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Individual Religious Commitment and Interdisciplinary Academic Achievement: Student Religiosity as a Factor in a National Academic Competition

Introduction

The United States Academic Decathlon (USAD) is a national scholastic competition for high school students requiring competence in ten interdisciplinary subject areas: language and literature, art, music, social science, economics, natural science, mathematics, interview, and speech. Academic Decathlon competitions utilize standardized curricula and tests nationwide and are organized on regional, state, and national levels. Public and private high schools participate in the Academic Decathlon across 44 states by organizing teams comprising nine students each. The Academic Decathlon consists of three categories per team based on student grade point averages: the Honors category includes students with a GPA of 3.75 and higher, the Scholastic category includes students with a GPA of 3.0 to 3.75, and the Varsity category includes students with a GPA of less than 3.0. Each competing team is required to field three competitors in each category, comprising a final team of nine students. Each state qualifies three teams for the national competition representing small, medium, and large high schools respectively. The United States Academic Decathlon program has been identified as an effective academic extracurricular activity to challenge and inspire highly achieving high school students (Ballard, 1993).

The purpose of the Academic Decathlon is to encourage interdisciplinary thinking across boundaries of the liberal arts and sciences. The Academic Decathlon utilizes a thematic approach to interdisciplinary studies intended to integrate knowledge from various disciplines and to encourage students to pursue deep learning. A thematic curricular design, such as that which is employed by the Academic Decathlon, enables students to encounter knowledge from a variety

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of sources and engage in diverse exercises that promote learning (Gardner, Wissick, Schweder & Canter, 2003). Each year, an annual curricular theme aids students in making connections across disciplinary boundaries.

Although each year the national theme may include elements of religion as related to the fine arts and social sciences, religious studies are not included as a distinct discipline. Still, even relation to a standardized, interdisciplinary academic competition like the Academic Decathlon, religiosity can be considered as a factor that may influence achievement in other major academic disciplines. Religiosity has been identified as an "important concept to consider in students' academic development" (Schumbehl, Cubbellotti, & Van Ornum, 2009, p. 34) and has direct implications for Christian perspectives in education.

This case study was an exploration of student religiosity as a factor of achievement in the Academic Decathlon competition. This case study included an examination of the differences between the religiosity of students on teams representing a public and a private school, both of which qualified at the state and national levels in the Academic Decathlon. The statistical significance of religiosity in relation to achievement scores in the Academic Decathlon was examined.

Review of Literature

At the close of the 20th century, the literature concerning the relationship between religiosity and academic performance remained largely underdeveloped (Trusty & Watts, p.1999). However, since that time, several studies have been conducted examining the role of religiosity in the academic achievement of students. Religiosity is a complex concept that comprises various aspects of belief, behavior, and intelligence (Holdcroft, p. 2006). While Nyborg (2009) demonstrated that IQ negatively correlated with the reported denominational

affiliation of students, several other studies have demonstrated that religiosity and academic achievement are positively correlated. Researchers have found that religiosity is positively correlated with grade point average (Zern 1989; Walker & Dixon, 2002).

Jeynes (2002a) reported that "religious schooling and religious commitment each have a positive effect on academic achievement and school-related behavior" (p. 27). Further, Jeynes (2003) found that urban high school students reporting high religiosity achieved higher performance on standardized academic measures, including reading and mathematics tests. Jeynes (2002b) also suggested that religiously-affiliated schools inherently promote academic achievement more than their public school counterparts by reporting that "religious schools do differ favorably from non-religious schools on a number of measures that would seem to support an environment of high academic achievement" (p. 16). Similarly, Regenerus & Elder (2003) reported that students reporting high religiosity attained higher scores on standardized mathematics and reading tests than did students who reported no religious commitment. Moreover, Loury (2004) found that more religiously committed students performed better on most academic measures than did their less religious counterparts. In like manner, Mooney (2005) found that two separate measures of religiosity correlated with academic achievement.

