THE JOURNAL OF BUSINESS INQUIRY

Volume 13 Issue 1 (Special Issue) 2014

Utah Valley University Woodbury School of Business

ISSN 2155-4072 (online)

The Journal of Business Inquiry 2014, 13, Issue 1 (Special Issue), 1-2
http:www.uvu.edu/woodbury/jbi/articles/
ISSN 2155-4072

Editorial
Special Issue Editor's Introduction: Religious Faith and Social and Applied Sciences

Utah Valley University's Woodbury School of Business organized the Religious Faith and Social and Applied Sciences Conference which was held from October 10 to October 12, 2013 in Orem, UT. The conference highlighted how religious faith has always been an important part of everyday life, in all social and applied sciences. To this end, it brought together researchers who worked on the impact of religion in various fields. Their interaction would certainly help in developing further their research. Furthermore, the outcome and findings of this research would also help policy and other decision makers to better understand these issues.

Researchers from various organizations, colleges and universities from the four corners of the world showed how religious beliefs influence many decisions that are made over the years: economic decisions, political decisions, legal decisions, decisions about health and many more.

Some of the papers presented at the conference were submitted for possible publication in a special issue of the journal. Based on blind reviews by specialists in the field, five of these papers were accepted to be published in this issue.

This special issue covers several areas: binge drinking in the US and religion, Islam and human life, text mining analysis of religious texts and the impact of religion on youth outcomes as well as learning to make good business decisions better. Following is the highlight of each paper.

Binge behavior has long been the focus of economic studies, and the debate continues as to what causes individuals to engage in such behavior. Christopher Westley (Jacksonville State University) and Falynn Turley (University of Alabama at Birmingham) examine the role of religion and region on binge drinking. They find that regional constraints are influenced in part by the dominant religion and also affect the likelihood to binge drink by adherents to minority religions. They also find that blanket prohibitions on drinking, whether explicit or implicit, may cause individuals to binge drink less regardless of their effect on drinking in general. Furthermore, they find both culture and region are predominant factors on binge drinking.

Current literature in both fields of history and legislation concentrates on how Islam came in response to a cultural need to civilize the ancient Arabs. Ebtisam Sadiq (King Saud University) explains the historic background that describes the life of the Arabs before the advent of Islam early in the 7^{th} century AD. Depending on historic sources, the study highlights the fact that prior to the appearance of Islam, the Arabian Peninsula was steeped in intellectual darkness and cultural ignorance. Compared to the surrounding nations and civilizations, its people were less enlightened on all cultural levels, the intellectual, religious, political, social, and economic. She shows how Islam fits for all times and people and selects aspects of history across a broad spectrum of three historical periods and examines them in relationship to Islam's legislative matter. Finally, the paper explains how and why Muslims have relaxed their hold on Islam despite its valuable precepts and thorough legislative coverage. She finds that this lapse is no fault of Islam but of the political, social and educational systems that diverted from the proper Islamic path. She suggests that Islam's moral and religious values, political, economic, and judicial directives can be accessed as sources

of wisdom in structuring modern familial, social and ruling systems. Furthermore, she suggests if Muslims have chosen to neglect such treasure, Islam cannot be held responsible for such lapse.

Over the last two decades, automatic text processing has improved in part because of the growth in availability of digitized text. Daniel McDonald (Utah Valley University) explores similarities and differences between nine religious texts by applying techniques used in the analysis of business and medical texts. The methodology he uses is the current methods in text mining. He extracted and categorized noun and verb phrases from nine religious texts: the Book of Mormon, the Greater Holy Assembly, the New Testament, the Old Testament, the Popol Vuh, the Qur'an, the Rig Veda, the Tao Te Ching, and the Torah. He uses the extracted topics as input to a Self-Organizing Map and separates the results of his analysis by noun and verb topic analysis and finds many interesting results. For example, of the verb inputs, 35 percent of verb topics occurred in only one religious text and also 36 percent of the topics occurred in only one religious text.

The existing literature has shown a correlation between participation in religious activities and positive social behavior among youth. Bryson Pope (Brigham Young University), Joseph Price (Brigham Young University) and Dean R. Lillard (Ohio State University) use data from several nationally representative datasets to estimate the relationship between church attendance and risky behaviors and whether these associations vary when one accounts for selective participation. They use various empirical methods including propensity score matching, sibling and family fixed effects models, and instrumental variables models that exploit cross-state variation in blue laws. They find more frequent church attendance has a real impact on youth behavior, specifically on current substance use (smoking, alcohol, and drug use).

Finally, the paper by Larron C. Harper (University Birmingham Alabama) studies the value of adding religious faith considerations to business education and addresses how barriers and pitfalls to the application of the learning in the real world workplace can be confronted. He suggests that Christian colleges and universities should be more deliberate in including biblical teachings in their course curricula. They can stress to their students that following God's will and biblical principles that foster neighborly love, fair and just treatment of employees and business associates and service to community need to be foremost in their minds. This should encourage students to seek out business decision-making models that enable them to handle multiple objectives that improve business outcomes. They are more likely to make the extra effort required to complete all the considerations embodied in the proposed stakeholder model.

Amir Kia
Editor-in-Chief
Utah Valley University
Email address: akia@uvu.edu

The Journal of Business Inquiry 2014, 13, Issue 1 (Special Issue), 3-11
http:www.uvu.edu/woodbury/jbi/articles/
ISSN 2155-4072

Binge Drinking in the United States: Do Religion and Region Matter?

By CHRISTOPHER WESTLEY AND FALYNN TURLEY*

Binge drinking has been the target of economic studies due to the negative factors associated with such behavior. Although many factors have been considered to influence binge drinking, this paper examines the role of religion and region. While it is generally believed that prohibition encourages more than it deters binge drinking, our results indicate that restrictions such as bans on alcohol purchases result in less binge drinking, and that both culture and region measures should be considered predominant factors.

Keywords: Binge Drinking, Economics of Prohibition, Economics of Religion

JEL Classification: D01, D12, H75, I18

I. Introduction

Binge behavior has long been the focus of economic studies, and the debate continues as to what causes individuals to engage in such behavior. In particular, the study of binge drinking of alcohol provides a specific case study of binge behavior in general. Binge drinking has long drawn the attention of social scientists due to societal problems linked to heavy drinking such as problem behaviors and health risks. Drinking and driving, sexual assault, injuries, and long-term health risks are all common problems associated with excessive drinking (Abbey, 1991, 2002; Hingson *et al*., 2002; Perkins, 2002; Wechsler *et al*., 1994).

Binge drinking has been the subject of studies such as Knight *et al*. (2003), Austin and Ressler (2012), Miron (2004), and Thornton (1991). These studies suggest that policy along with multiple other factors influence binge drinking and that prohibition often can have unintended consequences like political corruption, loss of civil liberties, and more potent products (Miron, 2004).

This paper adds to the current literature by attempting to measure the causes of binge drinking using a unique dataset, namely, county-level data collected by the Robert Wood Johnson Foundation measuring binge drinking, while also considering the role that religion and region play on binge drinking in the United States. Section II reviews the relevant literature on both binge drinking and the economics of prohibition, and Section III presents an empirical model with the expected theoretical relationships of explanatory variables and our measure of binge drinking. Section IV provides the results, and Section V provides concluding comments.

*Christopher Westley: Professor of Economics, Jacksonville State University, 700 Pelham Road North, Jacksonville, Alabama 36265. E-mail: cwestley@jsu.edu; Falynn Turley: Ph.D. Candidate in Biostatistics, University of Alabama at Birmingham. E-mail: fcartmill@jsu.edu.

The authors thank Jennifer Welch and Matthew Gillison for research assistance, and two anonymous referees for valuable comments. The usual *caveat* applies.

II. Literature Review

The National Institute on Alcohol Abuse and Alcoholism describes binge drinking to occur when a female consumes four drinks or more or when a male consumes five drinks or more within a two hour time period (NIAAA, 2012). In the United States today, much of the concern about binge drinking focuses on alcohol consumption among college students, with alcohol abuse among college students in particular being an area of concern for many years (Wechsler *et al*., 1994). The high severity of the problems associated with binge drinking has led many colleges to establish programs or bans to reduce drinking (Walters *et al*., 2000a, 2000b and 2001). Although public colleges and universities account for only 27 percent of four-year schools in the U.S., they comprise 68 percent of undergraduates. This implies that changes within the state college system could have a large impact on overall binge drinking activities and general alcohol consumption among students. Knight *et al*. (2003) found that although males tended to drink more heavily than females, there were less significant differences in the rate of drinking among legal versus underage drinkers and students living on campus and those living off-campus. They also found that heavy high school drinkers were linked to higher levels of alcohol consumption in college. Knight *et al*. concluded that "…strict alcohol policy enforcement practices by campus security may influence heavy drinking among students" (p. 696). However, particular weaknesses of this study include its reliance on nonobjective measures and a limited sample of schools.

A recent paper by Austin and Ressler (2012) studies the relationship between the use of designated drivers and alcohol consumption while controlling for workplace policies. While the authors note there has been little research into the variables that impact binge drinking itself, they suggest there is also some evidence that suggests behavior can be altered by workplace policy. In particular, they find that, after controlling for workplace policy variables when a designated driver was present, individuals were around 15 percent more likely to binge drink. They conclude that designated driver policies increase alcohol consumption.

Miron (2004) argued that prohibition had little effect on drug use and carried with it adverse consequences. Due to the quality and lack of data available on drug prohibition it is difficult to evaluate its effects (National Research Council, 2001; Horowitz, 2001). The most beneficial analysis comes from studying the prohibition of alcohol in the United States from 1920 to 1933. Miron concluded that prohibition cannot be proven to be directly responsible for decreasing cirrhosis deaths because rates had dropped dramatically by 1917 and started decreasing in 1908 (Miron, 2004). According to Miron, some of the more likely explanations for the decline were an increase in alcohol tax from 1916-1917, reduced immigration, the worldwide flu epidemic of 1918, and World War I. Miron found that, in general, drug or alcohol prohibitions seldom reduce consumption while resulting in unintended costs, including reductions in health, increases in crime, the destruction of civil liberties, and even the funding of terrorism.

Much of Miron's conclusions were supported in Thornton (1991), which found that prohibition causes political corruption, the promotion of crime, and overall higher prices. Corruption escalates with prohibition because politicians will accept bribes to protect those operating outside of the law. Prohibition will also cause a rise in crime due to the fact that the parties engaging in the transaction lack traditional methods of resolution. As prices for the prohibited goods rise, consumers demand substitutes and often, stronger and more dangerous products will result in order to compensate for the increased price. Thornton concludes that complete prohibition is impossible and the unintended consequences that result come at a high cost to society.

These studies suggest that many different factors can influence binge drinking and that binge drinking itself may result from prohibitions that increase the costs of drinking. They also suggest the intended effects of prohibition are quite limited and are overshadowed by unintended adverse consequences that can result in both the overconsumption of the prohibited good as well as increased demand for substitutes.

III. Model

Simple estimation by ordinary least squares is performed using the following equation (with descriptions of variables to follow):

$$Logit(Binge) = \alpha + ß_1 LIQUOR\ STORE\ RATE + ß_2 DRY\ COUNTY + ß_3 MEDIAN\ AGE + ß_4 COLLEGE + ß_5 PER\ CAPITA\ INCOME + ß_6 POPULATION + ß_7 BAPTIST + ß_8 EPISCOPALIAN + ß_9 CATHOLIC + ß_{10} NORTH + ß_{11} MIDWEST + ß_{12} SOUTH + ß_{13} WEST + \varepsilon \quad (1)$$

The dependent variable, BINGE, is the measure of binge drinking by county in the United States. The use of this variable in particular improves on previous studies due to its computation through a study conducted by the Robert Wood Johnson Foundation in conjunction with the University of Wisconsin's Population Health Institute that ranked counties on several key health factors including the prevalence of binge drinking. This study will henceforth be cited as RWJ (2010). To the best of our knowledge, this unique binge drinking measure has not been utilized in empirical studies in the academic literature. The resulting measure is between 0 and 1 and is positively related to binge drinking. As suggested by Baum (2008) and Greene (1993), logit transformation was conducted on the binge measure for the computation of BINGE to correct for possible nonsensical predictions for extreme values for the regressors that can result in ordinary least squares regressions that contain doubly truncated dependent variables. Therefore, the dependent BINGE variable is the logit transformation of the percentage of binge drinkers by county, collected by the RWJ Foundation in 2010.

The first six explanatory variables are socio-economic measures by county that are expected to explain binge drinking. LIQUOR STORE RATE is the ratio of liquor stores to the county population and was compiled by RWJ (2010). This variable's expected sign is ambiguous, as counties with few liquor stores may either encourage binge drinking if drinkers believe their access to alcohol is limited (promoting overconsumption when accessed) or discourage binge drinking if decisions to binge are based on access to alcohol itself. DRY COUNTY is a dummy variable indicating whether a county prohibits the sale of alcohol. Dry counties are assigned a 1, while others are assigned a zero. (Although dry counties predominant in the American South, we counted 33 states that contain at least one dry county.) We expect an inverse relationship with BINGE if prohibitions increase the cost of drinking, thus causing drinkers to abuse alcohol when they can access it. MEDIAN AGE is the median age of the population and was compiled by the U.S. Census Bureau (2010). We expect an inverse relationship between the age of the drinker and the likelihood to binge drink. COLLEGE represents the percentage of college graduates in the population as was compiled by the U.S. Census Bureau (2010), and PER CAPITA INCOME measures the per capita income of individuals in the population and was compiled by the U.S. Census Bureau (2010). We expect an inverse relationship between both variables and binge drinking if bingeing is a low socio-economic activity. POPULATION represents the population of the county collected by

RWJ (2010). This variable was converted into logs. We expect a negative relationship assuming that with higher populations come more recreational substitutes available to binge drinking. (Although we considered including unemployment by county in the model, we decided to omit this variable out of concerns its high level of correlation with PER CAPITA INCOME was skewing our results.)

The next seven explanatory variables are the variables for religion and region by county that are expected to explain binge drinking. The three religion variables were collected from a survey conducted by the Religious Congregations and Membership Study 2000, conducted by the Association of Statisticians of American Religious Bodies which compiled statistics by county for 149 religious congregations or bodies in the United States. We chose to focus on the effects of Baptist, Episcopalian, and Catholic influences on binge drinking because these comprise the three largest national religious bodies in the United States and that they, directly and indirectly, affect cultural constraints on human action. For each congregation, we include the number of members for every 1000 people in each county. The effect of region on BINGE is measured with four dummy variables: North, Midwest, South, and West. Table 1 lists the region assigned to each state.

Table 1: States by Region

North	Midwest	South	West
Connecticut	Illinois	Alabama	Alaska
Delaware	Indiana	Arkansas	Arizona
Maine	Iowa	Florida	California
Massachusetts	Kansas	Georgia	Colorado
New Hampshire	Michigan	Kentucky	Hawaii
New Jersey	Minnesota	Louisiana	Idaho
New York	Missouri	Maryland	Montana
Pennsylvania	Nebraska	Mississippi	Nevada
Rhode Island	North Dakota	North Carolina	New Mexico
Vermont	Ohio	Oklahoma	Oregon
	South Dakota	South Carolina	Utah
	Wisconsin	Tennessee	Washington
		Texas	Wyoming
		Virginia	
		West Virginia	

IV. Results

The results of ordinary least squares regressions are found in Table 2. Model 1 is a basic model showing the first six variables. In Model 1, LIQUOR STORE RATE is significant and positively correlated with BINGE, suggesting that access to alcohol affects binge decisions. The next variable, DRY COUNTY, is negatively correlated and significant, contrary to expectations. This result suggests that while prohibitions may or may not reduce general alcohol consumption, they do affect excessive drinking as measured by BINGE. Overall, the average percent of binge drinking was 11.5 percent with a confidence interval of 11.1 to 11.9 in dry counties and 14.1 percent with a confidence interval of 13.9 to 14.4 for non-dry counties. (Both intervals are calculated at the 95 percent confidence interval.) Due to the results of the Brown-Forsythe test of constant variance

(F = 15.9194, p = 0.0001), an unequal variance assumption is warranted. A two sample t-test showed a significant difference in the percent of binge drinking (t = -9.66, df = 717.23, $p < 0.0001$).

Both MEDIAN AGE and COLLEGE had the expected negative relationships with BINGE (although COLLEGE is not significant). Surprisingly, PER CAPITA INCOME has a positive relationship with BINGE which was unexpected as binge drinking is typically viewed as a low-income activity. POPULATION in Model 1 has a negative relationship with BINGE as was predicted, but is not significant.

Models 2-4 show the first six explanatory variables and add the individual religion variables to examine their impact and, with few exceptions, the signs and significances observed in Model 1 are consistent. The coefficient estimate for BAPTIST is negative and highly significant, the estimate for CATHOLIC is positive and highly significant, and the estimate for EPISCOPALIAN is positive but less significant than BAPTIST and CATHOLIC. These results suggest lower incidences of binge drinking in counties influenced by Baptist beliefs and higher incidences in counties influenced by Catholic beliefs. Interestingly, the inclusion of CATHOLIC in Model 4 causes COLLEGE to become positive (but insignificant).

Models 5-8 add the individual region variables to examine their relationship with BINGE. While all were significant, only SOUTH has an inverse relationship with BINGE, suggesting that relative to other parts of the country, binge drinking is less of a social problem in the South. Adding SOUTH to the model, however, causes POPULATION to become positive. Adding MIDWEST also causes POPULATION and COLLEGE to change signs (and become positive). With interesting exceptions, the results are consistent with expectations while expanding the model to consider the effect of religion and region suggests its robustness.

Table 2: Ordinary Least Squares Regression Results

Variable	*Model 1 Coefficient*	*Model 2 Coefficient*	*Model 3 Coefficient*	*Model 4 Coefficient*	*Model 5 Coefficient*	*Model 6 Coefficient*	*Model 7 Coefficient*	*Model 8 Coefficient*
LIQUOR	.0385**	0.0190*	0.0369**	.0068	0.0330**	0.0316**	0.0081	0.0373**
STORE RATE	(4.03)	(2.19)	(3.87)	(0.77)	(3.42)	(3.55)	(0.94)	(3.93)
DRY COUNTY	-0.1247**	-0.0841**	-1234**	-0.1648**	-0.1318**	-0.0684*	-0.0930**	-0.1286**
	(-4.20)	(-3.16)	(-4.17)	(-6.06)	(-4.45)	(-2.46)	(-3.53)	(4.35)
MEDIAN AGE	-0.0105**	-	-0.0101**	-0.0113**	-0.0119**	-0.0092**	-0.0113**	-0.0097**
	(-4.88)	0.01119**	(-4.73)	(-5.74)	(-5.49)	(-4.61)	(-5.92)	(-4.55)
		(-6.20)						
COLLEGE	-0.0023	-0.0031*	-0.0034*	0.0011	-0.0020	0.0056**	-0005	-0.0048**
	(-1.42)	(-2.14)	(-2.08)	(0.77)	(-1.26)	(3.64)	(0.35)	(-2.89)
PER CAPITA	0.000036*	0.00002**	0.00006**	0.00002**	0.00004**	0.00002**	0.00002**	0.00004*
INCOME	*	(9.29)	(14.19)	(10.08)	(14.11)	(10.02)	(9.72)	(14.67)
	(14.34)							
POPULATION	-0.0130	-0.0035	-0.0112	-0366**	-0.0240*	0.0214*	0.0119	-0.0071
	(1.33)	(-0.41)	(-1.15)	(-4.08)	(-2.37)	(2.33)	(1.37)	(-0.72)
BAPTIST		-0.0015**	-	-	-	-	-	-
		(-25.58)						
EPISCOPALIAN	-	-	0.0028**	-	-	-	-	-
			(3.37)					
CATHOLIC	-	-	-	0.0034**	-	-	-	-
				(22.45)				

Table 2: Ordinary Least Squares Regression Results: Continues

Variable	*Model 1 Coefficient*	*Model 2 Coefficient*	*Model 3 Coefficient*	*Model 4 Coefficient*	*Model 5 Coefficient*	*Model 6 Coefficient*	*Model 7 Coefficient*	*Model 8 Coefficient*
NORTH	-	-	-	-	0.1412* (3.97)	-	-	-
MIDWEST	-	-	-	-	-	0.3856** (20.09)	-	-
SOUTH	-	-	-	-	-	-	-0.4608** (-26.54)	-
WEST	-	-	-	-	-	-	-	0.1382** (5.09)
Constant	-2.1755** (-14.85)	-1.6547** (-12.48)	-2.1985** (-15.02)	-1.8153** (-13.44)	-1.9962** (-13.05)	-2.5679** (-18.65)	-1.8901** (-14.50)	-2.2631** (-15.41)
N	2593	2593	2593	2593	2593	2593	2593	2593
R^2	0.1763	0.3407	0.1799	0.3089	0.1813	0.2875	0.3527	0.1848

Dependent variable: BINGE (*t*-statistics in parenthesis)
** significant at 1% level or lower, * significant at 5%

It is unlikely that this data contains multicollinearity among the variables. For this to exist, the computed coefficients would possess large standard errors relative to the coefficients themselves. Our results show that the standard errors are generally close in size to the corresponding coefficients. Specification error exists in the presence of any misspecification of the explanatory variables. To ensure that no further misspecification bias occurred in the model, Ramsey's RESET test was utilized. To carry out this test, a second regression was run including the values for estimated values of BINGE raised to the second, third, and fourth powers for a total of three new regessors. This yielded a new R^2, referred to below as "R^2 (new)". Ramsey's RESET test is an *F*-test computed in the following manner:

$$F^* = [R^2(\text{new}) - R^2(\text{old})] / 3 \text{ (new regressors)}$$

Therefore, in Model 1, the *F*-statistic is computed as $F^* = (22.85\text{-}17.63)/3 = 1.74$. Since 1.74 is less than the critical value of $F(3, 2584) = 3.78$, the null hypothesis that this model is correctly specified as linear cannot be rejected. (The Ramsey RESET test was computed in the remaining models. The results are available from the authors upon request.)

The results of a White's test for heteroskedasticity suggest the presence of heteroskedasticity in the data with a χ^2-test statistic of 180.68, which exceeds the corresponding critical value when df = 25. This result can affect the standard errors and, by extension, lead to distorted *p*-values. However, the results of a White's correction test resulted in *p*-values and significance levels similar to the results derived in the original regressions, an outcome that is congruent with the assumption that heteroskedasticity problems are unlikely in large sample sizes such as our own. Similarly, although diagnostic plots resulting from our regressions indicate a slight deviation from normality, we are confident our regression is robust to slight violations of the normality assumption due to the large sample size.

Interaction Terms

In order to examine the relative strengths of religion and region, we reran Model 1 with interaction terms combining the individual religion measures with the regions. The results are shown in Table 3 and suggest the predominance of region over religion. While the results for Baptists, Episcopalians, and Catholics are all positively related to BINGE when they interact with NORTH, MIDWEST, and WEST, they are all inversely related to BINGE when they interact with

SOUTH. This means that Catholics in the South are less likely to binge drink and that Baptists in the other three regions are more likely to binge drink. To further test how the region affects the percent of binge drinking, we performed a one-way analysis of variance (ANOVA). Due to the heterogeneity of the variance detected by Levene's test, a Welch ANOVA was implemented. At the 0.05 level of significance, a significant difference in binge drinking by region was detected (F = 390.53 ndf = 3, ddf = 807, $p < 0.0001$). A Tukey post hoc comparison indicates that binge drinking rates in the North and Midwest are significantly higher than the other two regions, while the binge drinking rate in the South is significantly lower than the other three regions.

