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State Regulation of Homeschooling and Homeschoolers' SAT Scores

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Introduction

Parent-led home-based education, otherwise known as homeschooling in the United States, has experienced a renaissance and notable growth during the past 25 years in several nations around the world. Lines (1991) estimated that home-based education had shrunk to about 13,000 students in grades K through 12 in the United States by the early 1970s. Remarkable increase brought the number to an estimated 1.5 to 2.4 million by 2008 (Ray, 2008; see also, Princiotta, Bielick, & Chapman, 2006).

The growth has been fast but societal acceptance has not always been smooth for the homeschool community. For example, an appellate court decision in California in February 2008 essentially marked as illegitimate the educational practices of the parents of an estimated 166,000 homeschool students (Egelko & Tucker, 2008;

In re Rachel L., 2008; Maxwell, 2008). The judges interpreted the law in a way that was different from about 30 years of accepted legal and educational practice. The court decided that a parent must be a state-certified teacher in order to homeschool his or her children. That is, it said the state should exercise more regulation over homeschooling. Outcry from California's governor, various politicians, home-education advocacy organizations, and the civically active homeschool community was so strong that an unusual legal event occurred with the court agreeing to re-hear the case during the summer of 2008 (Associated Press, 2008). Consistently, various academics, public school administrators, legislators, policymakers, and teachers' unions in multiple states believe it would be better for the states to enact more regulation of homeschooling, a form of private education, while others clearly disagree (Burkard & O'Keeffe, 2005; Kunzman, 2005; Maxwell; National Education Association, 2006; Somerville, 2005).

Although some leaders within academe have given it little thought, the rise of parent-led home-based education has run headlong into century-old mainstream educational practices. One federal government researcher simply framed the situation the following way: "How government and the educational community react to the homeschooling phenomenon will decide the future of American education. There is no other policy variable that comes close to its potential importance" (Bauman, 2005).

Research probing several aspects of this minority form of education also continues to expand along with the numbers of homeschool families. Among the most-studied aspects of the movement are the reasons parents give for homeschooling rather than sending their children to public or private schools, demographics of the families, academic achievement of the students, social, emotional, and psychological development of the children and youth, and the success of adults who were home educated (Cooper, 2005; McDowell & Ray, 2000). While taking into account the findings related to these topics, legislators, policymakers, and philosophers of education have been carefully considering to what extent homeschooling should be regulated by state and federal governments (see, e.g., Buss, 2000; Cooper, 2005; Oregon Legislative Assembly, 2007; Reich, 2005). The present study addresses a matter that is salient to education policy – is there a relationship between the degree of state

regulation of homeschooling and homeschool students' performance on college-admissions tests?

Review of Literature, Conceptual Framework, and Need for Study Academic Achievement and Aptitude

The educational and general culture of the United States continues to value academic achievement and aptitude, regardless of the interminable debate that surrounds these particular constructs, the extent of their value, and the means of their measurement. Not surprisingly, numerous studies have addressed the academic achievement of the homeschooled, while fewer studies have addressed their academic aptitude. Dozens of studies have been completed during the past 25 years that examine the academic achievement of the home-educated. Examples of these studies range from a multi-year study in Washington State to three nationwide studies across the United States to two nationwide studies in Canada (Ray, 1994, 1997, 2000b, 2001, 2005; Rudner, 1999; Van Pelt, 2003; Wartes, 1991). The home educated in grades K to 12 have scored, on average, at the 65th to 80th percentile on standardized academic achievement tests in the United States and Canada, compared to the public school average of the 50th percentile. In order to lend some control to the aspect of students' background demographics, researchers have explored and found that children in homeschool families with low income and in which the parents have little education are also scoring, on average, above state-school averages (Ray, 2000a, 2005; Rudner, 1999). In addition, studies have shown that whether the parents have ever been certified teachers has a weak or no relationship to their children's academic achievement.

A few studies have addressed the performance of homeschool students on measures of academic aptitude (e.g., for success in college) or those that mix aptitude and achievement. For example, Belfield (2005) found the homeschooled to have SAT college-admission scores higher than private-religious school and public-school students but lower than private-independent school students. After controlling for certain background variables, however, he found that "... the predicted SAT-total scores for home-schoolers and private-independent school students converge toward the mean: the home-school premium over private-religious school students falls almost to zero" (p. 174). Belfield concluded the following: "So far at least, the results do not indicate home-schoolers are at a disadvantage" (p. 174).

Examining students at non-denominational Christian colleges and universities, Clemente (2006) compared the SAT scores of those who had been public-schooled, private-schooled, and homeschooled before their postsecondary studies. She found that the average SAT total score of the home educated ranked the highest, then the private-schooled average, and then the public-schooled mean ranked the lowest. She was not able, however, to control for some important background variables in the statistical analysis.

