

MARCH 2013

**REPORT**



# ISPU

## UNDER THE INFLUENCE: *ALCOHOL USE AMONG MUSLIM COLLEGE STUDENTS*

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## Acknowledgements

This work was supported by a grant entitled “Alcohol Use among Muslim College Students” from the Institute on Social Policy and Understanding (ISPU). The authors would like to thank the students who generously participated in the survey and ISPU for its continued support. More detailed information on the study procedures and results are available in the peer-reviewed journal article “Respondent-driven sampling of Muslim undergraduate U.S. college students and alcohol use: pilot study” by the same authors in *Social Psychiatry and Psychiatric Epidemiology*.

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# EXECUTIVE SUMMARY

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## Introduction

Alcohol abuse is a costly social and public health problem. To reduce its consequences, the United States has invested substantial resources to document use and abuse, monitor changes within demographic groups, and intervene. However, the data collected in all of these areas has little to say about drinking among Muslims because many surveys do not ask for one's religious affiliation and due to the challenges related to sampling this particular population.

One Muslim subgroup that may be at high risk is college students, for drinking is a very common activity among students. Negotiating these college/university norms may be especially challenging for Muslim students due to Islam's prohibition of alcohol and the cultural taboo that may exist among even non-observant Muslims. Knowing how they negotiate these norms will inform prevention, early intervention, and treatment efforts for the growing number of Muslims in the United States.

In light of the need for more data, ISPU funded this pilot study to initiate the process of documenting the prevalence of alcohol use among this specific population and to explore potential areas of intervention. In particular, this pilot study examines the relationship of alcohol use and various factors: family, religiosity, personal beliefs, and social influences. Our research combined an innovative sampling technique – respondent-driven sampling – with a web-based survey to gather data on this difficult-to-reach group.

Our pilot study gathered and analyzed data on 156 self-identified Muslim undergraduate students at Wayne State University (WSU), an urban university located in Detroit, MI. This university was chosen because (1) the Detroit metropolitan area hosts a large Muslim population, (2) WSU is located in a state where a large proportion of adults use alcohol, and (3) the campus is located near alcohol outlets, which makes alcohol beverages readily accessible to WSU students.

## Findings

Our findings are as follows:

- 9.1% of Muslim students surveyed at WSU said they used alcohol at least once in their lifetime. This is significantly lower than a 2001 national survey of American colleges that found 49.2% of Muslim students used alcohol. *It is also substantially lower than a 2010 federally funded study that found 63.3% of American full-time college students – across all demographics – had used alcohol in the past month.*

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*Our pilot study gathered and analyzed data on 156 self-identified Muslim undergraduate students at Wayne State University (WSU), an urban university located in Detroit, MI.*

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- The student’s social network is related to use or non-use of alcohol and may reflect stigma around use. Although the relationship is modest, our analysis of the data found that *there is a tendency for those who drink to be friends with and recruit others who drink and for abstainers to be friends with and recruit other abstainers.*
- Parental *behaviors* appear to influence students’ use of alcohol. The results showed that students who drank were more likely to report that their parents drank. However, the *attitudes* of the parents toward drinking were not related to the students’ use of alcohol.
- Finally, for future research, our pilot study shows it is possible to conduct a scientific study on Muslim students and alcohol consumption. The findings demonstrate that respondent-driven sampling is feasible in recruiting Muslim students and may be feasible for other studies. However further research, including the comparative use of different research methods, is needed.

## Discussion and Conclusion

This study shows that Muslim college students can negotiate an environment with alcohol-rich outlets and messages. The survey participants perceived that most students drink, suggesting that they inhabited a social environment that was also infused with alcohol. However, only a small minority of the Muslim students reported they had consumed alcohol at least once.

Our study also holds implications for six groups of potential stakeholders. For parents, the study reveals that their behavior influences their children’s behavior. For religious leaders and faith-based social service practitioners, it shows that the son/daughter’s beliefs and understanding of Islam, not necessarily the outward behaviors (e.g., prayer and mosque attendance) influence his/her decision to use or not use alcohol. For concerned youth leaders and community members, it demonstrates the importance of community influence, particularly from peers, the third source of influence. For clinicians, it demonstrates that while alcohol use was rare in this sample, it does happen and cannot be ignored.

For each of these potential stakeholders, our initial data also suggest the possibility of a broader finding: The tension between secular demands and religious, cultural, and/or familial influences for the young Muslims, at least in college, can be balanced. For the larger American audience, these data show that Muslim college students are similar to other college students in that family, social influences, and religion influence such risky behaviors as alcohol consumption among youth.

Finally, for researchers and funders, it showed that research on Muslims and alcohol use is scientifically feasible. As a pilot study, both its insights and limitations should serve as a clarion call for further research in an under-explored but frequently discussed segment of the American population.

## Background

In the United States, the transition to college is a vulnerable period in the developmental trajectory between childhood and adulthood. In general, this period represents an entrance to a new environment with its own norms of behavior, including the widespread acceptance of drinking alcohol and heavy drinking. In fact, almost half of college students report binge drinking, defined as more than five alcoholic drinks for men and four drinks for women during one sitting, in the prior year. Although the prevalence of underage drinking is dropping, full-time college students continue to exhibit high levels of binge drinking and are more likely to engage in this activity than are other young adults of the same age. Unfortunately, this pattern occurs when students are more likely to be exposed to behaviors and norms that differ markedly from their own and have to decide if they should emulate them or not. Several studies show that friends influence drinking behavior among college students. For this research, we explored the potential influence of family and friends on alcohol use among Muslim college students.

Negotiating college norms may be especially challenging for Muslim students due to Islam's prohibition of alcohol and the cultural taboo that may exist among even non-observant Muslims. Knowing how Muslim students negotiate these norms will inform prevention, early intervention, and treatment efforts for the growing number of Muslims in the United States. In addition, it may provide insight into the tension between secular demands and religious, cultural, and/or familial influences for the general population of young adults. This information, however, begins with determining the prevalence of drinking among Muslim college students in the United States.

## Alcohol Use Among Muslims

Very little is known about alcohol use and abstinence among Muslim college students. Among adults, the 2000 U.S. National Alcohol Study survey found that 78.0% of the 45 identified Muslims in the study reported lifetime abstinence; 75.6% of them reported they believed that Islam prohibits alcohol consumption. From these data, three points stand out: (1) obtaining national data with a sufficient number of Muslim participants is difficult, (2) most but not all Muslims report that they do not drink, and (3) most but not all Muslims report that they believe Islam prohibits alcohol consumption.

