Racial/Ethnic Variations in the Consequences of Religious Participation for Academic Achievement at Elite Colleges and Universities

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Research has not investigated how much of the previously documented positive association between high school religious service attendance and college grades is mediated by campus religious group participation. Nor do we know whether campus religious group involvement is an important mediator for black and Hispanic students who experience grade-lowering stereotype threat at historically white institutions. Path analyses conducted on a racially diverse sample of students at 28 elite institutions indicate that religious group involvement in college mediates the positive relationship between high school service attendance and college grades for Hispanic and to some extent black students. For Asian and white students, high school service attendance is positively associated with grades net of religious group involvement on campus. Asians frequently attending high school services on average earn a grade-point average of 0.12 points above Asians who never attended, net of controls.

Key words: education; college performance; religious participation; racial/ethnic minorities; academic achievement.

Recent research finds that religious practice prior to college is positively associated with college grades among students at selective (or “elite”) institutions (Mooney 2010). This association holds even when comparing students of the same religious affiliation, race/ethnicity, and social class who report the same time spent studying, attending parties, and being involved in extracurricular activities on campus (Mooney 2010). Religious involvement is positively associated with studying and negatively associated with behaviors like underage drinking (Regnerus 2003, 2005). This may be in part because college religious

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participation allows students to find social and academic support among a group that shares similar beliefs and who also learned values like the delay of gratification and the importance of rituals that promote high academic success (Khan 2011). However, it remains unclear how much of the positive association between high school religious participation and college achievement operates through involvement in a college religious group.

Elite colleges are a particularly appealing site for studying the association between religious involvement and academic performance because of their emphasis on addressing the achievement gap: on average, underrepresented minority students (primarily blacks and Hispanics) earn lower grades than *equally qualified* whites (Bowen and Bok 1998; Espenshade and Walton-Radford 2009; Omi and Winant 1994; Steinberg 1989). Grades, in turn, help predict educational attainment and adult social class (Bowen and Bok 1998).¹ Research suggests that the experience of stereotype threat and other forms of social alienation on historically white campuses plays an important role in accounting for the persistent achievement gap at elite colleges (Owens and Massey 2011; Steele 1997; Steele and Aronson 1995). Organizations aimed at providing social and academic support to black and Hispanic students help counteract exposure to negative-ability stereotypes, potentially helping to boost college grades (Charles et al. 2009). High school and college religious involvement may provide one avenue that enhance the grade performance of underrepresented minority students and therefore helps close the achievement gap at selective colleges and universities.²

This paper addresses two understudied questions: (1) How much of the positive association between high school religious service attendance and college grade-point average (GPA) is mediated by involvement in a religious group in college? (2) Do the paths between high school service attendance, college religious group involvement, and college GPA operate differently for blacks and Hispanics—the groups who experience academic underperformance—compared to whites and Asians?

¹Grade performance in college is in turn a key predictor of social mobility because grade-point average (GPA) is associated with on-time or eventual graduation, job prospects, and post-graduate education admission—each of which predict income and wealth in adulthood (Bowen and Bok 1998).

²In addition, there is reason to believe that because elite college students—religious or not—are already high achievers, they are least likely to display a positive association between college religious involvement and grades. Prior studies that examine the relationship between service attendance and grades among middle and high school students (Bankston and Zhou 1995; Glanville et al. 2008; Pedersen and Seidman 2005) indicate that students who enter selective colleges and universities experience a smaller boost in grades, after controlling for prior achievement, social class, and college engagement confounders (for example, see Mooney 2010).

DOES COLLEGE RELIGIOUS PARTICIPATION MATTER?

Examination of how religious involvement is associated with college grade performance is complicated by the changing nature of religious involvement in high school versus college. In high school, most of the students attend religious services with their families. Although churches and temples may provide access to tutoring, Bible study, and other religiously oriented social activities, their primary mission is spiritual.³ At elite colleges, over 90% of the students live on or near campus and away from their family support group (Charles et al. 2009). Because students live, learn, and socialize in the same environment, their campuses serve as what Goffman (1962) calls “total institutions.” The lines between religious, ethnic/cultural, social, and academic support organizations become blurred (Charles et al. 2009; Christie and Dinham 1991; Terenzini et al. 1994). Many student religious organizations either involve or are jointly run by students and a college religious official. These organizations may help boost academic performance by reinforcing religious values and behaviors learned prior to college, (Cookson and Persell 1985; Khan 2011; Mooney 2010). As a result, it is difficult to disentangle the effects of religion and social support.

This study focuses on two types of religious participation that are particularly common in each context; high school service attendance and college religious group participation. The frequency of high school religious service attendance is an indicator of the religious beliefs and practices students bring with them into college, whether or not they participate in a religious group in college. Likewise, campus religious group involvement is one primary—though not comprehensive—form of religious involvement among students at residential colleges. This study examines how much of the positive association between high school religious service attendance and college grades operates through these direct and indirect pathways (see figure 1). Path 1 depicts a positive, direct association between high school religious service attendance and grades. More frequent religious attendance in high school is modeled as linearly associated with an increase in grades. Path 2 represents the indirect path through which increased frequency of religious service attendance in high school is associated with the probability of involvement in a college religious group. College religious involvement is, in turn, associated with higher college grades, as shown in path 3.

Hypothesis 1: Part of the positive association between high school religious service attendance and college grades operates through participation in a college religious group.

³An exception may be religious/parochial schools, but a small and declining share of students attends these schools, as discussed in MacGregor (2012).

FIGURE 1. Theoretical model of high school service attendance, college involvement in a religious group, and grade performance (numbers refer to paths discussed in the text).

COLLEGE RELIGIOUS PARTICIPATION AND THE MINORITY ACHIEVEMENT GAP

The second component of this paper examines whether the positive association between precollege religious service attendance and college grades is similarly mediated by participation in a religious group in college for underrepresented minorities compared with whites and Asians. Black and Hispanic students earn significantly lower grades than *equally qualified* white students in a large part, because on average they are raised in lower socioeconomic status neighborhoods where schools emphasize rote learning and prepare students for low-skilled jobs (Espenshade and Walton-Radford 2009; Oakes 2005). As a result, black and Hispanic students disproportionately arrive at elite colleges less academically prepared than whites (Entwisle et al. 2006).