Chatmon (2006) also examined the SAT scores of those who had been public-schooled, private-schooled, and homeschooled who were attending private colleges and universities. She reported that although she found the scores of the home educated to be higher (in absolute terms) than those from the other two groups, the differences were not statistically significant.

Qaqish (2007) was interested in comparing homeschooled and non-homeschooled students' performance on an ACT mathematics achievement test that is used by many colleges for determining whether to admit a student. Qaqish introduced his study in the following way:

Historically, homeschooled students seem to have outperformed, on average, non-homeschooled students. However, in recent years, more people are choosing to go into homeschooling for their children for one reason or another, and this may have changed the demographics of home educated students in a manner that impacted the differences of performance on standardized tests between the two groups. But how much change is there in regard to performance on standardized tests is there? To answer this question in part, two datasets of response vectors for homeschooled and for non-homeschooled children for the same form of an ACT mathematics test were obtained. (p. 2)

He then conducted a careful statistical analysis of a large sample of students while controlling for the four background variables of grade level, gender, ethnicity, and socioeconomic status (SES). After employing control of the background variables, Qaqish found a slight difference in scores. "On average, non-homeschoolers performed better than homeschoolers, by about two items, out of sixty items, on the ACT mathematics test that was analyzed" (p. 11). He then posited the following: "This result may be due to the different teaching/learning media used in teaching each of the two groups, to different teacher/student interaction, or to the number of years homeschooled before taking the ACT mathematics test. More investigative research is needed in this regard" (p. 11).

In summary, multiple studies show that home-educated students in grades K to 12, as a group, score above average on standardized academic achievement tests. The few studies done on home-educated students' performance on college-admissions tests suggest they score about as well as do those who are not homeschooled. The bulk of the studies on academic achievement are, however, cross-sectional and descriptive, and not designed to be explanatory in the sense of establishing cause and effect (Ray, 2005; Johnson, 2001). Rudner (1999), reporting on the high achievement of the home educated, stated it in the following way: "This was not a controlled experiment. This study does not demonstrate that home schooling is superior to public or private schools. This study simply shows that those parents choosing to make a commitment to home schooling are able to provide a very successful academic environment." One of authors wrote the following after reviewing research on the academic achievement of the homeschooled: "In other words, the design of most research to date does not allow for the conclusion that homeschooling necessarily causes higher academic achievement than does public (or private) institutional schooling. On the other hand, research designs and findings to date do not refute the hypothesis that homeschooling causes more positive effects than does institutional public (or private) schooling" (Ray, 2005, p. 11).

Government Regulation of Parent-Led Home-Based Education

Whether and to what degree the state (i.e., civil government) should control private (i.e., non-government) education has been debated in the United States since at least the 1830s. This debate continues today, including the regulation of homeschooling (Ray, 2000a; Burkard & O'Keeffe, 2005; Howell, 2005; Reich, 2002). At any moment's notice, a legislator in any of the 50 states might introduce a bill that either increases or decreases the state's regulation of homeschool families and the children within them. Or, at any moment's notice, a policymaker within a state's educational agencies might consider altering current policy or procedures that deal with homeschoolers. And, as noted earlier, at any moment, a court could make a decision that remarkably affects the lives of thousands of homeschool students (Egelko & Tucker, 2008). It is important to base decisions affecting so many people, costing so much money, and possibly impinging on individual freedoms on accurate, reliable information. Many decision makers would like to have such research-based information about

homeschooling.

Empirical Evidence that is Directly Related

One of the sources of information used in discussing the regulation of home education is research on students' academic achievement, children and youth's social, emotional, and psychological development, the economic impact of homeschooling on society or state expenditures, and the relative success of the home educated as they move into college, the workplace, and adulthood in general, and whether any relationships exist between such variables and state law or policy regarding the regulation of homeschooling. Although a number of individuals and groups continue to advocate for more regulation of private homeschooling by the state (National Education Association, 2006; Reich, 2005) [1] while others advocate for increased parental freedom and increased liberty within educational choices, very little empirical evidence exists regarding the relationship between the degree of regulation and the academic success of home-educated students.

The authors of this report have found, after intensive searching, only three studies that address the relationship between regulation of homeschooling and students' academic achievement or aptitude. Ray's study (1997, 2000b) is the only research that focused on the achievement of the home educated as he conducted a nationwide study of homeschooling and tested whether there was any relationship between the degree of state regulation of homeschooling and the academic achievement of the home educated in grades K to 12. Ray (2000b) reported the following:

Low regulation was defined as [p. 84 ends here] no state requirement on the part of the home school parents to initiate any contact with the state.