Other factors, including family influence on religiosity and academic achievement have also been studied. McKune & Hoffmann (2006) found that high academic achievement can be predicted when parents and adolescents report similar levels of religiosity. McKune & Hoffmann also found that when parents report high religiosity and adolescents report low religiosity, low academic achievement can be predicted. Comparisons of academic achievement levels in public and private schools have become a subject of interest among researchers not because of religious

implications alone, but because of increasing public voucher availability to private schools (Lubienski, Crane, & Lubienski, 2008).

The review of literature suggested that religiosity and academic performance should correlate and provided a basis from which hypotheses were developed in relation to religiosity as a factor in the Academic Decathlon competition. Further, the review of literature suggested that both individual religious commitment (religiosity) and attendance at a private Christian school should positively influence academic achievement. Further, the literature reviewed suggested that academic achievement is positively correlated with religiosity. Thus, students with higher religiosity have been demonstrated to maintain higher grade point averages and higher scores on standard achievement tests. Finally, the literature reviewed suggested that private Christian schools promote higher academic achievement and an environment that supports student learning.

Methodology

Participants

Participants included students from two nationally qualifying teams representing small and medium schools during the 2009 to 2010 school year. The students on the teams in this study qualified to compete at both the state and national levels; all students were qualified by overall scores in all ten subject areas of the Academic Decathlon. The sample of students represented small and medium schools qualifying from a single state. The sampling procedure was one of convenience, conducted as a preliminary study in order to ascertain whether there was potential for religiosity being a factor within the small sample. The qualifying team at the small school level represented a private Christian school and the qualifying team at the medium school level represented a public school. Each team consisted of nine qualifying students. Both teams

competed in an on-site, state-level competition and a virtual (online) national-level competition. Participants included eight male and eight females. Ages of the participants ranged from 14 to 18.

Instrumentation

This study employed the Duke University Religion Index (DUREL), a concise, well-validated measure of religiosity that has been used in both educational and healthcare studies (Koenig, Parkerson, & Meador, 1997). The DUREL instrument consists of four subscales and five items. Three non-overlapping subscales include organizational religiosity (one item); non-organizational religiosity (one item); and subjective or intrinsic religiosity (three items). The subscale with overlapping items is overall religiosity, which comprises all five items. Scoring of the instrument is based on a range of 6 to 31, from lowest to highest religiosity levels.

The first subscale, organizational religiosity, is assessed with the question "How often do you attend church or other religious meetings?" and is scored on a 6-point scale. The second subscale, non-organizational religiosity, is assessed with the question "How often do you spend time in private religious activities such as prayer, meditation, or Bible study?" and is also scored on a 6-point scale. The third subscale, intrinsic religiosity, is designed as a psychological construct rather than a measure of professed behavior, and is assessed with three items, each on a 5-point scale. The intrinsic religiosity subscale has been demonstrated reliable for a small subscale where Chronbach's $\alpha = 0.75$ (Koenig, Parkerson, & Meador, 1997). The fourth subscale, composite religiosity, is the sum of the first three subscales. Responses to the questions which comprise the three scales on the DUREL instrument are reverse scored prior to statistical analysis.

Variables

The DUREL instrument was administered to the sample to assess three latent variables related to the associated subscales: organizational religiosity (OR), non-organizational religiosity (NR), and intrinsic religiosity (IR). The instrument contained several independent and dichotomous variables including: gender, USAD division, and ethnicity, and number of hours studied in preparation for the state and national competitions. The variable labeled "composite religiosity" represented the sum of the three subscale values. The state and national scores in all ten subject areas for both teams were also used as variables. In the Academic Decathlon, each subject area test is scored based on a total of 1,000 possible points. Therefore, each student can potentially score up to 10,000 points per competition and each team can score up to 60,000 points; the points of the lowest scoring student in each division are not included in the total team score.