One of the primary hypotheses for underperformance is that minority students feel socially alienated and targeted by negative-ability stereotypes on wealthy, historically white campuses. Social alienation and stereotype threat may create barriers to high performance both academically (e.g., by making it more difficult to concentrate on studying effectively) and socially (e.g., if minority students do not feel they have a group of like-minded peers, faculty, and administrators from whom to garner support) (Owens and Massey 2011; Steele 1997; Steele and Aronson 1995). Difficulties acclimating to their college environment also may arise in part because black and Hispanic students tend to hail from more religious families than white students (Wilson and Sherkat 1994). At college, they are more likely to be exposed to belief systems that deviate from those in which they were raised (Ebaugh and Chafetz 2000; Hirschman 2004; Portes and Rumbaut 2001, 2006).

Although approximately only 20–30% of students in the present study and other similar studies participate in any kind of a religious group in college (Mayrl and Oeur 2009), college religious involvement may provide underrepresented

students a sense of community as well as an academic support system. Campus religious groups may provide an environment in which students feel comfortable seeking academic and social support from like-minded peers and advisors (Zhou and Bankston 1998). Students who become involved in a religious group also may spend less time at parties. As such, religious involvement in college may reinforce the high priority students place on studying and other activities that promote high academic achievement (Pearce and Haynie 2004).

This hypothesis of differing associations between religious participation and college grades by race has been previously untested using large-scale social surveys. However, a growing body of ethnographic and archival research points to the dual function of many ethnic campus ministries in serving as both cultural organizations and religious groups (Bryant 2005; Hall 2006; Kim 2000, 2006). For example, Hall (2006) writes:

[Through Christian Chinese groups,] Chinese young people can come into contact with large numbers of other people like themselves, where being Asian is “cool” and “popular” and where they are no longer outsiders trying to “fit in” as they may have been in high school. At such colleges where there are large numbers of Chinese and other Asian students, there is also a greater likelihood that there will be a Chinese or Asian specific Christian group on campus as part of the general “Asian scene” at the college. This is because of the importance that Christians have traditionally placed on establishing such organizations on campus so that they may “witness” to others in society.

The centrality of these ethnic campus ministries follows in part from their histories; many were formed before secular Chinese cultural organizations. For example, the Chinese Christian ministry at Rutgers University was formed in 1982, long before a secular cultural organization was created (Hall 2006). To Hall (2006), these ministries offer such strong social and academic support that some Buddhist and other students convert to Christianity to fit in socially. Although this work focuses on Asian groups, it is possible that similar processes may help explain the positive role of campus religious groups for some black and Hispanic students as well.

Hypothesis 2a: For black and Hispanic students, college religious group involvement serves as an important mediator of the relationship between pre-college religious service attendance and college grades.

By contrast, white and Asian students at these schools on average hail from families with higher socioeconomic status (Massey et al. 2003). Moreover, with a greater fluency with the expectations of the college system, some white and Asian parents may leverage certain religious values, like delayed gratification, to instill in their children practices that support high academic achievement (Albrecht and Heaton 1984; Cookson and Persell 1985). In college, religious organizations may then serve to reinforce the high achievement expectations, routines, and practices that some white and Asian students may have learned through religion prior to college (Zhou and Bankston 1994). Exposure to, and

participation in, religious rituals may be used to facilitate positive habit formation, discipline, delayed gratification, and work ethics (Kahn 2011; Mooney 2010). Ethnographic studies of students at elite boarding schools—like those many of the white students in this sample attended—show how these elite high schools also use religious tradition to reinforce characteristics like work ethic, self-discipline, and positive routines (Cookson and Persell 1985; Kahn 2011). One might expect that, among these white and Asian students, the frequency of religious service attendance in high school may lay the foundations for higher grades in college.

Hypothesis 2b: For Asian and white students, the association between precollege religious service attendance and college grades operates through the direct pathway rather than the indirect path involving college religious group involvement.

DATA AND METHODS

Sample

The data used in this study come from the National Longitudinal Survey of Freshmen (NLSF). The NLSF is a stratified random sample of 3,924 college students who entered 28 selective four-year colleges and universities throughout the United States in the fall of 1999. Based on institutions' racial classification of students as white, Asian, black, or Hispanic, the NLSF randomly selected equal numbers of students from each racial group (see Charles et al. 2009; Massey et al. 2003). Students were interviewed in person during the fall of their freshman year to collect retrospective information about their social and educational experiences from childhood through high school. They were subsequently re-interviewed by phone every spring from 2000 through 2003 to learn about their social and academic experiences in college. College GPA is based on grades from all four years. The sample used here comes from the baseline and first two follow-up surveys, which had respective response rates of 86, 96, and 90%. Item non-response occurred evenly by race, and ranged between 0 and 11%, as summarized in table 1. A sample of 3,149 students had complete responses on all items used in these analyses.

Testing for systematic biases in survey non-response was conducted using regression analysis (Allison 2001). Results indicated no systematic non-response for college GPA. For the two other dependent variables on which systematic non-response occurred, separate logistic regressions were run on all predictors. For high school service attendance, non-response was significantly higher among Asians compared with whites. Participants who spent more time partying were more likely to report missing values (results available upon request).

Research shows that, in dealing with missing data, full information maximum-likelihood (FIML) estimation and multiple imputation perform better than list-wise deletion in cases where variables are not observed at random

TABLE 1 Descriptive Statistics of Variables Used in the Single and Multiple Group Models (by Race)

	Overall sample (N = 3,924)			White (N = 998)			Asian (N = 959)			Black (N = 1,051)			Hispanic (N = 916)		
	Mean	SD	Missing	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
<i>Dependent variables</i>															
4-year GPA (GPA) (1–4)	3.29	0.42	0.08	3.43	0.36	914	3.40	0.37	896	3.09	0.44	961	3.25	0.41	844
Involved in a religious group in fourth semester (RELGRP- COLL) (0–1)	0.20	0.40	0.00	0.16	0.37	998	0.23	0.42	959	0.24	0.43	1051	0.16	0.36	916
Frequency of religious service attendance senior-year HS (ATTSERV-HS) (0–1; scaled by /104) ^a	0.20	0.27	0.11	0.16	0.24	906	0.22	0.29	763	0.24	0.30	980	0.17	0.24	842
<i>Control variables</i>															
Religious affiliation															
Protestant	0.38	0.49	0.00	0.38	0.49	998	0.27	0.44	959	0.69	0.46	1051	0.15	0.35	916
Catholic	0.33	0.47	0.00	0.31	0.46	998	0.18	0.38	959	0.17	0.38	1051	0.68	0.47	916
Jewish	0.06	0.23	0.00	0.16	0.37	998	0.01	0.07	959	0.01	0.08	1051	0.05	0.23	916
Other religion	0.12	0.32	0.00	0.04	0.19	998	0.33	0.47	959	0.07	0.25	1051	0.03	0.17	916
No religion	0.12	0.32	0.00	0.11	0.32	998	0.22	0.41	959	0.06	0.25	1051	0.09	0.28	916
Immigrant generation															
First generation	0.16	0.36	0.00	0.15	0.35	998	0.15	0.35	959	0.16	0.37	1051	0.17	0.38	916
Second generation	0.08	0.27	0.00	0.02	0.15	998	0.13	0.34	959	0.04	0.20	1051	0.11	0.32	916
Gender															
Male	0.42	0.49	0.00	0.48	0.50	998	0.43	0.50	959	0.35	0.48	1051	0.42	0.49	916

