

The Relationship Between Spiritual/Religious Engagement and Affective College Outcomes: An Analysis by Academic Disciplines

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ABSTRACT

Using a state-wide college student dataset, this study examines how the level of college students' spiritual/religious engagement varies by academic disciplines and how the impact of such engagement on affective college outcomes varies across different academic disciplines. Findings show that students majoring in soft-applied-life disciplines (e.g., education, public health) are more likely to engage in spiritual/religious activities whereas those who major in the hard-applied-life disciplines (e.g., agriculture, animal sciences) and hard-applied-nonlife disciplines (e.g., engineering, computer sciences) are less likely to do so. Our findings also suggest that the impact of students' spiritual/religious engagement on affective outcomes varies across academic disciplines.

Keywords: academic discipline, academic major, affective college outcomes, spiritual development, spiritual/religious engagement

INTRODUCTION

Over the last few decades, there has been an increased attention to students' "inner" lives and researchers in the field of higher education have examined the role of spirituality and religiosity in college student development (e.g., Astin et al., 2011; Bryant, 2011; Carter, 2019a; Carter, 2019b; Gehrke, 2008; Gilbertson, 2022; Rockenbach & Mayhew, 2013). Many who work in higher education seek to develop the whole person, not just to enhance the academic or career readiness of the student (Astin et al., 2011; Braskamp et al., 2006; Chickering & Reisser, 1993; Evans et al., 2009; Hamrick et al., 2002). Holistic student development emphasizes not only cognitive and intellectual development but also the affective, inner-lives of students, such as spirituality, identity, and civic-mindedness (Astin et al., 2011; Braskamp et al., 2006; Chickering et al., 2006; Lee, 1999; Palmer & Zajonc, 2010; Parks, 2000). A quick glance at the mission statements of many colleges and universities reveals that the institutions seek to develop individuals who are educated, contribute to society, and are strong citizens. When it comes to students' spirituality, a national multi-year study of college student spirituality indicated that students are largely interested in spirituality and view their college experience as a time when they seek to discover personal meaning and purpose (Astin et al., 2011).

Still, little is unknown about how the effects of spirituality/religiosity vary across different student subgroups in higher education. Particularly, we have a limited understanding of how such effects are conditioned by academic majors. This study attempts to address this gap by examining how the effects of college students' spiritual/religious engagement (i.e., a behavioral aspect of spirituality/religiosity) on affective college outcomes vary across students in different academic disciplines. Specifically, we seek to answer the following research questions: (1) How do the levels of spiritual/religious engagement during the college years vary by students' academic disciplines? (2) How do the effects of spiritual/religious engagement on affective college outcomes vary by academic disciplines?

LITERATURE REVIEW

Spirituality and Religiosity

Spirituality and religiosity have been defined by researchers as separate concepts in various ways. Spirituality is often associated with the individual experience and may involve subjectivity, emotions, and a lack of structure (Astin et al., 2011; Hill & Pargament, 2003). In contrast, religiosity often involves membership within a community that has organized systems of beliefs and dogma, formality, and limited expression (Astin et al., 2011; Hill & Pargament, 2003). Astin and his associates (2011) acknowledged that some students do not express

their spirituality through religion and thereby define spirituality and religiousness as separate qualities. For some, religion is the primary way they express their spirituality; but for others, religion is not associated with their spiritual lives (Fuller, 2001).

Although spirituality and religiosity are delineated as separate concepts theoretically, scholars also argue that spirituality and religiosity are practically interchangeable. Tisdell (2008) suggested the interchangeability of spirituality and religiosity using the following evidence: (1) socialization of religion begins at an early age and includes the concept of spirituality as an integral part of religion; (2) religious doctrine provides ritualized guidance toward fulfilling a spiritual life; and (3) some less contemporary literature uses the term *religious* to describe the spiritual experience. Similarly, Hill and Pargament (2003) argued that spirituality and religiousness are related, interdependent constructs by emphasizing the commonality of spirituality and religiousness as a “search for the sacred” (p. 65). Indeed, Bryant et al. (2003) found that, despite their varied meanings, college student responses to spiritual or religious participation were highly correlated. Thus, in conjunction of the timeline of this dataset, there seems that the distinction between religion and spirituality is significant, but not definitive (Bryant, 2007). This study employs the perspective of the interdependence of spirituality and religiousness; hence, we use the terms spirituality/spiritual and religiousness/religious interchangeably.

College Students’ Spiritual/Religious Engagement

College students have indicated interest in spiritual matters. Among college students, 83% believe in the sacredness of life, 76% search for meaning/purpose in life, and 47% seek out opportunities for spiritual development (Higher Education Research Institute, 2004). However, recently 3 out of 10 adults indicated they are now religiously unaffiliated (Smith, 2021). Although religious engagement is known to decrease during college (Astin et al., 2011; Bryant et al., 2003), research found that students often engage in the examination of their religious beliefs during college (Astin et al., 2011; Bryant et al., 2003; Carter, 2019a, 2019b; Pascarella & Terenzini, 2005), acknowledging gender and racial difference in this engagement.