Procedure

The DUREL instrument was administered during the school day to both Academic Decathlon teams by the respective coaches. Anonymity was preserved and student names were not associated with the completed instruments. Students were instructed to answer honestly. A confidentiality statement was included on the instrument. In both cases, one team member was absent on the day the instrument was administered rendering the sample size for each team ($N = 8$).

Scores were recorded according to team, Team 1 being the medium school state and national qualifying team representing a public school and Team 2 being the small school state and national qualify team representing a private Christian school. Responses to the DUREL instrument items were reverse scored where a response of "1" by the participant was registered as a "5" for statistical analysis. The results of the three subscales derived from the DUREL (OR,

NR, IR) were calculated and registered for each student in the respective groups. The fourth subscale, composite religiosity, was calculated by summing the first three subscales for each participant.

Limitations

The small sample size is the primary limitation of this study, rendering it a case study rather than a representative sample. While the findings cannot be generalized, they represent a comparison between two similar teams from the same state that both qualified for the state and national competitions in their respective divisions. However, the variation in enrollment between the two schools was also a limitation of the study. Further, because the state studied was not selected at random, the sample was one of convenience.

Due to the anonymous administration of the DUREL instrument, religiosity could not be directly linked to individual scores in the Academic Decathlon competitions. Rather, scores in specific subject areas were compared in terms of overall team and divisional mean scores.

Alternative/Research Hypotheses

Three research hypotheses were developed according to the review of literature:

1. H_a1: Given that the literature reviewed suggested a strong positive correlation between religiosity and academic achievement, there was a significant difference in mean scores of the ten categories of the Academic Decathlon between the teams according to mean composite religiosity.
2. H_a2: Given that the literature reviewed suggested a strong positive correlation between religiosity and grade point average (GPA), composite religiosity was significantly different between the USAD divisions, which represent GPA levels.

3. H_a3: Given that the literature reviewed suggested a strong positive correlation between attendance at a private Christian institution and academic achievement, the team representing the private Christian school had significantly higher scores in the ten categories of the Academic Decathlon.

Null Hypotheses

1. H_01: There was no statistically significant difference in the total mean scores of the ten categories of the Academic Decathlon between the two teams in relation to composite religiosity.
2. H_02: There was no significant difference in the mean composite religiosity scores between the USAD divisions which grouped participants according to GPA range.
3. H_02: There was no significant difference in the total mean scores of the ten categories of the Academic Decathlon between the public school and the private schools.

Analysis

Statistical procedures were applied to the data to test for significant difference between religiosity subscales and competition scores in the Academic Decathlon competitions. Statistical decisions were made at $p = 0.05$ unless otherwise stated. For purposes of reporting effect size between the means, Cohen's *d* was calculated for the primary scoring variable, total score. Using mean and standard deviation, Cohen's *d* was calculated as 0.57 and using the *t*-value, Cohen's *d* was calculated as 0.60. In both cases, the effect size was found to be in the medium range.

Results

Descriptive Findings

Three descriptive findings supported preliminary assumptions upon which the hypotheses could be tested. First, there was a significant difference in religiosity in all subscales of the

DUREL between the two teams. Second, there was no significant difference in the number of hours studied between the two teams. Third, there was no significant difference in the ages of the students on the two teams. Together, the descriptive findings contribute to a proper interpretation of the empirical findings in the following section.

Significant Difference in Religiosity between Teams. A normality test suggested that the data were not normally distributed. The test for normality was a modified Kolmogorov-Smirnov test (Dallal & Wilkinson, 1986). The nonparametric Mann-Whitney procedure was applied to test for significant difference in religiosity between the two teams. A Mann-Whitney procedure was used to determine that composite religiosity between groups was significantly different, $Z = 2.836$, $p = 0.005$. The Mann-Whitney procedure yielded $U' = 59.5$ and $U = 4.5$. The mean rank for Team 1 was 5.06 and the mean rank for Team 2 was 11.94. The Z calculation used a correction for continuity. Team 2 reported significantly higher composite religiosity than did Team 1. A comparison of organizational religiosity (OR) subscale values between the teams was found to be significantly different ($Z = 2.363, p = 0.018$). A comparison of non-organizational religiosity (NR) subscale values between the teams was found to be significantly different ($Z = 2.836, p = 0.005$). A comparison of non-organizational religiosity (NR) subscale values between the teams was found to be significantly different ($Z = 2.941, p = 0.003$). While students who indicated lower non-organizational (NR) and intrinsic (IR) religiosity scores may attend some formal religious service on a regular basis, as indicated by a higher p-value for organizational religiosity (OR), personal religious commitment was not indicated. Table 1 contains summary statistics for religiosity subscales by team, including age and number of hours studied per week.