Family																
Parents' educational attainment (1–4) ^b	2.30	1.48	0.05	2.79	1.27	989	2.50	1.40	944	1.92	1.52	920	1.90	1.54	869	
High school academic achievement																
HS GPA	3.70	0.33	0.00	3.69	0.33	998	3.71	0.32	957	3.71	0.33	1051	3.70	0.35	914	
SAT (0.80–1.60; scaled by /1000)	1.30	0.15	0.10	1.30	0.15	900	1.30	0.15	853	1.29	0.15	942	1.30	0.15	818	
College activities																
Total hours working for pay/week (0–7; scaled by /100)	0.53	0.86	0.05	0.36	0.70	935	0.42	0.81	920	0.70	0.97	1007	0.64	0.88	863	
Total hours studying/week (0–1.27; scaled by /100)	0.28	0.15	0.05	0.26	0.15	934	0.28	0.14	916	0.27	0.16	1003	0.29	0.16	861	
Total hours partying (0–0.70; scaled by /100)	0.07	0.07	0.05	0.08	0.07	935	0.07	0.07	920	0.06	0.07	1008	0.08	0.07	864	
Total hours of extracurricular activities (0–10; scaled by /100)	0.81	0.81	0.05	0.76	0.76	935	0.81	0.82	919	0.85	0.84	1008	0.80	0.80	862	

RELGRP-COLL, indicator for college religious group participation; SAT, scholastic aptitude exam.

^aFrequency of religious service attendance senior-year HS (ATTSERV-HS) is converted from an ordinal to a numeric variable for the number of service attendances/year during the last year of high school: “Never” = 0, “Rarely” = 3, “Often, not weekly” = 12, “Weekly” = 52, “>1 per week” = 104. The numeric variable is then scaled 0–1 by dividing by 104.

^bParents' educational attainment is converted from two categorical variables into a single numeric variable: “No BA” = 0, “1 parent BA” = 1, “2 parent BA” = 2, “1 parent adv. degree” = 3, “2 parents adv. degree” = 4.

(Allison 2001). As such, FIML with maximum-likelihood estimation was used to deal with item non-response on dependent and independent variables. Results are based on a final working sample of 3,924 students.

Dependent Variables

The three dependent variables used in the path models include four-year college GPA, an indicator for college religious group involvement in the fourth semester, and a categorical variable for the frequency of service attendance. College GPA is constructed as a cumulative GPA based on all eight semesters from freshman fall to senior spring.⁴ The indicator for college religious group involvement is based on a survey item administered during the fourth semester, which asks students whether or not they are currently involved in a religious group: "In which of the following groups are you currently involved: A religious group? (Yes/No)."

Religious service attendance is collected in the fall of freshman year. Students are asked to "categorize [their] frequency of religious service attendance during their senior year of high school." The categories used do not offer a meaningful unit for interpreting corresponding regression coefficients. Instead, I assign numerical values that offer real-life interpretability: "never" (coded 0 attendances per year), "rarely" (coded as 3 attendances for major holiday services), "often but not weekly" (coded 12), "weekly" (coded 52) attendances per year, "more than once per week" (coded 104 for twice per week attendance).^{5,6} To ease model convergence and to produce coefficient estimates whose magnitudes are easily compared with the magnitudes of the other paths shown in figure 1, this variable is put on a 0–1 scale by dividing by 104.

There are two important limitations to the religious involvement variables used here. First, high school and college religious participation measures are not identical.⁷ Therefore, rather than focusing on changes in participation, this study examines the pathways through which these distinct contexts shape academic

⁴As a robustness check due to the possibility of issues with reverse causality, in ancillary analyses, I included grades from only the last four semesters. Results did not change substantially. These and all separate analyses are available upon request from the author.

⁵Note that analyses were also carried out using a binary measure for high school service attendance in which attending "never," "rarely," and "often, but not weekly," were coded 0 and attending "weekly" or "more than weekly" were coded 1. Relationships between high school service attendance, college religious group involvement, and GPA did not change substantively. To exploit the full variation in this survey item, results reported here are from the original ordinal variable.

⁶As a sensitivity analysis, I redefined the numeric values for "rarely," "often but not weekly," and "more than weekly" to 6, 24, and 76 as well as 6, 24, and 156 attendances per year, respectively, and found that the substantive conclusions from the path analyses did not change dramatically.

⁷This difference would be detrimental to a study explicitly examining change in religious involvement over time. However, the present study focuses not only on modeling change in religious involvement, but rather on recognizing key differences in the way religious involvement takes unique forms in high school versus residential college contexts.

performance. Secondly, the college item only measures the particular type of religious involvement in college that occurs through organized campus religious groups. It does not include either off-campus ministries, or other forms of on-campus religion.

Control Variables

Religious affiliation is grouped into five categories: Protestant, Catholic, Jewish, other religion, and no religion. The NLSF data do not identify specific denomination, beliefs about Biblical inerrancy, or moral stances on issues that could identify conservative Evangelicals or Fundamentalists. Students' race and ethnicity are based on institutional classification: white, Asian, black, or Hispanic.⁸

I also control for the average number of hours spent studying, attending parties, and being involved in extracurricular activities during the typical seven day week over the second, fourth, and sixth semesters of college.⁹ These three activities typically consume a notable amount of time during college students' daily lives and are likely to be correlated with both religious involvement and grades. For example, religious students also may spend more time in extracurricular clubs and volunteer work and less time in attending parties.

Analytical Strategy

This study draws primarily on path analysis to model the mediating relationship of college religious involvement in the association between high school religious service attendance and college GPA.¹⁰ Path analysis simultaneously models the relationships between multiple dependent variables, controlling for the differential association between each control variable and each dependent variable (Lynch 2007).¹¹ Path analysis parsimoniously estimates a single model of the direct and indirect associations (or "paths") between dependent variables.