Within studies on gender and spirituality, female college students were found to be more spiritually inclined than their male peers (Astin, 1993; Bryant, 2007; Rennick et al., 2013). Most notably, Bryant (2007) found several distinctions in the spiritual/religious engagement of male and female college students: women tend to be more spiritually/religiously engaged than men; women’s spirituality seemed to be influenced by other religious friends; and men’s spirituality seemed to be more influenced by religious identity. Furthermore, Bryant found that men’s spirituality seemed to be negatively affected by hours per week spent studying and also by majoring in a science field.

Regarding race and spirituality, relatively little is known about comparative patterns of involvement with spiritual/religious activities. When it comes to the belief in a higher being, 95% of Black freshmen believe in God, compared to 84% of Latinos, 78% of Whites, and 65% of Asians (Bartlett, 2005). Similarly, Rennick et al. (2013) found that African American and Asian students were the most engaged in spiritual/religious activities in comparison to their peers in other racial groups. They also found that White students were the least engaged in spiritual or religious activities, as 73% of White students indicated they spend no time (per week) in spiritual or religious activities. However, White students attending evangelical colleges reported higher levels of religious commitment than students of color in these institutions (Paredes-Collins & Collins, 2011).

Spirituality/Religiosity and College Outcomes

Overall, there is a positive relationship between spirituality/religiosity and physical/mental health and well-being within the general higher education population (George et al, 2000, 2002; Gilbertson et al., 2022; Plante & Sherman, 2001; Powell et al., 2003; Seeman et al., 2003). Specific to college students, those who integrated spirituality into the decision-making process were more likely to make healthier choices than those students who do not consider spiritual matters in their decision making (Nelms et al., 2007). For example, Wood & Hebert, 2005 found a negative link between spiritual meaning/purpose and drug/alcohol use in college students. Religion has also been associated with positive emotional health during adolescence (Regnerus, 2003). Likewise, spirituality has been found to positively affect emotional health during the college years (Astin, 1993) and religion has been found to be positively associated with college students' ability to cope during the bereavement process (Park, 2005).

With regard to the academic benefits from spirituality/religiosity, studies indicated that students perform better academically (e.g., higher GPA) when faculty utilized student-centered teaching methods that allowed for spiritual development (Astin et. al, 2011) and that faculty with high levels of spirituality were more likely to utilize student-centered teaching methods (Lindholm & Astin, 2008). Similarly, Walker and Dixon (2002) indicated a positive influence of spiritual beliefs and religious participation on college GPA among both Black and White students. Lee, Puig, & Clark (2007) also found that high school students' religiosity had a positive effect on bachelor's degree attainment, even after other significant predictors to retention were controlled for.

Other research examined the relationship of spirituality and affective/psychological college outcomes—such as psychological well-being, anger, leadership development, and college satisfaction—and demonstrated mixed findings. Bryant (2005) suggested that participation in religious groups may be related to lower psychological well-being for college students, but Phillips and Henderson (2006) reported that college students who participated in religious

activities were less likely to experience depression. Further, Rennick et al. (2013) found that spiritual/religious engagement was positively associated with psychological well-being but only among African American and White college students, as well as female college students. Some other studies found that religious well-being (i.e., the perception of well-being in one's spiritual life) was associated with less perceived stress (Pollard & Bates, 2004); yet spirituality has also been positively associated with anger and perceived stress in college students (Winterowd et al., 2005).

Regarding spirituality and leadership development in college, Gehrke (2008) found a significant relationship between aspects of socially responsible leadership and spirituality. Likewise, Astin et al. (2011) examined leadership skills for possible correlations with spirituality, but the results were statistically insignificant. In contrast, Rennick et al. (2013) found a highly positive relationship between spiritual/religious engagement and leadership skills across all racial and gender subgroups of college students, except for Latinos.

As demonstrated in the literature review, a number of studies have examined the relationship between spirituality/religiosity and college outcomes with some attention to gender and racial differences of the relationship. Still, little is known about how the relationship is moderated by academic environments, such as academic major. To address this research gap, the current study examines how the effects of college students' spiritual/religious engagement on affective college outcomes vary across different academic disciplines. We assume not only that the effects of spiritual/religious engagement on affective college outcomes will vary by academic disciplines, but also that students' level of religious/spiritual engagement will differ across academic disciplines.

Research Framework

The theoretical and conceptual frameworks guiding this study are Astin's (1984) involvement theory, Astin's (1993) Inputs-Environments-Outcomes (I-E-O) model, and Biglan's (1973) characterization of academic disciplines. These established frameworks hold relevancy in the field of higher education. Astin's (1984) involvement theory assumes that the more time and effort a student directs toward educationally meaningful activities, the more likely they are to produce gains in their college outcomes. In terms of our study, evidence within the literature suggests that spirituality/religiosity is positively associated with a number of college student outcomes. Therefore, we assume that students' involvement in spiritual/religious activities during the college years will positively influence their affective college outcomes, such as interpersonal skills, satisfaction, and sense of belonging.