Significant Difference in Hours Studied between Teams. The numbers of hours studied per week reported by each team were compared to test for significant difference. A preliminary

test for equality of variance indicated that the variances of the two groups were significantly different. Therefore a two-sample t-test was performed that does not assume equal variances. The means of the two groups were not significantly different. Using the unequal variances t-test, $t(9.1) = -.37$, $p = 0.718$. For these data, Team 1 reported slightly fewer hours of study (*M = 3.46, SD = 0.874, N= 8*) than did Team 2 (*M = 3.5838, SD = 0.346, N = 8*). No significant difference between the number of hours each group studied indicated that neither group spent more statistically significant time studying than the other.

Significant Difference in Age between Teams. A preliminary test for equality of variance indicated that the variances in age of the two teams were significantly different. Therefore a two-sample t-test was performed that does not assume equal variances. The means of the two groups were not significantly different. Using the unequal variances t-test, $t(10.) = 1.89$, $p = 0.089$. For these data, the students of Team 1 was slightly older (*M = 17.125, SD = 0.6409, N = 8*) than the students of Team 2 (*M = 16.125, 1.356, N= 8*). While the mean age for Team 1 was higher than the mean age for Team 2, the differences in age were not found to be statistically significant.

Table 1
Religiosity Subscales Summary

Team 1

Variable	n	M	SD	SEM	Min	Max
OR[a]	8	3.000	1.927	.681	1	6
NR[b]	8	2.000	1.604	.567	1	5
IR[c]	8	7.500	3.855	1.363	3	13
Age[d]	8	17.125	.641	.227	16	18
Hours[e]	8	3.460	.874	.309	1.330	4

Team 2

Variable	n	M	SD	SEM	Min	Max
OR[a]	8	5.375	.744	.263	4	6
NR[b]	8	5.000	.535	.189	4	6
IR[c]	8	13.375	2.264	.800	8	15
Age[d]	8	16.125	1.356	.479	14	18

Hours[e]	8	3.584	.346	.122	3	4

Notes: a = organizational religiosity subscale, b = non-organizational religiosity subscale, c = intrinsic religiosity subscale, d = mean age of students on the team, e = mean number of study hours for the team

Empirical Findings

Hypothesis 1: Significant difference in competition scores between teams. Given that Team 2 reported higher religiosity on all DUREL subscales, the alternative hypothesis stated that Team2 should have significantly higher scores in the ten subject areas of the Academic Decathlon competition. The null hypothesis was tested to determine significant difference between team scores. For each subject, a preliminary test for equality of variance was applied to determine if the variances of the two teams' scores were significantly different. In the case of unequal variance, a two-sample t-test was performed that does not assume equal variances. The modified Kolmogorov-Smirnov test suggested that the data for the subject area scores were approximately normally distributed.

No significant difference was found in the overall scores between the two teams. For the subject areas of Art, Language and Literature, Music, and Interview, no significant difference in competition scores was found between the two teams. For the subject areas of Economics, Essay, Mathematics, Science, and Social Science, Team 1 scored significantly higher than Team 2. For the subject area of Speech, Team 2 scored significantly higher than Team 1. Because no significant difference was found in overall competition scores and Team 1 scored significantly higher than Team 2 in five of the ten subject areas, the null hypothesis could not be rejected. Summaries of the statistical analyses for each subject area are included below. A summary of descriptive statistics for the subject areas is included in Table 2 and a summary of the results of the t-tests are included in Table 3.