Table 3: Interaction Variable Results

Variable	NORTH	MIDWEST	SOUTH	WEST
BAPTIST	0.0056***	-		
	(3.54)			
EPISCOPALIAN	0.0041*	-		
	(1.75)			
CATHOLIC	0.0003***	-		
	(2.60)			
BAPTIST		0.0003*		
		(1.86)		
EPISCOPALIAN		0.0098***		
		(8.57)		
CATHOLIC		0.0017***		
		(22.24)		
BAPTIST	-		-0.0014***	
			(-25.25)	
EPISCOPALIAN	-	-	-0.0127***	
			(-9.09)	
CATHOLIC	-	-	-0.0002	
			(-1.57)	
BAPTIST	-	-	-	0.0015***
				(3.47)
EPISCOPALIAN	-	-	-	0.0050***
				(3.45)
CATHOLIC	-	-	-	0.0007***
				(5.93)
N	2593	2593	2593	2593
R^2 BAPTIST	0.1799	0.1771	0.3390	0.1798
R^2 EPISCOPALIAN	0.1773	0.1991	0.2018	0.1801
R^2 CATHOLIC	0.1785	0.3086	0.1771	0.1874

Dependent variable: BINGE (t-statistics in parenthesis)
*** significant at 1% level or lower, ** significant at 5% or lower, * significant at 10% or lower

While religious beliefs help shape regional cultures (and constraints), the results for the interaction terms suggest that individuals belonging to minority religions (such as Catholics in the South or Baptists in the North, Midwest, and West) conform to region in which they reside. Region appears to play a more important role than religion does on binge drinking.

V. Conclusion

This paper adds to the literature on factors that influence binge drinking by considering the role that religion and region play and finds that regional constraints influenced in part by the dominant religion also affect the likelihood to binge drink by adherents to minority religions. It also finds that blanket prohibitions on drinking, whether explicit (in the case of dry counties) or implicit (by low access to liquor stores or via religious teaching in the case of counties influenced by Baptist beliefs regarding alcohol consumption), may cause individuals to binge drink less regardless of their effect on drinking in general. The relationship measured herein regarding per capita incomes and binge drinking is probably even more surprising because binge drinking is often viewed as a low income activity and these models show otherwise.

The interaction variable results also depict some interesting results. They show the region seems to play a more important role than religion in binge drinking. They suggest that prohibitive policies that discourage drinking in general do not necessarily promote binge drinking, and that in fact explicit or implicit prohibitions of alcohol consumption in general, while penalizing the majority of drinkers who do not binge or otherwise drink irresponsibly, may have the effect of reducing instances of binge drinking and the problems that result from it.

References

Abbey, Antonia. 1991. "Acquaintance Rape and Alcohol Consumption on College Campuses: How Are They Linked?" *Journal of American College Health*, 39(4): 165-9.

Abbey, Antonia. 2002. "Alcohol-Related Sexual Assault: A Common Problem Among College Students." *Journal of Studies on Alcohol and Drugs*, Supplement, 14: 118-28.

Association of Religion Data Archives. 2000. "Religious Congregations and Membership Study." www.thearda.com/Archive/Files/Downloads/RCMSCY_DL.asp.

Austin, Wesley. A., and Rand W. Ressler. 2012. "Do Designated Drivers and Workplace Policies Effect Alcohol Consumption?" *Journal of Socio-Economics*, 41(1): 104-9.

Baum, Christopher. F. 2008. "Stata Tip 63: Modeling Proportions." *Stata Journal*, 8(2): 299-303.

Greene, William. H. 1993. *Econometric Analysis*. New York: Macmillan.

Hingson, Ralph W., Timothy Heeren, Ronda C. Zakocs, Andrea Kopstein, and Henry Wechsler. 2002. "Magnitude of Alcohol-Related Mortality and Morbidity Among U.S. College Students Ages 18-24." *Journal of Studies on Alcohol and Drugs*, 63(12): 136-44.

Horowitz, Joel L. 2001. "Should the DEA's STRIDE Data Be Used for Economic Analyses of Markets for Illegal Drugs?" *Journal of the American Statistical Association*, 96(456): 1254-71.

Knight, John R., Sion Kim Harris, Lon Sherritt, Kathleen Kelley, Shair Van Hook, and Henry Wechsler. 2003. "Heavy Drinking and Alcohol Policy Enforcement in a Statewide Public College System." *Journal of Studies on Alcohol and Drugs*, 64(5): 696-703.

Miron, Jeffrey A. 2004. *Drug War Crimes: The Consequences of Prohibition.* Oakland, California: The Independent Institute.

National Research Council. 2001. *Informing America's Policy on Illegal Drugs: What We Don't Know Keeps Hurting Us*. Washington, DC: National Academy Press.

NIAAA (National Institute on Alcohol Abuse and Alcoholism). 2012. "Underage Drinking Research Initiative." www.niaaa.nih.gov/AboutNIAAA/NIAAASponsoredPrograms/Pages/underage.aspx.

Perkins, H. Wesley. 2002. "Surveying the Damage: A Review of Research on Consequences of Alcohol Misuse in College Populations." *Journal of Studies on Alcohol and Drugs,* Supplement 14: 91-100.

Robert Wood Johnson Foundation. 2010. "County Health Rankings." www.countyhealthrankings.org/sites/default/files/2010 County Health Rankings Data.xls.

Thorton, Mark. 1991. *The Economics of Prohibition.* Salt Lake City, Utah: University of Utah Press.

U.S. Census Bureau. 2010. "Age Groups and Sex: 2010—United States—County by State, and for Puerto Rico, 2010 Census Summary File 1." http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_SF1_GCTP2.US05PR&prodType=table.

U.S. Census Bureau. 2010. "Educational Attainment: 2006-2010 American Community Survey 5-Year Estimates." factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_5YR_S1501&prodType=table.

U.S. Census Bureau. 2010. "Selected Economic Characteristics 2006-2010 American Community Survey 5-Year Estimates." factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_5YR_DP03&prodType=table.

Walters, Scott T., Melanie E. Bennett, and Joseph H. Miller. 2000a. "Reducing Alcohol Use in College Students: A Controlled Trial of Two Brief Interventions." *Journal of Drug Education,* 30(3): 361-72.

Walters, Scott T., Melanie E. Bennett, and James V. Noto. 2000b. "Drinking on Campus: What Do We Know About Reducing Alcohol Use Among College Students?" *Journal of Substance Abuse Treatment,* 19(3): 223-8.

Walters, Scott T., David A. Gruenewald, Joseph H. Miller, and Melanie E. Bennett. 2001. "Early Findings from a Disciplinary Program to Reduce Problem Drinking by College Students." *Journal of Substance Abuse Treatment,* 20(1): 89-91.

Wechsler, Henry, Andrea Davenport, George Dowdall, Barbara Moeykens, and Sonia Castillo. 1994. "Health and Behavioral Consequences of Binge Drinking in College: A National Survey of Students at 140 Campuses." *Journal of the American Medical Association,* 272(2): 1672-7.

The Journal of Business Inquiry 2014, 13, Issue 1 (Special Issue), 12-26
http:www.uvu.edu/woodbury/jbi/articles/
ISSN 2155-4072

Islam and Human Life: Beyond Ancient Needs

By EBTISAM SADIQ*

This paper is expository in nature. It attempts to describe how Islam came in response to a cultural need to civilize the ancient Arabs but is fit for all times and people. The faith's influence proved to be thorough. Its legislative matter covers all aspects of human life: social, political, economic, and educational. It also delineates the paths to good health, scientific progress and human relationships including family ties, matrimonial matters, and inheritance distribution. However, Muslims seem to have a lax hold on Islam. There is a big gap between ideological awareness and practical application. This paper will attempt to highlight both the comprehensive nature of Islam's legislative system and its interest in human welfare as well as the decline in Muslims' reliance on the faith despite its usefulness to different aspects of human life.

Keywords: Islam, Ideology, Practice

JEL Classification: I20

I. Introduction

This paper is expository in nature and aims at explaining Islam to non-Muslims. A historic background that describes the life of the Arabs before the advent of Islam early in the 7th century AD will be explained. Depending on historic sources, the study highlights the fact that prior to the appearance of Islam the Arabian Peninsula was steeped in intellectual darkness and cultural ignorance. Compared to the surrounding nations and civilizations, its people were less enlightened on all cultural, intellectual, religious, political, social, and economic levels.

The study also analyzes how Islam transformed and civilized life in the Arabian Peninsula. It uplifted and reformed every aspect related to people's life on both the spiritual and the practical levels and enabled them to create a great civilization that extended from the Arabian Peninsula to India, China, and Russia in Asia; to Spain, Southern France, and the Balkan lands in Europe; to North Africa up to the Atlantic Ocean and to many other locations in the Black Continent. The population of the Arabian Peninsula and the surrounding nations flourished under Islamic guidance for centuries and enjoyed political stability, cultural enlightenment and progress in different sciences like physics, chemistry, geology, geography, astrology and medicine. In delineating Islam's contribution to the life of the Arabs, the paper emphasizes the Faith's comprehensive legislative coverage of all aspects of human life that makes it fit for contemporary and future use.

Finally, the paper explains how and why Muslims have relaxed their hold on Islam despite its valuable precepts and thorough legislative coverage. The study confirms that this lapse is no fault of Islam but of the political, social and educational systems that diverted from the proper

*Professor of English, King Saud University, Riyadh, Saudi Arabia. E-mail: esadiq@ksu.edu.sa.

The author wishes to acknowledge the valuable primary contribution to the study by Talal Eshky (Associate Professor of Communication Arts, King Saud University, Riyadh, Saudi Arabia) that came in the form of a brief Arabic paper and supplied references, on request, to Arabic sources.

Islamic path. It suggests that Islam's moral and religious values, political, economic, and judicial directives can be accessed as sources of wisdom in structuring modern familial, social and ruling systems. If Muslims have chosen to neglect such treasure, Islam cannot be held responsible for such lapse.

The paper differentiates itself from previous historical studies by combining three periods of Arab history and highlighting parts of their cultures in relationship to the Faith's presence or absence from them. These periods are the pre-Islamic past, the period following the Arab's reception of Islam and the present time. Historical studies often focus either on one period or combine two, but do not cover all three. Moreover, unlike the present study, they merely address history without involving legislative matter. A good example is Ali's (1993) book on Arab history before Islam and Amin's (1999) book on the early years of Islam.

On the other hand, writings on Islamic legislation usually focus on this subject exclusive of history. Books on Islam's legislation are mostly modern reprints and electronic versions of ancient sources that document the Prophet Muhammad's speeches (*hadiths*) or interpret them. Some such sources are al-Bukhari's (n.d.) edition of the Prophet's *hadiths* and al-Asqalani s (1997) interpretation of al-Bukhari's certified collection of them. An exception to this exclusion of legislation from history is a pioneer book of al-Kattan (1996) on the history of legislation. This source, however, does not touch on changes in Arab history in relationship to Islam's influence, which this paper intends to do.

In brief, unlike the existing resources in both fields of history and legislation, the present study selects aspects of history across a broad spectrum of three historical periods and examines them in relationship to Islam's legislative matter. It will draw on Ali (1993) and Amin (1999) for being instrumental in delineating history of their respective eras. It will also use al-Bukhari (n.d.) and al-Asqalani (1997) for information on Islam's legislative principles. Al-Kattan's (1996) history of legislation will be called upon when necessary but will be transcended into highlighting the relationship of legislation to the history of the people. All these sources and more will be accessed in the first and second parts of the paper, while the third that addresses Muslim's lax hold on Islam is the final contribution of the study. Direct quotes of the *Qur'an*, the Muslim's holy book, will be used to support personal insights and elaborations. Quotations will depend on Pickthall's (1971) translation of the holy text.

Section II provides a historical background. Islam and its influence are introduced in Section III. Section IV is devoted to the shifts in legislation and relaxing hold on Islam's values. The final section provides a summary and conclusions.

II. Historical Background[1]

This background covers several aspects of life in the Arabian Peninsula prior to the advent of Islam early in the 7th century AD. It describes the intellectual, religious, economic, political, and cultural conditions that Islam has transfigured. Such background is necessary for measuring out and recognizing the Faith's early contribution to the Arab civilization and the subsequent claims that this study makes on behalf of Islam as potential source of guidance to human life in other cultures.

[1] This historic background is largely indebted to Ali (1993). However, it does not directly quote from this source nor literally translate its content from Arabic into English. The background is more of a summing up and re-writing of parts relevant to the study.

A. Intellectual Situation

The ancient Arabs of the Peninsula were illiterate people. Their only source to fruitful thinking and to fine language was poetry. Poets composed and recited poems that the majority of the population indulged, and memorized. The exchange was generally oral. No form of reading or writing was available with the exception of the best poems being inscribed, by one of the very few scribes in the Peninsula, and hung on the Ka'ba building that the prophet Abraham (Ibrahim) and his son Ishmael (Ismail) have built back in history to worship the Creator of the universe.

B. Religious Setting

It reveals a great deal of backwardness and primitivism. Most of the Arabs in the Peninsula were heathenish. They worshipped stones and trees. Statues of pagan gods were installed around the Ka'ba, the structure that was originally intended to honor the one and only God of the universe. All Arabs whether Ibrahimites or heathenish came for annual pilgrimage to Mecca. No one bothered about the cultural merging between monotheism and paganism. People in the northeast were fire worshippers under Persian influence. The Christian faith at the northwest hardly reached people in the Peninsula, while that of Judaism traversed from the southwest and remained exclusively active in Yemen and Yathrib (contemporary al-Madina).

C. Economic State

Economically speaking, the majority of the Arabs of the ancient Arabian Peninsula was nomadic and had mainly shepherding for a vocation. With scarcity of water in a vast desert, the chances for a civilized settling into agricultural life were meager and occurred only in very rare areas. The varieties of fishing or pearl diving were only possible by the seacoast. In big cities there was trade, the closest possible form to a civilized living. But even there, the rich were wasting their life away in drinking and gambling in the form of bidding on their horses and camels. No solid economic system was detectable in the Peninsula.

Hijaz, the western part of the Arabian Peninsula, where the Prophet of Islam, Muhammad bin Abdul-Allah [PBUH][2] (570-632) AD was born and raised, was better off than the other locations. The city of Mecca, in particular, was a center of attraction to most Arabs in the Peninsula and the bordering northern countries. With the Ka'ba building standing at its center from the time of the prophet Abraham and his son Ishmael, the city became a place of attraction for the Arabs even before Islam. They all came for pilgrimage but exchanged commodities as well. Trade thrived through arriving pilgrims but Meccan also travelled north and south for further commercial purposes. Some went as far east as India.

D. Political System

The political system in the Peninsula before Islam's advent was tribal with the chieftain as the highest and most absolute authority. Hundreds of tribes were present in the region and the relationships between them were not always very peaceful. Wars broke between them not only out of economic necessity but also out of tribal allegiance among tribe members and competition

[2] "Peace Be Upon Him" is the Muslims' regular greeting to his good soul, often abbreviated into [PBUH].

among different tribes. Tribes on the trade ways plundered on trade caravans or required them to pay tribute on passing.

The lack of unity among the different tribes and the absence of central authority in the Arabian Peninsula made it a prey to powerful nations around, like the Persian Empire (northeast), the Roman (northwest), and the Ethiopian (southwest) (al-Kattan, 1996, p.195; Amin, 1999, pp. 12-30). These surrounding empires occupied the neighboring parts of the Arab world and threatened the rest. Truce was obtained at the high price of subservience to these empires, a matter that increased dissent between the tribes inside the peninsula, for the dominating empires often fed that dissent. The Arabs needed some force to stabilize the political situation in the Peninsula and outside of it to the north and to unite them under a single flag. Islam became such force in the 7th century AD.

E. Customs and Manners

The ancient Arabs had more vices than virtues for cultural traits. Among their positive traits they had hospitality, generosity, warmth and charity. The Arabs were extremely generous with guests and would sacrifice their best animals for hosting them. They would warmly greet an approaching visitor or even a passer-by, shake hands with acquaintances, embrace closer relatives and bless a sneezing person. They would respect their elderly and avoid gazing at women passing by on the roads. They would protect a person that seeks sanctuary in their tribal boundaries or private homes and defend him sometimes at the cost of their own lives.

But the ancient Arabs had notorious vices as well. Debauchery, violence, tribalism and superstition are some such vices. The rich, in particular, kept themselves recklessly entertained at night with drinking and attending to slave girls singing and dancing. They drank, gambled and fornicated. On the tribal level, the Arabs fought and plundered other tribes and traders' caravans. They would kill men in such attacks, enslave younger boys and women and collect spoils. Wars were also waged for other reasons beside the economic. Tribal feuds and rivalries based on the tribe's name and status were other reasons for such wars. Serial wars of revenge over a single killing not only of a human being but sometimes of an animal would last for years. One such war, called "al-Basoos War," extended on and off over the span of forty years (Ali, 1993, pp. 256-257). Irrational attitudes could also be detected in the ancient Arabs superstitious ways of thinking. Important decisions were made or altered on such basis. A traveler would cancel a journey for a bad omen if an owl would be seen to cross his path on the day of travel.

III. Islam and Its Influence

The Arabs at that time, the late 6th and early 7th centuries AD, were in dire need for some civilizing power. Islam came to overcome ignorance, superstition, debauchery, brutality, and tribalism. It also provided fair economic and political systems that enabled the Arab people to move into a civilized status.

A. No Revolution But Cultural Evolution

Divinely ordained,[3] the Faith started the process of cultural change in a gradual and discreet manner. The evolutionary process lasted for twenty years, thirteen in Mecca, the Prophet's hometown, and seven in al-Madina, the city that he immigrated to, seeking sanctuary for his Faith, Mission and followers from the unbelievers of Mecca.

Muslims believe that the *Qur'an* descended from the highest heaven to the first nearest to earth as one whole, but it completed its march down to Earth to be revealed to the Prophet in a gradual manner (al-Asqalani, 1997, p. 3; al-Kattan, 1996, p. 195).[4] There are several reasons as to why the *Qur'an*'s revelation to Prophet Muhammad [PBUH] took twenty years. Some are as follows:

a) The descent of the *Qur'an*, the divine words of the Creator, *Allah,*[5] on the Prophet through the Archangel Gabriel was a physically stressful experience that caused the Prophet to sweat, tremble and come close to fainting. A gradual descent of the holy text was necessary to minimize the strain.
b) The resistance of the Faith by the wild and heathenish nation was fierce and stubborn and the Prophet needed encouragement and moral support as he moved along in his mission. For each turn of resistance, an *ayah* (a verse in the *Qur'an*) would come to sustain the Prophet and inform him of how other prophets and messengers suffered while delivering and spreading the word of the Creator and how they endured.

[3] The *Qur'an*'s divine origin is evident in its prophetic statements of future events in human history. In reference to Noah's Ark, the holy text indicates that the Ark is preserved as a sign for those who wish to remember and to believe (al-Quamar/The Moon, 15). In the 7th century AD, no sign of the Ark was present. Modern excavations uncovered it in an eastern mountain in Turkey in 1960. The same can be said of preserving the body of Moses' Pharaoh. On the day of his drowning, the *Qur'an* decrees: "But this day We save thee in thy body that thou mayst be a portent for those after thee" (Yunus/Jonah, 92). The body of the Pharaoh was found in the Red Sea in 1898 (twelve centuries after the Qur'anic statement) well preserved without the traditional mummification methods.

[4] al-Asqalani is actually quoting and interpreting the Prophet's speeches in his book. This is a *hadith* (a speech of the Prophet) that indicates that the *Qur'an* descended in its totality then reached the Prophet in smaller portions.

[5] Another evidence of the divinity of the *Qur'an*'s origin is disclosed through computer calculations of systematic recurrence of significant words and their parallels or opposites inside the text. No human power would have devised and introduced such a miraculous balance into the text especially back in history at the 7th century AD. The following timetable gives examples of this textual miracle.

Word	**Frequency**	**Parallel Word**	**Frequency**
Days	365	Day	30
Month	12	Moon	12
Faith	25	Blasphemy	25
Men	24	Women	24
The World	115	The Day of Judgment	115
Angels	88	Devils	88
Punishment	117	Forgiveness	117
Death	145	Life	145

c) In their challenge of the Prophet, his people kept inquiring about ancient events and nations of the past. In response to each inquiry, the pertinent part of historical matter would unfold in order to satisfy and convince.
d) A gradual act of elimination of an old way of life and implementation of new systems was necessary to keep Prophet Muhammad's followers unburdened by novel teachings and to guarantee acceptance. Debauchery, gambling and usury were normal acts of daily life that would need time to phase out. Superstition and racist feelings of tribal allegiance and superiority were inherent in the people's psychic structure. A sudden or forced change would not have been easily acceptable to them.
e) It was necessary to give the recipients time to memorize the divine words of the Creator. Receiving the whole at one instance would have confounded the process. Memorizing the book was necessary because the Arabs were not a literate nation. They could neither read nor write. Their only way of keeping knowledge was memory. Earlier in their pre-Islamic dark ages they learnt poetry by heart but Islam then introduced the holy book as a more fruitful verse. Moreover, the Arabs were in the habit of substituting words in poetry if lapses of memory occurred upon reciting it. Such habit was necessary to overcome in order to preserve the accuracy of the divine text and its injunctions. An accurate learning of the rules of the book would depend on keeping its exact wordings. All of this needed time and gradation.
f) Since Islam was not merely an abstract faith but also a practical religion that was meant to meet and respond to actual life and daily matters, its teachings were revealed in gradual steps in response to daily needs. The *Qur'an* came to the Prophet to help him make decisions on daily matters as they unfolded (Amin, 1999, p. 195).

B. Faith Comes First: The Mecca Phase

B.1. Religious Factor

Since people would only accept new teachings and acquiesce to novel ways of life upon having faith and trust in them first, Islam started its mission by generating Faith in the Creator of the universe and His Messenger, the Prophet Muhammad (al-Kattan, 1996, p. 45). The early verses of the *Qur'an* focused on inviting man to contemplate the world and its coordinated parts and orderly operations. Relying on invoking rational thinking in the recipients and providing palpable evidence, the early verses pointed out how such a vast universe could never have invented itself but must have been indebted to some capable maker. The harmony and correlation between its different parts and processes can only occur if it has one creator, for the many gods the Meccan kept around the Ka'ba structure were not just incapable but would have definitely disagreed in the process of making and running the universe. Believing in the Prophet, on the other hand, entails trusting that he is the Creator's messenger to mankind and the recipient of His holy words, the *Qur'an*, through the Archangel Gabriel. Most of the verses of the Mecca period focused on these two elements which combined are called the first pillar of Islam, a structure of five.

The process of establishing and deepening faith also depended on invoking the history of other heavenly religions that preceded Islam and requiring faith in them and in their respective

messengers. It affirmed that Muhammad came as the last in a series of prophets who preceded him in this matter of guiding humanity to good worldly conduct and to the right path back to heaven.

B.2. Moral Values

Islam implemented moral values necessary for a good earthly existence and an ultimate return to heaven. This is not to say that Islam totally negated cultural values of the past. It did approve of and retain positive moral traits available in the culture like generosity towards guests, warmth in human relationships, respect for the elderly and support for a person in need (al-Kattan, 1996, pp. 47-48). In short, the Faith enforced the positive and eliminated the negative habits and traits from the life of the ancient Arabs.

The new emphasis falls on honesty, sincerity, keeping promises and honoring covenants; good intentions, goodness to others, helping those in need, and charity; pleasant manners, peaceful greeting, warmth, and generosity. More of the Faiths moral concerns will be highlighted in due time in the study.

The negative values of the ancient culture and the wild and coarse ways of its people were either immediately repealed or gradually phased out, depending on how harmful to human existence they were. Securing justice in human relationships and eliminating all forms of aggression among people were major concerns of the new Faith from the start. Killing innocent people (including the horrible practice of burying a newly born baby girl alive out of fear of future sexual disgrace) was condemned and prohibited right away. Stealing, cheating in trade, and unjustly ripping off orphans' money were other vices that Islam had to promptly put to end. Adultery and all forms of fornication were instantly negated and forbidden (al-Kattan, 1996, pp. 47-48).