In the first set of analyses in which I estimate a single group path model, I fit both a linear probability model (LPM) and a logit regression for the path between high school service attendance and college religious group involvement. In the LPM, I use the maximum-likelihood estimator. In the logit regression, the binary dependent variable for college religious group involvement was declared

⁸The NLSF allows for student self-identification into more specific racial categories (e.g., white vs. black Hispanic), but cell sizes restrict their analysis.

⁹Note that prior models included dummies for college major, but to preserve parsimony these controls are omitted in the final models due to non-significance.

¹⁰Under 3% of the sample participated in a college religious group, but never attended religious services in high school. As such, I treat college religious group involvement as a mediator of the high school service attendance-college grades relationship without modeling it as an interaction.

¹¹Note that the "college variables" listed in table 1 are not included in the models where the dependent variable is high school service attendance because high school service attendance is conceptualized and measured as temporally prior to these college factors.

as categorical using MPlus Version 5.0; Monte Carlo integration was used with the maximum-likelihood estimator.¹²

I fit both linear and non-linear models because comparisons of logit and probit coefficients across groups (as in the subsequent multiple group analysis) rely on biased coefficient estimates if there are differences in residual variances (or unobserved heterogeneity) across groups (Allison 1999; Breen and Karlson 2013). In contrast, the LPM is thought to be adequate when $0 \leq x_i\beta \leq 1$, for every individual i (Friedman 2012; Friedman and Schady 2012; Hox 2006).¹³ For the path between high school service attendance and college religious group involvement, $0 \leq x_i\beta \leq 1$ for the predicted probabilities of every individual (i) in my sample.¹⁴ In addition, LPM and logit predicted probabilities are similar (as shown in Appendix C).

Given these similar results, the LPM is appealing because all coefficient estimates can be straightforwardly used to calculate direct and indirect effects. Since the frequency of high school service attendance is rescaled to 0–1 to align with the 0–1 scale of college religious participation, unstandardized estimates and standard errors are used. The delta method and the “model indirect” command in MPlus are used to calculate the percent of the total effect that operates through the direct and indirect paths depicted in figure 1, based on Equation (1) below (see Bollen and Stine 1990; Muthén and Muthén 2007; Muthén and Satorra 1995).

$$\text{Total effect} = \text{Direct effect} + \text{indirect effect} = \beta_1 + \beta_2 * \beta_3 \quad (1)$$

Next, I use forward/sequential constraint imposition to estimate a series of nested multiple group path models that allow me to identify the most parsimonious model that captures any differences by race/ethnicity in the magnitudes of the direct and indirect paths shown in figure 1 (Mann et al. 2009). Multiple group path analysis tests for differences in paths between the racial/ethnic groups. It also allows for the effects of control variables to vary by race/ethnicity. If a given

¹²Note that as a robustness check, analyses were also conducted using the mean-variance adjusted weighted least squares (WLSMV) estimator on five multiple imputation datasets. Results did not change substantively. Predicted probabilities for college religious involvement at varying frequencies of high school service attendance based on the WLSMV estimator are shown in Appendix C.

¹³It is, however, important to note that both the logit and LPM models impose constraints on the error terms that are potentially problematic and may lead to biased coefficients. In light of the dilemma over how to handle unobserved heterogeneity in the residual variance when comparing logit and probit models across groups, it is possible that both the LPM and logit model results of this path yield biased estimates. Because the variance of a binary variable inherently is tied to its mean, there is no solution to this problem that does not rely on possibly flawed assumptions.

¹⁴This claim in theory should be verified using the true population elements (not the sample elements), but since this is not possible I examine whether the $0 \leq x_i\beta \leq 1$ condition holds within the sample. Note, however, that if this condition is violated in the true population, the estimates produced by the model used here may be inconsistent.

model does not yield a significant decrease in fit relative to the prior (less constrained) model, I conclude that the constrained paths are not statistically significantly different.

The results from the most parsimonious model are discussed throughout the remainder of the paper (results from this model are presented in table 3). I use the results from this model to calculate predicted GPAs for four hypothetical females (the modal gender in this sample)—one of each race/ethnicity—who are identical on all other observed characteristics (i.e., they have the mean values of continuous predictors and the modal values of binary predictors). Predicted GPAs allow for the visualization of meaningful differences in the magnitudes of the direct and indirect paths for each racial/ethnic group.

RESULTS

Descriptive Results

As summarized in table 1, whites and Asians exhibit similar grade performance, averaging 3.43 and 3.40 over four years of college, followed by Hispanics, whose average GPA is 3.25. Black students in the sample have the lowest average performance of 3.09, which falls 0.31 grade points below Asians and 0.34 below whites. Protestants comprise 38% of the sample, Catholics 33%, Jewish students 6%, other religious backgrounds (including Muslims, Hindus, Buddhists, Jains, and all other faiths) 12%, and Agnostic or no religion 12%.¹⁵

Table 1 also presents descriptive statistics by race/ethnicity. About 40, 30, and 16% of white students identify as Protestant, Catholic, or Jewish, respectively. About 33% of Asian students identify as Hindu, Buddhist, Jain, or Muslim (the combined “other religion” category), 27% as Protestant, 22% with “no religion,” and 18% as Catholic. Roughly 70% of black students identify as Protestant, 17% as Catholic, and the remaining as “other” or “no religion.” Roughly 70% of Hispanic students identify as Catholic, 15% as Protestant, 9% as “no religion,” 5% as Jewish, and the remaining as “other religion.”

Table 1 also shows that, across race/ethnicity, mean levels of involvement in a college religious group and weekly or more service attendance in high school are roughly equal, ranging between 15 and 25%.^{16,17} Asian and black students have the highest levels of religious participation in both college and high school. Based on parental education, whites and Asians come from higher

¹⁵Due to the racial/ethnic diversity of this sample, the distribution of religious traditions is skewed compared with the national distribution. These results do not generalize beyond highly selective colleges.

¹⁶Note that <3% of students who did not attend religious services in high school were part of a college religious group in their fourth semester of college.

¹⁷“Weekly or more” is the designation for regular religious service attendance used by prior studies (see Mooney 2010; Reimer 2011; Smith and Snell 2009). Here, too, “weekly or more” is a significant threshold.