As a first step, we used the public access data of the national 2001 U.S. College Alcohol Study data collected by Dr. Wechsler and stored at the University of Michigan. This national study, conducted between February and May 2001, asked students to identify the religion in which they were raised. Assuming that they still identify with it, lifetime drinking was 49.2% for Muslims compared to 87% for all other students. These results are discussed in more detail in our 2010 publication<sup>1</sup>. This lifetime drinking rate is very similar to those found among Muslim students in Beirut, Lebanon,<sup>2</sup> suggesting cross-country similarities. However, the drinking rates from these two studies are considerably higher than those rates reported from students attending universities located in other predominately Muslim countries. The discrepancy with these latter rates may suggest the existence of other influences on alcohol consumption.

Our first step in determining the prevalence of drinking among this group highlighted that Muslims college students drink alcohol, that there was no difference by gender, and that the risk factors for them were similar to those found among other students: parental, social, and religious factors. Unfortunately, the 2001 information is now dated and does not mention the survey participants' current religious beliefs as well as their ethnic or immigrant background. It also had very few measures on relevant social and religious factors.

Thus our newly collected data can be considered the first study to explicitly address this topic. We piloted our envisaged data collection at one university for several reasons: (1) to determine if Muslim students would participate, (2) the challenges faced when recruiting them, (3) and preliminary estimates on alcohol use and associated protective and risk factors. We used the Reference Group Theory, which posits that people use different reference groups for determining norms of appropriate behavior, to guide our selection of protective and risk factors. Potential groups for college students to emulate include their family, classmates with whom they have sustained social interactions and shared similar experiences, and their religious community's articulated values and expectations of behavior.

This theory has been used by at least two groups of investigators to study alcohol use and religious affiliation. The first group,<sup>3</sup> which tested religious affiliation and social class as competing reference groups, found that students, regardless of social class, affiliated with proscriptive Christian denominations were less likely to drink than students belonging to other denominations. This finding suggested religion was the guiding reference group. The second group<sup>4</sup> surveyed Muslim and Christian college students in Beirut, Lebanon. Importantly, Muslim students who attended Muslim-minority universities had the same prevalence of alcohol use as did Muslim students who attended Muslim-majority universities. This indicated that classmates were not a reference group for drinking. Additionally, Muslim students who reported that they participated in religious activities "regularly or rather regularly" and "believed in God" were less likely to drink than were Muslim students who did not express such belief and behavior. This indicated that religion was a reference group.

## Potential Influences on Alcohol Use Among Muslim College Students

### FAMILY

In general, the family represents a reference group for drinking norms across countries and religious affiliations. Investigators have examined its influence by measuring parents' own alcohol consumption (either current or lifetime) and attitudes toward drinking (condemn, no opinion, or condone). One study revealed differences in saliency of parental attitudes by ethnicity,<sup>5</sup> suggesting caution in generalizing from existing studies to different ethnic or religious groups. Investigators have also examined where the students lived, with students living at home less likely to drink than those living elsewhere. Although the influence of family may be heightened in this latter group, this does not mean that all such students drink. In our analysis of the 2001 survey, we found that the parents' history of drinking (or lack thereof) has a relationship, independent of other factors, to students' alcohol consumption; however, whether or not students lived with their parents was only marginally significant.

### RELIGIOSITY

Religiosity encompasses observed religious behavior, dedication, and belief. It is not the same as religious affiliation. The different dimensions of religiosity can be divided into *private* religiosity, which measures the individual's effort to live by religious standards; *public* religiosity, which measures observed activities/behaviors; and *personal religious belief*, which measures what one believes specific to a behavior as part of the religious affiliation.

In general, abstinence and less harmful alcohol use are associated with increased religiosity across different religious affiliations. In our analysis of the 2001 survey, Muslim students who rated religious activities as very important were less likely to drink than other Muslim students. In the National Alcohol Survey, participants who believed that their religion "discouraged drinking" (regardless of actual religious affiliation) were less likely to drink than other participants. However, no information is available on alcohol use and the influence of *private* religiosity and *personal religious belief on alcohol* among Muslim college students.

### FRIENDS AND OTHER SOCIAL GROUPS

Social influences that could be considered pro-alcohol include the high level of drinking among other students and friends, as well as easy access to alcohol. These influences are robustly associated with alcohol use among college students. Muslim students may face counter-balancing social influences to abstain if they live in an area with other Muslims, see more Muslims attending the university, and attended high school with more Muslims. Thus, these specific social influences may be protective factors against drinking; however, we lack data on them.

These social influences may be reflected in reported *motivations* for drinking. For example, reporting social motivations as the main reason to drink would support the importance of social influences. In contrast, reporting peer pressure (“conformity”) or “to get drunk” would suggest social influences are less salient.

### Potential Reference Groups for College Students

- Family
- Religion
- Social groups (i.e., friends, classmates)

Finally, an individuals’ perception of what occurs after drinking may impact his/her decision to abstain or drink. Among predominately conservative Christian college students, the expectation of negative aftereffects was the underlying reason for less drinking.<sup>6</sup> This finding would suggest that interventions should emphasize negative aftereffects and spend less time on social influences. However, as the negative effects being measured only occur after heavy alcohol consumption, relying on this strategy would send a biased and untruthful message.

## Aims of the current study

This study was conducted to (1) gather information about alcohol use among Muslim American college students and the potential role of family, religion, and social networks and (2) to test the feasibility and determine the challenges of recruiting Muslim college students for a study on the stigmatized topic of alcohol use. We wanted to research and test whether or not abstinence would be associated with greater private and public religiosity, specific personal religious belief that drinking alcohol is prohibited, expecting negative outcomes if they drank alcohol (e.g., feeling dizzy), and pro-abstinent familial and social influences. We used respondent-driven sampling and web-based survey at one university. More information on the procedures is provided in the appendix of this report and in our scientific publications.

# RESULTS

## Who Participated?

Survey participants were predominately female (67.9%) and foreign-born (55.8%). Overall, almost all (96.1%) of them had at least one foreign-born parent. Not surprisingly, 38.5% of the students reported thinking exclusively in English. Almost half (46.8%) reported a South Asian heritage and 35.3% reported an Arab heritage. Unfortunately, few students with an African heritage (either born in the United States or abroad) completed the survey, despite our outreach to African-American students and faculty. Most participants (91%) had graduated from an American high school. Consistent with the general WSU student population, most of the sample (82.1%) lived with their parents and received a scholarship (60.3%).

## Did They Drink?

Few of the Muslim students had ever drunk alcohol: 9.1% (based on a 95% confidence interval, 0.2 percent–17.1 percent). Given that this was a stigmatized topic, there was concern that students who abstained would refer the survey to other abstinent students. Our data showed partial support for this. However, this in-group recruitment tendency was not large. Both students who had and those who had never consumed alcohol had similar sized social networks of other Muslim undergraduate students. Only one of the ten students who initiated the survey reported ever using alcohol.