The second pillar of the Islamic structure, which is praying five times a day, came next and was introduced during the Mecca phase of Islam's initiation into the Arab culture. It was quite compatible with the moral objectives of that phase for prayer was intended to help a wild people overcome their moral and behavioral vices. Standing five times a day between the hands of the Creator in the act of praying would be a regular reminder against aggression and vices. The *Qur'an* elucidates: "Lo! worship preserveth from lewdness and iniquity" (al-Ankabut/The Spider, 45).[6]

C. Legislation Comes Next: The al-Madina Phase

Although the al-Madina phase is a legislative period in the history of the Faith, other forms of worship were simultaneously introduced. The next three pillars of Islam were established. These are the *zakat* (paying an annual percentage of one's fortune to the poor), Fasting during a specified month of the year (*Ramadan*), and the *Hajj* ritual (performing a pilgrimage once in a life time, during a specified period of time, to the holy lands around Mecca and to the holy mosque).

Legislation covered every aspect of human life including economic order, social matters, health conditions, and family relationships.

---

[6] Although there are several translations of the *Qur'an* available out in print and variations on the names of its *surahs* (a *surah* is a large unit in the *Qur'an* that contains smaller units called *ayahs*), this paper follows Pickthall's translation of the text and naming of the *surahs*. Pickthall, however, has translated the Arabic word prayer into worship which I believe is inaccurate because worship is a general term that includes other religious rituals. The *ayah* is very particular about what kind of worship has such power to cultivate behavior and reform character.

C.1. Economic System

The economic system of Islam that the Prophet established during this phase encouraged trade and forbade usury. It taught people to lend money (interest free) and to invest in trade, industry and agriculture. It emphasized the legal necessity to document and to certify such processes and forbade dishonesty in all dealings. It also condemned gambling as a psychologically demoralizing and economically destabilizing practice.

C.2. Family Life

The al-Madina phase took care of family and hereditary matters as well. It clarified rules of marriage and inheritance. It explained women's financial rights and moral dues in marriage, divorce, and the transitional stage before re-marrying. It emphasized the woman's sustainable rights from the divorcing husband and the proper time to re-marry after divorce. (A period of four months is necessary to secure the proper parentage of any possibly conceived child not made manifest yet.) The al-Madina phase also established inheritance rules and organized hereditary matters. It specified who inherits what and the inherited amount due to each person.

C.3. Judicial Matters

The legislative al-Madina period also enforced punishments for crimes committed against fellow human beings to guarantee the human right to a peaceful living. It called, like other religions, for preserving the safety of five essentials for a human being: life, progeny, property, religion and brains. It also affirmed self-dignity for all human beings by claiming their equality in origin and status. Tribalism and racist prejudices were designated as stinky. The *Qur'an* affirms: "The believers are naught else than brothers. Therefore make peace between your brethren" (al-Hujurat/The Private Apartments, 10).[7] Against rivalries and feuds the principles of peace making and forgiveness are strongly recommended. The Prophet supports this teaching of the *Qur'an* by saying: "He who calls for racism is not one of us" (Amin, 1999, p. 74).

C.4. Food and Health

Legislation in Islam included rules in food consumption too. Such rules are based on the principle of supplying good nutrition for people and eliminating harmful matter. Operating under its stated principle that alcohol has some good for the human body but that more harm comes out of it, the holy text aimed towards prohibiting it (al-Baqarah/The Cow, 219). However, it did so in stages. Drinking of alcohol was one of the vices that had to wait for the second period in the history of the Faith, the legislative one, to be struck out. Used to drinking, the Arabs needed time to overcome that habit. The Prophet and some of his best companions never tasted alcohol neither before nor after Islam, but not all of the Prophet's followers abstained. Witnessing the amount of moral evil and human disgrace it caused, those who did not drink wished to see the practice disappear. However, this was done in stages. Islam, first, forbade the person who consumed

[7] The numbers given in parenthesis are those of the *ayah* inside the larger unit, the *surah*. The *ayah* number remains the same in any edition of the *Qur'an* in any language. So is the *surah* number, if given. This paper, however, prefers to provide the name of the *surah* instead of its number as the custom is in Arabic scholarship on the *Qur'an*. It gives both the Arabic name in transliteration and the translated one as well.

alcohol to pray till he is fully sober again. Second, alcohol was designated as a Satanic vice that ought to be avoided. The third stage of ultimate prohibition occurs not in the *Qur'an* but in the Prophet's words that curse those who drink, serve or sell alcoholic beverages.

Food injunctions go beyond alcohol to focus on and forbid feeding on non-vegetarian birds and animals like beasts and birds of prey or animals that feed on unhealthy matter like pigs and hyenas. Islam also forbade consumption of dead animals or of animals that were not slaughtered in the proper Islamic way. Suffocating or strangling the animal is a slow, painful and unmerciful death and is therefore prohibited. Moreover, the blood that remains inside the veins in such processes would corrupt the freshness of the meat and jeopardize the health of the consuming subject.

In keeping with its concern for good habits in nutrition, Islam directed to moderation in food consumption. The Prophet advised that only one third of the stomach ought to be reserved for food, the second is for fluids and the third for air. He also recommended that one should eat only upon feeling hungry and should stop before reaching satiety.

D. Beyond the al-Madina Phase: Meeting the Requirements of All Times

Not all legislation acts necessarily occur in the *Qur'an* or during the al-Madina phase. Islam has left the gate open for future extension of the process to meet changing cultural conditions and evolving human needs. This flexibility does not mean that Islam has left gaps. The holy text states basic injunctions in a manner that precludes doubt and confusion. Issues that ought not to depend on human contribution are firmly declared in the holy book. Condemning homicide, lying and false testimony; prohibiting cheating, gambling and usury; naming the debarred partners in marriage (mothers, sisters, aunts); defining the rules of inheritance; and specifying punishments for crimes committed against fellow human beings (a life for life, an eye for eye, etc. unless the victim forgives) are some such matters that did not wait for human elaboration. Only negotiable matters are left open for future acts of legislation. The ongoing process is, nevertheless, varied and multi-leveled. It includes the following figures and steps.

a) The Prophet: The holy text has licensed the Prophet to judge, evaluate, legitimize or prohibit to human convenience matters that come his way. Such license is evident in the Qur'anic frequent injunctions to Muslims to "obey Allah and His messenger" (al-Mujadilah/She That Disputeth, 13). The text also indicates: "whatsoever the messenger giveth you, take it. And whatsoever he forbiddeth, abstain (from it)" (al-Hashr/The Exile, 7). The license is also enforced by the *Qur'an*'s warning to the Faith's followers against disobeying the Prophet for it would lead to "painful punishment" (an-Nur/The Light, 63). The Prophet's contribution to the legislative process of the *Qur'an* is called *sunnah*, a term which literally means a path or a method, connotes legislation and has even become almost exclusively attached to the Prophet's Speeches, deeds and his approval of the wise ways of his learned companions.

   The nature of his contribution varies. Besides affirming the rules of the *Qur'an*, the Prophet is authorized to elaborate on them. The *Qur'an*, for example, ordained prayers and *Hajj* as two pillars of Islam. The Prophet detailed the manner of their performance. The Qur'anic text, for another example, prohibited the eating of pigs' meat. The Prophet elaborated to include beasts and birds of prey. The *Qur'an*

recommended kindness to one's parents (even if non-believers) and the Prophet tripled the mother's due share of kindness as compared to the father's.[8]

The Prophet's most extensive contribution came on moral, social, and behavioral matters that the *Qur'an* did not elaborate on like the neighbors' rights including non-Muslims;[9] seeking education from birth to death; respecting the elderly; forbidding whispering among two persons in the company of a third; condemning gossip and backbiting; economizing in water consumption even if one lives by a river side; encouraging personal cleanliness and removal of dirt and harmful matter from public roads; planting trees and forbidding their cutting even on enemy's lands; paying the workers promptly before the drying of their sweat; freeing slaves by making the act stands as an atonement for big sins;[10] mercy to animals;[11] kindness to women, children, the elderly, the blind and the handicapped and sparing them in battlefields (Amin, 1999, p. 85).

The human contribution to the legislative processes of Islam is carried on after the Prophet's death and is supposed to continue across the ages to meet changing human and cultural conditions. His learned companions expanded on the legislative process according to the requirement of social and political life (al-Kattan, 1996, p. 69). Prior to his demise, the Prophet outlined and generated such continuity.

b) The Prophet has authorized his caliphs[12] after him to face up to the requirements of their times and to be guided in the process by the basics of Islam as stated in its holy book. He told his people prior to his departure: "Take my Sunnah and the Sunnah of my well-guided caliphs after me" (al-Mubarakfory, 2001, Vol. 3, p. 50). Such delegation is supported by the holy book, for the directive is to ask the learned if one does not know: "Ask the followers of the Remembrance if ye know not" (an-Nahl/The Bees, 43).[13]

Each of the four caliphs has had his contribution to the legislative or moral system of Islam. The first caliph, for instance, introduced the grandmother into the inheritors' list. The second caliph performed the extra evening prayers during the Ramadan month in a public congregational form whereas the Prophet prayed them in private (to preclude burdening his followers with any extra prayers after the daily five). The second caliph also specified flogging as punishment for a drunkard if caught on the street (but let go of him if drinking at home). The third caliph licensed the Friday Speech after the noon prayers (though people went back to the early practice of having it before praying). The fourth caliph enforced punishment for

---

[8] In regard to both parents, the *Qur'an* stresses: "Consort with them kindly" (Luqman/Lukman, 15); but the Prophet elaborates: "Your mother," and repeats it thrice before he concludes, "then you father" (al-Bukhari, (n.d.) 12:4).

[9] The Prophet [PBUH] missed his Jewish neighbor and on being informed he was sick went to visit him.

[10] Other cultures and religions practiced enslavements at war, including the ancient Arabs. The Greek and Roman cultures and Judaism had no reservation in benefiting from the practice (Amin, 1999, p. 87). Islam abolished slavery in a gradual manner, like wine taking, because a sudden prohibition, in this case, would have destabilized the economic system of the country.

[11] A fallen woman is reported to have earned the eternity of heaven because she has helped a dying dog to some water she obtained for it from a nearby well.

[12] A caliph is the elected political and the religious leader of the Muslim community after the Prophet. Four of them ruled before the Umayyads took the lead by force and made it hereditary. Historians suggested a fifth to be added to the first four though separated chronologically from them because of his extreme piety.

[13] Here I have to divert from Pickthall's naming of the *surah* because he uses the singular form of the word whereas the title in Arabic is in the plural.

lying about any of Allah's messengers or prophets. A fabricated story about prophet David (Dawood) at the time made it necessary to be strict about this matter.

c) Consensus: Upon being asked how to judge matters that has had no precedence in the holy book or his *sunnah*, the Prophet instructed his people to meet, discuss, and consult with each other and to ultimately go by the general consensus of the group. The procedure as an official religious legislative method was interrupted after the death of the fourth caliph. However, since the Prophet did not specify time for it, the implication is that it can be performed at all ages and may be resumed in modern and contemporary times as well.

d) Consulting scientists in fields of their expertise is part of Islam's recommended actions for legislation. Since the objective is to secure human welfare and eliminate danger, threats and risks, the directive (of ask the learned if you do not know) implies that doctors, engineers, economists, chemists, physics experts, etc. ought to be trusted to provide the right advice for religious legislation. To this practice the permission to avail people of organ donation and test-tube babies is indebted.

e) Contribution with personal insight and parallelism based on measuring new cases against similar old ones in Islamic legislation is an important practice in the process. The practice was approved by the Prophet when he dispatched one of his companions (Mu'ath bin Jabal) to rule in Yemen. He asked him "how do you think you will manage?" The man answered: "by falling back on the *Qur'an* first, if the answer is not present, I go to your *Sunnah*, and if an answer is not present I will use my personal judgment" (ibin Humbal, 2001, Vol. 6, p. 321).The Prophet approved of the intended plan.

In short, Islam and its rules have covered the main parts of human life and left solid background and clear examples for new cases, events and situations to be dealt with and legislated for. It covered questions of faith, and worship; moral values and obligations; human behavior; familial, marital, and social relationships; inheritance, economy, and commercial dealings; health and nutrition laws; crimes and punishments. For its contribution to human legislation the Faith received a tribute by Harvard University that quotes an *ayah* (a verse) of the *Qur'an* at the entrance of its Faculty of Law: "O ye who believe! Be ye staunch in justice, witnesses for *Allah*, even though it be against yourselves or (your) parents or (your) kindred" (al-Nissa/Women, 135). The Prophet Muhammad is also honored by the Supreme Court of Justice as one of the Greatest Lawgivers of the World in 1935 (US Message Board, 2013).

IV. Shifts in Legislation and Relaxing Hold on Islam's Values

As early as the time following the demise of the fourth caliph, aspects of the political system started to divert from the truly Islamic path. The principle of people's approval and consensus in electing the Prophet's caliph was abandoned. Mu'aweya, the establisher of the Umayyad ruling house, took the lead by force and made the ruling system hereditary. So did the Abbasid ruling house after the downfall of the Umayyad. The principle of hereditary system survives till the present time in many parts of the Arab world which is not what we would call a truly Islamic way of electing a ruler.

However, more comprehensive changes have become obvious at the present time. Starting with the 20th century, most Arabic and Islamic countries abandoned Islamic legislation and started to adopt foreign systems. A separation of religious creeds and political systems became evident as

a result of such practice. Syria, Lebanon, Iraq, Algeria and Tunisia are obvious examples of this turn. Morocco, Egypt and Sudan retained Islamic legislation only in personal laws related to marriage, divorce and inheritance. Countries with more traditional ruling systems (like monarchies or smaller ruling houses of *emirs*, princes) remain more inclined towards Islamic legislation as a basis for their rule. The Gulf countries, Jordan and Yemen are some such countries. However, even these countries began of late to gradually shift into foreign systems. The Saudi system remains an exception in that it continues to rely heavily on Islamic legislation and to permit change in a much slower and less politically direct manner. Changes in this country are more cultural, social and intellectual than political.

The shift to foreign political systems in the Islamic and Arab world has its roots in political, economic, intellectual and religious forces that this paper will try to highlight.

A. The Political Factor

Despite the Umayyad's usurpation of power, the early Islamic Kingdom remained intact for almost five centuries with a caliph at its center and appointed rulers in its extended parts. As wealth poured in, caliphs departed from the spirit of Islam and procrastinated in luxury. Such indulgence weakened their hold on the kingdom and regional governors broke their loyalty and became politically independent. As many as fifty governors were discernible across the Arabian Peninsula, the adjacent northern parts and North Africa before the Tartar fighter Genghis Khan brought the Islamic kingdom down in1205 AD.

The Ottoman Empire restored the unity of the Islamic world in 1299, extended its territories up to the Balkan lands, and continued to hold power till its downfall in 1923 by European forces. Europe's resistance, and curtailment, of the Ottoman expansion culminated in the European occupation of most parts of the Arab and Islamic world with the exception of the central and western parts of the Arabian Peninsula. The first was too dry of a desert then to be worthy of attention and the second was the holy places of the Islamic World which Europe had no interest to impinge on.

Such colonization was one of the biggest causes for the departure from Islamic legislation. The colonizing powers introduced their own systems of economy, trade, politics, and the military into the occupied countries. They generally allowed religious freedom and kept personal laws in marriage, divorce and inheritance to go on in the Islamic fashion. The subjugated nations gradually became accustomed to Western values and ruling methods. After the driving away, or the voluntary departure, of the colonizing forces, most of the Islamic countries continued to abide by the colonizer's laws and to acquiesce to the separation between religious practice and the politics.

The reliance on Islamic law in Saudi Arabia prolongs mainly because the country has never experienced foreign occupation.[14] Yet despite such a hold, purity is hard to maintain in a rapidly evolving world. Change occurs in this instance more on the intellectual, cultural and economic levels than the legislative one.

B. The Economic Factor

Due to the rapid development of architecture, economy, and finance, the Arab world in general and the gulf area in particular have recruited foreign labor forces on all levels. The numbers

[14] Commitment to Islamic legislation is an essential part of the Saudi house's claim to political authority as a result of collaboration with the Wahabi movement of religious revival. The hold that the country retains on Islamic legislative matter is an extension of that covenant.

of expatriate workers have grown into a large proportion. The local governments were obliged to adopt international laws in dealing with such large work force in the region and abandon local habits. They had to honor contracts with countries lending hand in the development process to guarantee the rights of the imported work force in an internationally recognized context. These laws are not what the Islamic legislators have written down, though most of them are akin in essence to Islamic values. Medical coverage, limiting of work hours, granting holidays, and paying end of service rewards are newly introduced concepts in the work field, though they do not necessarily contradict the teachings of Islam.

A real type of departure from Islamic values with more serious moral consequences occurs on family levels. Due to the amount of wealth that oil has brought to the region, rich families have recruited external hands on the domestic level. Their number in cases of wealthy households was alarmingly big. This phenomenon has negatively affected family life, children upbringing, and local values as well. The end result of such domestic merging with foreign hands is that the rich became less strictly adhesive to Islamic way of life than the poor in such countries because they could afford such services. They also often travelled abroad for leisure and were more exposed to foreign ways than the poor.

C. The Intellectual Factor

Sending young people abroad for education was one reason for departure from the traditional way of life that has its roots in Islamic teachings. Opening branches of foreign universities in the region like the American University in Egypt, Lebanon and of late in the Emirates has become another cultural factor that brought Western influence within its boundaries. Educated abroad or in foreign universities at home, the young started to adopt Western patterns of behavior like dressing in Western costumes, reversing traditional hair length between boys and girls (with boys growing hair to the shoulders and girls having crew cut), eating in fast food restaurants, using English more than Arabic, paying less heed to religious rituals and so on and so forth. These groups were first reprimanded by the strictly religious sects. Then due to the frequency of what was initially considered a violation and due to the conflicts and confrontations that ensued, the sect dropped the practice. They even became accustomed to the sight of family gatherings in restaurants replacing the old scene of finding only men enjoying such places.

D. The Religious Factor

Although it sounds paradoxical that religion would distract from religious legislation, the intended meaning here is to illustrate how abuse of religious license or limited comprehension of Islamic principles have negatively affected maximum benefits of Islamic legislation. This limitation is observable on several levels.

a) The eagerness of the religious men to contribute to the ever evolving legislative process of Islam has created different views and several sects across the ages. The disciples of each *imam* (a leading religious thinker) were enthusiastic to the degree of blind prejudice against other legislative groups and ideas. Instead of multiplicity and flexibility in application that such variety was supposed to lend the process, it created dissent. Governments were at loss whom to follow. The safest way out in many cases were acts of borrowing from foreign legislative systems.

b) Absence of documentation of a large portion of the Prophet's *sunnah* and of the contribution of his caliphs and of early religious thinkers (who were closer to the spirit of Islam than subsequent generations of thinkers) was one more reason for shifts in application of Islamic legislation. Had such contributions been collected and inscribed, they would have made a useful body of Islamic legislation enough to guide in application and to facilitate further acts of law making across the ages.
c) The interference of hereditary systems of ruling especially of primogeniture has impeded the legislative process. Unelected and unqualified rulers (especially young heirs) were not capable of hosting religious thinkers and generating legislation dialogues. Such atmosphere has isolated the process from the political orders that ran Islamic countries.
d) The religious thinkers responsible for legislation were unable to keep up with the rapid developments in trade, science, industry and education coming from abroad or to determine whether to accept and issue rules towards adopting them or to reject them altogether.
e) Religious thinkers found it sometimes difficult to agree on significant issues related to the Muslim nation's welfare and they remained divided among themselves over them. This has opened up a large gap in the face of having a whole and solid body of Islamic legislative matter. Many governments went to authorize different sectors in their administrative body to devise rules of their own or to adopt foreign laws when necessary. The conditions of purging imported rules of forbidden turns that Islamic legislation does not approve of were not strictly adhered to in many cases. Not all borrowed matters proved necessarily congenial to Islam's teachings
f) A mixing of Islamic values with traditional and tribal social systems has put off many of the moderate and enlightened Muslims from complying with the strict outcome of such merging.

V. Concluding Remarks

This paper has attempted to explain Islam to the non-Muslims by telling the story of Islam with the Muslims. It sheds light on Islam as a civilizing force in the life of the ancient Arabs and moves to explain why Muslims have relaxed their hold on the Faith despite its major contribution to their cultural evolution and growth. In order to trace Islam's influence, the study provides a historical background that portrays the life of the Arabs before the Faith's advent. Such backdrop enables the study to explain how Islam's teachings have transfigured the Arabs' nomadic life style into a civilized order of life on both the spiritual and the practical levels. It purged their religious habits of paganism and directed them to monotheism. It delineated a path to moral propriety and good human relationships on both family and public levels. It legislated on economic, political, judicial and health matters. It suggested means to democracy and to a continuation of its legislative processes to suit evolving human needs across the ages. The study then moves to investigate the reasons behind the Muslim's relaxed hold on Islam. The findings point in the direction of a complex process of internal political corruption and foreign colonization of the Arab world in addition to the inefficiency of the Islamic religious thinkers in dealing with both.

The study has relied on Arabic sources to develop the topic and has as such managed to bring the content of such sources into the sphere of Western scholarship. The accessed sources are both historical and legislative. While the two sides of history and legislation remain separate in Arabic

scholarship, the study links them together in this paper. The historic perspective highlights Islam's influence and the legislative sources indicate its genuine nature and comprehensive coverage of human life. The study, in conclusion, makes claim for Islam as a system fit for application at the present time despite Muslim's relaxed hold on it.

References

al-Asqalani, ibn Hijir. 1997. *Fateh al-Bari bi Shareh Sahih al-Bukhari* [The Interpretation of al-Bukhari's Certified Collection of the Prophet's Sayings]. Vol. 10. CDRom. Beirut: al-Arees Company for Computer.

al-Bukhari, Muhammad Ismail, ed. n.d., *Sahih al-Bukhari* [al-Bukhari's Certified Collection of the Prophet's Sayings]. Hadith No. 5834. Vol. 12. CDRom. Amman, Jordan: Dar Ihya'al-Turath al-Arabi.

al-Hamawe, Yaqut. 1986. *Mu'jum al-Bildan* [The Countries' Dictionary]. Beirut: Dar Sader.

al-Kattan, Manna'. 1996. *Tareekh al-Tushree' al-Islami* [The History of Islamic Legislation]. Riyadh: al-Ma'arif Library for Publication and Distribution.

al-Mubarakfory, abu-Alala'. 2001. *Tuhfa al-Ahwathee* [al-Ahwathee's Treasured Piece]. Beirut: Daral-Kuttub al-Elmeyah, n.d. CDRom. Riyadh: Mawsua't Hebat al-Jazeera al-Thaqafeyah.

Ali, Jawad. 1993. *al-Mufusul fe Tareekh al-Arab Qubl al-Islam* [The Detailed in Arab History before Islam]. 10 Vols. Alexandria, Egypt: General Organization of the Alexandria Library.

Amin, Ahmad. 1999. *Fujr al-Islam* [The Dawn of Islam]. 2nd ed. Cairo, Egypt: Dar al-Shuroog.

Ark Discovery International. 2013. "Noah's Ark." www.arkdiscovery.com/noah's_ark.htm (accessed on August 23).

bin Munthoor, Muhammad bin Mukkurum. 2001. *Lisan al-Arab* [The Arab's Tongue]. Beirut: Dar Sader, n.d. CDRom. Riyadh: Mawsua't Hebat al-Jazeera al-Thaqafeyah.

ibin Humbal, Ahmmad. 2001. *Musnad Ahmmad ibin Humbal* [Ahmmad ibin Humbal's Certified Source]. Egypt: Mua'sasut Qurtubah. CDRom. Riyadh: Mawsua't Hebat al-Jazeera al-Thaqafeyah.