Significant difference in art scores. The mean scores of the two teams were not significantly different ($p = 0.418$). For these data, the mean Art score for Team 1 was lower ($M = 597.778$, $SD = 121.924$, $N= 18$) than the mean Art score for Team 2 ($M = 635.550$, $SD= 153.017$, $N= 18$). No significant difference indicated that neither team scored significantly higher in the Art subject area in the Academic Decathlon competitions.

Significant difference in economics scores. The mean scores of the two teams were significantly different ($p <= 0.001$). For these data, the mean Economics score for Team 1 was higher ($M = 583.333$, $SD = 106.329$, $N= 18$) than the mean Economics score for Team 2 ($M = 424.445$, $SD = 140.680$, $N= 18$). A test for significant difference indicated that Team 1 scored significantly higher than Team 2 in the Economics subject area in the Academic Decathlon competitions.

Significant difference in essay scores. The mean scores of the two teams were significantly different ($p <= 0.001$). For these data, the mean Essay score for Team 1 was higher ($M = 388.867$, $SD = 114.716$, $N= 18$) than the mean Essay score for Team 2 (M = 212.661, $SD = 100.526$, $N= 18$). A test for significant difference indicated that Team 1scored significantly higher than Team 2 in the Economics subject area in the Academic Decathlon competitions.

Significant difference in language and literature scores. The means scores of the two teams were not significantly different ($p = 0.679$). For these data, the mean Language and Literature score for Team 1 was higher ($M = 475.555$, $SD = 81.905$, $N= 18$) than the mean Language and Literature score for Team 2 ($M = 458.889$, $SD = 147.684$, $N= 18$). A test for significant difference indicated that neither team scored significantly higher in the Language and Literature subject area in the Academic Decathlon competitions.

Significant difference in mathematics scores. The means of the two teams were significantly different ($p <= 0.001$). For these data, the mean Mathematics score for Team 1 was higher ($M = 388.867, SD = 114.716, N= 18$) than the mean Mathematics score for Team 2 ($M = 212.661, 100.526, N= 18$). A test for significant difference indicated that Team 1 scored significantly higher than Team 2 in the Mathematics subject area in the Academic Decathlon competitions.

Significant difference in music scores. The means of the two teams were not significantly different ($p = 0.147$). For these data, the mean Music score for Team 1 was lower ($M = 597.778, SD = 98.670, N= 18$) than the mean Music score for Team 2 ($M = 663.333, 158.114, N= 18$). A test for significant difference indicated that neither team scored significantly higher in the Music subject area in the Academic Decathlon competitions.

Significant difference in science scores. The means of the two teams were significantly different ($p <= 0.001$). For these data, mean Science score for Team 1 was higher ($M = 618.889, SD = 172.111, N= 18$) than the mean Science score for Team 2 ($M = 342.222, SD = 99.620, N= 18$). A test for significant difference indicated that Team 1 scored significantly higher than Team 2 in the Science subject area in the Academic Decathlon competitions.

Significant difference in social science scores. The means of the two teams were significantly different ($p = 0.025$). For these data, the mean Social Science score for Team 1 was ($M = 752.778, SD = 147.740, N= 18$) than the mean Social Science score for Team 2 ($M = 626.111, SD = 175.109, N= 18$). Significant difference indicated that Team 1 scored significantly higher than Team 2 in the Social Science subject area in the Academic Decathlon competitions.

Significant difference in speech scores. The means of the two teams were significantly different ($p = 0.03$). For these data, the mean Speech score for Team 1 was lower ($M = 781.667$, $SD = 137.227$, $N= 9$) than mean Speech score for Team 2 ($M = 903.333$, $SD = 39.922$, $N= 9$). A test for significant difference indicated that Team 2 scored significantly higher than Team 1 in the Speech subject area in the Academic Decathlon competitions.