*Both students who had and those who had never consumed alcohol had similar sized social networks of other Muslim undergraduate students.*

HISTORY OF ALCOHOL USE (N=156)	
	PERCENTAGE
Used in past 30 days	2.6
Used but not in the past 30 days	1.9
Used but not in the past 12 months	3.8
Never used	91.7
Missing	—

## Were there differences in demographics by alcohol use?

There were few demographic differences between both groups of students. Students who had used alcohol were less likely to report receiving scholarships than were lifetime abstainers ( $p=.02$ ). Additionally, students who drank were more likely to report they were “Just Muslims” as opposed to being Sunni, Shia or belonging to another group ( $p=.009$ ). There was no difference for alcohol use by students’ history of conversion/born to a Muslim family or by graduation from an American high school/graduation from a foreign high school.

COMPARISON OF DEMOGRAPHIC CHARACTERISTICS BY HISTORY OF EVER DRINKING		
	Percentage of Students Who Never Used Alcohol (n=143)	Percentage of Students Who Ever Used Alcohol (n=13)
<b>Age (n=156)</b>		
18	18.9	15.4
19	28.7	7.7
20	21.0	30.8
21	18.9	23.1
22	4.9	15.4
23 or older	7.7	7.7
<b>Current Year at Wayne State (n=156)</b>		
Freshman	23.1	23.1
Sophomore	30.1	15.4
Junior	21.7	46.2
Senior	25.2	15.4
<b>Sex (n=153)</b>		
Female	70.0	61.5
Male	30.0	38.5
<b>Marital Status (n=152)</b>		
Married, living with spouse	3.6	—
Married, not living with spouse	5.0	—
Divorced	0.7	—
Never been married	87.8	100.0
Other	2.9	—
<b>Racial/Ethnic Heritage (more than one selection permitted; n=156 with 3 missing values imputed to be “no”)</b>		
African	3.5	—
Arab	36.4	23.1
Persian	2.8	—
South Asian	47.6	38.5
East Asian/Pacific Islander	8.4	7.7
European	3.5	30.8

Hispanic	0.7	—
<b>Parents' Born in the U.S. (n=153)</b>		
Both parents born in U.S.	1.4	7.7
One parent born in U.S.; one born in another country	5.7	—
Both parents born in another country/countries	92.9	92.3
<b>Student Born in the U.S.? (n=153)</b>		
Yes	44.3	30.8
No	55.7	61.2
<b>Graduate from an American High School (n=153)</b>		
Yes	92.9	92.3
No	7.7	7.7
<b>Tuition (more than one selection permitted)</b>		
Self-paid	n=40	n=4
Parents or other relatives	n=52	n=8
Scholarship	n=90	n=4
Loans	n=38	n=10
Other	n=18	n=2
<b>In general, in what language(s) do you think? (n=153)</b>		
English	38.6	46.2
Mostly English but also in another language(s)	34.3	30.8
Equally between English and another language(s)	22.9	15.4
More in another language(s) but also in English	2.9	7.7
Another language(s)	1.4	—
<b>Did you convert to Islam? (n=152)</b>		
Yes	2.2	7.7
No	97.8	92.3
<b>Which of the below best describes your religious beliefs? (n=153)</b>		
Shi'a	14.3	7.7
Sunni	67.9	46.2
Nation of Islam	0.7	—
Ahmadi	0.7	—
Just Muslim	16.4	46.2

## Was the family a reference group?

Students who had consumed alcohol were more likely to report that their parents consumed it as well ( $p=.01$ ). However parents' attitudes, as opposed to their actual behaviors, toward this activity appear to have no relationship to the students' abstaining or prevalence of drinking. There was no difference between abstainers and drinkers who lived with parents or in the latter's attitude toward alcohol use.

COMPARISON OF FAMILY VARIABLES BY HISTORY OF EVER DRINKING		
	Percentage of students who never used alcohol (n=143)	Percentage of students who ever used alcohol (n=13)
Either parent had ever used alcohol (n=150)		
Yes	9.5	38.5
No	90.5	61.5
Both parents disapproved of alcohol use (n=152)		
Yes	97.8	92.3
No	2.2	7.7
Lived with parents or other relatives (n=150)		
Yes	83.6	84.6
No	16.4	15.4

## Was religion a reference group?

Lifelong abstainers were significantly more likely than those who had consumed alcohol to report that Islam prohibits alcohol use (95% vs. 69.2%,  $p < .001$ ). In addition, they were significantly more likely to strongly agree (65% vs. 46.2%,  $p = .005$ ) with one of the private religiosity measures: “My religious beliefs influence how I make decisions in my life.” Three other such measures were in the expected direction of higher religiosity among abstainers but were not significant. In contrast, none of the three *public* religiosity measures or the one *Islamic-specific measure* was significantly associated with alcohol use. In other words, a student’s beliefs and understanding of Islam, not necessarily engaging in outward religious behaviors (e.g., prayer and going to the mosque) influence his/her decision to abstain.

We also examined the percentage of Muslim students who rated religious activities as important using the same wording as in the 2001 national college survey. In that survey, 33.1% of Muslim students rated religious activities as “very important”; in the current study, 48.4% did so. Although our data suggests that the current study sample has higher religiosity, the two prevalence rates are not significantly different.

Finally, we compared the sample’s responses with that of a 2009 national survey. The resulting data revealed that Muslim students had significantly higher *private* religiosity responses than the general population of full-time college students.

**RELIGIOSITY AND ALCOHOL-SPECIFIC RELIGIOUS BELIEF BY ALCOHOL USE  
AMONG MUSLIM UNDERGRADUATE COLLEGE STUDENTS**

	Full-time enrolled college students, NSDUH 2009	Percentage of students who never used alcohol ( <i>n</i> =143)	Percentage of students who ever used alcohol ( <i>n</i> =13)
<b>PUBLIC RELIGIOSITY MEASURES</b>			
How important is it for you to participate in the following activities: religious activities ( <i>n</i> =153) 47.9%			
Very important	n/a	47.9%	53.8%
Important		40.7%	30.8%
Not at all important		11.4%	15.4%
During the past 12 months how many times did you attend religious services ( <i>n</i> =153)			
0	6.4%	7.7%	
1 to 2	15.7%	0	
3 to 51	43.6%	53.8%	
52 times or more	13.2% (11.7%, 14.8%)	34.3%	38.5%
In general, to what extent do you adhere to the practices of Islam ( <i>n</i> =153)			
Never		0.7%	0
Rarely		2.1%	0.81
Sometimes		17.9%	7.7
Most of the time		50.0%	38.5
All of the time	n/a	29.3%	23.1%
<b>PRIVATE RELIGIOSITY MEASURES</b>			
My religious beliefs are a very important part of my life ( <i>n</i> =153)			
Strongly agree	29.9% (28.3%, 31.5%)	65.0%	46.2%
Agree		28.6%	30.8%
Disagree		2.1%	23.1%
Strongly disagree		4.3%	0
My religious beliefs influence how I make decision in my life ( <i>n</i> =153)			
Strongly agree	23.5% (22.1%, 25.0%)	62.9%	23.1%
Agree		28.6%	69.2%
Disagree		2.9%	0
Strongly disagree		5.7%	7.7%
It is important that my friends understand my religious beliefs ( <i>n</i> =153)			
Strongly agree	n/a	46.4%	30.8%
Agree		45.7%	53.8%
Disagree		3.6%	15.4%
Strongly disagree		4.3%	0%
It is important that my friends share my religious beliefs ( <i>n</i> =152)			
Strongly agree	5.4% (4.6%, 6.4%)	21.6%	7.7%
Agree		30.9%	38.5%
Disagree		33.1%	38.5%
Strongly disagree		14.4%	15.4%
Composite scale of above 4 items, <i>M</i> ( <i>SD</i> )		11.85 (2.58)	12.95 (2.76)
<b>PERSONAL ALCOHOL-SPECIFIC RELIGIOUS BELIEF</b>			
How do you believe your religion views each of the following: Alcohol ( <i>n</i> =153)			
Prohibit	n/a	95.0%	69.2%
Discourages		2.1%	7.7%
No stance		2.1%	23.1%
Actively encourages		0.7%	0