Pickthall, Mohammed Marmaduke. 1971. *The Meaning of the Glorious Qur'an: An Explanatory Translation*. Beirut, Lebanon: Dar al-Kitab al-Lubnani.

The Quran: Unchallengeable Miracle. 2013. "Ancient Egypt and the Pharaoh's Body." www.quranmiracles.com/2011/03/ancient-egypt-and-the-pharaoh-body (accessed on August 23).

US Message Board. 2013. "Prophet Muhammad (PBUH) Honored by the Supreme Court of Justice." www.usmessageboard.com (accessed on August 23).

The Journal of Business Inquiry 2014, 13, Issue 1 (Special Issue), 27-47
http:www.uvu.edu/woodbury/jbi/articles/
ISSN 2155-4072

A Text Mining Analysis of Religious Texts

By DANIEL MCDONALD*

Religious text scholarship explores the meaning of passages and uses critical/rhetorical research methods. In contrast, automated tools that perform shallower but broader quantitative analysis have been created. These tools process entire books and help illuminate relationships between religious texts. We have automatically extracted and categorized noun and verb phrases from nine religious texts: the Book of Mormon, the Greater Holy Assembly, the New Testament, the Old Testament, the Popol Vuh, the Qur'an, the Rig Veda, the Tao Te Ching, and the Torah. The extracted topics were used as input to a Self-Organizing Map (SOM). The map uncovered some interesting relationships.

Keywords: Religious Text Analysis, Self-Organizing Map

JEL Classification: C38

I. Introduction

The research of religious texts is often performed by literary and philosophy scholars and those trained in schools of Divinity. The research uncovers insights into religious passages that go deeper than words or phrases. Such focus on the meaning of scripture passages produces insights into the beliefs and practices of religions. Such research often uses qualitative and critical/rhetorical research methods. Such methodologies are appropriate as passages may have multiple levels of meaning and symbolism and do not fall into the often flattened categories of quantitative research.

In contrast to a deep understanding of scriptural passages is the automated lexical analysis that is used in information retrieval systems of today. Words and phrases are extracted from documents and indexed to facilitate searching. Users of search tools enter a few words and phrases and similar documents are retrieved. While such tools are constantly improving, there is still a large difference between the rich analysis done by religious scholars enabled by critical/rhetorical research methods and that done automatically by computers.

However, computer analysis of text is very fast. As a result, entire books can be processed producing quantitative data that can be analyzed. While the analysis is not as rich or deep, it is broader and can be revealing in its breadth and its quantitative nature. Over the last two decades, automatic text processing has improved in part because of the growth in availability of digitized text. In this research, we look to apply techniques used in the analysis of business and medical texts to religious texts. Our goal is to explore similarities and differences between nine religious texts based on our automatic processing of the text using current methods in text mining.

* Assistant Professor of Information Systems and Technology, Utah Valley University, 800 West University Parkway, Orem, UT 84058. E-mail: dmcdonald@uvu.edu.

The author would like to acknowledge those from the Religious Faith and Social and Applied Sciences Conference whose comments helped improve this work.

II. Literature Review

Digitized natural language texts in the form of research, email, web pages, and digitized books have proliferated greatly over the last decade. The growth of the World Wide Web has been a catalyst for such growth. In 2008, Alpert and Hajaj (2008) reported that Google had counted one trillion unique URLs on the Web. The U.S. National Library of Medicine (NLM) posts all medical research abstracts on the Web. The NLM currently reports having 19 million abstracts, with between 2,000-4,000 added daily (Medicine, 2013). Project Guttenberg, which was founded in 1971 by Michael Hart, supplies access (via the Web) to previously published books that are now out of copyright. The project site reports offering 43,000 eBooks for free download (Gutenberg, 2013). Started in 1999, the Internet Sacred Text Archive is a "text archive of electronic texts about religion, mythology, legends and folklore, and occult and esoteric topics" (Hare, 2013). The site is not sponsored by a religion and seeks to support religious tolerance. The sacred text archive includes over 900 references in its bibliography.

For a researcher or executive, staying on top of new publications or synthesizing information relevant for decision making is a challenging task. This deluge of information is referred to as the information overload problem (Bowman *et al.*, 1994). Language processing and analysis techniques have been developed to facilitate gleaning knowledge or at least highlighting relevant information from text. Applying such automated techniques of text analysis to cultural and religious texts creates an opportunity to produce new insights into cultures and religions as well as cultivate tolerance.

A. *Stylometry*

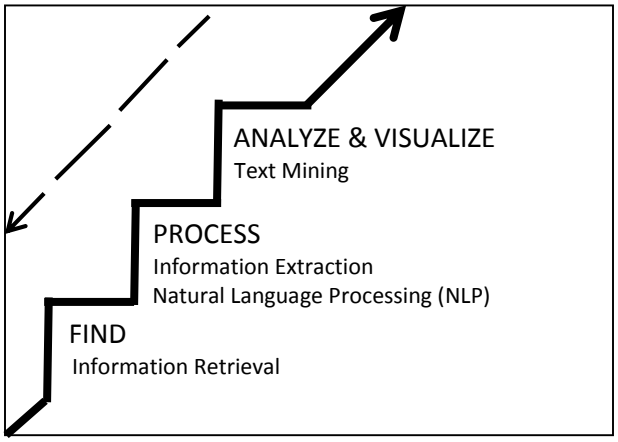
Over the years, applications of text analysis have varied. A common application of text analysis is stylometry. Stylometry does not analyze text content, but rather uses statistics to analyze writing style (Zheng *et al.*, 2006). This research area, also called authorship analysis, has been applied early on to literature such as the Federalist Papers (Mosteller, 1964) and also to the writings of Shakespeare (Hope, 2009). Stylometry has also been applied to email (de Vel *et al.*, 2001), online forums (Zheng *et al.*, 2006), and computer code (Gray *et al.*, 1997). Use of stylometry to analyze religious texts, in particular, the Book of Mormon has also been common (Jockers *et al.*, 2008; Reynolds, 1982 and 1997, Reynolds and Tate, 1982).

B. Text Mining

In contrast to stylometry, a research area called text mining focuses more on text content analysis and seeks to help alleviate the information overload problem (Fan *et al.*, 2006). Text mining includes many computer-automated tools and techniques. Figure 1 shows different focus areas of text mining, which include the find, process, and analyze and visualize areas. Underlying each area is the goal of uncovering relevant and timely information or insights. A starting point in text analysis is to find relevant document(s) to support a task (Salton *et al.*, 1975). This task may be broad research, an information search task, searching email for relevant forensic data, or increasing understanding among cultures and religions. Depending on the user task, the resulting set of documents may be large or small. Higher steps depicted in Figure 1 can provide feedback to lower steps, so the process operates more like a cycle than a one-way linear staircase. For example, finding the correct documents can be facilitated through analysis and visualization.

In the process area of text mining, automated tools can identify proper nouns, identify entity relationships, or extract events (DARPA 1993a, 1993b, 1995, 1998). The structures extracted can inform the "find" task or be used as input to "analyze and visualize" tasks. Finally, in the "analyze and visualize" area, text or extracted structures such as events can be aggregated and displayed using different visual metaphors (Hearst, 1999, and Pirolli *et al.*, 2001). Such analysis and visualization metaphors can assist "find" tasks or be used to help support drawing conclusions or making decisions. Text mining analysis reveals relationships found in single or multiple textual documents. Applying text mining to religious texts can yield cultural and religious insights as content relationships among religious texts are explored.

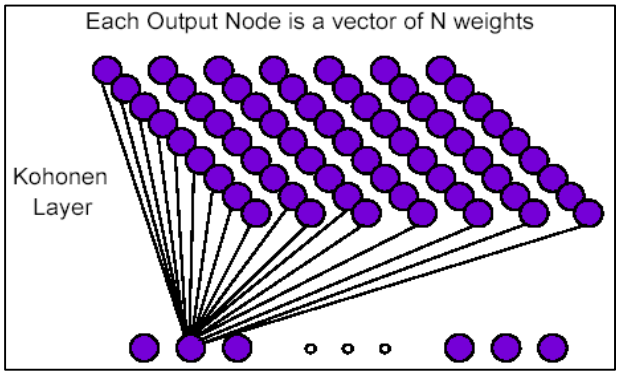
Figure 1: The Text Mining Research Areas



C. Self-Organizing Map

A self-organizing map (SOM) is a two-layered neural network algorithm used for clustering and dimension reduction. The SOM, developed by Teuvo Kohonen, is unsupervised in that it does not require human intervention (Kohonen, 1995). The SOM is similar to multi-dimensional scaling in that it takes a multi-dimensional input layer and maps the inputs to a two-dimensional output layer (Jain and Dubes, 1988). Figure 2 shows the SOM topology. In dealing with text,

Figure 2: The SOM Topology



each input is typically a word or phrase, which we will call a term. The number of inputs corresponds to a union of unique terms from the documents to be clustered. The value for an individual input is either 1 or 0 depending on whether a particular document contains the input term. Each document to be clustered arranged as a set of inputs, is presented as a sequence of 1s and 0s, depending on the existence of the given term in the document. The number of output nodes can vary based on configuration. The topology in Figure 2 shows 63 output nodes. Also shown in Figure 2 is that the network is completely connected meaning each input node is connected to every output node. Each output node contains a vector of weights that correspond to each input node. During the training phase of the algorithm, sets of inputs are presented multiple times in order to tune the connection weights. At the end of a training iteration, an output node is selected with the smallest distance from the input set. The weight vectors of the selected output node along with neighboring output nodes are adjusted to further decrease the distance to the input set. Slowly the difference between the output nodes begins to correspond to the difference between sets of inputs. Similar sets of inputs will be placed closer together on the output map with less similar inputs being placed farther apart (Lin *et al.*, 1999).

The SOM has been used extensively to assist in text mining search tasks. The graphical map has been used to cluster similar documents to support information seeking (Kaski *et al.*, 1993). Lin *et al.* (1991) used the SOM as a retrieval interface for an online bibliographic system. Chen *et al.* (1996) used the SOM to categorize Web pages. Kaski *et al.* (1998) in their WEBSOM system used the SOM for categorizing over one million documents from 85 Usenet newsgroups.

Beyond supporting the finding of documents in a collection, the visualization power of the SOM has also been used to analyze textual content. Orwig *et al.* (1997) used the SOM to classify electronic brainstorming output from an Electronic Meeting System called GroupSystems (Orwig *et al.*, 1997). The SOM was used to facilitate group problem solving. Roussinov and Chen (1999) also analyzed the output of electronic meetings, comparing the output of the SOM along with Ward's clustering algorithm. In a more literary application, Honkela *et al.* (1995) used the SOM to visualize the raw text from 200 Grimm Tales. The map was used to highlight the relationships between words from the stories based on their proximity of placement on the map.

III. Research Gap

The primary research gap we wish to explore in this paper is the lack of automated analysis and visualization of religious text content. Text from non-religious topics has been visualized using the SOM. Examples in research include text from web pages, electronic meetings, online bibliographic systems, and even popular stories. We are not aware of studies using the SOM to visually compare content solely from religious texts.

In addition, we want to address a gap in the way text is represented when used with a self-organizing map. When the self-organizing map is used to cluster documents, the input nodes are 1s and 0s that represent the existence of terms (words or phrases) extracted from the text itself. For example, Honkela *et al.* (1995) originally identified 7,000 unique words from the Grimm Tales and ultimately reduced the vocabulary down to 270 to use as inputs to the SOM, a 96 percent reduction. While such an approach works well to find contextual relationships between the terms that were kept as inputs, reducing the inputs in this fashion greatly hides differences between the documents from which the terms came. The dimensionality of the inputs has been reduced by simply using the words with the highest frequency. In this paper we introduce a technique for

reducing dimensionality by preprocessing text into word categories based on the semantic similarity as opposed to eliminating words with lower frequency.

Finally, there is a research gap in the way the SOM is being used. The typical application of the SOM identifies themes, topics, or word contexts across documents. We are more interested in highlighting the similarity and differences between entire books. For example, electronic meetings or web pages were processed to identify themes or topics and the Grimm Tales were processed to identify words with similar contexts across tales. The document boundaries were not as important as the topic or category boundaries that resulted. We are using the SOM to see how closely religious texts cluster to other religious texts and not to identify common themes or contexts among the texts.

IV. Research Questions

The purpose of this research is to use automated techniques to perform quantitative analysis on religious texts. We explore the use of the SOM clustering algorithm to cluster seven varied religious texts based on their topic similarity. Instead of using terms as inputs, each religious text will be preprocessed into topic categories and those categories will serve as inputs to the SOM. Also, different from previous research, the purpose of the SOM clustering will be to analyze the cluster position of entire religious texts as opposed to identifying topic categories from within those texts. We have four primary questions that we want to explore.

1. Can any interesting observations be drawn from the resulting visualization of the sacred texts?
2. Does the location of documents on the output layer of the SOM correspond to word category overlapping among religious texts?
3. Which religious texts actually cluster together?
4. Does the clustering of texts using noun categories vary from the clustering created using verb categories?

V. Experimental Design

The experimental design consisted of selecting the sacred texts to include in the experiment, processing the texts by extracting the noun and verb phrases and placing them in semantic categories, selecting cutoffs for the number of topic categories to include as inputs from each book, and then producing the SOMs.

A. Selecting the Text

The nine religious texts were downloaded from the Internet Sacred Text Archive (Hare, 2013). The books processed included the Book of Mormon (BOM), the Greater Holy Assembly (GHA), the King James Version of the New Testament (KJV-NT), the King James Version of the Old Testament (KJV-OT) the Popol Vuh (PV), the Qur'an (Q), the Rig Veda (RV), the Tao Te Ching (TTC), and the Torah (T). In selecting the books, we aimed to use books that came from different parts of the world and are part of different religious traditions. We chose books from the following four geographic areas:

Americas—The Book of Mormon and the Popol Vuh both have origins on the American continent. The Book of Mormon is the scripture of the Church of Jesus Christ of Latter Day Saints

(LDS). The book was originally published in English in 1830 CE. The book claims to be a translation of ancient writings from inhabitants of the American continent with the translator being the religion's first modern-day prophet Joseph Smith. Joseph Smith reported the original language of the book to be Reformed Egyptian, though there is no surviving original record.

The Popol Vuh is a sacred text of the Quiche Indians in Central and South America. The Popol Vuh was originally written in Quiche. The oldest surviving written account is from 1701 thanks to the Spanish 18th century Dominican Friar Francisco Ximénez. A major reference of the Popol Vuh is the one translated by Adrián Recino into Spanish in 1947, with a subsequent translation into English in 1954 by Delia Goetz & Sylvanus Griswold Morley. It is this translation that we use in our text analysis.

Middle East—The Old Testament, the New Testament, the Greater Holy Assembly, the Torah, and the Qur'an all have origins in the Middle East. The Old Testament and the New Testament are sacred to religions of a Christian denomination. We used the King James Version of the Old Testament and the New Testament also called the Authorized Version published in English in 1611. This version was the third translation to English and was commissioned by King James VI, later known as King James I after the union of the Scottish and English crowns. The King James Version was conceived to fix reported errors in earlier translations and is a popular version used in Christianity today. According to *The Christian Post*, based on Bible sales in the United States in 2013 through September, the King James Version was the second most purchased version of the Bible after the New International Version (NIV) which was first published in 1978 (Menzie, 2013).

The Greater Holy Assembly is a sacred book of Kabbalah originally written in Aramaic and first appeared in Spain in the 13th century. Kabbalah is a school of thought that originated in Judaism and is considered mystical. While its teachings are used by many religious denominations, it is not a religious denomination itself. The Greater Holy Assembly is one of three books from a collection called the Zohar. The other two books of the Zohar are The Lesser Holy Assembly and The Book of Concealed Mystery. The Zohar was published by a Jewish writer named Moses de Leon. De Leon credited the work to Shimon bar Yochai, a 2nd century rabbi who was inspired by the Prophet Elija to write the Zohar. Adherents of Kabbalah claim the Zohar is the concealed part of the Oral Torah. The version we use in our text analysis is the first translation to English. It was translated by S. L. Macgregor Mathers in 1912 from the Latin version translation by Christian Knorr Von Rosenroth in 1684.

The Qur'an is a sacred text of Islam. The book contains revelations from God, given to Muhammad through the angel Gabriel. The revelations occurred up to the year 632 CE, which is the year of Muhammad's death. After the death of Muhammad, the first caliph Abu Bakr, with the help of Zayd ibn Thabit collected the book into one volume so it could be preserved. The original language of the Qur'an is Arabic and many argue that it cannot be reproduced in another language. The English version we use was translated from Arabic to English by Mohammed Marmaduke Pickthall in 1930. Pickthall, an Islamic scholar, had converted to Islam in 1917.

The Torah is central to Judaism. The Torah specifically means the first five books of the Tanakh or the Five Books of Moses. In some cases, the term Torah can also include the Oral Torah, which contains interpretations and amplifications. Revelations in the Torah are believed to have been given by God to Moses. The main revelatory event occurred on Mount Sinai. Some believe others revelations occurred at the Tabernacle. We used an English version of the Torah which did not include the Oral Torah. Our English translation was done by the Jewish Publication Society of America (JPS), which was first available in 1917.

India—There are four Vedas that originated in India, the Rig Veda, the Sama Veda, the Yajur Veda, and the Artharva Veda. The Rig Veda is one of the canonical sacred texts of Hinduism. The Rig Veda is a book of hymns composed by rishi that are dedicated to various deities. The content of the Rig Veda is accepted as originating between 1700-1100 BCE, being written in an early Indo-Aryan language. The oldest existing Rig Veda manuscript is from the 14th century CE and is kept at The Benares Sanskrit University. The first translation of the Rig Veda to a Western language was into Latin in 1830. The version we use was the second translation into English and was done by Ralph T.H. Griffith in 1896.

China—The Tao Te Ching originated in China. The Tao Te Ching is fundamental to religious Taoism. The book was written by the sage Lao-Tse (or Laozi) around the 6th century BCE. The oldest excavated text dates back to the 4th century BCE. The book was originally written in Classical Chinese using seal script, an ancient style of Chinese calligraphy. The Tao Te Ching has been translated many times to Western languages. The version we use was translated into English by James Legge in 1891.

We hypothesized that the book topic categories would cluster together based on geographic origins of the text. We supposed that regional speaking and writing influences would tend to make books from similar regions overlap.

B. Processing the Text

After selecting the books for the experiment, the texts were then formatted into XML files. Each XML file was processed by our content tagging algorithm (McDonald *et al.*, 2004). The algorithm tokenizes the document and recognizes sentence boundaries. The tokenizing process separates hyphenated words, adds spaces to punctuation, recognizes abbreviations, and matches parenthesis and quotations. Once tokenized, a document's words and phrases are tagged using hybrid semantic/syntax tags. The tagging process is aided by the use of an extensive dictionary of approximately one million word-tag entries. After being tagged, the text is processed several times more to combine tags into topic categories. The topic categories are part of a large category hierarchy. Nouns and verbs are placed into different categories. There are just over 3,400 different categories in the hierarchy into which terms (words or phrases) can be assigned. Once a sentence is processed, the instances of terms in topic categories are summed. The result is a list of topic categories with count totals.

In Table 1 we report the total breakdown of terms into nouns, verbs, and other categories between the nine books. Nouns typically made up 17 to 24 percent of terms, while verbs made up 13 to 17 percent of terms. The most common terms from books were neither nouns nor verbs however, which accounted for around 40 percent of terms, but rather prepositions. As shown in the table, the Popol Vuh, the Old Testament, the Torah, and the Rig Veda had a higher percentage of nouns than did the other texts. Subsequently, those four books were offset with a smaller percentage of verbs than the other texts. After combining nouns and verbs together, The Greater Holy Assembly had the lowest combination percentage. The length of the texts vary as well, with the Old Testament being the largest, followed by the Book of Mormon, the New Testament, the Qur'an, the Torah, the Popol Vuh, the Rig Veda, the Greater Holy Assembly, and the Tao Te Ching. Several texts were also very evenly distributed between nouns and verbs. The Qur'an, the Tao Te Ching, and the New Testament all had a similar number of nouns and verbs.

Table 1: Tallies for Content Categories Across Religious Books

	Nouns	%	Verbs	%	Other	Total
Book of Mormon (BOM)	48,613	18.57	42,492	16.23	170,742	261,847
Greater Holy Assembly (GHA)	8,666	18.94	6,347	13.87	30,744	45,757
New Testament (KJV-NT)	33,200	17.73	31,915	17.04	122,151	187,266
Old Testament (KJV-OT)	143,089	**21.53**	98,975	**14.90**	422,405	664,469
Popol Vuh (PV)	18,736	**24.18**	10,935	**14.11**	47,829	77,500
Qur'an (Q)	27,479	16.46	28,443	17.04	110,989	166,911
Rig Veda (RV)	13,018	**20.49**	8,775	**13.81**	41,734	63,527
Tao Te Ching (TTC)	1,931	17.62	1,907	17.40	7,124	10,962
Torah (T)	34,576	**20.90**	23,343	**14.11**	107,521	165,440

C. Selecting Topic Categories as Inputs

A critical experimental design issue was how to decide on the number of topic categories to include as inputs into the analysis. In order to keep dimensionality to a minimum and not overweight rarely occurring topic categories, we decided to select the most commonly occurring topic categories based on term counts. We sorted the topic categories for each book in descending order based on the frequency of the member terms.

When the term running total summed to 85 percent of the total terms for a book, we used that topic category as the cutoff for the cluster inputs. Using this approach, we were able to represent 85 percent of all term instances from a book to place the book on the SOM. At the same time, we kept the total number of noun inputs to 179 and the total number of verb inputs to 86. No individual book had more than 108 noun topic categories or more than 66 verb topic categories. This approach varies from the typical strategy of including actual terms as inputs and thus not being able to represent nearly as many topics from a book. Table 2 shows the total noun and verb topic categories per book and the number of actual topic categories used in order to achieve the 85 percent coverage of book term instances. Being able to represent 85 percent of the terms from a book and at the same time keeping inputs to below 180 is an innovation of our work.

Table 2: Topic Categories Selected as Inputs

	Total Noun Categories	Categories to cover 85% of nouns	% of Total Noun Categories	Total Verb Categories	Categories to cover 85% of verbs	% of Total Verb Categories
Book of Mormon (BOM)	406	84	20.69	220	50	22.73
Greater Holy Assembly (GHA)	331	75	22.66	172	38	22.09
New Testament (KJV-NT)	400	78	19.50	219	46	21.00
Old Testament (KJV-OT)	448	66	14.73	230	50	21.74
Popol Vuh (PV)	435	76	17.47	213	53	24.88
Qur'an (Q)	432	85	19.68	234	47	20.09
Rig Veda (RV)	350	65	18.57	212	66	31.13
Tao Te Ching (TTC)	270	108	40.00	155	47	30.32
Torah (T)	339	59	17.40	200	43	21.50

In most cases, we were able to represent 85 percent of the term instances while using under 23 percent of the topic categories. An exception to that rule was the Tao Te Ching. Forty percent of its noun categories were required to cover 85 percent of the book's nouns. Similarly, 30 percent of its verb categories were required to cover 85 percent of the book's verbs. Also, 31 percent of the Rig Veda verb categories were required to cover 85 percent of the books verbs. These results would indicate a higher variety of verb usage in the Tao Te Ching and Rig Veda compared to the other sacred texts. The Tao Te Ching was the shortest text in the study. The greater diversity of topic categories could also relate to the shorter length of the text. Longer books have more opportunity to revisit the same topics. The Rig Veda was also one of the three shortest books.