Significant difference in interview scores. The means of the two teams were not significantly different ($p = 0.151$). For these data, the mean Interview score for Team 1 was lower ($M = 802.778$, $SD = 97.792$, $N= 9$) than the mean Interview score for Team 2 ($M = 857.778$, $SD = 43.381$, $N= 9$). A test for significant difference indicated that neither team scored significantly higher in the Interview subject area in the Academic Decathlon competitions.

Significant difference in total scores. The means of the two teams were not significantly different ($p = 0.113$). For these data, the mean Total Score for Team 1 was higher ($M = 5333.000$, $SD = 1079.005$, $N= 18$) than the mean Total Score for Team 2 ($M = 4668.111$, $SD = 1359.916$, $N= 18$). A test for significant difference indicated that neither team scored significantly higher overall in the in the Academic Decathlon competitions.

Table 2
Subject Area Competition Scores Summary Statistics

	Team 1					
Subject	N	M	SD	SEM	Min	Max
Art	18	597.778	121.924	28.738	300	820
Economics	18	583.333	106.329	25.062	400	740
Essay	18	388.867	114.716	27.039	200	600
Literature	18	475.556	81.905	19.305	260	600
Math	18	388.867	114.716	27.039	200	600
Music	18	597.778	98.671	23.257	460	800
Science	18	618.889	172.111	40.567	320	880
Social Science	18	752.778	147.740	34.823	400	910
Speech	9	781.667	137.227	45.742	500	915

Interview	9	802.778	97.792	32.597	665	935
Total Score	18	5333.00	1079.01	254.32	3126	7120
			Team 2			
Subject	N	M	SD	SEM	Min	Max
Art	18	635.556	153.018	36.067	220	840
Economics	18	424.444	140.680	33.159	220	760
Essay	18	212.661	100.526	23.694	0	428.60
Literature	18	458.889	147.684	34.809	300	760
Math	18	212.661	100.526	23.694	0	428.60
Music	18	663.333	158.114	37.268	380	880
Science	18	342.222	99.620	23.481	180	580
Social Science	18	626.111	175.110	41.274	375	900
Speech	9	903.333	39.922	13.307	830	950
Interview	9	857.778	43.381	14.460	805	920
Total Score	18	4668.110	1359.920	320.540	2315.000	6890.000

Hypothesis 2: Significant Difference in Religiosity between GPA (USAD Division). A one-way Analysis of Variance was performed to test the null hypothesis that the average mean values of composite religiosity across categories of USAD division were equal. In the presence of significance for the omnibus ANOVA test, a Newman-Keuls multiple comparison test was used to perform pairwise comparisons. The average values across categories of USAD divisions were not found to be different: $F(2, 13) = .02$, $p = 0.98$. For these data, the mean composite religiosity score for the USAD Honors division (GPA > 3.75) was ranked highest (*M = 18.833, SD = 7.859, N = 6*), the mean composite religiosity score for the USAD Scholastic division (3.0 > GPA < 3.749) was ranked lowest (*M = 17.800, SD = 9.257, N = 5*), and the mean composite religiosity score for the USAD Varsity division (GPA <=3.0) was ranked in the middle (*M = 18.200, SD = 8.044, N= 5*). Scores were representative of both teams, public and private. The null hypothesis could not be rejected. Table 4 contains summary statistics for religiosity subscales by USAD divisions, Honors, Scholastic, and Varsity. Table 5 contains a summary of

the results of the Knewman-Keuls procedures by USAD divisions. Table 6 contains a summary of the results of the ANOVA procedure.