FIGURE 2. Results of single group path model of high school service attendance, college involvement in a religious group, and grade performance ($N = 3,924$).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Note: Displaying unstandardized coefficients. Model includes controls for religious affiliation, immigrant generation, gender, parents' educational attainment, high school GPA and SAT score, and time spent on the following college activities during the typical week (in hours, scaled by dividing by 100): working for pay, studying, partying, in extracurricular activities.

socioeconomic status families than blacks or Hispanics. Other demographic controls also are summarized in table 1.¹⁸

Multivariate Path Analysis: Does College Religious Group Involvement Matter?

Responding to the first hypothesis, figure 2 displays the results of the single group path model displaying the direct relationship between high school service attendance and GPA and the indirect relationship mediated through college religious group involvement. A one unit increase in the frequency of high school service attendance (i.e., moving from non-attendance to bi-weekly attendance due to the 0–1 rescaling) is associated with an increase in the GPA of 0.027 points, all other variables held constant. However—in support of the first hypothesis—the association between high school service attendance and GPA is partially mediated by participation in a religious group in college. Students who attend high school services bi-weekly experience on average a 38.4% higher probability of college religious group participation than students who do not attend high school religious services. In turn, college religious group participation is associated with a 0.021 point increase in GPA, all else equal.

Based on Equation (1) and the unstandardized coefficients shown in figure 2, 77% of the total association between high school service attendance and college

¹⁸Controls for the division of college major (social sciences, humanities, natural sciences/math/engineering, or undeclared) did not change results substantively and are excluded from the final results.

GPA operates through the direct pathway. The remaining 23% operates through the indirect association, whereby increased high school service attendance raises the probability of college religious group participation, which in turn is associated with a boost in GPA.

Multiple Group Path Analysis: Differences by Race/Ethnicity

The second set of analyses—which test hypotheses 2a–2b—are motivated by the persistent racial achievement gap in higher education. Table 2 displays the results of changes in model fit for the conceptual model shown in figure 1 when it is estimated separately for whites, Asians, blacks, and Hispanics. Model 1 offers sufficiently good fit for a multiple group model in which all paths are estimated freely across racial/ethnic groups. In this model, the commonly used measure of comparative fit index (CFI) (0.995, out of 1, where values >0.95 are generally taken to indicate good fit) and root mean square error of approximation (RMSEA) (0.04, with 0.00 indicating best-possible fit and values <0.05 suggesting good fit) imply a very good fit. The Tucker-Lewis index (TLI) (0.757, out of 1, where values >0.90 are generally considered good fitting) and Chi-square with its respective degrees of freedom (10.4 on 4 degrees of freedom), however, indicate a poorer fit. Model 2 constrains the path from high school attendance to college religious group involvement equal for all race/ethnic groups. The other paths are fit freely (i.e., estimated separately). Compared with model 1, model 2 fits better by all measures (the CFI and TLI increase, RMSEA decreases, and the chi-square remains virtually unchanged on more degrees of freedom). The difference in chi-square of 0.211 on 3 degrees of freedom is non-significant, indicating no statistical difference in fit. As such, model 2 becomes the baseline comparison model against which the remaining models are compared. Building on model 2, model 3 additionally estimates a single path between high school service attendance and college GPA for whites and Asians, and another single path between college religious involvement and GPA for blacks and Hispanics (the two sets of paths shown to be similar in table 2). Model 3 fits even better than model 2 (again, CFI and TLI increase while RMSEA decreases and the chi-square remains virtually unchanged on more degrees of freedom). The difference in chi-square of 0.056 on 1 degree of freedom is not statistically significant, again indicating no statistical difference in fit from the otherwise best-fitting model 2. Finally, to ensure that all paths do not operate similarly for all groups, I compare the fit of model 2 with that of the single group path model (reported in table 2). I find that model 4 fits quite well on its own, but that the difference in chi-square of 8.638 on 3 degrees of freedom suggests that the single group model fits significantly worse than model 2. As such, the remainder of the analysis is based on the multiple group model 3.

Table 3 displays results of the most parsimonious multiple group path model (model 3 from table 2), net of controls. Results indicate a significant positive association between high school service attendance and GPA for whites and Asians, but a non-significant association between blacks and Hispanics, net of

TABLE 2 Changes in Multiple Group Analysis Model Fits by Estimation Strategies for the Four Racial/Ethnic Groups ($N = 3,924$)

Model number and description	CFI	TLI	RMSEA	Chi-square	Sig	d.f.	P	Nested goodness-of-fit relative to model #	Difference in Chi-square	Significant difference in Chi-square	Difference in d.f.
(1) All race groups and all paths estimated separately	0.995	0.757	0.040	10.40	*	4	0.034	N/A	N/A		N/A
(2) Baseline Model: RELGRP-COLL on ATTSERV-HS constrained to be equal for all race groups; GPA on RELGRP-COLL and GPA on ATTSERV-HS estimated separately for all race groups	0.997	0.922	0.023	10.61		7	0.157	1	0.211		3
(3) GPA on RELGRP-COLL constrained equal for Whites and Asians; GPA on ATTSERV-HS constrained equal for blacks and Hispanics; RELGRP-COLL on ATTSERV-HS constrained equal for all four race groups	0.999	0.972	0.014	10.67		9	0.299	2	0.056		1

(4) Each path (RELGRP-COLL on ATTSERV-HS, GPA on RELGRP-COLL, and GPA on ATTSERV-HS) constrained equal across race groups (three separate paths estimated)	0.995	0.890	0.027	19.25	10	0.069	2	8.638	*	3
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Note: Models include controls for religious affiliation, immigrant generation, gender, parents' educational attainment, high school GPA and SAT score, and time spent on the following college activities during the typical week (in hours, scaled by dividing by 100): working for pay, studying, and partying, and extracurricular activities. ATTSERV-HS, frequency of religious service attendance in high school.