Notes: Unadjusted proportions. CI = confidence interval, NSDUH = National Survey on Drug Use and Health, n/a = not applicable

## Were social influences reference groups?

The students in the current study reported alcohol use to be very common among all university students, indicating that they believed they were operating in an environment where many, if not most, students drank. However, those who drank perceived that significantly more university students, Muslim students, and their friends used alcohol than did the abstainers. They also reported a significantly lower proportion of Muslims in their high schools and current neighborhoods than did the abstainers.

Such differences may reflect the problem of estimating proportions in general. To test this hypothesis, we compared estimates of the proportion of Muslim students at the university with students who had consumed alcohol and those who had not. The estimates provided by both groups showed no differences, thereby indicating that any difference in proportion was not due to estimating biases.

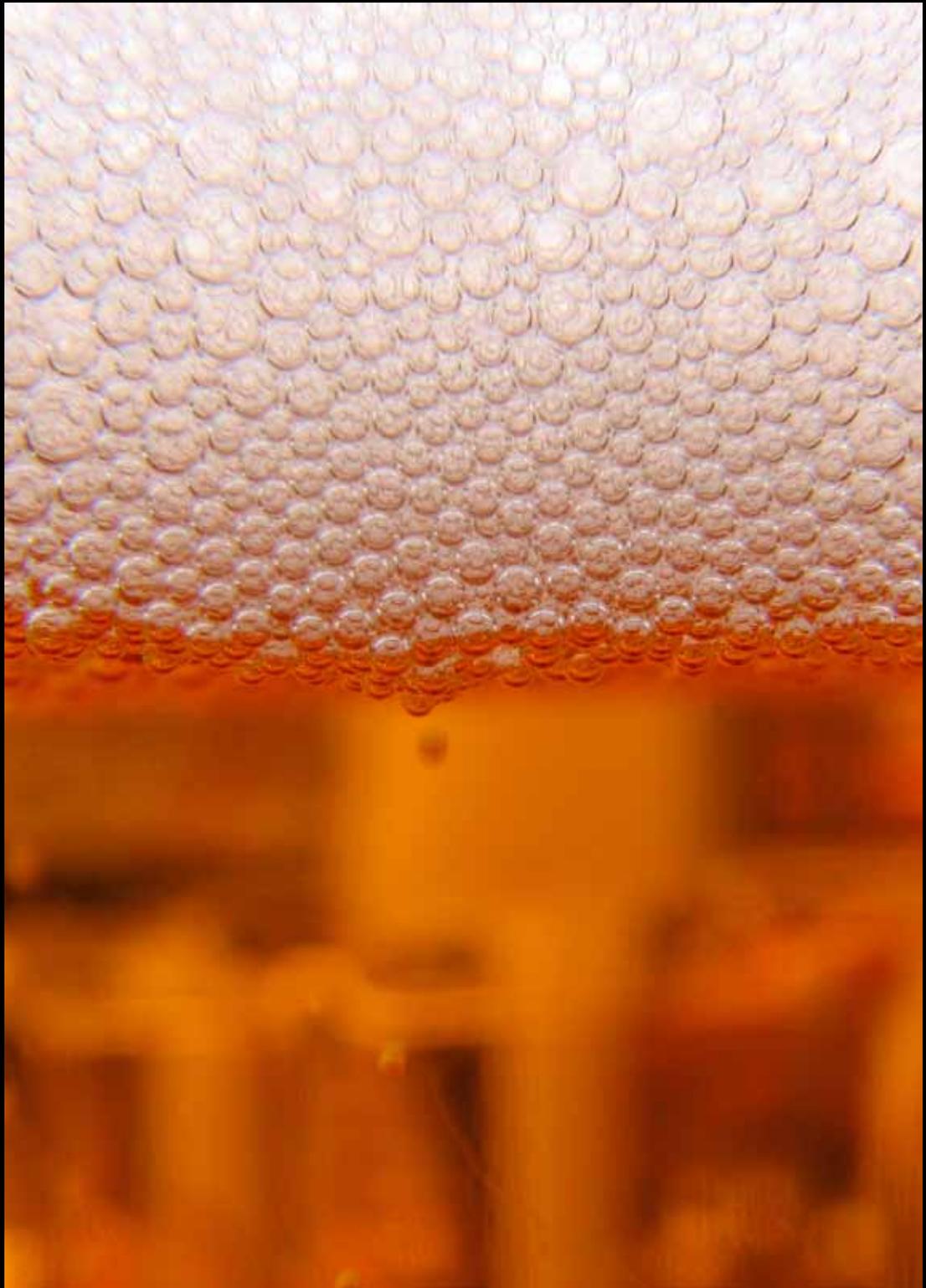
SOCIAL INFLUENCES BY ALCOHOL USE AMONG MUSLIM UNDERGRADUATE COLLEGE STUDENTS		
Variable	Percentage of students who never used alcohol (n=143)	Percentage of students who ever used alcohol (n=13)
Percentage of other Muslims around...		
Current neighborhood (n=152)		
Almost none, %	11.5%	30.8%
Some but less than 10%,	20.9%	23.1%
10% to 30%,	11.5%	23.1%
Over 30% but less than 50%	15.8%	23.1%
50% or more	40.3%	0
During high school (n=151)		
Almost none, %	10.1%	46.2%
Some but less than 10%,	20.3%	38.5%
10% to 30%,	14.5%	7.7%
Over 30% but less than 50%	13.8%	7.7%
50% or more	41.3%	0
At Wayne State (n=151)		
Almost none, %	0	0
Some but less than 10%,	4.3%	0
10% to 30%,	32.6%	38.5%
Over 30% but less than 50%	42.8%	46.2%
50% or more	20.3%	15.4%
Social network size of other Muslim undergraduate students (n=156)		
1 – 7 students	21.0%	38.5%
8 – 15 students	26.8%	30.8%
16 – 30 students	25.4%	23.1%
31 or more students	26.8%	7.7%

Perception of alcohol use among...		
Undergraduate students (n=154)		
Almost all or all	20.6%	61.5%
Most	46.8%	30.8%
Some	27.7%	7.7%
None	5.0%	0
Muslim undergraduate students (n=154)		
Almost all or all	2.1%	15.4%
Most	8.5%	38.5%
Some	68.8%	46.2%
None	20.6%	0
Your friends (n=153)		
Almost all or all	0.7%	33.3%
Most	7.1%	33.3%
Some	39.0%	25.0%
None	53.2%	8.3%

## What were the motivations for drinking?

Abstainers had more expectations of negative outcomes if they drank than did the other students. This finding suggests that the students are honestly reporting their alcohol use. There was no difference in average scores between the two groups on the positive expectancies, which indicates that those who had consumed it were not pulled by perceived increased positive aspects.