Astin's (1993) I-E-O model serves as an analytical framework for our study. Astin utilized the concepts of college input, environment, and output as a research methodology. Input is conceptualized as those attributes belonging to

students when they enter college (e.g., gender, ethnicity, high school grades, socioeconomic status); environment is conceptualized as the physical and psychological conditions that students experience during college (e.g., institutional characteristics, student involvement, major); and outcomes is conceptualized as the impact of college on students. When considered together, inputs, environment, and outcomes provide researchers with a rigorous approach to examining data and a more accurate estimation of the impact of college on students. In this study, we controlled for student entering characteristics, academic environments, and other college experiences that might also impact students' affective outcomes in order to reveal any unique contributions of religious/spiritual engagement on affective college outcomes.

To assess academic environments, we utilized Biglan's (1973) characterization of academic disciplines, which provides a framework for studying different cognitive styles of scholars. Biglan (1973) utilized multidimensional scaling to examine the characteristics of academic disciplines and categorized them by three criteria: the degree to which a paradigm exists (hard vs. soft), degree of concern with application (pure vs. applied), and degree of concern with life systems (life and nonlife). Although the hard-soft dimension describes the level of consensus of scholars on subject matters, the pure-applied dimension refers to the level of concern scholars in that academic discipline have with applying their discipline to practical situations. Life and non-life refers to whether the academic discipline works with animate or inanimate objects. We chose to use Biglan's model as it encompasses the variety of academic disciplines represented in our data source.

RESEARCH METHOD

Data Source and Sample

The data for this study were drawn from the 2010 University of California Undergraduate Experience Survey (UCUES). The UCUES is managed by the University of California (UC) Office of the President and administered by the UC Berkeley Office of Student Research. The survey is conducted on a biennial basis and administered to all undergraduates from all nine UC campuses. The 2010 UCUES data set originally included 74,410 respondents. However, given that the research questions for this study focused on the impact of spiritual/religious engagement on affective college outcomes across different academic disciplines, only those students who declared a major were included in the data analysis. Also, this dataset was available to this team of researchers. Further, to improve the reliability of statistical estimates, the data were screened using several data cleaning techniques. Consequently, the final sample used for this study was composed of 53,770 undergraduate students. Of those undergraduates that were

included, a majority of were female students (59%). In terms of racial composition, a majority (38.4%) were Asian (including Filipinos and Pacific Islanders), with White (31.8%), Latina/o (16.7%), and African American (3.4%) comprising other ethnic groups.

Variables

Overall, we utilized 20 variables for this study that were drawn from the set of core questions included in the UCUES 2010 survey. Specifically, the variables include four dependent variables (i.e., affective student outcome measures), one main independent variable (i.e., spiritual/religious engagement), and 15 control variables. These variables are discussed here in detail, and all variable definitions and coding schemes can be found in Appendix A.

Dependent variables

The affective student outcome measures chosen for this study are: (a) interpersonal skills, (b) academic satisfaction, (c) social satisfaction, and (d) sense of belonging. All are individual survey items that are self-reported levels of interpersonal (social) skills, satisfaction with the academic experience, satisfaction with the social experience, and sense of belonging on campus.

Independent variables

Students' spiritual/religious engagement was our main independent variable, and it was measured by an item that asks students how many hours per week they spent on spiritual or religious activities.

Because research has indicated that spirituality and religious engagement is linked to gender (Astin, 1993; Bryant, 2007) and race/ethnicity (Bartlett, 2005; Rennick et al., 2011), these and other demographic variables (i.e., socio-economic status, immigration background, native English-speaking status) were utilized as control variables that reflect the entering characteristics of college students. Several factor scales were also utilized as control variables that reflect college experiences. Those factor scales included academic participation and interaction, research or creative projects experience, collaborative work, critical reasoning and assessment of reasoning, curricular foundations for reasoning, elevated academic effort, extracurricular engagement, time employed, and academic time. Refer to Appendix B for details on factor scales used in this study.

Students' academic major variable was also recoded into eight academic disciplines based on Biglan's (1973a) model: hard-pure-life (HPL), hard-pure-nonlife, (HPNL), hard-applied-life (HAL), hard-applied-nonlife (HANL), soft-pure-life (SPL), soft-pure-nonlife (SPNL), soft-applied-life (SAL), and soft-applied-nonlife (SANL). Table 1 displays a list of academic majors within the 2010 UCUES data for each category of Biglan's model.

Table 1: Academic Majors in the UCUES 2010 Classified by Biglan’s Model of Academic Disciplines