* $P < .05$, ** $P < .01$, *** $P < .001$.

controls. Tests for significant differences in the magnitude and percent of the total relationship between high school service attendance and college GPA operating through direct versus indirect pathways are summarized in table 4. Results indicate that, for whites and Asians, the direct path between high school service attendance and GPA accounts for the entirety of the positive religion–grades association. This direct path is also significantly larger than the slightly negative (though non-significant) indirect path operating through college religious participation for both whites ($t = 2.57$) and Asians ($t = 2.52$). The path between high school service attendance and college religious group participation is significant and of similar magnitude for each group. For blacks and Hispanics, on the other hand, the direct path accounts for under 25% of the total religion–grades relationship, whereas the indirect path involving college religious involvement is significant and positive and accounts for at least 75% of the total religion–grades relationship. Note, however, that t -tests do not find statistically significant differences in the magnitudes of the direct and indirect pathways for

TABLE 3 Results of Multiple Group Path Model of High School Service Attendance, College Involvement in a Religious Group, and Grade Performance

Path	Path description	β	Significance	SE	t -value
β_{31}	GPA on ATTSERV-HS				
	White	0.063	*	0.027	2.3
	Asian	0.131	*	0.056	2.3
	Black	0.007		0.042	0.2
	Hispanic	0.007		0.042	0.2
β_{21}	RELGRP-COLL on ATTSERV-HS				
	White	0.558	***	0.023	24.3
	Asian	0.558	***	0.023	24.3
	Black	0.558	***	0.023	24.3
	Hispanic	0.558	***	0.023	24.3
β_{32}	GPA on RELGRP-COLL				
	White	−0.024		0.024	−1.0
	Asian	−0.024		0.024	−1.0
	Black	0.037	*	0.018	2.1
	Hispanic	0.080	*	0.038	2.1
N	3924				
χ^2 (d.f.)	10.670 (9)*				
CFI	0.999				
RMSEA	0.014				

Note: Reporting unstandardized coefficients. Model includes controls for religious affiliation, immigrant generation, gender, parents' educational attainment, high school GPA and SAT score, and time spent on the following college activities during the typical week (in hours, scaled by dividing by 100): working for pay, studying, partying, and extracurricular activities. Results correspond to model 3 of table 2.

* $P < .05$, ** $P < .01$, *** $P < .001$.

TABLE 4 Magnitudes, Significance, and Percent of the Total Effect Between High School Service Attendance and College GPA Operating Through Direct and Indirect Paths, by Racial/Ethnic Group

Group	Direct path			Indirect path			% of Total effect		$t_{(\text{Direct} - \text{Indirect} = 0)}$	Significance
	β	Significance	Delta method SE	β	Significance	Delta method SE	Direct path	Indirect path		
White	0.063	*	0.027	-0.014		0.013	128.571	-28.571	2.570	*
Asian	0.131	*	0.056	-0.014		0.013	111.966	-11.966	2.522	*
Black	0.007		0.042	0.021	*	0.018	25.000	75.000	-0.306	
Hispanic	0.007		0.042	0.045	*	0.022	13.462	86.538	-0.801	

Note: Direct and indirect effects and standard errors are estimated using the model indirect command in Mplus version 5.0. Standard errors are estimated using the delta method. The test for significant difference in the magnitude of the direct and indirect effects is based on the approximate t -distribution: $t = (\beta_{\text{dir}} - \beta_{\text{ind}}) / \sqrt{SE_{\text{dir}}^2 + SE_{\text{ind}}^2}$.

blacks and Hispanics. These results lend partial support for hypothesis 2a and strong support for hypothesis 2b.

I conclude that: (1) the direct pathway between high school service attendance and GPA is not statistically significantly different for blacks and Hispanics (but it is different for whites and Asians); (2) the indirect path involving college religious involvement is not statistically different for whites and Asians (but it is different for blacks and Hispanics); (3) Per hypothesis 2a, factors associated with religious group involvement are particularly beneficial for Hispanic and black students, though no statistical difference is found in the magnitude of the direct versus indirect paths, and (4) in support of hypothesis 2b, high school service attendance has large positive association with GPA for both Asian and white students, whereas the indirect path through college religious group participation has no statistically significant effect.

Figure 3 reports predicted GPAs for a hypothetical student from each racial/ethnic group with varying types of religious involvement. The hypothetical student has sample mean characteristics on all continuous control variables and—to ease interpretability—the modal characteristics on binary control variables: that is, a Protestant, non-immigrant female. Differing frequencies of high school religious service attendance are shown in this case without college religious group involvement. Involvement in a college religious group is displayed for the hypothetical student who did not attend high school religious services. The first panel of figure 3 shows that, for the hypothetical Hispanic or black female, continued religious involvement in the form of participation in a college religious group is associated with a significant boost in college GPA. On average, participation in a campus religious group is associated with a 0.08 point boost in GPA for the hypothetical Hispanic student and a 0.04 boost in GPA for the hypothetical black student (see table 4 for statistical testing of this indirect path). For the hypothetical Asian or white student, the second panel of figure 3 shows that the most notable increase in GPA is associated with more frequent religious service attendance in high school. On average, the difference in GPA between those who never attended high school religious services and those who attended more than once per week is 0.12 points for Asians and 0.06 points for whites. College religious group involvement plays a negligible mediating role for whites and Asians (see table 4 for statistical testing of direct and indirect effects).

DISCUSSION

Using data from a sample of elite college students, the present study sheds light on at least two elements of religious involvement and grade performance that are previously understudied through the use of longitudinal data among elite college students. First, as discussed by Mayrl and Oeur (2009), prior studies tend to lack information on religious involvement prior to *and during* college. Secondly, we know little about whether high school religious involvement

FIGURE 3. Predicted GPA for a Protestant, non-immigrant female, by race and varying levels of high school and college religious involvement (black = not involved in college religious group, grey = involved in college religious group). Sample-average characteristics assumed for all other variables, including: parental education, high school GPA and SAT, and hours spent working for pay, studying, attending parties, and at extracurricular activities (see table 1 for averages).

compared with college religious involvement, is differentially associated with grades for underrepresented minority, white, and Asian students at elite colleges.

At the broadest level, the findings of this paper support the idea that much of the positive association between religiosity and grades is due to forces set in play before students arrive at college (Uecker et al. 2007). In fact, for the sample of elite college students as a whole, the direct association between high school service attendance and GPA explains almost three-quarters of the total religious attendance–grades relationship. But the importance of continued religious involvement in college—such as through participation in a campus religious group—differs for white and Asian compared with black and Hispanic students. For Asian and, to a lesser extent, white students, the religious foundations laid in families and communities prior to college (measured by the frequency of high school service attendance) drive the positive relationship between religious involvement and college grades. A number of studies show that the largest predictor of adult religious participation among Asians is the frequency of participation in childhood (Cadge and Ecklund 2007; Min and Kim 2005). Many of these studies focus on Korean Christians and particularly emphasize the role of ethnic churches in providing protective social networks that facilitate adolescents' educational success (Hirschman 2004). In general, this work highlights that religious involvement during childhood and adolescence helps Asian youth solidify not only an ethnic identity, but also a core value system that emphasizes academic achievement (Cha 2001).