Once the topic categories for each book were identified, we removed the topics that were common to all nine sacred books. We wanted to include only information that would help differentiate the books. There were 14 noun topic categories that were common to all the books. Those 14 removed categories included animals, date/time references, external body parts, family relationships, emotions, references to a group, types of geography, references to God, internal body parts, plants, positions, the word thing(s), different roles, and uncategorized nouns. There were 16 verb categories that were shared by all 9 sacred books. The removed verb categories included the following: amuse, appear, be, build, characterize, conjecture, directed motion, do, future, get, give, have, message transfer, put, say, and see.

D. Creating the SOM

The SOM was created using free software developed by Cao Thang called Spice-SOM version 2.1 (Thang, 2011). The training of the SOM used a learning rate of .01 and a Sigma of 2 with a Sigma decreasing rate of .01. We ran the training for 1000 iterations. The output map is a 20 neuron by 20 neuron map using a hexagonal topology. Because each neuron on the map has six sides, the hexagonal topology allows for more neighbor neurons. We used a Gaussian neighborhood function to change the weights of the neurons after each iteration.

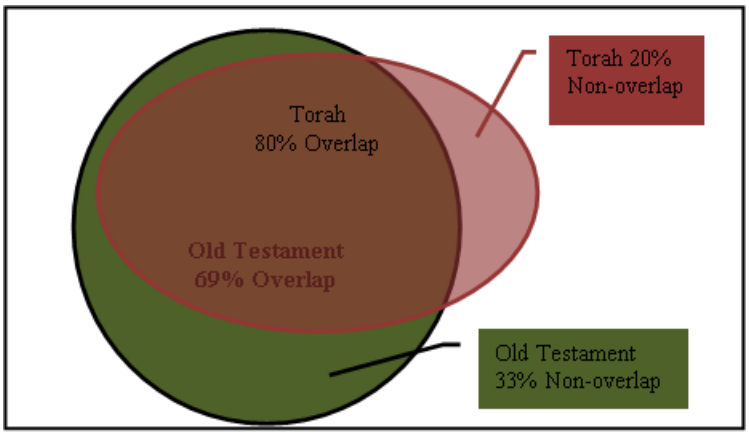
VI. Results

We created maps from two different sets of data. In the first map, only noun topic categories were used as inputs. In the second map, only verb topic categories were used as inputs. We have therefore separated the results of our analysis by noun and verb topic analysis.

A. Noun Topic Analysis

The self-organizing maps are created in part based on total topic overlap between books. Books with more topics in common should appear closer on the map. In order to get an idea of noun topic overlap between books, we organized the data in Table 3. Table 3 shows the percent of all the topics from each row that overlap with each column text. The overlap was calculated by taking the total topic matches between books (rows and columns) and then dividing that total by the number of topics in the first book listed in the comparison (the row). All the books had a different number of topics, though the Greater Holy Assembly and the Popol Vuh topic counts were close. Overlap percentage is thus not a commutative calculation. Because books had a different number of topics, the Torah's overlap percentage with the Old Testament, for example, is different than the Old Testament's overlap percentage with the Torah. Eighty percent of the Torah's topics overlapped with the Old Testament. Sixty-nine percent of the Old Testament's topics, however, overlapped with the Torah. This relationship is shown in Figure 3. While the overlapping categories are the same, the overlapping category count represents a different percentage of the sacred texts in the comparison. The difference in overlap percent results from the difference in topic counts from each book. Thirty-six categories overlapped between the Torah and the Old Testament. The Torah, however, had 45 topic categories (80 percent overlap), while the Old Testament had 52 topic categories (69 percent overlap). As a result, the Torah has a higher overlap percent with the Old Testament.

Figure 3: Percentage of Category Overlap Calculation



As shown in Table 3, the greatest topic overlap percentage (80 percent) takes place between the Old Testament and the Torah. So, on the self-organizing map, we would expect these two books to appear close together. The Book of Mormon also has high overlap (71 percent) with the New Testament and with the Qur'an (64 percent). Again, we would expect these books to appear

close together. By looking at the "average overlap percent of other texts" line at the bottom of Table 3, we can see which books should appear near the center of the map. In other words, to what book are most other books related. The sacred books are most similar to the Book of Mormon, followed by the New Testament and the Qur'an. The books show an average of a 59 percent topic overlap with the Book of Mormon, a 57 percent topic overlap with the New Testament, followed by a 55 percent overlap with the Qur'an. In the SOM, we would expect these three books to appear a bit more central on the map, with the other books being the closest to these three books.

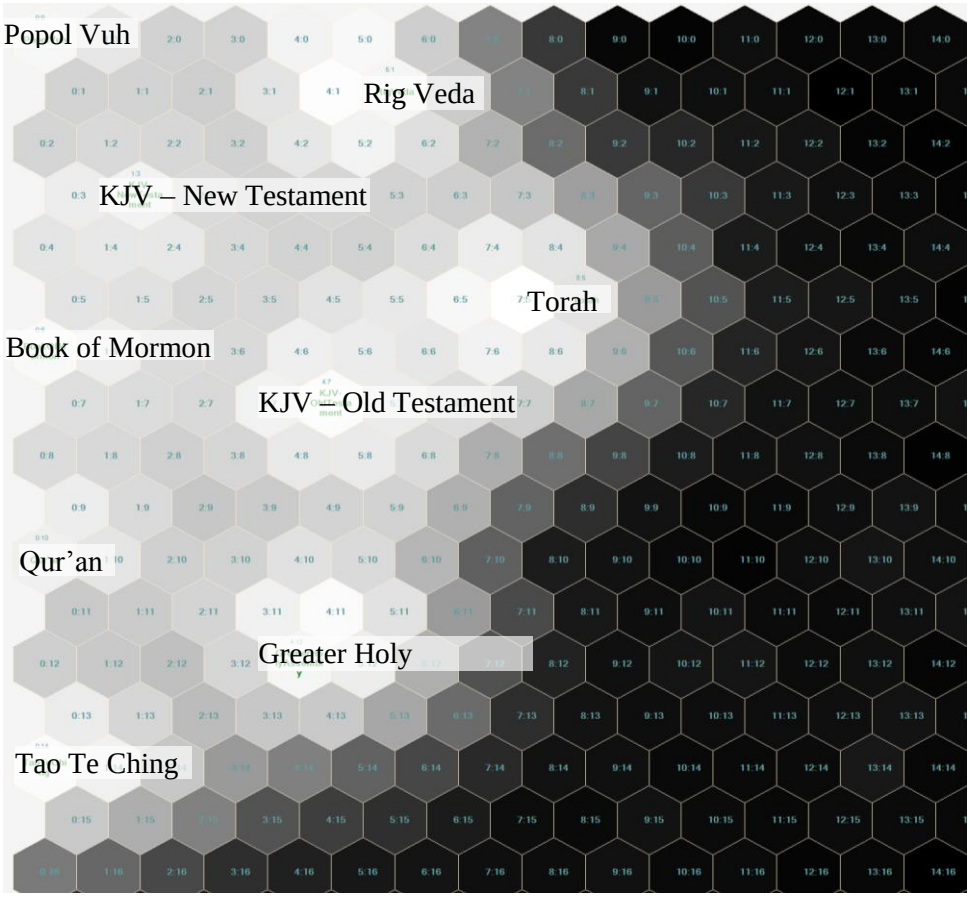
Table 3: Overlap of Noun Categories Between Books

TAG SOURCE	BOM	GHA	KJV-NT	KJV-OT	PV	Q	RV	TTC	T	AVG
Book of Mormon (BOM)	100%	39%	***71%***	51%	43%	***64%***	41%	49%	44%	50%
Greater Holy Assembly (GHA)	44%	100%	54%	39%	44%	51%	41%	46%	31%	44%
New Testament (KJV-NT)	***78%***	52%	100%	53%	44%	***63%***	44%	50%	50%	54%
Old Testament (KJV-OT)	***69%***	46%	65%	100%	54%	***62%***	50%	50%	***69%***	58%
Popol Vuh (PV)	48%	44%	45%	45%	100%	44%	39%	42%	47%	44%
Qur'an (Q)	***63%***	44%	56%	45%	38%	100%	45%	46%	35%	47%
Rig Veda (RV)	57%	49%	55%	51%	47%	***63%***	100%	49%	37%	51%
Tao Te Ching (TTC)	40%	33%	38%	31%	31%	39%	29%	100%	27%	33%
Torah (T)	***69%***	42%	***71%***	***80%***	***64%***	56%	42%	51%	100%	59%
Average Overlap % of Other Texts	***59%***	43%	***57%***	49%	46%	***55%***	41%	48%	43%	49%

Figure 4 shows the actual SOM produced based on the noun topics. Based on the overlap calculations from Table 3, the sacred texts on average were most similar to the Book of Mormon (BOM), followed by the New Testament (KJV-NT), the Qur'an (Q), and then the Old Testament (KJV-OT). The SOM is consistent with our overlap calculations in its placement of those four sacred texts in the center area of the SOM. Specifically, it placed the Book of Mormon vertically right in the middle of the SOM, with four books above and four books below it. The Book of Mormon was most similar to the New Testament, which appears right above it and the Qur'an, which appears right below it, followed by the Old Testament, which appears next to it on the right.

The greatest topic overlap between any two books from Table 3 occurred between the Old Testament and the Torah. This close relationship did manifest itself on the SOM by placing the two books right next to each other. The Torah was next most similar to the New Testament and then the Book of Mormon, which were also placed in a cluster close to the Torah.

Figure 4: Self Organizing Map of Nine Religious Texts Using 179 Noun Category Inputs



The proximity on the SOM shown in Figure 4 between the Rig Veda and the Torah requires some explanation. Based on the overlap percentages shown in Table 3, the Rig Veda is tied with the Greater Holy Assembly for being the least similar to the Torah. On the SOM, however, the Torah is placed close to the Rig Veda. A partial explanation for this is that the Rig Veda shares a unique topic category with the Torah while the Greater Holy Assembly does not. The topic uniquely shared between the Torah and Rig Veda is called "container" and includes words from the Torah including sack(s), basket, laver, and sheath. The "container" words from the Rig Veda include draught(s), jars, chalice(s), and beakers.

The book that on average is the least similar to other books is the Tao Te Ching, showing an average of 33 percent topic overlap with other books. On the SOM, the Tao Te Ching was placed at the very bottom, which is consistent with its limited overlap. While still relatively low, the Tao Te Ching has the most topic overlap with the Book of Mormon and then the Qur'an. On the SOM, the Book of Mormon and the Qur'an appear relatively close to the Tao Te Ching, but so does the Greater Holy Assembly, which shares fewer topic categories. Again the explanation lies in the number of unique topic categories shared between the Tao Te Ching and the Greater Holy Assembly. The three categories uniquely shared between the books include the "form", "issue", and "purpose" topic categories. The "form" category includes largely the term form with different modifiers. The "issue" category includes variations of issue, but also matter and account. The "purpose" category includes variations of the words reason and purpose.

B. Verb Topic Analysis

Table 4 shows the overlap in verb topic categories. Similar to Table 3, the overlap percentage calculation is not commutative. Overall, Table 4 reveals a slightly higher overlap percentage of verb topics (50 percent) compared to the noun topic overlap percentages (49 percent from Table 3). Also, the verb categories show a much greater range of overlap percentages. Noun overlap ranges from 29 percent to 80 percent. Average verb overlap (Table 4), on the other hand, ranges from 17 percent to 96 percent. There are more verb topics shared among all sacred texts than there are noun categories that are shared. We removed 16 verb categories that are shared by all the books in our sample compared to the 14 noun categories that are shared by all the books. Table 5 lists topics that overlap between books and includes some example terms that are members of each topic. The nouns and verb topics are listed in alphabetic order. Related to the verbs having more topic overlap is the lack of topic diversity in the verb topics. The verb-based SOM needed only 86 topics to cover 85 percent of all verbs, while the noun model required 179 different topics. Religious documents repeat verbs more frequently than they do nouns. The verbs to be, to build, to do, and to have all appear frequently in all documents.

Another possible factor that impacts the verb topic overlap is simply the lower number of verbs in the documents compared to nouns. While the ratio of nouns to verbs is similar in three books as shown in Table 1, there are more noun topics than verb topics in 8 of the 9 books. While verbs clearly play different roles than nouns, the greater noun frequency may have had an impact on the number of noun categories present.

Table 4: Overlap of Verb Categories Between Books

TAG SOURCE	BOM	GHA	KJV-NT	KJV-OT	PV	Q	RV	TTC	T	AVG
Book of Mormon (BOM)	100%	30%	***70%***	***70%***	58%	52%	61%	45%	55%	55%
Greater Holy Assembly (GHA)	48%	100%	43%	38%	52%	24%	33%	33%	38%	39%
New Testament (KJV-NT)	***79%***	31%	100%	***66%***	***66%***	62%	59%	59%	52%	59%
Old Testament (KJV-OT)	***70%***	24%	58%	100%	55%	55%	***67%***	42%	***76%***	56%
Popol Vuh (PV)	53%	31%	53%	50%	100%	42%	53%	50%	44%	47%
Qur'an (Q)	57%	17%	60%	60%	50%	100%	50%	***67%***	43%	50%
Rig Veda (RV)	41%	14%	35%	45%	39%	31%	100%	31%	37%	34%
Tao Te Ching (TTC)	50%	23%	57%	47%	60%	***67%***	50%	100%	37%	49%
Torah (T)	***69%***	31%	58%	***96%***	62%	50%	***69%***	42%	100%	60%
Average Overlap % of Other Texts	**58%**	25%	54%	**59%**	55%	48%	55%	46%	48%	50%

Also interesting in Table 4 is the similarities and differences in religious book centrality when using verb topics compared to noun topics. When comparing overlap using noun topics, the sample of religious books was most similar to the Book of Mormon and the Qur'an. However, when comparing topic overlap using verb categories, the sample of books was most similar to the Old Testament and the Book of Mormon, followed by the Popol Vuh and the Rig Veda. In other words, these four books had their verb topics most shared by the other sample religious books. Only the Book of Mormon has high numbers in both noun and verb overlap categories. The

average overlap percentage numbers to the Old Testament are a bit misleading. The average is high largely due to its overlap with the Torah. As shown in Table 4, the greatest similarity of all the texts is the Torah's similarity to the Old Testament, the same as with our noun analysis.

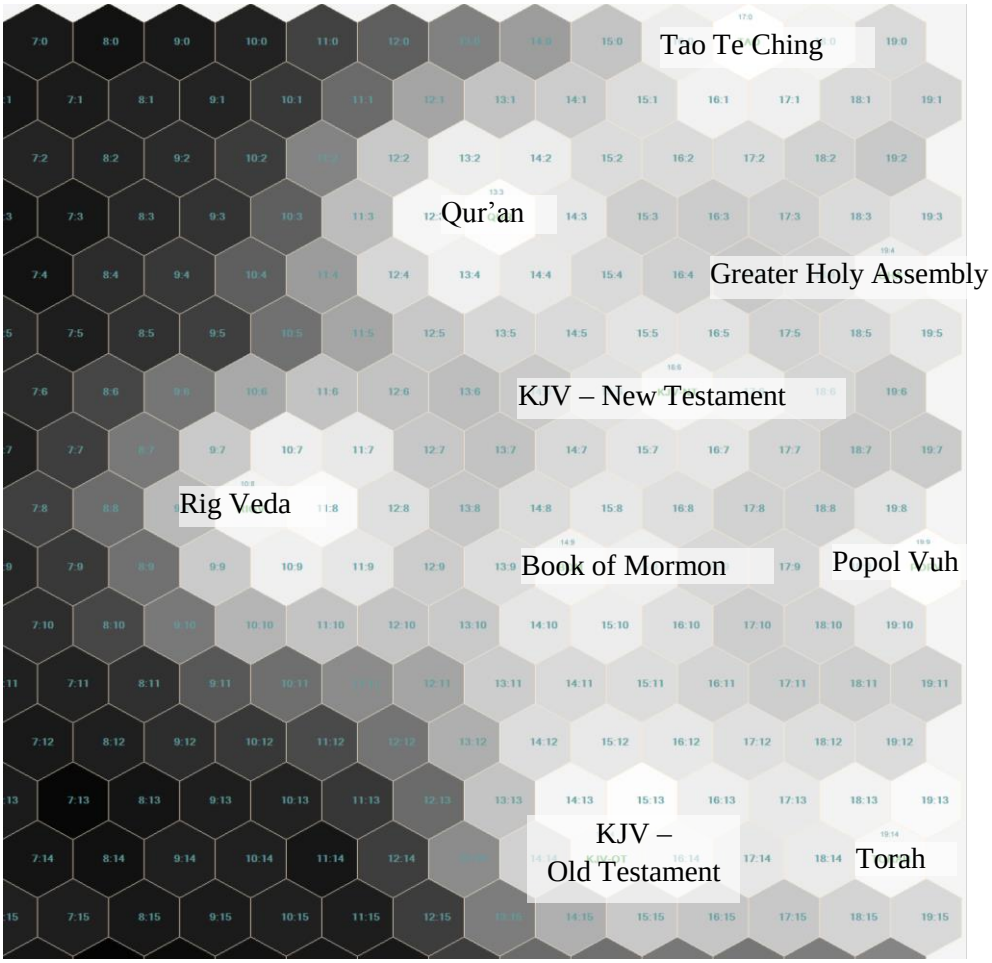
Table 5: Topic Categories Common Across All Sample Religious Books

Noun Category	**Examples**
Animals	flocks, sheep, creatures, beast(s), dragon, fish(es), cattle, oxen, bird(s), deer, jaguar, kine, dogs, rhinoceros, tiger, bullock, lamb(s), swine
Date/Time	first year, night, day, morrow, today, time, Sabbath, hour, dawn
Earth	earth, world
Emotions	joy, fear, pride, anger, wrath, love, laughter, bliss, pleasure, happiness
External body parts	hand(s), face, eye(s), hair, beard, mouth, flesh, body(ies), ear(s), arm(s)
Family relationships	father(s), son(s), daughter(s), children, brother, grandmother, mother
Geography	land, wilderness, vineyard, waters, field, town(s), sky, garden, sea
God	Lord, God, Allah, Christ, Tetragrammaton, Ancient of Days, Elohim, Jesus
Group	mankind, branches, secret combinations, members, cast, council
Internal body parts	heart, bowels, womb, brain, throat, organs, bones, kidneys
Plants	tree(s), timbers, thorn(s), briers, gourd(s), grass, crops, flower, cedars, roses, lilies, reed
Positions	left, side, ground, midst, top, center, corner, right side
Roles	brethern, king, man, inferiors, disciples, lords, hero(s), sage, woman, children, boys, messenger, folk
Thing	thing(s), all things, everything, sacred things, remnant
Verb Category	**Examples**
Amuse	concerning, sought to, offend, tried to, gladden, inspired, try to, trieth, shame, sought, tempt, gladdening, pleased with, gladden, dazzle, afflict
Appear	shall come, came, arose, cometh, appear
Be	is, were, was, are, will be, shall be
Build	make, made, making, will make, would make, build
Characterize	remember, establish, regarding, entered into, used, describing, praised, ascribe, hearld, regards, praised, were numbered, choose
Conjecture	know, knew, knoweth, means, deny, let, observe
Directed motion	go, enter into, ascendeth, departed, arrived, flee, fell, escape, fall upon, descendeth, going, go, depart
Do	did, do, doeth, had done, was done
Future	shall, will, shalt
Get	called, gather, found, save, buy, invoke, call earn, reach
Give	pass, give, gave, giveth, pass
Have	have, had, hath, having
Message transfer	teach, tell, told, preach, ask, translated, teaches, translates, shew, show, ministering, present, to minister
Put	put, set, placed, arranged, inserted at, mounted
Say	said unto, say unto, saith, says, declare, claim, saying
See	saw, see, seeing, seest, heard, hear, taste

The next highest similarity is the New Testament's similarity to the Book of Mormon.

Figure 5 shows the Self-Organizing Map created based on the 86 verb topic inputs. According to Table 4, we should most likely see the Old Testament, the Book of Mormon, the Popol Vuh, and the Rig Veda across the center of the map. This predicted outcome plays out, but only in part. The Rig Veda, the Book of Mormon, and the Popol Vuh do appear in the middle of the SOM. However, the Old Testament joins the Torah at the bottom of the SOM. The Old Testament's high average overlap was largely a result of its high similarity to the Torah and the Book of Mormon despite its lower overlap with the Tao Te Ching and the Greater Holy Assembly. Because the range of its overlap percentage was so great, it was pushed out of the center towards the books with which it had the most overlap.

Figure 5: Self Organizing Map of Nine Religious Texts Using 86 Verb Category Inputs



As far as verb topics go, the sample religious texts have the least overlap with the Greater Holy Assembly. The sample religious books have, on average, only a 25 percent overlap with the Greater Holy Assembly. On the SOM, however, the Greater Holy Assembly is on a side, but not in the corner. The placement may in part result because the Greater Holy Assembly has its greatest overlap with the Popol Vuh (52 percent) and the Book of Mormon (48 percent). Because the Popol Vuh and the Book of Mormon are central on the map, the Greater Holy Assembly was placed a bit

more central. The Tao Te Ching, which is in a more isolated position than the Greater Holy Assembly on the SOM has the next lowest average overlap percent at 46 percent.

The New Testament has a very central position on the SOM. The New Testament has its highest overlap with the Book of Mormon (79 percent), the Popol Vuh (66 percent), the Old Testament (66 percent), and the Qur'an (62 percent). Being similar to both the Qur'an and the Old Testament gives it central position on the SOM, but also having consistent overlap with many books accounts for its central position as well.

VII. Discussion

We started our analysis with four primary research questions. In this section, we address each research question and elaborate specifically regarding the religious texts that clustered together.

A. Quality of Observations From Maps

The first research question was whether any interesting observations could be drawn from the resulting analysis and visualization of the sacred texts. Automatic text analysis is very common, but applying those same text mining techniques to religious text is not common. While the criteria of "interesting" is admittedly subjective, the maps produced by the text-processing algorithms have supplied evidence of being useful. For example, the noun topic map shown in Figure 4 places the Book of Mormon in the center of the SOM. This placement is a result in part of having strong overlap with the New Testament, the Old Testament, and the Torah. The overlap makes sense as the Book of Mormon shares an account of a group that left Jerusalem around 600 BCE that lived the Law of Moses. The group traveled to the American continent. About half-way through the book, Christ visits and ministers to the people of the American continent. The stories in the Book of Mormon overlap similar time frames as the Old Testament, the Torah, and the New Testament, so it makes sense that they would share a lot of noun topic overlap.

B. Document Placement on the SOM and Tag Overlap

The second question was whether the location of documents on the output layer of the SOM corresponds to word category overlapping among religious texts. The short answer is yes, we were able to track the placement of books on the SOM (both on the noun and verb maps) to the overlap percentages listed in Tables 3 and 4. The SOM, however, was more sophisticated than just a summary of topic overlaps. The SOM took into account additional factors in addition to total tag overlap. When books shared topics with just one other book, then that unique overlap was valued more than an overlap that was widely shared by the books. In other words, not all topics provided equal amounts of information into the similarity between books. For example, we were able to explain why the Rig Veda was placed next to the Torah on the noun SOM, despite having such a low tag overlap percentage. Also, average tag overlap to a book does not necessarily result in a book being centrally located on the SOM. The Old Testament, for example, has the highest average tag overlap of verb tags, but it appears at the bottom of the SOM in Figure 5. The SOM considers overlap relationships of every book and not just averages that can be skewed by very large overlaps by two books (like the Old Testament and the Torah).

C. What Texts Actually Cluster Together

The third research question was which religious texts actually cluster together. In the SOM from the noun inputs and in the SOM from the verb inputs, the Book of Mormon clustered closely with the New Testament, the Old Testament, and the Torah. Also, if books clustered with the Old Testament, they typically clustered with the Torah, due to the Torah's high overlap with the Old Testament (96 percent). For example, the Rig Veda had its highest verb overlap with the Torah (69 percent) and its second highest overlap was with the Old Testament (67 percent). The Popol Vuh had a high overlap with the Torah (62 percent), but also a high overlap with the Old Testament (55 percent). We had expected books to cluster based on their geographic origins and this result did not occur. While it is interesting to observe the clusters of books, we want to further explore the actual words that are shared between books.

