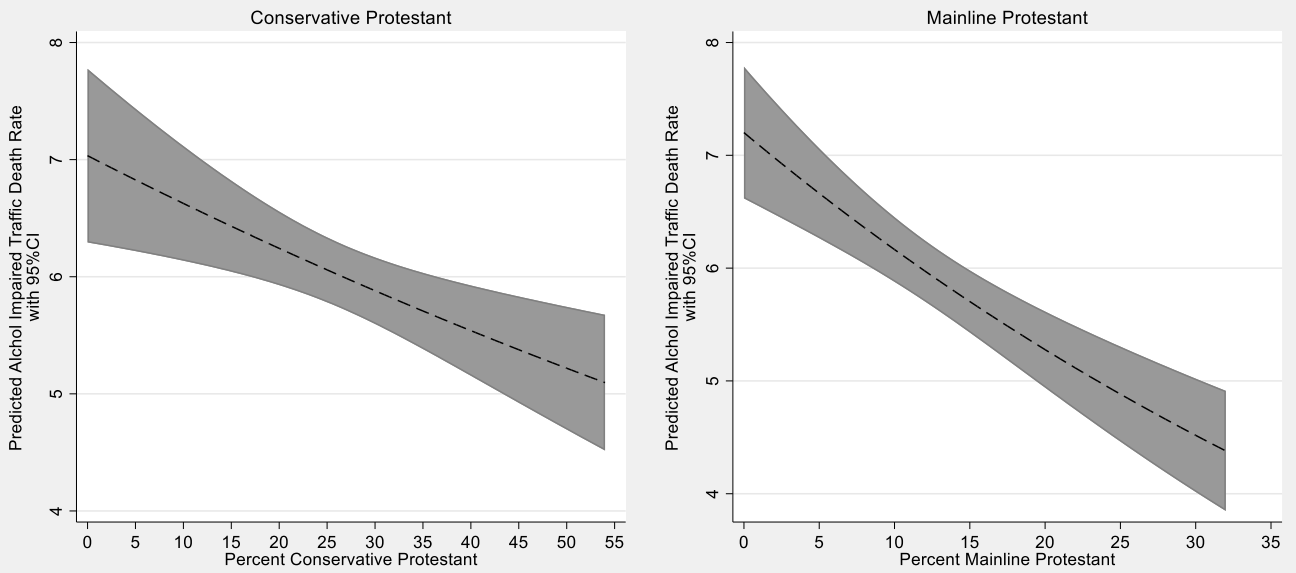


Figure 1: County Religious Composition and Alcohol Impaired Driving Deaths