Conversely, the Hispanic students and, to a lesser extent, black students in this sample who continued their high school religious involvement through participation in a campus religious group in college on average experienced statistically significant improvements in grades compared with those who were involved only in high school. The boost in GPA associated with the hypothetical Hispanic or black female's college religious group involvement at first glance may seem modest. However, in this sample of elite college students in which Hispanics and blacks on average earn GPAs 0.26 and 0.36 points below whites, respectively, the mean boost in GPA associated with college religious group involvement accounts for 31 and 11% of their achievement gap (see Massey et al. (2003) for documentation on the magnitude of the achievement gap at elite institutions).

Black and Hispanic student organizations at most elite colleges emerged from the civil rights movement (Willie 2003). They were founded to help minority students battle social alienation on historically white campuses (Willie 2003). With ethnic identities spanning white and black racial groups, Catholicism unites the overwhelming majority of Hispanics. The 70% of Hispanic students in this sample who identify as Catholic therefore may turn to religious organizations for academic and social support in addition to religious community. This involvement may then offset almost a third of the Hispanic–white achievement gap. Conversely, not participating in a college religious group

is associated with a larger decrease in GPA for the average black or Hispanic compared to white student.

Prior research highlights the importance of religious groups in serving a dual social and academic support function for underrepresented minority students (Solorzano et al. 2000). For Hispanic and black students, who on average experience the largest barriers to high academic achievement at elite colleges, religious groups might help minimize other stressors and unevenness in preparation that lead to the achievement gap in the first place (Bryant 2004; Kuh and Gonyea 2006). Cultural and religious groups provide access to like-minded peers who often share similar religious views and racial/ethnic identities. Religious groups may help increase students' sense of purpose and reinforce the payoffs associated with hard work/delayed gratification (e.g., higher grades or a higher probability of graduation months later, or a better job after graduation).

Understanding how universities may think about closing the racial achievement gap at elite universities is important given the dearth of minorities in the highest leadership positions across sectors. Academically successful minority students at elite colleges and universities are likely to be eventually highly recruited into top leadership positions in organizations across sectors (Bowen and Bok 1998). Even though elite college students represent only a small fraction of college goers in the United States, they represent a disproportionately large share of America's religious elite, whose future enterprises and leadership might influence America's religious and social values (Lindsay 2008).

Despite the contributions of the present study, many questions remain. Research suggests that the value systems learned and reinforced through religion—such as working hard and delaying gratification—and the social and academic support gained through formal programs and informal relationships built through religious groups help raise achievement. However, the specific mechanisms that underlie the positive association between religious involvement in high school or college and college grades need to be further investigated. Without experimental data based on random assignment to a religious group versus a control group, issues of selection bias and spuriousness are not fully resolved. For example, the possibility of a selection bias is reflected in the mixed findings of prior work on the direction of the effect of religiosity on students' emotional well being and college satisfaction (Bryant 2007; Phillips and Henderson 2006; Schafer 1997).

One way in which future research may begin to address this potential shortcoming is by examining whether there is something unique about *religious* group involvement—compared with involvement in other campus organizations that offer social and academic support to minority students and others at risk of experiencing social alienation on campus. A similar line of inquiry would be useful with regard to examining the specific benefits of religious service attendance prior to college for white and Asian students compared with involvement in any number of other family and/or extracurricular engagements.

Finally, in order to move beyond this study's exclusive focus on *campus* religious group involvement during college, future work should also measure and analyze the potential implications of participation in off-campus ministries or other forms of religious participation. Doing so also might involve using more varied measures of religiosity that tap into the many forms in which it may be expressed.

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APPENDIX A Regression Coefficients for Effects of Controls on Single Group Path Model of High School Service Attendance, College Involvement in a Religious Group, and Grade Performance

Variable	ATTSERV-HS			RELGRP-COLL			4 YGPA		
	β	Significance	SE	β	Significance	SE	β	Significance	SE
<i>Religious affiliation</i>									
Protestant (reference)	—			—			—		
Catholic	−0.097	***	0.019	−0.085	***	0.018	0.008		0.019
Jewish	−0.108	***	0.017	0.052	**	0.016	0.051	**	0.017
Other religion	−0.212	***	0.018	−0.046	**	0.017	0.049	**	0.018
No religion	−0.291	*	0.040	−0.096	***	0.022	0.039	*	0.018
<i>Ethnicity</i>									
White (reference)	—			—			—		
Asian	0.139	***	0.022	0.08	***	0.020	−0.031		0.021
Black	0.052	*	0.021	0.038	*	0.019	−0.321	***	0.020
Hispanic	0.018		0.021	0.035		0.019	−0.136	***	0.020
<i>Immigrant generation</i>									
Domestic (reference)	—			—					
First generation	−0.011		0.021	0.002		0.020	0.012		0.021
Second generation	0.000		0.022	−0.021		0.020	−0.010		0.021
<i>Gender</i>									
Male	−0.027		0.016	−0.007		0.015	−0.109	***	0.015
<i>Family</i>									
Parents' educational attainment (converted numeric: 1–4)	−0.024		0.017	0.023		0.015	0.176	***	0.016

Continued

APPENDIX A *Continued*

Variable	ATTSERV-HS			RELGRP-COLL			4 YGPA		
	β	Significance	SE	β	Significance	SE	β	Significance	SE
<i>High school academic achievement</i>									
HS GPA	0.020		0.018	0.028 *		0.012	-0.028		0.017
SAT (scaled by /1000)	-0.012		0.020	-0.013		0.015	0.012		0.017
<i>College activities</i>									
Total hours working for pay/week (scaled by /100)	-0.033 *		0.017	-0.008		0.015	-0.001		0.016
Total hours studying/week (scaled by /100)	0.026		0.017	0.038 *		0.015	0.095 ***		0.016
Total hours partying (scaled by /100)	-0.126 ***		0.017	-0.064 ***		0.015	-0.065 ***		0.016
Total hours of extracurricular activities (scaled by /100)	0.046 **		0.017	0.019		0.015	0.006		0.016
χ^2 (d.f.)	4.41 (1)*								
CFI	0.998								
RMSEA	0.029								

Note: Displaying unstandardized coefficients.
* $P < .05$, ** $P < .01$, *** $P < .001$.