Shared topic categories can reveal differences between texts in addition to analyzing topics that were not shared. Table 6 shows very common topics shared among the texts, yet differences abound. For example, the Popol Vuh, the Tao Te Ching, and the Greater Holy Assembly include more references to female family roles like grandmother, mother and daughter. The Qur'an, the New Testament, the Book of Mormon, and the Rig Veda reference male family roles like father(s), son(s), and brother more. Also, the Greater Holy Assembly and the Tao Te Ching reference mouth frequently, while the other five books reference hand(s) a lot. Of the common emotions, joy and fear seem to be the most common. Instead of joy, though, the Tao Te Ching talks of happiness and the Qur'an talks of pleasure. The kinds of animals in the books are also interesting. Sheep is a common in the Book of Mormon and the New Testament, but not in other books. Cows are common in the Rig Veda and the Qur'an, but not in other books. The term beast(s) is common in the Greater Holy Assembly, the New Testament, the Old Testament, and the Torah.

Table 6: Common Noun Categories with Most Common Examples

Books	Family Relationships	External Body Parts	Emotions	Virtues	Animals
Book of Mormon	father(s), son, children	hand(s), face, eyes	joy, fear, pride	strength, righteousness	flocks, lamb, sheep
Greater Holy Assembly	son, father, daughter	hair, beard, mouth	wrath, anger, fear	wisdom	creatures, beasts, dragons
KJV – New Testament	son, father, brother	hand(s), flesh, body	love, joy, fear	righteousness	beast, sheep, lamb
KJV – Old Testament	son, father, wife, daughter	hand(s), eyes, mouth	fear, anger, wrath	righteousness, trust, honour, hope	beast(s), sheep, cattle, oxen
Popol Vuh	father, grandmother, sons	face(s), eyes, hand	joy, laughter, pity	strength, rank	bird(s), jaguar, deer
Rig Veda	son, children, father(s)	eye(s), hand(s), body	joy, love, bliss	strength	kine/cow, horse, cattle
Qur'an	father(s), son brother	hand(s), eyes, ears	fear, wrath, pleasure	good, beneficent, forgiveness	cattle, creature, birds, beast
Tao Te Ching	mother, children, family	arms, mouth, body, eyes	happiness, fear, dislike	skill, gentleness	creatures, dog, rhinoceros
Torah	children, son(s), fathers	hand(s), flesh, eyes	guilt, anger, fear, wrath	grace, justice, righteousness	beast(s), cattle, bullock

In addition to topic categories that are shared by religious texts, most books have a few topics that are unique to it. Examples from the unique topics are listed in Table 7.

Table 7: Unique Noun Examples (total unique categories in parenthesis)

Book of Mormon (4)	categories: cause, manner, military, record ex: cause, manner, ways, armies, record(s)
Greater Holy Assembly (11)	categories: +, =, access, concession, disposition, greater god, introduction, jewelry, numbers, scripture, shape ex: openings, conformations, dispositions, Macroprosopus, Microprosopus, crown(s), number, Psalms, curls
KJV-New Testament (2)	categories: water vehicle, motivation ex: ship(s), boat, sake, reason, temptation
KJV-Old Testament (0)	category: shared metal with Torah ex: gold, brass, iron
Popol Vuh (11)	categories: ball, culture, demon, hispanic deity, insect, language, maya deity, maya demon, order, phrase, version, ex: ball, language, lenguas, Quiche, Maya, Spanish, Mexicans, wasps, louse, ants, bumblebees, stone, title, tribe(s)
Qur'an (10)	categories: discover, evidence, hell, human creation, job, likeness, punishment, ready, religion, success ex: hell, duty, thy duty, tidings, portent(s), woe, burden, harm, aware, scripture, religion, revelation
Rig Veda (5)	categories: assistance, attack, drink, hindu deity, natural disaster, ex: aid, help, battle, juice, milk, drink, Indra, Agni, Soma, Maruts, flood(s), tempest, quake
Tao Te Ching (22)	categories: activity, attitude, behavior, case, complexity, condition, confusion, difficult, existence, govword, idea, impact, individual, vessel, method, movement, nobody, performance, point, rest, state, and value ex: activity, favour, dignity, conduct, complications, condition, disorder, difficulty, existence, government, idea, degree, self, vessel, method, movement, no one, show, display, point, rest, state, superiority
Torah (0)	category: shared metal with the Old Testament ex: gold, brass, iron

The Book of Mormon uniquely has references to record keeping, armies, and “ways” or manners of doing things. The Greater Holy Assembly has more references to jewelry, conformations, dispositions, Macroprosopus and Microprosopus, and numerous mathematical symbols. The New Testament uniquely has more references to water vehicles such as ships and boats. The Old Testament did not have any unique word categories, but shared the metal category uniquely with the Torah. Both books had many instances of gold, brass, and iron. The Popol Vuh has unique references to balls for playing sports, different languages, cultures, tribes, and numerous insects. Insects from the Popol Vuh include wasps, ants, bumblebees, and lice. The Qur’an has a greater number of references to Hell, duties, tidings, portents, burdens, and the term revelation. The Rig Veda has a greater number of references to helping and giving aid and to battles. The Rig Veda also has more references to beverages such as juice, milk and drinks. The

Rig Veda includes references to Hindu deity, such as Indra, Agni, Soma, and Maruts. Finally, the Rig Veda had more references to natural disaster words like floods, tempest, and quake. The Tao Te Ching included many unique categories. Some of its unique terms tended to be abstract in nature like existence, idea, self, vessel, rest, state, and superiority.

D. Clustering with Noun Topics Versus Clustering with Verb Topics

Our final research question was whether the clustering of texts using noun topics varies from the clustering of texts using verb topics. The answer is yes, the clustering does vary between SOMs. The main difference is between the centrality of the Rig Veda and the Popol Vuh in the verb SOM compared to their lack of centrality in the noun SOM. Consistent between the noun and verb SOMs, however, is the common relationship between the Book of Mormon, the New Testament, the Old Testament, and the Torah. While the placement on the maps of the group of four is not identical, the connection remains strong in both SOMs. Also, the Tao Te Ching remains on the edges of both SOMs.

VIII. Limitations and Future Work

A limitation of our current work is in our selection of texts to analyze. We aimed to process a sample of religious texts from various religious traditions and geographic areas as opposed to being completely comprehensive. For example, we included only one of the four Vedas from Hinduism. We included only one of the three books of the Zohar from Kabbalah. We included only the Torah from Judaism specifically and not the rabbinic commentaries on the Torah which are part of the Oral Torah. With so many different religious texts available in the world, analyzing only nine is a limitation of our work.

An additional limitation of our work is our creation of the noun tag hierarchy. While its creation was informed by current existing tag hierarchies (Miller, 1995 as well as Sekine and Nobata, 2003), our current noun hierarchy has not been evaluated and we cannot make any claims to its generalizability. The verb category hierarchy however uses the verb categories published by Levin (1993).

Finally, we recognize that there are variations in different translations of the sacred texts we have used. We used only one translation of each work. Future work could include clustering different translations of the same texts to see how similar the books appear on the self-organizing map.

Also, in future work, we want to expand the number of books we include in our analysis. We also want to reduce the number of topics that get used as inputs to see how that changes the clustering on the SOM. For example, we want to explore what would happen if we included topics that accounted for only 20 percent of the nouns and verbs as opposed to the 85 percent noun and verb coverage we have in this research.

While in this paper, we focused more on how religious texts clustered together given our inputs to the SOM, in future research, we want to explore deeper how the religious texts differ. With the inputs to the noun SOM, 36 percent of the topics occurred in only one religious text. Of the verb inputs, 35 percent of verb topics occurred in only one religious text. To better understand the unique contribution of each book, we want to explore more deeply where the texts differ given the topic categories.

References

Alpert, Jesse, and Nissan Hajaj. 2008. "We Knew the Web Was Big..." *Google Official Blog.*

Bowman, C. Mic, Peter B. Danzig, Udi Manber, and Michael F. Schwartz. 1994. "Scalable Internet Resource Discovery: Research Problems and Approaches," *Communications of the ACM*, 37(8): 98-107.

Chen, Hsinchun, Chris Schuffels, and Richard Orwig. 1996. "Internet Categorization and Search: A Self-Organizing Approach." *Journal of Visual Communication and Image Representation*, 7(1): 88-102.

DARPA. 1993a. "Proceedings," *Tipster Text Program (Phase I).* Fredricksburg, Virginia: Morgan Kaufmann.

DARPA. 1993b. "Proceedings," *Fifth Message Understanding Conference (MUC-5).* Baltimore, MD: Morgan Kaufmann.

DARPA. 1995. "Proceedings," *Sixth Message Understanding Conference (MUC-6).* San Francisco, California: Morgan Kaufmann.

DARPA. 1998. "Proceedings," *Seventh Message Understanding Conference (MUC-7).* Washington, D.C.: Morgan Kaufmann.

de Vel, O., A. Anderson, M. Corney, and G Mohay. 2001. "Mining E-Mail Content for Author Identification Forensics," *ACM SIGMOD Record,* 30(4): 55-64.

Fan, Weiguo, Linda Wallace, Stephanie Rich, and Zhongju Zhang. 2006. "Tapping the Power of Text Mining." *Communications of the ACM*, 49(9): 76-82.

Gray, Andrew, Philip Sallis, and Stephen MacDonnell. 1997. "Software Forensics: Extended Authorship Analysis Techniques to Computer Programs," in *Proceedings of the 3rd Biennual Conference on the International Association of Forensic Linguists.*

Gutenberg, Project. 2013. "Free Ebooks - Project Gutenberg".

Hare, John Bruno. 2013. "Internet Sacred Text Archive".

Hearst, Marti A. 1999. "User Interfaces and Visualization," in *Modern Information Retrieval,* eds. Ricardo Baeza-Yates and Berthier Ribeiro-Neto, 257-339. New York: ACM Press.

Honkela, Timo, Ville Pulkki, and Teuvo Kohonen. 1995. "Contextual Relations of Words in Grimm Tales Analyzed by Self-Organizing Map," in *Proceedings of the International Conference on Artificial Neural Networks (ICANN-95),* eds. F. Fogelman-Soulié and P. Gallinari, 3-7, Nanterre, France.

Hope, Warren. 2009. *The Shakespeare Controversy: An Analysis of the Authorship Theories.* 2nd ed. McFarland & Co.

Jain, Anil K., and Richard C. Dubes. 1988. *Algorithms for Clustering Data*. Upper Saddle River, NJ: Prentice Hall Inc.

Jockers, Matthew L., Daniela M. Witten, and Craig S. Criddle. 2008. "Reassessing Authorship of the *Book of Mormon* Using Delta and Nearest Shrunken Centroid Classification." *Literary & Linguistic Computing*, 23(4): 465-91.

Kaski, Samuel, Timo Honkela, Krista Lagus, and Teuvo Kohonen. 1993. "Creating an Order in Digital Libraries with Self-Organizing Maps," *International Conference on Neural Networks (ICANN).* London, UK: Springer, 974-77.

Kaski, Samuel, Timo Honkela, Krista Lagus, and Teuvo Kohonen. 1998. "WEBSOM—Self-Organizing Maps of Document Collections." *Neurocomputing*, 21(1): 101-17.

Kohonen, Teuvo. 1995. *Self-Organizing Maps*. Berlin: Springer-Verlag.

Levin, Beth. 1993. *English Verb Classes and Alternations: A Preliminary Investigation.* Chicago: The University of Chicago Press.

Lin, Chienting, Hsinchun Chen, and Jay F. Nunamaker. 1999. "Verifying the Proximity Hypothesis for Self-Organizing Maps," in *Proceedings of the 32nd Hawaii International Conference on Systems Sciences.* Hawaii.

Lin, Xia, Dagobert Soergel, and Gary Marchionini. 1991. "A Self-Organizing Semantic Map for Information Retrieval," in *Proceedings of the 14th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval.* 262-69.

McDonald, Daniel, Hsinchun Chen, Hua Su, and Byron B. Marshall. 2004. "Extracting Gene Pathway Relations Using a Hybrid Grammar: The Arizona Relation Parser." *Bioinformatics.* 20(18).

Medicine, U.S. National Library of. 2013. "Fact Sheet Medline".

Menzie, Nicola. 2013. "Top Bible Translations Remain NIV, KJV, and NKJV," *The Christian Post:* September 19.

Miller, George A. 1995. "WordNet: A Lexical Database for English." *Communications of the ACM*, 38(11): 39-41.

Mosteller, Frederick. 1964. *Applied Bayesian and Classical Inference: The Case of the Federalist Papers*. Springer.

Orwig, Richard E., Hsinchun Chen, and Jay F. Nunamaker. 1997. "A Graphical, Self-Organizing Approach to Classifying Electronic Meeting Output." *Journal of the American Society of Information Science*, 48(2): 157-70.

Pirolli, Peter, Stuart K. Card, and Mija Van Der Wege. 2001. "Visual Information Foraging in a Focus + Context Visualization," in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 506-13.

Reynolds, Noel B. 1982. *Book of Mormon Authorship*. Maxwell Institute.

Reynolds, Noel B. ed**.** 1997. *Book of Mormon Authorship Revisited: The Evidence for Ancient Origins*. Maxwell Institute.

Reynolds, Noel B., and Charles D. Tate eds**.** 1982. *Book of Mormon Authorship: New Light on Ancient Origins*. Bookcraft.

Roussinov, Dimitri G., and Hsinchun Chen. 1999. "Document Clustering for Electronic Meetings: An Experimental Comparison of Two Techniques." *Decision Support Systems*, 27(1-2): 67-79.

Salton, Gerald, Anita Wong, and Chung-Shu Yang. 1975. "A Vector Space Model for Automatic Indexing." *Communications of the ACM*, 18(11): 613-20.

Sekine, Satoshi, and Chikashi Nobata. 2003. "Definition, Dictionaries and Tagger for Extended Named Entity Hierarchy," *Proceedings of the Language Resources and Evaluation.*

Thang, Cao. 2011. "Spice-Som".

Zheng, Rong, Jiexun Li, Hsichun Chen, and Zan Huang. 2006. "A Framework for Authorship Identification of Online Messages: Writing-Style Features and Classification Techniques." *Journal of the American Society for Information Science and Technology*, 57(3): 378-93.

The Journal of Business Inquiry 2014, 13, Issue 1 (Special Issue), 48-60
http:www.uvu.edu/woodbury/jbi/articles/
ISSN 2155-4072

The Impact of Religion on Youth Outcomes

By BRYSON POPE, JOSEPH PRICE AND DEAN R. LILLARD*

We use data from several nationally representative datasets to estimate the relationship between church attendance and risky behaviors and whether these associations vary when one accounts for selective participation. We use various empirical methods including propensity score matching, sibling and family fixed-effects models, and instrumental variables models that exploit cross-state variation in blue laws. Our results across the different approaches converge into a general pattern that youth with higher church attendance are less likely to commit property or violent crimes, smoke, drink, use drugs, or receive a traffic ticket.

Keywords: Church Attendance, Risky Behaviors, Crime, Blue Laws

JEL Classification: Z12, I31, K42

I. Introduction

Past research has consistently shown a correlation between participation in religious activities and positive social behavior among youth (Mocan and Rees, 2005; Johnson *et al.,* 2000). Religiously involved youth are less likely to use alcohol, cigarettes, and drugs, have pre-marital sex, and commit crimes (Sabia, 2006). The literature recognizes that these simple associations do not identify whether religious participation has a causal effect on these positive outcomes. This is due to the inability of observing many potentially influencing factors pertaining to youth and their families.

There are a number of mechanisms through which religious groups could plausibly have a causal effect on youth outcomes. First, religious groups transmit values and help youth internalize moral messages and norms. Second, members and leaders of religious groups monitor youth behavior and serve as examples for youth to emulate. Third, religious groups provide an institutional setting that provides activities for youth that pull them away from harmful influences and behaviors. For one reason or another, it is clear that parents and children choose to participate in religious activity. Therefore, the usual issues of self-selected samples make it challenging to statistically identify whether religious participation actually has a causal effect on youth outcomes.

To confront that challenge, we follow a few well-established statistical methods. First, we compare outcomes of observationally similar individuals who participated in religious groups with different levels of intensity. We also use multivariate regression and propensity score matching methods, models that include either individual and family fixed effects, and an instrumental variable approach developed by Gruber and Hungerman (2006) that exploits temporal and cross-

*Bryson Pope: Department of Economics, Brigham Young University. E-mail: brysonrpope@gmail.com; Joseph Price: Department of Economics, Brigham Young University, 162 FOB, Brigham Young University, Provo, UT 84602. E-mail: joseph_price@byu.edu. Phone: (801) 422-5296, Fax: (801) 422-0194; Dean R. Lillard: Department of Human Sciences, Ohio State University. E-mail: lillard.13@osu.edu.

The authors gratefully acknowledge helpful comments from participants at the National Poverty Conference and the Religious Faith and Social and Applied Sciences Conference.

sectional variation in whether stores are open for business on Sundays (blue laws). We use data from the National Longitudinal Surveys of Youth 1979 (NLSY79), the Children of the National Longitudinal Surveys of Youth 1979 (CNLSY79), and Monitoring the Future (MTF). The richness of these nationally representative data allows us to implement the above methods and control for many observed characteristics. Although non-identical results are to be expected, the use of various different statistical techniques provides different approaches to finding the direction and magnitude of the influence religion has on youth outcomes.

II. Methods and Existing Evidence

Many previous studies have presented estimates of the simple or conditional correlation between religious participation and positive outcomes. Few, however, use methods or have data needed to credibly estimate whether this relationship is of a causal nature. The correlational studies typically fail to control for the potential of selection bias. Below we give a brief review of the literature and methods used by the few studies that rigorously address selection bias with regard to religion and crime.

Correlational Evidence

Correlational studies typically compare outcomes of people who participate differently in religious activities but who are observationally equivalent across a set of individual or family characteristics. For example, studies find that, controlling for background characteristics, youth who are more religiously involved are less likely to commit crimes (Mocan and Rees, 2005; Johnson *et al*,. 2000).

Many correlational studies focus on particular groups of interest. In their meta-analysis of 60 studies, Baier and Wright (2001) found that correlations between religiosity and outcomes were consistently stronger for blacks. Dehejia *et al.* (2007) estimate how negative outcomes vary with economic and social disadvantage (low income, low education), and then examine whether those associations differed for youth who participated in religious activities more and less frequently. They find that the negative association between disadvantage and negative outcomes is weaker among youth who participate more in religious activities. These associations are consistent with the hypothesis that religious involvement may confer benefits but do not prove a causal relationship.

Causal Evidence and Methods Used

A. Matching Estimators

Matching estimators are based on the idea that one should compare differences in behavior of observationally similar individuals to reduce the influence of unobservables. Although matching estimators are similar in nature to traditional regression estimates, the actual comparison between churchgoers and non-churchgoers is made more explicit. We use one of the most common matching methods, propensity score matching. [1]

To compute a propensity score we regress whether or not a person goes to church (in our case at least monthly) on a set of observed matching characteristics. In general this set should not

[1] Rosenbaum and Rubin (1983) provide the theorem that shows one can use this method to reduce the dimensionality of the set of data one uses to compare individuals.

include any characteristic that might be affected by the treatment (here church attendance).[2] We use the coefficients from the full sample to predict the probability that each respondent attends church. We then divide the sample into those who report they attend church monthly and those who report they do not attend church, or attend church less than monthly. Finally, we use the propensity score of each person who attends religious services to match him/her to a person who does not. Each attending person is matched to the non-attender whose propensity score is closest in value. Under the conditions described in Rosenbaum and Rubin (1985), Heckman, Ichimura, and Todd (1998) and Heckman *et al.* (1998), the causal effect of attending church at least monthly is given by the difference between the average outcome of attenders and matched non-attenders.

The economic literature is replete with studies that have used similar propensity score matching techniques as the study at hand. Lundquist (2004), for example, uses propensity matching scores for an individual's propensity to marry, and find divergent trends in nuptial patterns between black people and white people disappear in the military. Jalan and Ravallion (2003) also use Rosenbaum and Rubin's (1983) propensity score matching approach to estimate the distribution of net income gains from an Argentinean workfare program.

It is important to note that there are a number of different ways in which calculated propensity scores can be matched. We have chosen to use the nearest neighbor matching method. Other options may include caliper matching, stratification matching, and difference-in-difference matching involving kernels and local linear weights. Neighbor matching is attractive in its simplicity and its well accepted intuitive approach.

B. Fixed-Effects Models

While matching estimators permit one to use a rich set of covariates when comparing individuals, it does not resolve the fundamental problem of the possible existence of unobserved factors that determine the behavior of interest and other outcomes being studied. A second method solves this problem for a subset of unobserved factors that are shared in common by people who also share factors that do not vary over time. This method is referred to as the "fixed-effects" method.

To implement the fixed-effects method, one estimates models that compare differences in religious participation and outcomes across members of the same group. In such models, any unobserved characteristic that determines both participation and the outcome of interest will be "swept out" as long as that characteristic is common to all members of the group. One might, for example, compare the religious participation and outcomes of siblings. The key critical assumption in these models is that the shared environment of the siblings fully captures the influence of unobserved factors that determine both religious participation and outcomes of interest.

When data contain information on the same individual over time, it is also possible to estimate a model that includes individual fixed effects. These models test whether an individual changes his behavior over time as he participates more (or less) in religious activities. Social scientists commonly estimate models with individual fixed effects to try to estimate the causal effect of choices to marry (Korenman and Neumark, 1991) or engage in sex during adolescence (Sabia, 2006). Such models only account for unobserved determinants that do not vary over time.

[2] Even among this set one can only use variables in a range with common support in the treated and untreated states. Heckman, Ichimura, and Todd (1998) and Heckman *et al.* (1998) describe conditions that define the set of variables one can use to match.

While fixed-effects models have attractive properties, they also have shortcomings.[3] Fixed-effects estimators only account for time-invariant omitted variables,[4] and require sufficiently many of the same individual observations over time or that include a sufficient number of groups with two or more members. Furthermore, an implicit assumption of the fixed-effects estimator is that the variation in the variable of interest (here church attendance) measures a randomly assigned change. However, this assumption is unlikely to be met. It is unlikely, for example, that individuals who change their religious attendance are representative of a randomly selected individual from the general population. Similarly, one suspects that, if siblings attend religious services with different frequency, they probably differ in unobservable ways (even when they share the same family environment). Finally, the fixed-effects estimator may be too conservative because it ignores any differences in behavior across individuals that are correlated religious attendance. It is possible that some of the cross-individual variation in religious participation results in causal changes in outcomes. The fixed-effects model, however, assumes that variation has no causal effect.

C. Instrumental Variables

Researchers also try to estimate causal effects by the method of instrumental variables (IV). The method requires finding a variable (instrument) that is correlated with the explanatory variable of interest and that is uncorrelated with the outcome being studied. That is, the IV must affect the outcome of interest only through the explanatory variable. This is a difficult task. Also, individuals must experience different levels of the instrument, and the variation in exposure to the instrument must cause individuals to participate in religious services with different frequency. The model is implemented in two steps. First, one runs a model of participation in religious services as a function of the instrument (and other covariates). Second, one uses the predicted value of religious participation in a model of the behavior of interest. Under the above assumptions, the IV estimator identifies the causal effect of religious involvement.