Biglan Classification	Major
Hard-Pure-Life (HPL)	Biology/Biological Sciences, General; Biochemistry; Biophysics; Molecular Biology; Molecular Biochemistry; Biochemistry and Molecular Biology; Biochemistry, Biophysics and Molecular Biology, Other; Botany/Plant Biology; Cell/Cellular Biology and Histology; Anatomy; Cell/Cellular and Molecular Biology; Cell/ Cellular Biology and Anatomical Sciences, Other; Microbiology, General; Microbiological Sciences and Immunology, Other; Zoology/Animal Biology; Entomology; Animal Physiology; Genetics, General; Physiology, General; Exercise Physiology; Ecology; Marine Biology and Biological Oceanography; Aquatic Biology/Limnology; Ecology, Evolution, Systematics and Population Bio, Other; Neuroscience; Neurobiology and Anatomy; Biological and Biomedical Sciences, Other; Neuroscience; Neurobiology and Anatomy; Biological and Biomedical Sciences, Other
Hard-Pure-Nonlife (HPNL)	Mathematics, General; Mathematics, Other; Physical Sciences; Astrophysics; Planetary Astronomy and Science; Atmospheric Sciences and Meteorology, General; Atmospheric Sciences and Meteorology, Other; Chemistry, General; Chemistry Physics; Chemistry, Other; Geology/ Earth Science, General; Geochemistry; Geophysics and Seismology; Physics, General; Physics, Other; Physical Sciences, Other; Geography; Geography, Other
Hard-Applied-Life (HAL)	Agriculture, General; Agricultural Business and Management, Other; International Agriculture; Animal Sciences, General; Animal Sciences, Other; Food Science; Plant Sciences, General; Agronomy and Crop Science; Soil Science and Agronomy, General; Agriculture, Agricultural Operations and Related Science, Other; Natural Resources/Conservation, General; Environmental Studies; Environmental Science; Natural Resources Management and Policy; Forest Management/ Forest Resources Management; Urban Forestry; Natural Resources and Conservation, Other; Agricultural Engineering; Bioengineering and Biomedical Engineering; Bioinformatics; Biomathematics, Bioinformatics, & amp; Computational Biology, Other; Biotechnology; Nutrition Sciences; Nursing Science; Registered Nursing, Nursing Admin, Nursing Research, Other
Hard-Applied-Nonlife (HANL)	Architecture; City/Urban, Community and Regional Planning; Environmental Design/ Architecture; Landscape Architecture; Computer and Information Sciences, General; Computer and Information Sciences, Other; Information Science/ Studies; Computer

Science; Web Page, Digital/Multimedia and Info Resources Design; Computer and Information Sciences and Supportive Services, Other; Engineering, General; Aerospace, Aeronautical, & Space Engineering; Chemical Engineering; Civil Engineering, General; Structural Engineering; Computer Engineering, General; Electrical and Electronics Engineering; Engineering Physics/Applied Physics; Engineering Science; Environmental/ Environmental Health Engineering; Materials Engineering; Mechanical Engineering; Nuclear Engineering; Manufacturing Engineering; Operations Research; Geological/ Geophysical Engineering; Engineering, Other; Apparel and Textiles, General; Pharmacology; Toxicology; Environmental Toxicology; Applied Mathematics, General; Computational Mathematics; Applied Mathematics, Other; Statistics, General; Statistics, Other; Mathematics and Computer Science; Hydrology and Water Resources Science; Oceanography, Chemical and Physical; Geological and earth sciences/Geosciences, Other; Optics/Optical Sciences; Materials Science; Pharmacy, Pharmaceutical Sciences, and Admin, Other

Soft-Pure-Life (SPL) Religion/ Religious Studies; Psychology, General; Physiological Psychology/ Psychobiology; Social Psychology; Psychology, Other; Social Sciences, General; Anthropology; Anthropology, Other; Political Science and Government, General; American Government and Politics (United States); Political Science and Government, Other; Sociology, Social Sciences, Other

Soft-Pure-Nonlife (SPNL) Communication, General; Speech Communication and Rhetoric; Mass Communication/Media Studies; Journalism; Foreign Languages and Literatures, General; Linguistics; Comparative Literature; Linguistic, Comparative, and Related Lang Studies, Other; Chinese Language and Literature; Japanese Language and Literature; Korean Language and Literature; Slavic Languages, Literatures, and Linguistics, General; Russian Language and Literature; Germanic Languages, Literatures, and Linguistics, General; German Language and Literature; Scandinavian Languages, Literatures and Linguistics; Dutch/ Flemish Language and Literature; French Language and Literature; Italian Language and Literature; Portuguese Language and Literature; Spanish Language and Literature; Arabic Language and Literature; Middle/ Near Eastern and Semitic Languages, Literatures and Linguistics, Other; Classics and Classical Languages, Lit and Ling, General; Ancient/Classical Greek Language and Literature; Latin Language and Literature; Classics and Classical Languages, Literature; and Linguistics, Other; Celtic Languages, Literatures and Linguistics; Foreign Languages, Literatures and Linguistics, Other; English Language and Literature, General; Creative Writing; Rhetoric and Composition; American Literature (United States); English Language and Literature/Letters, Other; Liberal Arts and

Sciences/Liberal Studies; Humanities/ Humanistic Studies; Liberal Arts and Sciences, General Study and Human, Other; Medieval and Renaissance Studies; Science, Technology and Society; Philosophy; Philosophy, Other; Art/Art Studies, General; Fine/Studio Arts, General; Art History, Criticism and Conservation; Fine Arts and Art Studies, Other; Music, General; Music History, Literature and Theory; Music Performance, General; Music Theory and Composition; Musicology and Ethnomusicology; Music, Other; History, General; History, Other

Soft-Applied-Life (SAL) Education, General; Agricultural Teacher Education; Mathematics Teacher Education; Physics Teacher Education; Human Development and Family Studies, General; Peace Studies and Conflict Resolution; Cognitive Science; Social Work; Criminology; Public Health, General; Public Health, Other