Moderate regulation was defined as the state requiring home school parents to send to the state notification or achievement test scores and/or evaluation of the student's learning by a professional. High regulation was defined as the state requiring home school parents to send to the state notification or achievement test scores and/or evaluation by a professional and, in addition, having other requirements (e.g., curriculum approval by the state, teacher qualifications of parents, or home visits by state officials). There was no significant difference between students' scores in the three groups. (p. 84-85)

Greene (2000), on the other hand, took a different and more global approach by which he "... estimate[d] the extent and nature of education freedom in each state, using a new Education Freedom Index (EFI) ..." that quantified "... the range of education options in each state" (e.g., educational choice) and examined whether the degree of choice in each state was correlated with public-school students' academic achievement. The EFI included a measure of the degree of freedom to homeschool that integrated some elements similar to those used by Ray (2000b). "The home-schooling measure is the average of two indicators: the percentage of students in the state that are home schooled (when this figure is available), and the absence of state restrictions and regulations on home schooling, according to information collected by the Home School Legal Defense Association" (Greene). Greene found that the EFI was significantly correlated with public-school achievement. In his next study, Greene (2002) reported that he refined his methods with a later year's data and found basically the same thing: "... the observable relationship between education freedom and [public-school] student achievement remains strong. Where families have more options in the education of their children, the average student tends to demonstrate higher levels of academic achievement" (p. 7).

Greene's work (2000, 2002), however, did not reveal whether regulation of homeschooling was correlated with homeschool students' learning. Therefore, very little is known about the relationship between state regulation of homeschooling and home-educated students' academic performance or aptitude.

Predictions about State Regulation and Homeschooling

What predictions might be made about the relationship between state regulation of homeschooling and homeschool students' academic success? To answer this, some research evidence, theory, and homeschool practice will be considered.

First, the historical period of time during which modern-day home-based education has co-existed with social-science research methods as generally practiced today is relatively short so many aspects of homeschooling have not been studied. Therefore, and as previously mentioned, there is a paucity of evidence about the relationship between state regulation and academic achievement or aptitude. The one study on this found no relationship between degree of regulation and homeschool students' academic achievement, as previously reported.

Second, arguments for more active regulation are typically based on concerns other than academic achievement: philosophical, socio-political, or human developmental. For example, Reich (2002) implied that state-regulated institutional public schooling more likely develops decent, civil, and respectful persons than does unregulated homeschooling. Reich (2005) later argued that there is a certain civic education for children upon which the state should insist and the state must "... protect the independent interest of the child in developing into a free or autonomous adult" (p. 118) and that these two elements must be ensured by increased state regulation of private home-based education. Along the same lines, Buss (2000) argued that the state should consider exercising control over homeschool children's peer associations in order to "... facilitate children's development of the capacity for autonomous choices ..." (p. 2). In another vein, Apple (2006) argued that the practice of private home education represents "...individualized atomistic decisions to school ..." for one's own child and interferes with building "...momentum for the large scale transformations that are necessary ..." in society, such as enhancing democracy and decreasing the negative treatment of the "Other" by those groups in position of power and influence (see also, Apple, 2000).

Further, both of the authors of the present study have heard state legislators and social workers argue during legislative hearings in various states that homeschooling should be more actively regulated because then more children who are performing poorly academically, are in "at-risk homes," or who are being abused by parents will be identified and helped. Along these lines, Kelly, Barr, and Weatherby (2005) equated children who were being legally homeschooled with being "missing" students and at risk of being "educationally neglected" and then called for more state management of homeschooling. Neither Buss (2000), Kelly, Barr, and Weatherby, Reich (2002, 2005), nor such legislators and social workers have offered evidence to support their theoretical arguments that if the state does not regulate homeschoolers more than homeschool children and the adults they become will exhibit negative traits or have more damaging things befall them.

Another argument that some policymakers and professional educators make for more regulation of home education is that during this era when public schools are being subjected to more accountability programs and policies such as The No Child Left Behind Act (NCLB), private schools and homeschool

families should also be held accountable.

Arguments for less regulation of homeschooling are also typically philosophical, socio-political, or human developmental. For example, Burkard and O’Keeffe (2005) argued that compulsory schooling laws and state management of home education are both antithetical to the concept of education as the voluntary and deliberate passing of information from one person to another and of other processes such as “...

training, instruction, schooling, indoctrination, and so forth” (p. 240). They also stated the following: “The libertarian case is that compulsion is

never right for older children, teenagers, for example, and does not become viable even for little children, merely on the assumption that some homes are insufficient to the task” (p. 241-242). And Somerville (2005) generally equated the freedom of parents to homeschool as they so desire with freedom in general when he wrote the following: “A totalitarian state can stamp out home education. A free people will not” (p. 148). Further, he explained that “... homeschoolers view any regulation as the first of a thousand cuts.