APPENDIX B Regression Coefficients for Effects of Controls on Multiple Group Path Model of High School Service Attendance, College Involvement in a Religious Group, and Grade Performance

Variable	ATTSERV-HS			RELGRP-COLL			GPA		
	β	Significance	SE	β	Significance	SE	β	Significance	SE
<i>Religious affiliation</i>									
Protestant (reference)	—			—			—		
Catholic									
White	−0.013		0.034	−0.082	*	0.032	−0.037		0.035
Asian	−0.103	**	0.034	−0.062		0.033	0.014		0.039
Black	−0.095	**	0.030	−0.073	*	0.028	0.046		0.032
Hispanic	−0.172	***	0.042	−0.058		0.040	0.009		0.045
Jewish									
White	−0.113	**	0.034	0.063	*	0.032	0.081	*	0.035
Asian	−0.073	*	0.029	0.032		0.028	0.013		0.032
Black	−0.068	*	0.030	0.021		0.028	0.047		0.030
Hispanic	−0.163	***	0.036	0.104	**	0.035	0.024		0.040
Other religion									
White	−0.091	**	0.032	−0.057		0.030	0.045		0.034
Asian	−0.406	***	0.035	−0.091	**	0.035	0.059		0.043
Black	−0.085	**	0.031	−0.007		0.028	0.040		0.032
Hispanic	−0.064		0.034	−0.027		0.033	0.043		0.037
No religion									
White	−0.230	***	0.060	−0.040		0.037	0.038		0.035
Asian	−0.460	***	0.081	−0.177	***	0.047	0.015		0.044

Continued

APPENDIX B *Continued*

Variable	ATTSERV-HS			RELGRP-COLL			GPA		
	β	Significance	SE	β	Significance	SE	β	Significance	SE
Black	-0.224		0.148	-0.038		0.066	0.047		0.033
Hispanic	-0.289	*	0.088	-0.086		0.048	0.059		0.041
<i>Immigrant generation</i>									
Domestic (reference)	—			—			—		
First generation									
White	0.025		0.034	-0.008		0.031	0.010		0.034
Asian	0.020		0.117	-0.019		0.095	0.030		0.105
Black	-0.014		0.035	-0.009		0.032	0.008		0.036
Hispanic	-0.087		0.056	0.090		0.050	0.041		0.055
Second generation									
White	0.044		0.034	-0.006		0.031	0.000		0.034
Asian	-0.013		0.115	-0.015		0.094	-0.064		0.104
Black	-0.006		0.035	0.008		0.032	-0.022		0.036
Hispanic	0.030		0.055	-0.104	*	0.050	0.012		0.055
<i>Gender</i>									
Male									
White	-0.042		0.032	-0.009		0.029	-0.081	*	0.032
Asian	0.036		0.032	0.016		0.029	-0.086	**	0.033
Black	-0.038		0.032	-0.060	*	0.028	-0.167	***	0.032
Hispanic	-0.054		0.033	0.037		0.031	-0.127	***	0.033

<i>Family</i>								
Parents' educational attainment (converted numeric: 1–4)								
White	–0.045	0.033	–0.001		0.029	0.188	***	0.032
Asian	0.030	0.033	0.032		0.029	0.142	***	0.033
Black	–0.049	0.034	–0.045		0.030	0.143	***	0.034
Hispanic	–0.002	0.034	0.081	*	0.032	0.232	***	0.034
<i>High school academic achievement</i>								
HS GPA								
White	0.053	0.035	0.000		0.025	–0.003		0.035
Asian	0.024	0.035	0.057	*	0.024	–0.084	*	0.036
Black	0.008	0.033	0.038		0.023	–0.046		0.034
Hispanic	0.004	0.036	0.033		0.027	0.007		0.037
SAT (scaled by /1000)								
White	0.006	0.037	0.032		0.031	0.020		0.037
Asian	–0.011	0.037	–0.028		0.031	–0.001		0.037
Black	–0.008	0.035	–0.016		0.029	0.030		0.035
Hispanic	–0.039	0.038	–0.025		0.033	0.006		0.039
<i>College activities</i>								
Total hours working for pay/week (scaled by /100)								
White	–0.022	0.037	0.005		0.031	–0.015		0.032
Asian	–0.026	0.032	–0.033		0.029	–0.066	*	0.033
Black	–0.039	0.033	–0.053		0.028	0.066	*	0.033
Hispanic	–0.062	0.034	0.044		0.031	–0.027		0.034
Total hours studying/week (scaled by /100)								
White	0.046	0.034	0.054		0.030	0.144	***	0.032
Asian	–0.015	0.033	0.027		0.029	0.096	**	0.034

Continued

APPENDIX B *Continued*

Variable	ATTSERV-HS			RELGRP-COLL			GPA		
	β	Significance	SE	β	Significance	SE	β	Significance	SE
Black	0.017		0.033	0.091	**	0.029	0.116	***	0.033
Hispanic	0.079	*	0.034	-0.015		0.032	0.059		0.034
Total hours partying (scaled by /100)									
White	-0.103	**	0.034	-0.094	**	0.030	-0.090	**	0.033
Asian	-0.164	***	0.034	-0.053		0.030	-0.080	*	0.035
Black	-0.130	***	0.032	-0.061	***	0.028	-0.006		0.032
Hispanic	-0.107	**	0.034	-0.049		0.031	-0.094	**	0.034
Total hours of extracurricular activities (scaled by /100)									
White	0.038		0.035	0.015		0.030	-0.043		0.032
Asian	0.039		0.034	-0.001		0.030	0.030		0.034
Black	0.077	*	0.033	0.028		0.029	0.004		0.032
Hispanic	0.014		0.035	0.043		0.032	0.046		0.035
χ^2 (d.f.)	10.670 (9)*								
CFI	0.999								
RMSEA	0.014								

Reporting unstandardized coefficients.
 * $P < .05$, ** $P < .01$, *** $P < .001$.

APPENDIX C Comparisons of Linear Probability Model (LPM), Logit, and Probit Model Predicted Probabilities for College Religious Group Involvement (=1), by Frequency of High School Religious Service Attendance

Model	Frequency of high school religious service attendance				
	Never (0/year)	Rarely (3/year)	Often, not weekly (12/year)	Weekly (52/year)	More than once per week (104/year)
LPM (MLR estimator)	0.127	0.143	0.191	0.404	0.681
Logit model (MLR estimator)	0.118	0.128	0.161	0.387	0.749
Probit model (WLSMV estimator)	0.112	0.121	0.156	0.378	0.726

Predicted probabilities are for the hypothetical Protestant, non-immigrant female, with sample mean values of all continuous predictors, as described in the discussion of figure 3.

Predicted probabilities calculated from the logistic regression use: $Pr = (e^{x'B}) / (1 + e^{x'B})$.

Predicted probabilities from the probit regression are based on z -scores obtained from the model estimates ($z = x'B$), which are then converted to probabilities using a z table.

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