Soft-Applied-Nonlife (SANL) American/United States Studies/ Civilization; Asian Studies/ Civilization; East Asian Studies; European Studies/ Civilization; Latin American Studies; Near and Middle Eastern Studies; Russian Studies; Scandinavian Studies; Southeast Asian Studies; Chinese Studies; German Studies; Italian Studies; Japanese Studies; Area Studies, Other; African American/Black Studies; American Indian/Native American Studies; Hispanic- American, Puerto Rican, and Mexican-American/ Chicano Studies; Asian-American Studies; Womens Studies; Ethnic, Cultural Minority, Gender and Group Studies, Other; Legal Studies, General; International/ Global Studies; Classical, Ancient Med and Near Eastern Studies and Archaeology; Jewish/Judaic Studies; Community Organization and Advocacy; Public Administration; Public Policy Analysis, General; Economics, General; Econometrics and Quantitative Economics; Development Economics and International Development; International Economics; Economics, Other; International Relations and Affairs, Urban Studies/Affairs; Visual and Performing Arts, General; Dance, General; Design and Visual Communications, General; Design and Applied Arts, Other; Drama and Dramatics/Theatre Arts, General; Film/Cinema/Video Studies; Film/Video and Photographic Arts, Other; Visual and Performing Arts, Other; Business Administration and Management, General; Business/ Managerial Economics; Management Science

Analysis

First, to understand how the level of spiritual/religious engagement varies by academic disciplines, a cross-tabulation with Chi-square analysis was performed. Then, to determine how the effects of spiritual/religious engagement on affective college outcomes vary by academic disciplines, a series of separate regression analyses were conducted across different academic disciplines. For the

purpose of separate regression analyses, we used only two (i.e., hard or soft, and pure or applied) of the three dimensions of Biglan’s (1973) model to compare regression coefficients across academic disciplines more efficiently. Prior to running the regression analyses, the data was split into four Biglan categories of academic disciplines, and multiple blocks of variables were entered into the regression models. For each of the outcome measures, the best regression model was determined by eliminating non-significant items; and the hierarchical multiple regression was performed again using the forced entry method. Finally, to see if any differences observed in the impact of spiritual/religious engagement on affective college outcomes across academic disciplines were statistically significant, *t*-tests were performed on the independent variable of our interest (spiritual/religious engagement) for each combination of outcome measures and subgroups.

RESULTS

Disciplinary Differences in the Level of Spiritual/Religious Engagement

To compare the level of spiritual/religious engagement across academic disciplines, we conducted a cross-tabulation with Chi-square analysis (see Table 2). The results show that, in general, the level of spiritual/religious engagement of the students in our study (i.e., students at selective public research universities in California) was low.

Table 2: Chi-Square Analysis of Time Spent on Spiritual/Religious Activities Per Week by Biglan Major Classification (n = 56,050)

	No Time (%)	One Hour or More (%)	χ^2
Biglan Major			144.72*
Hard-Pure-Life (<i>n</i> = 11,784)	64.6	35.4	
Hard-Pure-Nonlife (<i>n</i> = 3,304)	69.9	30.1	
Hard-Applied-Life (<i>n</i> = 4,542)	70.9	29.1	
Hard-Applied-Nonlife (<i>n</i> = 8,120)	70.6	29.4	
Soft-Pure-Life (<i>n</i> = 10,538)	66.8	33.2	
Soft-Pure-Nonlife (<i>n</i> = 7,311)	67.9	32.1	
Soft-Applied -Life (<i>n</i> = 1,645)	61.8	38.2	
Soft-Applied -Nonlife (<i>n</i> = 8,806)	66.5	33.5	

* *p* < .001

No more than 38.2% of students in any discipline engaged in one hour or more per week of spiritual/religious activities. In addition, there was a significant difference in the level of spiritual/religious engagement across academic disciplines ($\chi^2 = 144.72, p < .001$). The highest level of involvement in spiritual/religious activities was among those students in the soft-applied-life disciplines. That is, more students (38%) who were enrolled in majors such as education and educational administration reported spending an hour or more per week on spiritual/religious activities than students in other academic disciplines. Following close behind with 35.4 % of students participating in some weekly spiritual/religious activities were students in hard-pure-life (e.g., biology, botany, ecology) disciplines. In contrast, about 70% of those students who were enrolled in hard-applied-life (e.g., health sciences, agriculture), hard-applied-nonlife (e.g., engineering, computer sciences), or hard-pure-nonlife (e.g., mathematics, chemistry, physical sciences) disciplines indicated that they do not engage in any kind of weekly spiritual/religious activities.

General Effects of Spiritual/Religious Engagement on Affective College Outcomes

Before we examined whether the effects of spiritual/religious engagement on affective college outcomes vary across academic disciplines, we first investigated if such spiritual/religious engagement had a significant effect on our affective college outcomes (i.e., interpersonal skills, academic satisfaction, social satisfaction, and sense of belonging) for the aggregate student sample after controlling for an extensive set of confounding variables, including student inputs, academic majors, and other college experiences (see Table 3 for the full sample regression results). Results indicated that spiritual/religious engagement had a significant effect ($p < .001$) on all four outcome measures even after controlling for student input characteristics, academic major, and college experience variables. Adjusted R-squared values ranged from .08 for sense of belonging to .19 for interpersonal skills, while standardized regression coefficients (betas) for spiritual/religious engagement ranged from -.02 for academic satisfaction to .04 for interpersonal skills. Results indicated that, overall, spiritual/religious engagement had a significant positive effect on interpersonal skills, social satisfaction, and sense of belonging among college students. On the contrary, satisfaction with the overall academic experience appears to be negatively impacted by spiritual/religious engagement.