The few IV studies that investigate the impact of religion have used three different instruments: the repeal of blue laws which allowed stores to be open on Sundays, the fraction of people in a given area who are of the same ethnicity, and the fraction of residents who adhere to a particular religion. For example, Gruber and Hungerman (2006) use differences in the date that state governments repealed laws that prohibit stores to operate on Sunday. This instrument rests on the assumption that individuals spend time on activities that give them the most utility. By banning stores from operating on Sundays, state governments raise the cost of shopping (and thereby lower the relative cost of attending church). The reverse effect occurs when governments repeal blue laws. It becomes cheaper to shop and therefore church is a less attractive way to spend time for people on the margin. They find that church attendance drops following the repeal of blue laws. They then use NLSY79 data to show that people who were religious before blue laws were repealed, drank more and were more likely to use drugs after the repeal of blue laws allowed stores to remain open on Sundays.

In other work, Gruber (2005) instruments religious participation with the fraction of people in an individual's area who are of the same ethnicity. Using GSS data he shows that people are more likely to go to church if they live near more people of the same ethnicity. Using ethnic

[3] For an overview, see Currie (2003).

[4] Ruhm (2005) notes that in fact using fixed effects in the face of a time-varying omitted variable may even aggravate the bias.

concentration as a proxy for religious affiliation, he finds that people living in areas with more people of the same ethnicity have more income, higher education, are more likely to marry, are less likely to divorce, and experience lower levels of welfare receipt and disability.

In his study of county-level crime rates, Heaton (2006) uses county-level religiosity from 1916 to instrument for current religious participation in the same county. He finds that while county-level current religious adherence predicts measures of county-level crimes committed in models estimated by Ordinary Least Squares, coefficients from models estimated by IV show no impact of religion on crime.

Each of these instruments for religious participation has its drawbacks. In some cases the first stage relationship between the instruments and the religious participation is statistically weak. In the case of blue laws, there have been no state-level changes in blue laws since 1992 so using this instrument for more recent data would require using law changes at the county or local level.

III. Data

We use data from the National Longitudinal Survey of Youth of 1979 (NLSY79), the Panel Study of Income Dynamics (PSID), and the Monitoring the Future (MTF) surveys. We rely on the NLSY79 and PSID data to generate our main results. The NLSY79 and PSID are nationally representative surveys that track individuals over years including years in which many state governments repealed blue laws. Both surveys identify each individual's state of residence along with many other characteristics. In addition, outcome data of siblings (NLSY79, PSID) and other relatives (PSID) are tracked. Although the MTF lacks state identifiers and has no information on outcomes of siblings, results from the MTF supplement our main results in informative ways.

The National Longitudinal Study of Youth 1979 (NLSY79)

The NLSY79 is a nationally representative sample of 12,686 youth who were between the ages of 14 and 22 in 1979. In 1979, the respondents provided detailed information about their family background, including the religious affiliation of their parents. The NLSY79 contains religious participation measures in 1979 and then detailed information about illegal activities in 1980. Both violent crime and property crime are measures based on self-reported behavior and are described in more detail in Levitt and Lochner (2001).

Church attendance is reported in the NLSY79 on a six-point scale: never, infrequently, monthly, two to three times a month, weekly, and more than weekly. For the analysis, we convert the six-point scale into a measure of number of days per year, which we standardize by dividing by the standard deviation across the sample.

The Children of National Longitudinal Study of Youth 1979 (CNLSY79)

Starting in 1986, children of the female NLSY79 respondents were surveyed. This sample, known as the Children of the NLSY79 (CNLSY79) allows us to observe the religious participation and outcomes of a second generation. Together with data on religious participation of the parents of the NLSY79, we can examine religious participation across three generations. More importantly, the data allow us to carry out our analysis exploiting differences within an individual over time and differences between siblings.

One downside is that since the original respondents to the NLSY79 were 14-21 in 1979, the only older youth that we observe in the sample are those who were born to relatively younger mothers. One way that we can address this issue is by looking at outcomes among youth at even

younger ages. While a ten-year old does not really fit the focus of our studies on youth, it is possible that the patterns that start to develop at these younger ages will influence behavior of individuals in the focus age range in the rest of our paper.

The CNLSY79 provides data on several important indicators of youth outcomes. The first is the behavior problem index (BPI) which is based on the parent's report of whether the child exhibits certain behaviors such as being aggressive, fighting, etc. The responses to these questions are aggregated into the BPI with higher scores representing worse behavior. The second is the PIAT-reading raw score which is a widely used measure of child cognitive achievement. This is a particularly appropriate measure when looking at the impact of religion since many congregations put a great deal of emphasis on personal scripture study. Academic achievement is likely to displace other bad behaviors because of the increased prospects of post-secondary schooling, thus increasing the opportunity cost of deviant behavior. The third is a self-reported measure of whether the individual has ever had a physical fight or intentionally harmed another person.

The Panel Study of Income Dynamics (PSID)

The PSID is a household-based survey that began in 1968 with a survey of about 5,000 households. Each member of the 1968 household and all offspring of any member of those households has been followed and interviewed. Annual interviews were conducted from 1968 through 1997. Since 1997 surveys are conducted biennially. We use data from 1968 through 2003. As of 2003, data have been collected from more than 60,000 individuals.

Information on religiosity and religious participation varies widely across the years the PSID has operated. The PSID collected data on the frequency that the head of household attended church from 1968-1972. From 1970-1976 and from 1981-2003 the PSID collected data on the religious preference of the head of each household in the sample. In addition, the religious preference of wives of household heads was asked from 1985-2003. Starting in 1994 the PSID collected more detailed measures of affiliation, including specific Protestant denomination affiliation. These data are available for all individuals who participated at least once over the full duration of the PSID surveys.

Additional information on religiosity is available for a subset of PSID respondents who participated in the Child Development Supplement (CDS) in 1997 and 2002. Because the PSID asks questions in intermittent years, we created several measures of religious affiliation. We first identified "own affiliation" for all PSID sample members who were either a "head" or a "wife" in the survey year religious affiliation was asked. We do so iteratively, working back from the more detailed denominational information in the 1994 and later surveys to the broader response categories used in earlier years. In coding the data, we allowed respondents to identify multiple religions across different survey years (to allow for the possibility that a person changed religions). We next created an "imputed" religious affiliation measure that was coded for each son or daughter of a PSID head or wife for whom affiliation was collected. This coding assigns the religion of the mother and/or father to the child living with them. Here again, we coded all reported affiliations. We thus measure multiple affiliations when the mother and father were of different religions and when one or both of them changes religious affiliation over the period we observe them.

In our multivariate analysis we categorize individuals who identify with some religion according to whether or not the religion treats Sunday as a holy day. We define a person to observe a holy day other than Sunday if he or she reports any affiliation with Judaism, Jehovah's Witnesses, Seventh Day Adventists, other non-Christian religions or any other religion.

In order to analyze the behavior of the largest number of CDS respondents as possible, we use the frequency of church attendance of the father and/or mother (whichever is greater) rather than the child's reported church attendance. Results are similar, however, when we use the child's reported frequency of attendance.

We also categorize PSID respondents according to whether their state of residence (at each age) required retail stores to close on Sundays (i.e. had a "blue law" in force). To categorize the presence of a blue law we use information reported in Laband and Heinbuch (1987), Goos (2005), and Gruber and Hungerman (2006).

Monitoring the Future (MTF)

Monitoring the Future (MTF) is a cross-sectional school-based survey that the University of Michigan administers each year to 15,000-19,000 students. From 1975 to 1990 the MTF only surveyed students in 12th grade. Since 1991, the MTF also surveys students in grades 8 and 10. The survey asks students to report how frequently they attend church. Responses are limited to four categories: never, a few times a year, monthly, and weekly. We convert these responses into days per year. The survey also asks students to report whether they have consumed cigarettes, alcohol, and drugs over the last 30 days, and at what quantity. The MTF also asks each student if he has ever received a (traffic) ticket. We use these data as a proxy measure of risky behavior.

MTF data can only be used as supplementary analyses because the study does not release data to identify siblings and state of residence or to track individuals over time. Given the size of the samples collected for the MTF, providing access to such data could greatly benefit researchers and increase use of the MTF data. Summary statistics of these surveys with regards to religiosity are presented in Table 1.

Table 1: Summary Statistics

	Frequency of Religious Attendance			
CNLSY79	Never	Few times	Monthly	Weekly
BPI	91.849	84.369	80.222	78.414
PIAT-reading	53.596	55.078	55.976	57.467
Hurt someone	0.326	0.382	0.319	0.286
N(BPI)	841	1,083	608	2,422
NLSY79				
Violent crime	0.192	0.156	0.131	0.126
Property crime	0.122	0.087	0.057	0.050
N(violent crime)	1,140	2,168	860	2,549

Table 1: Summary Statistics: Continues

	Frequency of Religious Attendance			
	Never	Few times	Monthly	Weekly
MTF				
have had a ticket	0.436	0.405	0.394	0.331
have smoked	0.720	0.742	0.717	0.616
smoked last 30 days	0.375	0.363	0.327	0.219
used alcohol	0.933	0.953	0.942	0.872
alcohol last 30 days	0.706	0.724	0.701	0.566
used drugs	0.670	0.668	0.612	0.470
drugs last 30 days	0.388	0.358	0.302	0.193
N(ticket)	9,129	29,010	13,203	23,390

Notes: Each column includes the individuals from the dataset that reported that frequency of religious attendance. The sample size varies a little bit across outcome measures and we report the sample size of one outcome measure (indicate in parenthesis) from each dataset.

IV. Results

This section provides some empirical estimates of the impact of religious participation on a wide range of youth outcomes using the datasets described. We recognize that our models likely fail to capture important controls for youth outcomes and that our measure of religion (frequency of church attendance) fails to capture the full picture of religious involvement (Regnerus, 2003). However, our goal here is to describe the implementation of each of these five approaches in sufficient detail so that they may be more easily used by other researchers, and additionally to give an indication of the apparent general trend that emerges regarding the relationship between youth outcomes and church attendance.

Each of these methods address in different ways the fact that people choose to go to church and that the factors that influence this decision may bias our estimates. Since we cannot randomly assign people to attend church, we are never sure whether the correlations we observe between church attendance and good behavior is due to selection into church attendance or a causal impact of religion on behavior. In the regression framework, this simply means that the error term (the unexplained factors of our outcome) is positively correlated with the likelihood that someone attends church. This creates an upward bias in our estimate of church attendance on youth outcomes and causes us to attribute a larger impact to church attendance than we should. Each of the methods described below provide different solutions to this problem, though each method comes with its own set of advantages, drawbacks, and unique data requirements. This multi-faceted approach is also based on the recommendation of Currie (2003) that when dealing with the sample selection problem, it is preferable to use a number of techniques.

A. Multivariate Regression

The most common approach to the selection problem is to control directly for the factors that lead people to attend church more often. Higher levels of church attendance is associated with being female, from the south, in a larger family, and having a mother who is married, is more educated, and does not work.

Our results (Table 2) suggest that youth experience better outcomes if they attend church more often. This association is statistically significant at the 5 percent level for 10 of the 11 undesirable outcomes. To put these results into context, consider how behaviors would change if one could exogenously increase church attendance by one standard deviation. If the estimated associations were causal, a one standard deviation increase in church attendance would cause the probability of smoking, using drugs, or drinking alcohol in the past 30 days to fall by about 6-7 percent.

B. Matching Estimators

An alternative is to simply match each church-attending youth with a non-church attending youth who otherwise have similar observable characteristics. We can then compare outcomes between this matched set of individuals. In this way, we attempt to establish the counterfactual with the key assumption that all unobservables that influence the decision to go to church are identical between the two individuals.

Table 2 provides our estimates of the differences in youth outcomes using the propensity score matching strategy. [5] Our results indicate that this method also suggests that youth who go to church often have better outcomes. Furthermore, the magnitude of the benefit attributed to church is even larger than the OLS estimate. For example, the PSM estimate shows a decrease of 0.012 percentage points (8.1 percent) to commit a violent crime and a 0.064 percentage point decrease (9.3 percent) in the likelihood of a frequently religious youth to drink alcohol sometime in their life. These are both larger than our OLS estimate. Furthermore, the magnitude of these coefficients seems reasonable when compared with the results reported by Mocan and Rees (2005). They report a 0.013 (6.8 percent) marginal effect for young males who report having no religion for juvenile assault (nearly identical to our results for violent crime), 0.032 on male juvenile theft, 0.011 on male juvenile robberies, and 0.027 for juveniles selling of drugs. Similarly, results from Sabia (2006) indicate that youth who attend church services weekly decrease their chance of committing suicide with marginal effects ranging from 0.007 to 0.043. The magnitude of our results for the effect of religion on juvenile violent and property crimes, then, seems plausible when compared with the existing literature.

The difference in the coefficients across the various methods used is not surprising given the different specifications used in each model. However, a general trend emerges. Although the various models produce different estimates, with few exceptions the sign value on the coefficients indicates frequent religious attendance decreases negative outcomes in youth. The main disadvantage of the matching estimators is that we can only match on observable characteristics in our data. There are likely many other factors that influence why people go to church (and also affect their outcomes) that we cannot observe. One way to capture some of these unobserved factors is by comparing personal characteristics to an individual who has the same unobserved characteristics such as a sibling or the individual's past or future self.

[5] We use all of the default options for the psmatch2 command in STATA. There are a number of ways in which the matching strategies can be implemented giving a possible wide range or estimates (and thus subject to some misuse or abuse). We chose the propensity score matching estimator since it appears to be the most widely used in social sciences.

Table 2: Estimates for Frequent Religious Involvement in Youth on Negative Outcomes

Dataset	Outcome	Mean	OLS	PSM	Family fixed effects	Individual fixed effects
CNLSY79	BPI	82.22	-1.143*	18.330**	0.018	0.470
			[0.522]	[3.284]	[0.578]	[0.550]
	PIAT-reading	56.10	0.316**	2.716**	0.246*	0.341**
			[0.110]	[0.762]	[0.104]	[0.111]
	hurt someone	0.323	-0.004	-0.032	-0.013*	-0.005
			[0.003]	[0.021]	[0.006]	[0.005]
NLSY79	violent	0.148	-0.009*	-0.012	0.021	--
			[0.004]	[0.012]	[0.012]	--
	property	0.075	-0.013**	-0.031**	0.003	--
			[0.003]	[0.009]	[0.009]	--
MTF	tickets	0.384	-0.038**	-0.024	--	--
			[0.002]	[0.020]	--	--
	drink (life)	0.690	-0.036**	-0.064**	--	--
			[0.001]	[0.010]	--	--
	drink (30 days)	0.306	-0.071**	-0.138**	--	--
			[0.001]	[0.018]	--	--
	smoke (life)	0.920	-0.056**	-0.107**	--	--
			[0.001]	[0.020]	--	--
	smoke (30 days)	0.661	-0.067**	-0.129**	--	--
			[0.001]	[0.017]	--	--
	Drug (life)	0.587	-0.091**	-0.176**	--	--
			[0.001]	[0.018]	--	--
	Drug (30 days)	0.292	-0.077**	-0.145**	--	--
			[0.001]	[0.016]	--	--

Notes: Each column include controls for age, parent's marital status, education, and work status. Standard errors are clustered at the individual level. Statistical significance of 1% and 5% are denoted by **, and * respectively.

C. Individual and Family Fixed Effects

We specify and estimate models with fixed effects (i.e. separate intercepts) either for each individual or for siblings. In the individual fixed-effect model the effect of religious attendance is identified for individuals who change how often they attend church over successive survey waves (or who report different attendance frequencies). Individuals who never attend and individuals who always report the same frequency of attendance are dropped from the analysis. In this specification, the coefficient on religious attendance measures how much behavior changes as frequency of attendance changes, holding constant all time-invariant person-specific characteristics.

In the family fixed-effect model, the effect of religious attendance is identified not only for individuals who change their attendance over time but also for siblings who (consistently) attend with different frequency. In these models all individuals remain in the sample as long as the sample includes data for at least one other sibling. The family fixed-effects model controls for time-invariant characteristics that siblings experience in common. The set of such characteristics might

include shared genetic endowments, shared attitudes or cultural beliefs parents transmitted to them, and shared environmental influences.

The fixed-effects specification demands much of the data but produces more conservative estimates of the effect of religious attendance. Thus comparing siblings is likely better than comparing two unrelated individuals even when there is a host of control variables. It will also capture the time-invariant unobserved characteristics that multivariate regression or matching strategies cannot address. We are able to observe siblings in the NLSY79 and CNLSY79 datasets. In the CNLSY79 data we also observe repeated measures of the same individual in terms of both their frequency of church attendance and various outcomes.

The OLS regression in Table 2 is a simple Ordinary Least Squares multivariate regression. The fourth column limits the sample to only one observation for each individual (the one with the highest age) and includes a set of family fixed effects. This approach controls for all of the time-invariant characteristics of a particular family that influence all of the children in the home in the same way.

The final column contains coefficients obtained when individual level fixed effects are used which control for all of the time-invariant characteristics that influence the outcomes of an individual. This is equivalent to a cross-sectional regression in which we were able to include controls for every single characteristic of the individual that does not change over time (i.e. parent's education, race, age at birth; prenatal care; environmental factors during their childhood, etc.). More importantly it also controls for all of the time-invariant unobservable factors that might influence outcomes for which we would never be able to adequately measure with current methods.

The OLS results indicate a positive association between church attendance and good youth outcomes. A unit increase in church attendance leads to a 1.143 drop in the BPI (2 percent) and a 0.316 point rise in the reading test score (1 percent). In addition, a standard deviation increase in church attendance leads to a 0.9 percentage point increase in the probability of committing a violent crime (6 percent) and a 1.3 percentage point increase for property crime (17 percent). When we include the individual fixed effects we find a positive impact for the reading scores and the likelihood of harming others, while reading scores remain positive and significant.

D. Instrument for Church Attendance

Table 3 reports results of a model in which we exploit variation in the presence of blue laws across different states and over various years. Since blue laws in the United States are always designed to restrict what types of stores can be open on Sunday, we interact our measure of the presence of a blue law with whether or not the individual belongs to a religious denomination for which Sunday is their day of worship or holy day. In Table 3 we present results estimated with (Column 2) and without (Column 1) state fixed effects. The notes on Table 3 include a list of all of the additional control variables that are included in both regressions.

We find that while youth are not more likely to smoke in states either with or without blue laws, those whose religion treats Sunday as a holy day are less likely to start smoking in states that do not allow businesses to operate on Sundays. The results remain (marginally) significant in column 2 when we estimate these models with state fixed effects. The model with state fixed effects identifies the effect for states that either changed their laws or for individuals who moved between states with and without blue laws.

Table 3: Effect of Religious Affiliation and Blue Laws on the Probability a Youth Starts to Smoke

	(1)	(2)
Blue law * Sunday is holy day	-0.0103**	-0.0090*
	(0.0050)	(0.0051)
State has blue law	0.0087	0.0116**
	(0.0055)	(0.0058)
Sunday is holy day	-0.0072	-0.0058
	(0.0049)	(0.0049)
Mean outcome	0.030	0.030
State FE?	No	Yes
N	98,935	98,770

Notes: The coefficients reported are the marginal effects from a probit regression. Sample restricted to PSID respondents age 5 to 30 who have not yet begun to smoke. Statistical significance of 5% and 10% are denoted by **, and * respectively. All models control for age, highest grade completed to date, religious affiliation, number of reported religions, whether a female respondent gave birth or conceived in the calendar year, the fraction of the year she spent pregnant, marital status (married, single, divorced), cigarette price, sex, race (black, Hispanic, other), the average of household income over all observed years, and a year trend.

V. Conclusion

The goal of this paper has been to illustrate some of the tools used by economists to address the problem of selection. The need for these tools arise because individuals can choose whether or not to go to church and the unobservable factors that make a person more likely to go to church also likely influence their behavior directly. This selection problem will lead to biased estimates and cause us to attribute a larger effect to church attendance than we should. Each of these methods that we have described in this paper provides distinct advantages over the traditional OLS approach, but specific limitations may prohibit their use in particular datasets or settings.

It is also important to mention that the absence of a significant effect when using these tools is not proof that religion has no effect on the outcomes of youth. These methods often require the analysis to focus on a subset of the sample, making precise inference difficult. However, when we do detect significant effects using these methods we can be more confident of ascribing them to a causal interpretation. For each method used, our results suggest that more frequent church attendance has a real impact on youth behavior, specifically on current substance use (smoking, alcohol, and drug). Future exploration using these methods on a variety of datasets will allow for more precise estimates of the magnitude of these effects.

References

Baier, Colin J., and Bradley R. E. Wright. 2001. "If You Love Me, Keep My Commandments": A Meta-Analysis of The Effect of Religion On Crime. *Journal of Research in Crime and Delinquency*, 38(1): 3-21.

Currie, Janet. 2003. "When Do We Know What We Think We Know? Determining Causality." In *Work, Family, Health and Well-Being*, ed. Suzanne M. Bianchi, Lynne M. Casper and Roselind Betkowitz King, 275-92.

Dehejia, Rajeev, Thomas DeLeire, Erzo F.P. Luttmer, and Joshua Mitchell. 2007. "The Role of Religious and Social Organizations in the Lives of Disadvantaged Youth." NBER Working Paper No. 13369.

Goos, Maarten. 2005. "The Impact of Shop Closing Hours on Labor and Product Markets." http://cep.lse.ac.uk/stokerochford/papers/new/Goos.pdf.

Gruber, Jonathan. 2005. "Religious Market Structure, Religious Participation, and Outcomes: Is Religion Good for You?" NBER Working Paper No. 11377.

Gruber, Jonathan, and Daniel M. Hungerman. 2006. "The Church vs the Mall: What Happens When Religion Faces Increased Secular Competition?" NBER Working Paper No. 12410.

Heaton, Paul. 2006. "Does Religion Really Reduce Crime?" *The Journal of Law and Economics*, 49(1): 147-72.

Heckman, James, Hidehiko Ichimura, Jeffrey Smith, and Petra Todd. 1998. "Characterizing Selection Bias Using Experimental Data," *Econometrica*, 66(5): 1017-98.

Heckman, James J., Hidehiko Ichimura, and Petra Todd. 1998. "Matching As An Econometric Evaluation Estimator," *Review of Economic Studies*, 65(2): 261-94.

Jalan, Jyotsna, and Martin Ravallion. 2003. "Estimating the benefit incidence of an antipoverty program by propensity-score matching." *Journal of Business & Economic Statistics*, 21(1): 19-30.

Johnson, Byron R., David B. Larson, Spencer De Li, and Sung Joon Jang. 2000. "Escaping from the Crime of Inner Cities: Church Attendance and Religious Salience Among Disadvantaged Youth." *Justice Quarterly*, 17(2): 377-91.

Korenman, Sanders, and David Neumark. 1991. "Does Marriage Really Make Men More Productive?" *The Journal of Human Resources*, 26(2): 282-307.

Laband, David N., and Deborah Hendry Heinbuch. 1987. *Blue Laws: The History, Economics, and Politics of Sunday-Closing Laws*. Lexington, MA: Lexington Books.

Levitt, Steven D., and Lance Lochner. 2001. "The Determinants of Juvenile Crime." In *Risky Behavior Among Youths*, ed. Jonathan Gruber. Chicago. IL: University of Chicago Press, 327-73.

Lundquist, Jennifer Hickes. 2004. "When Race Makes No Difference: Marriage and the Military." *Social Forces*, 83(2): 731-57.

Mocan H. Naci, and Daniel I. Rees. 2005. "Economic Conditions, Deterrence and Juvenile Crime: Evidence from Micro Data." *American Law and Economics Review*, 7(2): 319-49.

Regnerus, Mark D. 2003. "Religion and Positive Adolescent Outcomes: A Review of Research and Theory." *Review of Religious Research*, 44(4): 394-413.

Rosenbaum, Paul R., and Donald B. Rubin. 1983. "The Central Role of the Propensity Score in Observational Studies for Causal Effects." *Biometrika*, 70(1): 41-55.

Rosenbaum, Paul R., and Donald B. Rubin. 1985. "Constructing a Control Group Using Multivariate Matched Sampling Methods that Incorporate the Propensity Score." *American Statistician*, 39(1): 33-38.