Table 3
Summary of Tests for Significant Differences in Subject Area Scores between Teams

Subject	N	t-Test	*p*	Significance	Higher Team
Art	18	t(34) = -.82	p = 0.418	-	-
Economics	18	t(34) = 3.82	p <= 0.001	***	2
Essay	18	t(34) = 4.9	p <= 0.001	***	2
Literature	18	t(26.6) = .42	p = 0.679	-	-
Math	18	t(34) = 4.9	p <= 0.001	***	2
Music	18	t(28.5) = -1.49	p = 0.147	-	-
Science	18	t(27.2) = 5.9	p <= 0.001	***	2
Social Science	18	t(2.35) = 2.35	p = 0.025	*	2
Speech	9	t(9.3) = -2.55	p = 0.030	*	1
Interview	9	t(11) = -1.54	p = 0.151	-	-
Total Score	18	t(34) = 1.62	p = 0.113	-	-

*Notes: * p < .05, ** p < .005, *** p <= .001*

Table 4
Religiosity Subscales Summary Statistics by USAD Division

USAD Honors Division (GPA 3.75 or Higher)

Variable	N	M	SD	SEM	Min	Max
OR[a]	8	4.000	1.897	.7746	1	6
NR[b]	8	3.667	2.160	.882	1	6
IR[c]	8	11.167	4.167	1.701	5	15

USAD Scholastic Division (GPA 3.00 to 3.749)

Variable	N	M	SD	SEM	Min	Max
OR[a]	8	4.000	2.000	.894	1	6
NR[b]	8	3.400	2.191	.979	1	5
IR[c]	8	10.400	5.177	2.315	3	15

USAD Varsity Division (GPA less than 3.0)

Variable	N	M	SD	SEM	Min	Max
OR[a]	8	4.600	2.074	.927	1	6
NR[b]	8	3.400	1.817	.812	1	5
IR[c]	8	9.600	4.393	1.965	3	14

Notes: a = organizational religiosity subscale, b = non-organizational religiosity subscale, c = intrinsic

religiosity subscale

Table 5
Summary of the Newman-Keuls Procedure for Composite Religiosity by USAD Division (GPA)

	n	M	SD
Honors[a]	6	18.833	7.859
Scholastic[b]	5	17.800	9.257
Varsity[c]	5	18.200	8.044

Notes: a = GPA of 3.75 or higher, b = GPA between 3.0 and 3.749, c = GPA less than 3.0

Table 6
ANOVA Results for Comparison of Religiosity between USAD Divisions (GPA)

	SS	*df*	MS	*F*	Approx. *p*
Total	913.440	15.000		.020	
Treatment	3.000	2.000	1.500		.979
Error	910.430	13.000	70.030		

Notes: Error term used for comparisons = 70.030 with 13.000 df.

Hypothesis 3: Significant Difference in Religiosity between School Type (Team). The statistical analysis from Hypothesis 1 demonstrated that there was no significant difference in competition scores between Team 1 and Team 2. While there was significant difference in the religiosity subscale values of the two teams, the private Christian school did not have significantly higher scores in the ten subject areas of the Academic Decathlon. Therefore, the null hypothesis stating that there is no significant difference in academic achievement between the public school (Team 1) and the private Christian school (Team 2) could not be rejected.

Discussion

The results of this research suggest that the literature reviewed indicating a positive correlation between academic achievement and religiosity may not be universal. It is important to note that the students surveyed in this study do not represent the general population of secondary students; rather, they represent the highest achieving students in their respective high

schools. Further, the students represent the nationally qualifying teams from their respective divisions in the United States Academic Decathlon. Students were equally qualified to compete based on overall academic achievement in the competition.

Because no significant difference was identifiable between the religiosity of students and their respective GPA ranges, this study also indicates findings contrary to the literature reviewed. The test for significant difference in religiosity between GPA ranges included all students from both teams, representing both the public and private schools. While this study focused on academic achievement in the Academic Decathlon, the GPA categories provide a glimpse into the achievement of students in their daily schoolwork. No significant difference in GPA range based on religiosity subscale values suggests that individual religious commitment has no significant influence on GPA. Similarly, Schubmehl, Cubbellotti, & Van Ornum (2009) found no significant correlation between grade point average and spirituality.