Table 3: Regression Coefficients on Affective College Student Outcomes

	Interpersonal Skills (<i>n</i> =36,587)	Academic Satisfaction (<i>n</i> =37,308)	Social Satisfaction (<i>n</i> =37,379)	Sense of Belonging (<i>n</i> =37,455)
Block 1 - Demographic				
Gender (Male)	-.06***	-.00	-.03***	-.03***
African American	-.00	-.03***	-.04***	-.06***
Latino	-.02**			-.02**
Asian American	-.08***	-.13***	-.06***	-.07***
Social Class - Lower	-.04***	-.06***	-.06***	-.05***
Social Class - Upper	.02***	.02***	.02**	.03***
Immigrant Status (Immigrant)	.03***		.03***	.02**
Block 2 - Biglan Academic Discipline				
Hard-Pure-Life	.01*	-.08***	-.01	
Hard-Pure-Nonlife	-.02***	-.02**		
Hard-Applied-Life	-.00	-.05***		.02**
Hard-Applied-Nonlife	-.02***	-.03***		.02**
Soft-Pure-Life	.04***	-.03***	-.01*	-.01*
Soft-Applied-Life		-.02***	-.02***	-.01*
Soft-Applied-Nonlife	.03***	-.05***		-.02***
Block 3 College Environment				
Academic Participation and Interaction	.18***	.11***	.04***	.06***
Research or Creative Projects Experience	.02**	.04***	.02***	.02***
Collaborative Work	.15***	.05***	.17***	.13***
Critical Reasoning and Assessment of Reasoning	.07***	.10***	.07***	.07***
Curricular Foundations for Reasoning	.03***	.04***		.04***
Elevated Academic Effort	.02***	.08***	-.01*	
Extracurricular Engagement	-.17***	-.02***	-.15***	-.08***
Time Employed	.07***	-.01**		
Academic Time	-.07***		-.04***	-.02***
Block 4: Spiritual/Religious Activities				
Time spent per week on spiritual or religious activities	.04***	-.02***	.03***	.02***
Adjusted <i>R</i> ²	.19	.12	.09	.08

Conditional Effects of Spiritual/Religious Engagement by Academic Disciplines

Conditional (or differential) effects of spiritual/religious engagement on our affective college outcomes are observed across academic disciplines. Table 4 displays the unstandardized regression coefficients of spiritual/religious engagement on the four outcome measures and their statistical significance. We used unstandardized regression coefficients instead of standardized regression coefficients to compare differential effects of spiritual/religious engagement across academic disciplines because the standard deviations of spiritual/religious engagement and corresponding outcome measures were not equivalent across academic disciplines. The table also indicates specific group differences (i.e., *t*-test results) in the impact of spiritual/religious engagement that were statistically significant across academic disciplines.

Table 4: Unstandardized Regression Coefficients of Time Spent on Spiritual/Religious Activities on Student Outcomes by Academic Discipline

Academic Discipline	Student Outcomes			
	Interpersonal Skills	Academic Satisfaction	Social Satisfaction	Sense of Belonging
Hard-Pure [A]	.04***	-.03*	.05***	.03* (B)
Hard-Applied [B]	.04**	-.04** (C)	.03	-.01 (A, C, D)
Soft-Pure [C]	.04***	-.00 (B)	.06***	.03*(B)
Soft-Applied [D]	.04**	-.04*	.03	.04*(B)

Note 1: Results of *t*-tests are presented by the bolded beta and/or the letter corresponding to the group whose effect is significantly different at the .05 level from the group compared. Italicized letters are significant at the .01 level.

Note 2: Sample size for each subgroup varied depending on the type of college outcomes. The sample size ranges are as follows: Hard-Pure (3,304 to 11,784), Hard-Applied (4,542 to 8,120), Soft-Pure (7,311 to 10,538), and Soft-Applied (1,645 to 8,806). * $p < .05$; ** $p < .01$; *** $p < .001$

The most notable group difference is observed in the effect of spiritual/religious engagement on students' sense of belonging. It seems that, except for students enrolled in Hard-Applied disciplines, all other students experienced a heightened sense of belonging from spiritual/religious engagement (the range of *t* scores was 2.97 to 3.31, $p < .001$). In other words, it seems that most students obtained an improved sense of belonging as a benefit of their

spiritual/religious engagement during the college years, but students who were enrolled in hard-applied disciplines (e.g., engineering, computer science, agriculture, and horticulture) did not. When it comes to academic satisfaction, the results showed that spiritual/religious engagement had no significant effect on this type of affective outcome among students in the soft-pure disciplines (e.g., anthropology, political science, English, philosophy), whereas spiritual/religious engagement had a negative effect on it among students in other academic disciplines.

Although differential effects of spiritual/religious engagement across academic disciplines were our main interest, results of our separate regression analyses also identified some general effects of such engagement. General effects of religious and spiritual engagement were observed in interpersonal skills, where a nearly identical positive relationship was found across all academic disciplines. Social satisfaction was also positively affected by spiritual/religious engagement for students in the hard-pure ($b = .05, p < .001$) and the soft-pure disciplines ($b = .06, p < .001$).