Ruhm, Christopher J. 2005. "Maternal Employment and Adolescent Development," IZA Discussion Papers 1673, Institute for the Study of Labor (IZA).

Sabia, Joseph. 2006. "Does Early Adolescent Sex Cause Depressive Symptoms?" *Journal of Policy Analysis and Management*, 25(4): 803-25.

The Journal of Business Inquiry 2014, 13, Issue 1 (Special Issue), 61-69
http:www.uvu.edu/woodbury/jbi/articles/
ISSN 2155-4072

Learning to Make Good Business Decisions Better – Another Contribution Christian Colleges and Universities Can Make to Improving Business Outcomes

By LARRON C. HARPER*

Higher learning institutions with Christian charters have the opportunity of teaching better workplace practices through demonstrating to students and others how their faith can improve outcomes for all who have an interest in the business decisions they will make. The addition of biblical principles to common decision-making criteria found in most business curricula ensures that students have better skills to enhance value for the businesses and people they serve. Biblical teachings are introduced to support a model of "Stakeholder Management" that incorporates sound principles of decision-making. Utilizing the model and biblical principles in business courses can lead to an improvement of business outcomes for all stakeholders.

Keywords: Stakeholders, Business Decision-Making, Christian Institutions

JEL Classification: A13, M14

I. Introduction

Higher learning institutions with Christian charters have the opportunity of teaching better workplace practices by demonstrating to students and others how their faith can improve outcomes for all who have an interest in the business decisions they will make. They should embrace this role and avoid pressures to eliminate religious contributions in their business curricula.

This paper demonstrates the value of adding religious faith considerations to business education and addresses how barriers and pitfalls to the application of the learning in the real world workplace can be confronted. A business model of "Stakeholder Management" is introduced and biblical teachings that support the model and provide encouragement to use the model are explained. Barriers to transferring the teaching that incorporates biblical principles to the workplace are identified.

II. Survey of the Literature

The relevant literature related to Christian principles and their use in the world of business and economics is vast. One category puts religious beliefs at the core (purposeful and otherwise) of management and leadership. Examples include: Boa and Bowman (2002), Bush (2010), Covey (1991 and 2004), Dungy and Whitaker (2007), Ehrman (2005), Greenleaf (1991), Hart (1989), Isaacson (2007), Lewis (1952), Morowitz (2004), Nicolson (2003), Niebuhr (1964), Rice (2010), Spong (2001), Thornton (2012) and Zacharias (2000). Another category calls for a new direction in management through a better understanding of economics, markets, psychology,

*Assistant Professor, Entrepreneurship, Management and Marketing, Brock School of Business, Samford University 800 Lakeshore Drive, Birmingham AL 35229. E-mail: lcharper@samford.edu. Phone: (205) 726-2931.

sociology, history, academics, practice and, in some cases, related Christian religious principles. Friedman (2008), Gladwell (2008), Kennedy (1987) and Pennock (2000) are examples.

Rumsfeld (2013) stresses the need of solid guidelines to ensure sound decision-making in times of multiple constituents with varied and often conflicting goals. A case for the use of biblical principles helping support the needed decision-making guidelines is made by Novak (2002), Service and Arnott (2006) and Service and Carson (2009).

O'Boyle (2012) and Saroglou (2011) state that some of the principles of a major monotheist religion can help in improving completeness of decisions while Sirico (2000) suggests that business principles and religious thought should not be divorced. A disregard of religion could likewise call for disregarding much of the social science in the area of exchange, wealth creation and destitution aspects of economics as "social science" (including empirical studies) requires understanding principles that are not altogether proven or absolute truths. Emmett (2012), Grassl (2012) and Gay (2002) support the claim that one cannot say biblical principles require faith and secular principles do not.

III. Challenges Associated With Implementing Generally Accepted Principles in Business Decision-Making

Business decision-making has evolved from just determining the return-on-investment (ROI) for investors to ascertaining and managing the impact of the decision on all stakeholders. Wheeler and Sillanpää (1997) define stakeholders "as individuals and entities who may be affected by business, and who may, in turn, bring influence to bear upon it" (p. x). They highlight direct stakeholders (investors, employees, customers, suppliers and local community) and secondary stakeholders (regulators, civic groups, pressure groups, commentators, trade bodies and competitors). Businesses are being challenged, in addition to acting economically (making a profit) and legally (complying with laws and regulations), to do more through calls for "corporate social responsibility." Social responsibility proponents admit that earning profits is the economic foundation of business but stress that more needs to be done. For an example of the additional considerations needed to meet corporate social responsibility requirements you are referred to The Center for Corporate Citizenship at Boston College.

Good business education has a strong record of teaching decision-making techniques that concentrate on the profit-maximization objective while recognizing that many variables influence the revenues and expenses that determine the profits. Economic principles claim all benefits and costs, short-term and long-term, direct and indirect, tangible and intangible should be taken into account when making decisions. However, the realities of most workplaces lead to compromises that neglect longer-term, indirect and intangible benefits and costs.

There is no doubt about the importance of financial management education that focuses on teaching the principles of sound capital resource acquisition and application. As financial markets evolve the concepts of market efficiency and effectiveness must be addressed. Building understanding of diverse financial instruments being applied in many unique ways dominates advanced finance courses. Financial managers can limit their role to that of supporting the core business of those organizations they serve or they can pursue avenues that enhance profits through financial market transactions. Decision-making principles differ depending on what role the financial manager chooses; however, the profit motive is always a core consideration.

Marketing education strives to teach the value of a business exchange where buyer and seller are mutually satisfied. If the mutual satisfaction can be sustained in the long-term customer loyalty

strengthens and the business prospers. Business ethics studies often pose questions such as "Are marketing campaigns trying to address real needs or are they trying to create needs that do not yield sustainable benefits?" A sustainable business must be able to satisfy real customer needs over the long term.

Managers are taught to identify and respond to the needs of those they manage. Employee satisfaction can be a significant contributor to business success. Handling trade-offs between improved benefits to other stakeholders (customers, investors, public) and overall employee satisfaction, where these occur, often provide managers a dilemma. As business conditions change managers need to make employment decisions that can have a devastating impact on the lives of those affected.

Solomon (1999) expressed concern about the dehumanization of business activity. He maintains "Talking about money is one of the many ways of dehumanizing business, [because it reduces] business to an unsentimental, amoral activity" (p. 3). He highlights phrases "the bottom line," "a killing in the market" and "the invisible hand" that suggest an absence of human activity or consideration. If the task of "making money" surmises a one-dimensional image of business this could be disastrous for business. Ignoring the impact on people will result in poor business performance. Micklethwait and Wooldridge (1996) provide a comprehensive critique of the proliferation of 20th century publications of management and leadership theories. Many of the theories use metaphors that Solomon (1999) regards as dangerous. "It's a Jungle Out There!," "Business as a Battlefield," "An Efficient Money-Making Machine," "The Information Revolution" and "The Game of Business" are covered in his book. Common to the actions behind business approaches with these metaphors in mind are win-lose situations, destruction of the opposition, the lack of human considerations and insensitivity to wider implications.

The stakeholder management model presented in the next section offers an antidote to the improper use of such metaphors. Whatever actions the metaphors promote the model will help ensure that all stakeholder interests are considered and trade-offs are managed with care. Biblical principles offer instruction and encouragement to students to develop the will and ability to tackle multi-dimensional issues with differing consequences for those who have an interest in the outcome of decisions made properly.

IV. A Stakeholder Model Helps Clarify Business Decision-Making Objectives

Carroll and Buchholtz (2006) cover in the "Principles of Stakeholder Management—The Clarkson Principles," seven principles for managers regarding how stakeholders should be treated. Summarizing the authors, "The key words in the principles suggest action words that should reflect the kind of cooperative spirit that should be used in building stakeholder relationships: acknowledge, monitor, listen, communicate, adopt, recognize, avoid, acknowledge conflicts" (p. 88). Their text offers many examples of the extent to which businesses can implement a stakeholder management model, highlighting successes while pointing out some pitfalls.

Harper (1998) provides a decision-making process checklist and a business case preparation framework. The process and framework facilitated gathering the data, conducting the analyses, offering recommendations and making decisions. If followed correctly the process and framework would assist in the correct implementation of decisions taken. The model is designed to offer managers a process and framework to use in multi-faceted decisions.

Key questions at the outset of the analysis include identifying:

"• Who are the utility's stakeholders?
- What needs does each stakeholder have that the utility must address?
- How are the stakeholder needs linked with the overall utility mission and goals?
- What additional goals/objectives must *'the Business Case'* address to be sure that all stakeholder needs are accounted for?" (Harper, 1998)

Once these four questions are answered decision-makers are in a better position to address important considerations in the decision-making process. They needed to account for:

"• how each stakeholder will react, …
- the tradeoffs between competing objectives and how these will be handled….
- uncertain outcomes, namely the consequences of expectations not being met….
- resource constraints… [due to] a limited resource pool." (Harper, 1998)

V. A Fully Implemented Stakeholder Model Facilitates Tough Decision-Making

The model and principles seem straight forward yet pressures to take decisions quickly, the reluctance to consult with those not in the inner-circle and incentives that focus on partial results are just three of many reasons why decision-makers avoid following the suggested process and framework. Nevertheless the value of a stakeholder model should not be ignored. Hammond *et al.* (1999, p. 235) propose eight keys in a road map to effective decision-making:

- Work on the right decision problem
- Specify your objectives
- Create imaginative alternatives
- Understand the consequences
- Grapple with your tradeoffs
- Clarify your uncertainties
- Think hard about your risk tolerance
- Consider linked decisions

Following the road map when considering complex business decisions requires a process and framework embodied in the stakeholder model. The decision-makers must identify stakeholder objectives and decide which and whose objectives will take precedence. They need to embark on an exploration of alternatives hoping to discover solutions that produce the best benefits with the minimum of harm to competing objectives. The process and framework help to ensure an understanding of consequences that will facilitate the negotiation of tough consequences. The tradeoffs that will result and risks that are present are best evaluated by the more comprehensive coverage of a stakeholder model.

Curricula at good business schools include instruction in business decision-making processes that prepare students to tackle tough decisions. However, is sufficient attention given to discouraging the simplification of decision-making by ignoring some stakeholders? Are students encouraged to seek better solutions that cover more considerations? These questions point to an opportunity for Christian colleges and universities to use biblical principles in order to have students embrace the stakeholder model for decision-making.

VI. Biblical Teachings that Support the Stakeholder Model in Business Decision-Making

A very strong tie between scripture and the stakeholder model is the second of the great commandments. "You shall love your neighbor as yourself" (Matthew 22:39). We know through the parable of "the good samaritan" that everyone is our neighbor. To love all is to take the interests of all into account when making business decisions. People should do what they would expect others to do for them. Therefore, students' attention can be drawn to "In everything, therefore treat people the same way you want them to treat you" (Matthew 7:12).

Christians are challenged "to imitate God." To imitate God in business decision-making, consideration has to be given to all those who have an interest in the outcome. Colossians 3:1-4:6 covers "The Exalted Calling" challenging Christians to live and work in specific ways "as for the Lord, rather than for men" (3:23). Managers making decisions that will serve the Lord will eagerly seek solutions that do more than suffice a few primary objectives. When deciding on and implementing a course of action managers must be concerned about minimizing the negative consequences as well as about maximizing the benefits.

Keller (2012) advises Christians to heed the apostle Paul's teaching in Ephesians 6. All work should be done "as if you were serving the Lord" (p. 213). He advises both employers and employees to change their audience. Who is watching you work? Whom are you working for? Whose opinion matters most in the end (p. 214)?

VII. Barriers to Introducing Biblical Teachings in Business Practice

No detailed research is required to conclude that there are barriers to applying biblical principles to business decision-making in practice. Apart from the obvious opposition coming from a secular society where aggressive resistance to religious considerations is prevalent, Christians struggle to find appropriate ways to apply their beliefs. They have trouble with their roles and obligation to their faith. They do not receive appropriate support from their churches and fellow followers.

Knapp (2011) writes "The church's public influence is waning as Western society undergoes a gradual shift that leaves Christians less certain of how−or whether−their faith should inform their priorities and purposes at work or in other areas of public life" (p. 77). He makes the case noting "... Jacques Ellul believes [people] are tempted to 'disassociate the spiritual situation from the material one, despising the material situation, denying that it has any meaning, declaring that it is neutral and does not concern eternal life …" and adding that "workplace culture frequently supports the division of consciousness. As individuals we may find that values derived from faith are not always reflected in the collective behaviors of groups with which we identify at work" (p. 78).

Knapp cites Mudrack and Mason's (1996) research among corporate managers which finds that individuals perceive incongruity between their personal ethical commitments and the expectations of their employers.

Earlier in the chapter Knapp (2011) asks "How is it that many sincere Christians seemed so comfortable relegating their faith to the inner or private sphere, far from work?" He postulates that "The explanation must lie in our human capacity to move with ease from one social role to another, conforming to the expectations that come with each, yet seldom allowing ourselves to confront the inconsistencies this creates in our lives" (p. 71).

Keller (2012) refers to dualism: "a term used to describe a separating wall between the sacred and the secular.... [It] leads some to think that if they work to please Christ, it must be done overtly in his name. They feel that they have to write and perform art that explicitly mentions Jesus, or teach religious subjects in a Christian school; or that they must work in an organization in which all people are professing Christians. Or they must let everyone know that they lead biblical studies in office in the morning before work hours" (p. 196). Many perceive that the Great Commission (Matthew 28:19, 20) supports this version of dualism. They resist the assertion that there are other means to achieve the desired end state.

Another dualistic approach addressed by Keller (2012) is: "Christians think of themselves as Christians only within church activity. Their Christian life is what they do on Sundays and weeknights, when they engage in spiritual activities" (p. 196). He adds that based on his experience this form of dualism is harder to dismantle because "this form [of dualism] fails to grasp the importance of what is distinctive about the Christian worldview−namely, that the gospel reframes all things, not just religious things" (p. 197). If Christian institutions did a better job of integrating biblical teachings in lessons of economics, finance, marketing and other business courses this challenge may be easier to handle.

After college years most of the biblical teaching is in the hands of churches and their leaders. Based on research and experience working with Christians and churches, Knapp (2011) offers many reasons for the failure of churches to support their members seeking guidance and assistance with applying their faith in the workplace. He quotes a 1987 study by Doug Sherman and William Hendricks that concludes "The church has grown silent on the subject of work" (p. 25). He claims that churches observe a caste system that devalues non-church work (pp. 27 and 28). He continues "We should ask ourselves what is being communicated when a church allots time on Sunday morning to commission a short-term team for ten days in Mexico, yet does nothing to commission new college graduates for their careers in business or government or education" (p. 29). Scriptural references to money and riches are challenging and throughout history Christians and churches have struggled to steer a straight path in handling available resources in fulfilling needs. Consequently, churches fail to embrace the role of assisting businesspeople in their efforts to manage non-church finances.

VIII. Conclusions and Suggestions

The first step to learning how to make good business decisions better is to ensure that all business courses are well taught. Teachers should avoid the tendency to overemphasize the simpler, more efficient but incomplete decision-making rules in their subject. Shortcomings of the decision-making rules for each discipline must receive attention and students need to be encouraged to find solutions that serve all appropriate criteria. The stakeholder model should not be relegated exclusively to business ethics or managerial values courses.

In every course students must see business decision-making as a multi-dimensional challenge involving the discipline being taught and considerations from other disciplines and the society at large. All courses must recognize the need for the proposed stakeholder management model. If this occurs all that students will need is encouragement to tackle multi-dimensional problems properly by applying the stakeholder model completely. This is where biblical principles apply.

Christian colleges and universities can be more deliberate in including biblical teachings in their course curricula. They can stress to their students that following God's will and biblical principles that foster neighborly love, fair and just treatment of employees and business associates

and service to community need to be foremost in their minds. This should encourage students to seek out business decision-making models that enable them to handle multiple objectives that improve business outcomes. They are more likely to make the extra effort required to complete all the considerations embodied in the proposed stakeholder model.

Understanding that many obstacles exist to applying biblical principles in the workplace Christian colleges and universities should provide resources to assist churches and other institutions that are in a position to offer guidance to Christians in active business careers. The stakeholder business decision-making model is one such resource. Its core principles and the support that biblical teachings provide should be learned and understood.

Christian institutions are uniquely positioned to provide more support to businesspeople. They should recognize the great role Christians can play in improving business outcomes if enabled to apply biblical principles in their work. They should be less critical and more helpful. This will require developing a better understanding of how biblical principles can be followed in business decision-making.

Business must not be regarded as an enemy. It should be a partner in the care for people and a way for believers to worship God through their work. Solomon (1999) points out that in the 1800s business replaced "sectarian massacres in the name of religion and hundred-year feuds in the pursuit of a throne or some parcel of land" (p. 5). Due to the way business was conducted "a decade of war (1805 to 1815) slipped quietly into a century of peace and prosperity" (p. 35). While business has flaws, at its heart "is the need to be aware of and concerned with other people's interests and desires, and to go about efficiently trying to satisfy them" (p. 36). Economic progress is necessary to feed growing populations and with business focusing on people's interests, needs and desires it becomes the instrument to ensure that society can deliver.

Keller (2012) warns that "Christians are never as good as their right beliefs should make them and non-Christians are never as bad as their wrong beliefs should make them," (p. 197) making the case for greater integration of faith and work. Christian institutions should embrace their role in supporting the integration.

If students, businesspeople and Christian institutions consider the business professions to "be a calling" a major step will be taken towards improving business outcomes. Top of mind awareness of God's will and a duty to fulfill biblical teachings is present in those who consider themselves "called" by God to service in their profession. Pray for these people, lay hands on them, commission them to mission at their workplace. Encourage them to serve others using their God given talents and the business decision-making tools that take all stakeholder interest into account. Enable them to worship God through their work.

Finally, there is a role for Christian institutions of higher learning to help degree seeking students and believers among the business community connect their faith with their learning and work. All seek support in applying their beliefs while meeting goals in complex business settings. Business degree curricula and executive education programs should be designed and delivered to meet this need.

References

All biblical quotations taken from the New American Standard Bible 1995 Update

Boa, Kenneth, and Robert M. Bowman Jr. 2002. *20 Compelling Evidences That God Exists.* Tulsa, OK: RiverOak Publishing.

Bush, George W. 2010. *Decision Points*. New York: Crown Publishing.

Carroll Archie B., and Ann K. Buchholtz. 2006. *Business and Society: Ethics and Stakeholder Management*, 6th ed., Mason, OH: Thomson South-Western.

Covey, Stephen R. 1991. *Principle-Centered Leadership*. New York: Summit Books.

Covey, Stephen R. 2004. *The 8th habit.* New York: Free Press.

Dungy, Tony, and Nathan Whitaker. 2007. *Quiet Strength: A Memoir*. Carol Stream, IL: Tyndale House Publishers.

Ehrman, Bart D. 2005. *Misquoting Jesus: The Story Behind Who Changed the Bible and Why.* New York: HarperCollins.

Emmett, Ross B. 2012. "Review of the 'Crisis of Global Capitalism: Pope Benedict XVI's Social Encyclical and the Future of Political Economy' edited by Adrian Pabst." *Journal of Markets & Morality*, 15(2), 487-91.

Friedman, Thomas L. 2008. *Hot, Flat and Crowded*. New York: Farrar, Straus and Giroux.

Gay, Craig. 2002. "Is Entrepreneurial Activity Necessarily Pleasing to God?" *Journal of Markets & Morality*, 5(1), 127-34.

Gladwell, Malcolm. 2008. *Outliers: The Story of Success*. New York: Little, Brown & Co.

Grassl, Wolfgang. 2012. "Review of 'Human Development in Business: Values and Humanistic Management in the Encyclical Caritas in Veritate'." *Journal of Markets & Morality*, 15(2), 510-3.

Greenleaf, Robert K. 1991. *The Servant as Leader.* Indianapolis, IN: The Robert K. Greenleaf Center.

Hammond, John S., Ralph L. Keeney, and Howard Raiffa. 1999. *Smart Choices: A Practical Guide to Making Better Decisions.* Boston, MA: Harvard Business Press.

Harper, Larron C. 1998. "Guidelines for Developing the 'Business Case' for Proposed Actions by an Electric Utility." Paper presented at the Conference of the Electricity Supply Industry (CEPSI), Thailand.

Hart, M. H. 1989. *The 100: A Ranking of the Most Influential Persons In History.* New York: Carol Publishing Group.

Isaacson, Walter. 2007. *Einstein: His Life and Universe*. New York: Simon & Schuster.

Keller, Timothy. 2012. *Every Good Endeavor: Connecting Your Work to God's Work.* New York, NY: Dutton.

Kennedy, Paul. 1987. *The Rise and Fall of the Great Powers.* New York: Random House.

Knapp, John C. 2011. *How the Church Fails Businesspeople (and what can be done about it)* Grand Rapids, MI: Wm. B. Eerdmans Publishing Co.

Lewis, Clive S. 1952. *Mere Christianity.* San Francisco: HarperCollins.

Micklethwait, John, and Adrian Wooldridge. 1996. *The Witch Doctors—Making Sense of the Management Gurus.* New York, NY: Times Books.

Morowitz, Harold J. 2004. *The Emergence of Everything: How the World Became Complex.* New York, NY: Oxford University Press.

Mudrack, Peter E., and E. Sharon Mason. 1996. "Individual Ethical Beliefs and Perceived Organizational Interests." *Journal of Business Ethics,* 15(8), 851-61.

Nicolson, Adam. 2003. *God's Secretaries: The Making of the King James Bible.* New York: HarperCollins.

Niebuhr, Reinhold. 1964. *The Nature and Destiny of Man: A Christian Interpretation, Volume 1: Human Nature.* New York: Charles Scribner's Sons.

Novak, Michael. 2002**.** "Human Dignity, Personal Liberty: Themes from Abraham Kuyper and Leo XIII." *Journal of Markets & Morality*, 5(1), 59-85.

O'Boyle, Edward J. 2012. "The Acting Person and Personalist Capital." *Journal of Markets & Morality*, 15(1), 89-102.

Pennock, R. T. 2000. *Tower of Babel: The Evidence Against the New Creationism.* Cambridge, MA: The MIT Press.

Rice, Condoleeza. 2010. *Condoleezza Rice: a Memoir of My Extraordinary, Ordinary Family and Me*. New York: Delacorte Books.

Rumsfeld, Donald. 2013. *Rumsfeld's Rules: Leadership Lessons in Business, Politics, War, and Life.* New York: Broadside Books.

Saroglou, Vissilis. 2011. "Believing, Bonding, Behaving, and Belonging: The Big Four Religious Dimensions and Cultural Variation." *Journal of Cross-Cultural Psychology*, 42(8), 1320-40.

Service, Robert W., and Dave Arnott. 2006. *The Leadership Quotient: 12 Dimensions for Measuring and Improving Leadership.* New York: iUniverse.

Service, Robert W., and Charles M. Carson. 2009. "Management and Leadership: Religion The 'Mother of all Context'." *Interbeing Journal*, 3(1), 37-43.

Sirico, Robert A. 2000. "The Entrepreneurial Vocation." *Journal of Markets & Morality.* 3(1), 1-21.

Solomon, Robert C. 1999. *A Better Way to Think About Business—How Personal Integrity Leads to Corporate Success.* Oxford, UK: Oxford University Press.

Spong, John Shelby. 2001. *A New Christianity for a New World.* San Francisco: Harper.

Thornton, W. P. 2012. *Why Can't They Hear You? Orality Based Teaching for Cross-Cultural Trainers.* Global Impact Missions.

Wheeler, David, and Maria Sillanpää. 1997. *The Stakeholder Corporation*, London, UK: Pitman Publishing.

Zacharias, Ravi. 2000. *Jesus Among Other Gods.* Nashville, TN: Thomas Nelson.