We asked those who had consumed alcohol to rate different motivations for drinking. Social motivations were rated as significantly more important than either conformity or alcohol-effect motivations. All items in the conformity scale were scored as “very unimportant” by 76.9% of the survey’s respondents, indicating their explicit rejection of peer pressure as motivation for drinking.



## DISCUSSION

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This pilot study, supported by funding from ISPU, was the first study to sample Muslim college students and one of the first studies to use respondent-driven sampling to sample religious minorities. It showed the feasibility of recruiting Muslim students to complete a survey on alcohol use at one university.

The findings are of interest to American Muslims and the general public. It provides support for the feasibility of continued research using respondent-driven sampling among religious minorities. The findings of abstinence being associated with higher religiosity, more proscriptive social influences, and negative expectancies among Muslims echo those found among predominately Christian students, suggesting that the Muslim students were answering truthfully. However, more research is needed on respondent-driven sampling among religious minorities on a controversial topic to support its validity.

As to the findings, lifetime alcohol use was unexpectedly low (9.1%) in this sample as compared to the results of our analysis of the 2001 national college survey. To put this prevalence in perspective, a 2009 national survey found that 63.3% of full-time college students had used alcohol during the past month.

Possible reasons for the discrepancy between the lifetime alcohol use of 49.2% among American Muslim students in 2001 and 9.1% in 2011 include the methods (i.e., sampling approach, online survey) used, the types of people being surveyed, what their social environment was like, and other changes over time. As it was a pilot, we did not continue sampling students beyond the initial 156 respondents. A larger sample size might have yielded tighter confidence intervals and reached Muslim students who were not affiliated with student organizations serving Muslim students. It is possible that this group would be more likely to consume alcohol. The in-group recruitment rate was moderate among abstainers, suggesting *different but not exclusively different* social circles. Thus, a larger sample size might have reached more students with a history of alcohol use. However, we monitored the recruitment process and key estimates did not change, which suggests that these estimates for alcohol use are stable for this population of Muslim students.

Our sampling was restricted to social networks at one university. Muslim students who attend Wayne State University might differ from their counterparts at other universities. In particular, the sample was drawn from a region with a substantial number of Muslims, a factor that may have diminished pro-alcohol social influences, compared to Muslim students recruited elsewhere. The students predominately lived at home (compared to only 41% in the 2001 survey) and received scholarships, both of which may have diminished experimentation. Furthermore, they

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were predominately immigrants or children of immigrants and thus may not be representative of all Muslim undergraduate students. Unfortunately, the 2001 study contained no information on immigration status and region of residence, which limited our ability to compare the two studies. In particular, African-American students were very poorly represented in the current sample. However, we do not know the true proportion by race/ethnicity of Muslim students at Wayne State University.

Reliance on social networks for sampling, which is key to respondent-driven sampling, would have excluded Muslim students who did not know other Muslim students socially at the university. Those students, in turn, might have had a higher prevalence of drinking, especially due to fewer proscriptive social influences at the university. In other studies, non-respondents to surveys have also been shown to include heavier drinkers. Researchers have emphasized that respondent-driven sampling requires knowledge of the underlying population. For this sample we familiarized ourselves with the student organizations and prominent Muslim faculty members, but may have lacked information on unaffiliated Muslim students.

Another reason for the low alcohol use is the online survey's promise of anonymity. This anonymity would allow them to emphasize the positive side of Islam, such as abstinence, to counter negative stereotypes.

Lastly, the low prevalence of lifetime alcohol use may reflect true changes since 2001. Drinking by the general population of American college students dropped to historic lows in 2010, and our sample might have reflected this lower drinking rate. The expansion of social media since 2001 may have helped Muslim students feel connected with other Muslim students and thus enhance proscriptive social influences. In addition, religiosity and religious identity may have increased since 2001. When we compared responses on the identical religiosity measure in both surveys, the change was in the direction of greater religiosity over time, even if it was not significant. Finally, one must also realize that during the interval between the surveys the increased anti-Muslim public rhetoric might have led students to distrust any survey of Muslims.

Nonetheless, even with this low prevalence of alcohol use, drinking has a strong relationship with students who do not adhere to religious beliefs that prohibit alcohol, lower private religiosity, and lower social influences that prohibit drinking. These findings, as well as the finding on negative expectancies, are consistent with models developed using predominately Christian samples. However, only a larger sample can rigorously confirm this and examine it in a multivariate model.

It is important to emphasize that those who abstained from alcohol reported that even though they were surrounded by more Muslims, they were not isolated from non-Muslims in the university or in their neighborhoods. Likewise, those who had consumed alcohol were not isolated from other Muslims. With a larger sample and additional measures, we could explore how social influences

(e.g., social monitoring) support abstinence. We know from studies of the general population that social monitoring helps maintain behavior; however, we did not ask detailed questions on actual and perceived monitoring by parents or neighbors.

Other possible factors may explain the pattern of Muslims in neighborhoods and alcohol use observed. Students may have reported living in neighborhoods with a higher proportion of Muslims due to the choice of their parents, who were overwhelmingly immigrants, to live in ethnic neighborhoods. Thus, they may be following their parents' model of not drinking and just happen to live in neighborhoods with a higher proportion of Muslims.

As a caveat, one should realize that there are gas stations, drug stores, and other alcohol outlets even within Muslim neighborhoods and that the students presumably drove cars or motorcycles or took public transportation to reach the university. In a separate study, we found how some young adults from these neighborhoods travel to other towns or retreat to basements to drink.

All three reference groups included in our theoretical model appeared to exert influence on alcohol use. The parents' drinking history, the students' proscriptive religious belief and private religiosity measures, as well as the social influences of friends, neighborhoods, and high school, were all significantly associated with alcohol use. This small pilot study could not assess how these measures are correlated to each other or whether they are independent influences of other reference groups.