Limitations

The study affirms the findings of existing literature on the impact of spiritual/religious engagement on college outcomes and adds important new findings on the conditional effects of spiritual/religious engagement on affective college outcomes. However, there were several limitations. First, this study does not utilize longitudinal data, as the survey simultaneously measured spiritual/religious engagement and affective outcomes. This nature of the data does not allow for time sequencing between the variables. This study therefore provides correlational information between the variables rather than causal connections. Also, this study does not demonstrate what characteristics may exist in college students that lead them to choose one academic discipline over another. Therefore, important mediating information may be missing from our analysis. This study also utilizes one variable that reflects a behavioral aspect of spirituality or religiousness and may miss some important aspects of spiritual/religious engagement such as student attitudes about spiritual or religious matters. Finally, the sample was taken from students at a large research university system in California, so it may not be generalizable to students beyond this type of institution and in different regions of the United States.

DISCUSSION AND CONCLUSIONS

Using the dataset from the 2010 University of California Undergraduate Experience Survey (UCUES), this study investigated how the *level* of college students' spiritual/religious engagement varies by academic disciplines and how

the *impact* of such engagement on affective college outcomes varies across different academic disciplines. We based our study on several established findings from scholarly literature. Students have reported high levels of interest in spirituality (Astin et al., 2011), and academic disciplines have been indicated to have a significant impact on both the college student experience and outcomes (Feldman et al., 2008; Nelson Laird et al., 2008; Rockenbach & Mayhew, 2013; Umbach & Wawrynski, 2005). Also, an examination of conditional effects—such as differential effects depending on academic discipline—allows us to better understand how academic sub-environments mediate the relationship between college experiences (spiritual/religious engagement in this case) and outcomes.

Three notable findings from the results of this study are that (1) the level of spiritual/religious engagement did appear to vary across academic disciplines, (2) the effect of college students' spiritual/religious engagement on their affective college outcomes did appear to vary by academic disciplines, and (3) that spiritual/religious engagement did appear to have a significant general effect on affective college outcomes.

Our findings show that the level of spiritual/religious engagement seems to vary across academic disciplines, which is consistent with the literature where academic discipline impacts other aspects of higher education (Feldman et al., 2008; Kim & Sax, 2011, 2014; Nelson Laird, et al., 2008; Pascarella & Terenzini, 2005; Umbach & Wawrynski, 2005). Within our study, students majoring in soft-applied-life disciplines, which include such majors as recreation, education, public health, counseling, and human resources, were the most likely to indicate that they participated in religious/spiritual activities for one or more hours each week. As religious and spiritual activities often involve human interactions of a helping nature, this classification more than any other would appear to involve similar interests. The students in our study that were least likely to report spending at least one hour per week on spiritual/religious activities were those in the hard-applied-life disciplines (e.g., agriculture, animal sciences, nursing) and hard-applied-nonlife disciplines (e.g., engineering, computer sciences, pharmacy). These findings appear to be inconsistent with Astin et. al (2011) who found that students majoring in helping professions, such as nursing or education, tend to be more active in spiritual questing than those students majoring in engineering. The findings of our study differ Astin et al.'s findings as the students majoring in nursing and education in our study indicated less interest in spirituality/religiosity than other academic disciplines. Further, Astin et al. found that faculty in the health sciences were more likely to agree with the idea that they should be involved in fostering spiritual development, whereas faculty in biological sciences, social sciences, indicated that less interest in fostering spiritual development in their students. Comparably, engineering majors were less spiritually/religiously engaged than students in other disciplines.

The findings of this study also reveal that the conditional effects of spiritual/religious engagement on affective college outcomes do vary by Biglan's academic major classification. Our findings suggest that students in some academic disciplines benefit more or less than their counterparts in other academic disciplines. For example, spiritual/religious engagement had a positive effect on sense of belonging among students in hard-pure, soft-pure, and soft-applied academic majors, but there was not a significant relationship between spiritual/religious engagement and sense of belonging among students in hard-applied academic majors (e.g., engineering, computer science, astronomy, chemistry, geology, math, and physics). Students in our study in the hard-applied disciplines were the least likely to report spending time each week in spiritual or religious activities, which are activities that tend to involve human interaction. It is possible that students in the hard-applied disciplines do not have as much human interaction as their peers in other disciplines and that the educational climate within the hard-applied disciplines is less likely to foster a sense of belonging in students than educational climate of other academic disciplines. For example, it is possible that the hard-applied disciplines reward performance differently than other disciplines and in ways that are based more specifically on non-human interactions.

Another interesting conditional effect was observed in the relationship between spiritual/religious engagement and academic satisfaction, one type of college student satisfaction. Other studies, such as Astin et al. (2011), measured overall satisfaction. Our results show that spiritual/religious engagement had a negative impact on the academic satisfaction for students across all academic disciplines, except for those students in the soft-pure disciplines, for which spiritual/religious engagement showed no effect. This finding in our study is mostly consistent with Astin's (1993) finding that religious engagement has a negative impact on academic satisfaction. Our findings could be a result of students who feel marginalized by their engagement in spiritual/religious activities. The soft-pure students may have a smoother integration between spiritual/religious engagement and college life. Their traditional college experiences are more integrated with the curricular and co-curricular, as these academic disciplines deal with human life. There may be more discussion during class activities, which allows for integration of spiritual/religious matters with their academic discipline.