Further, while the literature reviewed suggested that a private Christian school should provide an environment conducive to higher academic achievement (Jeynes, 2002b), this was not the case in this study. While neither team achieved significantly higher total scores than the other, the public school achieved significantly higher scores in five of the ten subject areas while the private Christian school achieved significantly higher scores in only one subject area. There was no significant difference in scores between the two teams in four of the ten subject areas.

Considerations

Two issues may be considered as potential factors in the comparison of scores between the two teams. First, the public school enrollment exceeded the enrollment of the private school by nearly 88%, which may have permitted additional resources and additional course selections. However, Nix (2009) found that school size did not correlate with academic achievement in

Christian schools. Second, the mean age of students from the public school was 17 while the mean age of students from the private school was 16. The difference in age may indicate that older students have had higher level mathematics and science courses than younger students. However, although the public school students were generally one year older than the private school students, no statistically significant difference in age was found. Nevertheless, both the size of the school and the age of the students may have been factors that influenced competition scores.

Further, the strong statistically significant difference in mathematics and science scores between the two teams is noteworthy because of the reported conflicts between science and religion in American education (Nord, 1999; Singham, 2000; Beckwith, 2003). However, Campbell (2005) suggested that students themselves do not necessarily perceive science and religion as conflicting. Nevertheless, while a broad generalization cannot be made from this study, it is worthy to consider that in this case, higher religiosity related to lower mathematics and science scores. This finding has obvious and direct implications for Christian education.

Finally, significantly higher scores in the Speech subject area from the more religious team may suggest that the affective nature of religion (Holdcroft, 2006) is a factor in the achievement levels of students in this subject area. Because of the social nature of religion, the social skills it facilitates may enable students to perform well in speech and communication. Similarly, Jeynes (2005) found that students who attended religious services did not demonstrate a statistically significant increase in academic achievement, but they did report increased affective measures such as quality of life and improved behavior.

Conclusion

This study provided preliminary research into comparing academic achievement in an extracurricular, interdisciplinary academic competition between two schools in the same state: a private Christian high school, and a public school. The national prominence of the United States Academic Decathlon provided a comprehensive perspective on academic achievement of highly motivated students across multiple subject areas. The conclusion that student religiosity was not found to have a significant influence on competition scores in the Academic Decathlon suggests that religiosity and academic achievement may not always positively correlate.

Further, the notion that private Christian schools generally lead to higher academic achievement may not always be the case. As Lubienski, et al (2008) noted, "assertions regarding academic achievement may not be the best grounds" for making arguments for or against public versus private education (p. 695). In this study, while there was significant difference in religiosity between the two schools, there was no significant difference between total competition scores in the Academic Decathlon; that is, neither the public nor private school scored significantly higher or lower in the competition.

Future research should be conducted on national basis and should include a statistical sample that is representative of the population of students competing in the Academic Decathlon. Nationally-qualifying teams for each division of the Academic Decathlon, small, medium, and large schools should be included in the sample selection process. Religiosity scores, utilizing the DUREL instrument should be compared for the sample on both state and national levels in order to determine statistically significant differences. Research should likewise be conducted analyzing for a statistically significant linear correlations between GPA scores and USAD scores in each of the ten subject areas among the sample of private school participants and public school participants. Such an analysis would not only contribute to a broader understanding of religiosity

as a factor in an in an interdisciplinary academic competition such as Academic Decathlon, but to academic achievement across multiple subject areas. Lee, Puig, & Clark (2007) found that post-secondary educational attainment was significantly correlated with religious when other factors, such as self-concept, parental involvement, and prior academic performance, were controlled. Future research could include in academic achievement levels beyond high school, especially for students who competed in Academic Decathlon. Finally, the implications for Christian education suggest that emphasis on faith-learning integration, in particular, in subjects such as mathematics and science, may require some measure of improvement (Braun, Jenkins, & Grigg, 2006; Lubienski, Crane, & Lubienski, 2008).

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