In conclusion, these findings show both the feasibility and the challenge of using respondent-driven sampling to investigate alcohol consumption among Muslim college students. We showed that (1) we could recruit participants who would complete the survey and (2) that their responses suggest, as we had hypothesized, that life-long abstinence for Muslim college students is associated with high private religiosity, personal alcohol-specific religious beliefs, negative expectancies of alcohol use, and a proscriptive social environment.

One of the challenges we encountered was the low prevalence of alcohol use detected. This may be due to multiple issues, including (1) the sampling technique was initiated with students affiliated to student organizations serving predominately Muslim students or (2) the characteristics of the sample (e.g., immigrants, on scholarships, live with their parents).

A larger sample is needed to acquire more detailed information on alcohol use among Muslim college students, including more students who do not live at home. In our publication to the general academic population, we concluded that respondent-driven sampling is a promising sampling strategy that can reach religious minorities; however, rigorous comparison to random sample technique is needed for validation.



## IMPLICATIONS AND RECOMMENDATIONS

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Our study holds implications for six groups of potential stakeholders: (1) For *parents*, the study shows the importance of how their own behaviors influence the behavior of their children; (2) For *religious leaders and faith-based social service practitioners*, it shows that the child's beliefs and understanding of Islam, not necessarily the outward behaviors (e.g., prayer and going to the mosque), influence his/her decision to drink alcohol or not; (3) For *concerned youth leaders and community members* it demonstrated the importance of community influence, particularly from peers, the third source of influence; (4) For *clinicians*, it demonstrates that while alcohol use was rare, it does happen and cannot be ignored.

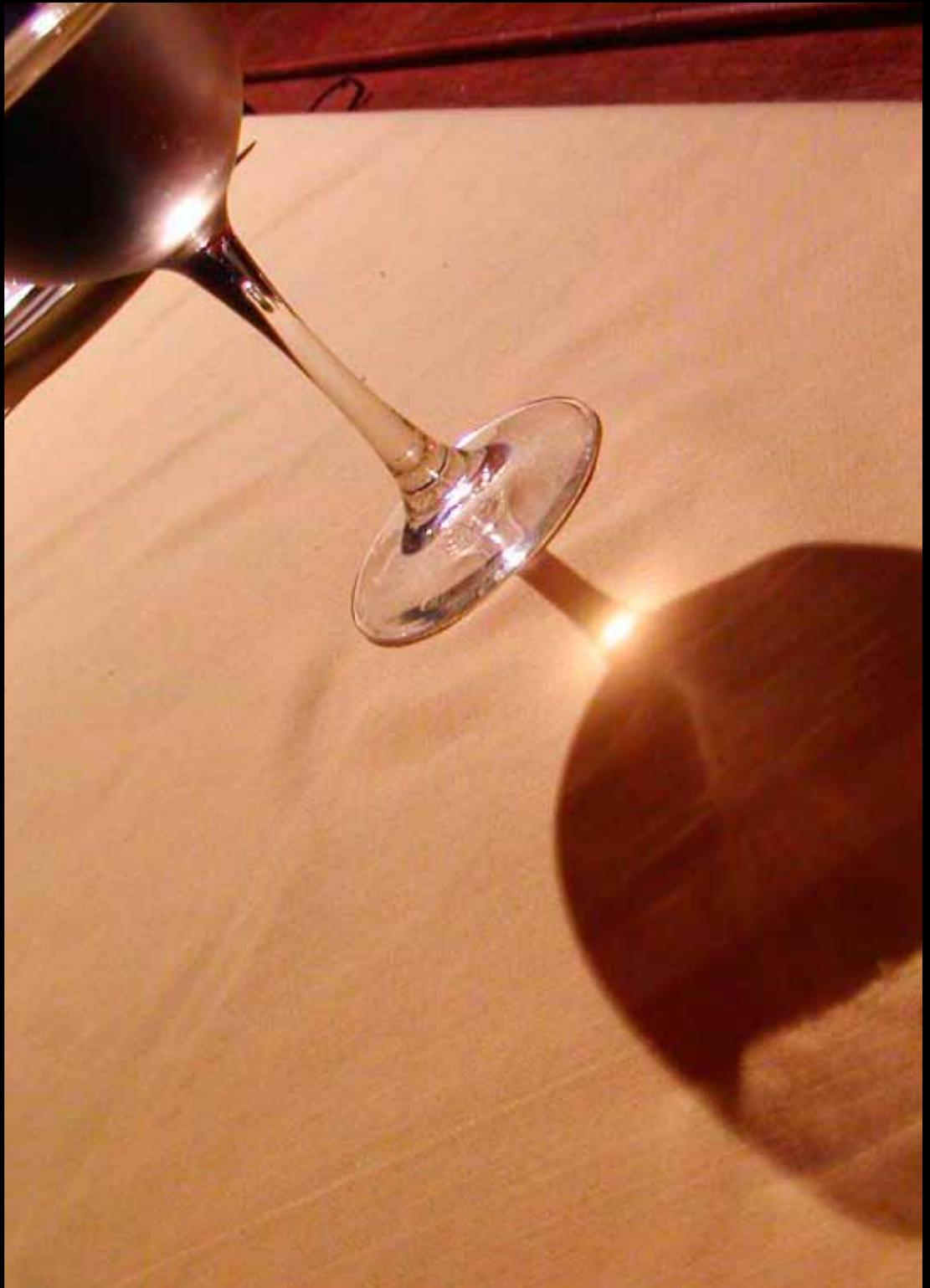
For all four of these potential stakeholders, our initial data also suggest the possibility of a broader finding: The tension between secular demands and religious, cultural, and/or familial influences for young Muslims—at least in college—can be balanced; (5) For the *larger American audience*, these data show that Muslim college students are similar to other college students in that family, social influences, and religion influence such risky behaviors as alcohol consumption.

Finally, (6) for *researchers and funders*, it showed that research on Muslims and alcohol use is scientifically feasible. Both the insights and limitations of this pilot study should serve as a clarion call for further research in an underexplored, but frequently discussed, segment of the American population.