Although in our study spiritual/religious engagement tended to negatively affect *academic* satisfaction, students' spiritual/religious engagement tended to improve their *social* satisfaction, meaning that students who are participating in spiritual/religious activities were also likely to indicate they were socially satisfied with college. Spiritual/religious activities often involve human interaction, interaction that could positively impact social satisfaction; thus, the human interaction that often accompanies spiritual/religious engagement could positively contribute to students' social satisfaction. In Astin and colleagues' (2011) study,

spiritual/religious engagement was found to have a negative relationship with college satisfaction. Their study measured overall college satisfaction, whereas our study measured satisfaction with two variables, academic satisfaction and social satisfaction. Our findings add to the body of literature and clarify that the impact of spiritual/religious engagement varies by the type of satisfaction. That is, spiritual/religious engagement seems to have a positive impact on social satisfaction but has a negative impact on academic satisfaction.

Although we are mainly interested in the disciplinary conditional effects of spiritual/religious engagement, findings of this study also indicated some general effects of such engagement. Results from our full-sample regression analysis showed that spiritual/religious engagement had a significant general effect on three of our four affective college outcomes, even after controlling for an extensive set of confounding variables including student demographics, academic majors, and other college experiences. We found a positive relationship between spiritual/religious engagement and social satisfaction, interpersonal skills, and sense of belonging—all college outcomes that involve positive interactions with others. These findings are consistent with Astin et al. (2011) as well as most other studies on psychological well-being (Mayhew et al., 2016). The current study's finding suggests that, above and beyond any effects of academic discipline, students benefit personally and socially from spiritual/religious engagement, which is also consistent with the findings of most studies (Mayhew et al., 2016). Such engagement may encourage positive social interactions that improve associated gains in college outcomes. The results also suggest that spiritual/religious engagement has a positive impact in developing an awareness of oneself and others and in developing healthy relationships. Further, the positive effect of spiritual/religious engagement on interpersonal skills may also assist students' transitioning from an egocentric worldview to an altruistic one.

IMPLICATIONS

The results of this study carry some important theoretical, methodological, and practical implications to consider for higher education research and practice. Our study shows that spiritual/religious engagement has a unique, significant effect on a select set of affective college outcomes. Given this finding, a theoretical implication is that spiritual or religious engagement should be given consideration in studies that examine college impact. Furthermore, the results of this study also reveal some conditional effects of spiritual/religious engagement on affective outcomes based on students' academic discipline. This finding underscores the methodological importance of examining the conditional effects of academic discipline. At least, researchers should consider using academic discipline as a

control variable when examining the relationship between certain college experiences and college student outcomes.

Findings of this study also provide greater clarity to the existing mixed findings on the relationship between spirituality/religiosity and college outcomes. This study does suggest that spiritual/religious engagement is positively related to college students' sense of belonging, social satisfaction, and interpersonal skills. These findings support the theoretical framework that faith is more than just a segment of life, but that it is worthy of holistic consideration (Fowler, 1981; Hill & Pargament, 2003).

Although many professionals in higher education value spiritual and religious engagement for its own purposes and some will view the research of it as an exercise of academic interest, this study finds practical relevance in spiritual/religious engagement to the aims of student success that have long been areas of interest (Astin, 1984, 1993). Institutions of higher education and their members should think about how we can facilitate college students' spiritual engagement and their growth in spirituality during the college years. While college students generally benefit from spiritual/religious engagement, our study shows that students in some academic disciplines appear to either benefit less or do not benefit at all from such engagement. Given this finding, higher education professionals need to not only encourage students to be more actively involved in their own spiritual/religious engagement through purposeful curricular and co-curricular activities but also provide an optimal academic environment where students feel encouraged to integrate or explore matters of spirituality or religiosity in their own academic context.

Finally, as many higher education institutions are looking for solutions and interventions on how to address the mental health crisis and overall well-being of their students, the spiritual and religious engagement of students can be considered to address these significant issues. Spiritual and religious engagement can be utilized to promote healthy social and emotional learning. Specifically, those faculty and staff working with students can promote journaling, meditation, and solitude both inside and outside of the classroom so that spiritual/religious engagement can be established in the lives of students. Faculty and staff can have a significant impact on students' holistic development. When life stressors occur, spirituality and religion seem to have its most distinct influence because of its ability to help individuals interpret life events and potentially promote social and emotional well-being (Carter, 2019b).

Conclusion

This study examined the impact of spiritual/religious engagement on select affective outcomes among college students and how the impact may vary by academic discipline. Results indicated that spiritual/religious engagement is

another behavior that varies by students' academic major. Further, students' level of spiritual/religious engagement does impact their interpersonal skills, academic satisfaction, social satisfaction, and sense of belonging. Spirituality and religiosity are key aspects of developing the inner-lives of students and whole person development, which are valued by many higher education practitioners. Furthering our understanding of how spiritual/religious engagement varies among academic disciplines can better equip us to serve the various needs of our students.

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