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## APPENDIX A: SAMPLING ISSUES

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### Sampling Issues

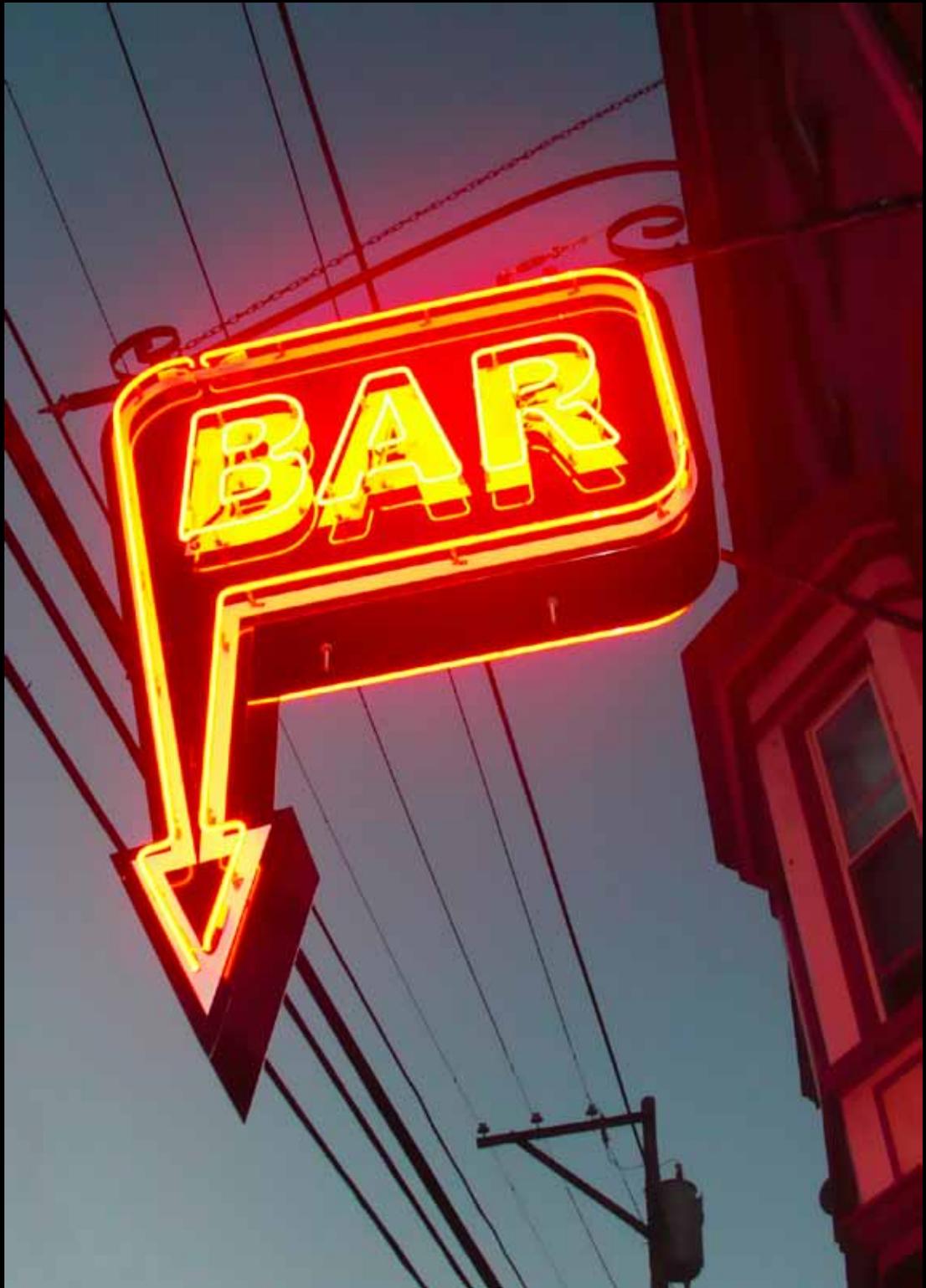
Sampling remains a barrier to studying alcohol use among Muslim college students. Although non-rigorous sampling is used extensively in qualitative studies, the scientific value of survey research is directly tied to the sampling methods. Unfortunately, sampling proscriptive religions is challenging because American census forms do not ask about one's religious affiliation and are frequently missing from large national surveys. Rigorous sampling methods have traditionally relied on lists of target populations. However, relying on the member lists of a mosque or organization (e.g., the Muslim Students Association) would exclude nonaffiliated Muslim students and thus bias the findings. An alternative approach frequently used by investigators is "chain-referral sampling" or "snowball sampling". However, chain-referral sampling also suffers from biases because it often over-represents those affiliated with large social networks in the final sample. In addition, the participants' responses are not independent, since recruited individuals would be more similar to their recruiters than to other respondents.

Respondent-driven sampling was developed to address the issue of rigorous sampling when a list is not available. Although it is an extension of chain referral sampling in that the sampling is initiated with a few individuals (i.e., "seeds"), there is one significant difference: There are restrictions on the number of people each participant can recruit. The analysis also controls for dependence within chain referrals. In other words, a person with 300 friends could recruit only three of them. Additionally those three friends and the recruiter would be part of a single chain referral and analyzed appropriately. Dr. Heckathorn developed the sampling technique in 1997 in order to sample injection drug users. This technique is currently applied internationally. Importantly, respondent-driven sampling assumes the existence of social networking. The logical outcome of this assumption is that all members of the target population (in this case all of WSU's Muslim students) would be included in the final sample if the sampling were allowed to continue until saturation. *This sampling approach would have to be university-specific as one set of seeds cannot be used across universities.*

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## APPENDIX B: METHODOLOGY & MEASURES

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### Survey Participants

Eligible participants included self-identified Muslims currently enrolled as undergraduate student at Wayne State University (WSU) in Detroit, MI, aged eighteen or older. This final criterion was designed to restrict recruitment to those students who could legally participate in the survey without parental permission. Approximately 60% of WSU's 32,000 students are undergraduates, 70% of whom receive scholarships/grants to cover at least part of their tuition. Although primarily a commuter campus, WSU can house 3,000 students. The number and racial mix of Muslim students are unknown, as data on religion is not collected. Detroit is located in a region with a substantial Muslim community and in a state with a comparable proportion of adults using alcohol in the past month as the national median (Centers for Disease Control and Prevention, 2011). Liquor license data confirmed the availability of alcohol to students – there were several alcohol outlets located near the university. The final sample size was 156 students.

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*Detroit is located in a region with a substantial Muslim community and in a state with a comparable proportion of adults using alcohol in the past month as the national median.*

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### Measures

#### DEMOGRAPHICS

We initiated the survey by asking if the student is Muslim. Although no one checked “no,” the plan had been to exclude those responses. For demographic characteristics, we asked potential participants to indicate their age, sex, race, and national origin. We also asked about their religious group within Islam (e.g., Sunni or Shi'i) and provided the option of “Just Muslim.” We presented them with a list of options for how students pay tuition. Those who selected “scholarship” were coded as receiving a scholarship. For a crude measure of acculturation, we asked in which language(s) they think. In the analysis, we contrasted “English” with all other responses, including “English and another language.” Other measures of acculturation were one's place of birth (to identify first-generation Americans) and parents (to measure second-generation Americans), and graduation from an American high school.

#### ALCOHOL USE

We took specific questions on alcohol use, parental attitude toward alcohol and modeling of abstinence, and reasons for using alcohol or for abstaining from Dr. Wechsler's 2001 College Alcohol Survey. Unlike the 2001 study, we asked only those students who had consumed alcohol why they had done so. We then formed subscales from their responses: *social* (to have a good time, celebrate, and as a reward), *conformity* (to fit in, everyone else is doing it,

and to feel more comfortable with the opposite sex), and *enhancement* (to relax, to get drunk, to increase confidence in a social setting). The internal reliabilities of these subscales were .97, .92, and .83 respectively.

Two scales were selected from the *Comprehensive Effects of Alcohol* questionnaire<sup>7</sup>: the *Cognitive and Behavioral Impairment Scale*, which measures the negative expectancies of alcohol use, and the *Sociability Scale*, which measures the positive expectancies of alcohol use. All respondents were asked to respond to these scales, regardless of prior alcohol use or non-use. Examples from these scales are indicated after the stem sentence: “Please indicate your degree of agreement that a particular effect will likely occur to YOU from drinking alcohol: Writing impaired (negative expectancy), Talkative (positive expectancy).” In this sample, the internal reliabilities were .97 for the Cognitive and Behavioral Impairment Scale and .95 for the Sociability Scale.

## RELIGIOSITY MEASURES

Seven religiosity measures were included in the survey. Four of these measures were from the annual U.S. National Survey of Drug Use and Health, one was from the Muslim American Physician Survey, one from the 2001 College Alcohol Study, and one was written by the pre-survey focus group. For comparisons, the responses for four measures were obtained from the 2009 full-time college students’ sample.

The *private* religiosity measures were: “My religious beliefs are a very important part of my life,” “My religious beliefs influence how I make decision in my life,” and “It is important that my friends share my religious beliefs.” The focus group suggested the other private religiosity measure: “It is important to me that my friends understand my religious belief.” We examined the private religiosity items separately and together as a scale (internal reliability=.85).

The *public* religiosity measure was: “During the past 12 months how many times did you attend religious services?” The *one Islamic-specific measure* was considered a public religiosity measure: “In general, to what extent do you adhere to the practices of Islam?” The one measure from the 2001 College Alcohol Study was also considered a public religiosity measure: “How important is it for you to participate in the following activities: religious activities?”

After a lead-in statement assuring the students that this was not a test and we were interested in their personal beliefs, we asked about their *personal alcohol-specific religious* belief (anchored 1=actively encourages, 5=prohibits).

## SOCIAL INFLUENCES

The researchers constructed several social influences measures: the proportion of Muslim students at WSU, in their current neighborhood, and at their high school during their student days. To facilitate answering and analysis, responses were limited to the categories anchored

with 1= “almost none” and 5= “50% or more.” We also asked about the proportion of students, Muslim students, and their friends who drink; responses were limited to categories anchored with 1= “none” and 4= “almost all or all”. The size of the student’s social network with other Muslim undergraduate students was defined as the number with reciprocal knowledge of names and social contact in past two weeks (e.g., in person, phone, text, email, or social media). For respondents who answered “a lot” or some other indication of a large number, 300 was imputed. Network size is required to conduct inverse weighting as required by respondent-driven sampling. The imputation for large numbers was not expected to influence the results, as the analysis is more sensitive to small network sizes.

## ANALYSIS

Respondent-driven sampling uses specialized software to weigh by the inverse size of the social network and to control for dependence within referrals. This specialized software provides adjusted population prevalence and 95% confidence intervals, excludes responses from students who initiated the study (as they are identified and selected by the investigators), and provides an adjusted mean network size and in-group recruitment tendencies. The in-group recruitment tendencies have a range from 1.0 to -1.0, with 0 indicating no tendency for students to recruit people who are similar or dissimilar to themselves as regards alcohol use. There is no confidence interval calculated for in-group tendencies; however, according to the developers, studies examining HIV infection in injection drug users rarely found in-group recruitment tendencies exceeding .30. To test bivariate associations, we used the unweighted sample.

## Pre-testing the survey

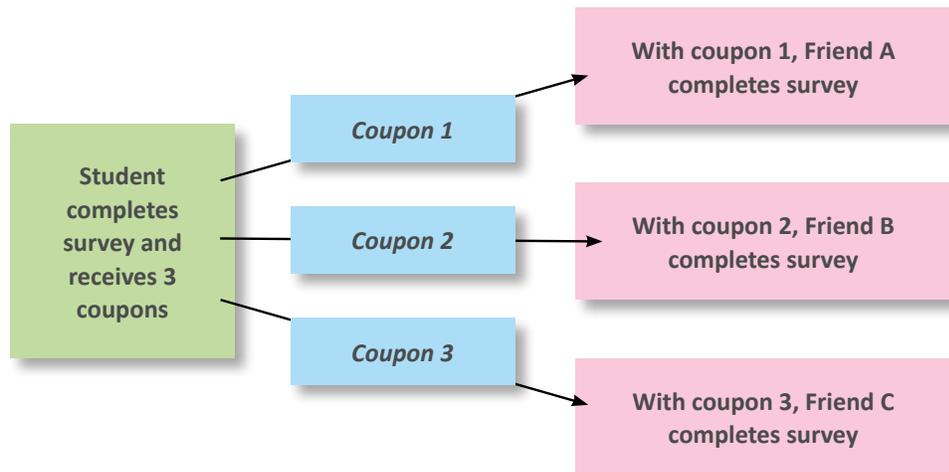
Prior to implementing the survey, we conducted a focus group with Muslim students from other universities. They reviewed the survey’s questions and offered opinions on the acceptability of the recruitment method and reimbursement. These students were not eligible to participate in the survey and did not complete it. They approved the measures and added one additional religiosity measure, listed below. Three Muslim students at another university pre-tested the web-based survey; their answers were not included in the results. They indicated that the survey was easy to follow and complete. One of their suggestions was to allow for students to think in multiple languages.

## Sampling

Respondent-driven sampling was used to recruit eligible students who would complete a fifteen-minute web-based questionnaire. Recruitment was initiated by reaching out to officers of student organizations serving predominately Muslim students. This outreach was designed to introduce the investigators to the students, publicize the survey, and address any questions they might have. Based upon the ensuing discussions, the study was expanded from just examining alcohol use to examining tobacco use as well. The students voiced support for the survey, had no questions

about it, and did not complain to the investigators during the survey. Support for continuing it was also maintained through contacts and presentations to the classrooms of three prominent Muslim faculty members. These meetings were initiated due to lagging recruitment rates.

Prior to completing the survey, the students received “coupons” with codes needed for the survey via university email to the students’ university email address. This step was taken to verify that each student was enrolled at the university. Each “coupon” consisted of a one-page form with the URL for the survey, instructions, and the unique code. After completing the survey, each student received by university email an electronic gift certificate and three coupons to distribute to other Muslim undergraduate students who agreed to take the survey. The instruction explicitly stated that a recruited participant has to be an “undergraduate Muslim student at Wayne State University.” After each coupon was used by an eligible student to complete the survey, the referring student received another gift certificate. Due to flagging recruitment rates, however, the value of the gift certificate was increased during the study. The study was approved by the Wayne State University Institutional Review Board.



## Endnotes

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