Any possible restriction on homeschooling ... will be met with fierce resistance from well-organized homeschoolers” (p. 148).

As another example, Howell (2005) argued that parents have more at stake than does society in the “Cultivation—encouraging belief, modeling action, pointing out consequences ...” (p. 12) of their children’s lives, that in cultivating them parents exercise thoughtful decision making about the short-term good of their children and strategic thinking about long-term consequences of their educational decisions for their children, their families, and society at-large, and that it would not be helpful for the state to encroach on parental authority in the education of their children.

And advocates of less regulation have argued, regarding issues of accountability to government and the NCLB, that (1) findings are equivocal regarding whether such governmental accountability policies and high-stakes testing are effective in the public-school realm (c.f., Marchant, Paulson, & Shunk, 2006), (2) even if such accountability policies were effective in public school settings there is no evidence such policies would be practically and effectively transferable to a home-based education setting, and (3) federal law excludes homeschooling from the requirements of NCLB (Home School Legal Defense Association, 2007).

Third, predictions about the relationship between state regulation of homeschooling and successful homeschooling are sometimes based on experiences of homeschool practices. These experiences are difficult to document. Both of the authors have heard such arguments made in public. For example, policymakers and public-school officials have reported that they have met too many homeschool parents who are disorganized, not well-educated, or generally lacking in their diligence to make sure that their children are receiving adequate instruction in the academic basics or social skills. They argue that these families need government oversight or else the children and youth in them will be illiterate or not fit well into society. On the other hand, advocates of homeschooling free of regulation argue that such ill-equipped parents are rare, and such hypothetical failure families and students amongst homeschooling are rarer, as a proportion, than they are among students who attend public schools. Advocates of less regulation of homeschooling have also argued that the more time that homeschool parents must spend complying with state regulation (e.g., getting approval from state-school officials, administering state-approved achievement tests to their students, “teaching to the tests,” keeping

records of lesson plans and more and submitting them to the government), the less time they have to devote to the academic instruction and civic and moral education of their children and thus their children will not perform in general as well as they could (Christian Homeschool Association of Pennsylvania, 2002).

Very limited empirical evidence, theoretical arguments that range widely across many aspects of the philosophical, socio-political, and human developmental, and anecdotes about homeschool practice make it difficult to make confident predictions about the relationship between the degree of state regulation of homeschooling and homeschool students' academic achievement or aptitude. The one extant directly-related study found no relationship between regulation and academic achievement, and no one has offered a robust and convincing conceptual framework that would predict a positive, negative, or absent correlation between state regulation and achievement or aptitude. More empirical evidence would better inform discussions on this topic.

Need for the Study

The debate over what the state's role should be in regulating or controlling private education in a free society will likely continue for a long time. A wide variety of stakeholders in the education of children and youth in the United States will continue promoting their points of view. Those who make worldview-based theoretical arguments will continue to do so and will hopefully make clear that they are doing so. Those who want to include findings from empirical research in their arguments for or against (more or less) regulation of home-based education need evidence over which to deliberate. This study was planned to provide some such evidence for them.

Purpose

The purpose of this study was to determine whether there is a relationship between the college-admissions (or college-aptitude) SAT scores of students who were homeschooled and the degree of state regulation of homeschooling. Since (a) research to date shows the home educated to outperform, on average, public-school students in terms of academic achievement and to perform as well as institutional-school students in terms of college-admissions tests, (b) most people do not consider it an easy task to homeschool one's children and those parents who so choose typically expend significant time, energy, and resources to educate their children, (c) there is no evidence that homeschool families significantly alter their learning attitudes and efforts based on their states' homeschool laws, and (d) there is no evidence that homeschool parents and youth change their interest in postsecondary education based on their states' homeschool laws, then it is hypothesized that there will be found no relationship between the degree of state regulation of homeschooling and students' performance on a college aptitude test.

Methods

Definitions

"Homeschooled students" were operationally defined as those students who took the college-admissions SAT test and identified themselves as being homeschooled. Homeschooling (or home-based education or home education), "... generally construed [in the United States], is the practice of educating children and youth, during what most people call the elementary and secondary school years, in a learning environment that is home-based and parent-led (or, at least, clearly under the authority of

the parents rather than under the authority of a state-run public school system or a private school). A corollary to this is that these children and youth do not spend the societally conventional school days and hours in institutional classroom schools with specialized or state-certified teachers” (Ray, 2005, p. 15).

The “degree of state regulation of homeschooling” was defined according to three categories, as follow:

Low regulation – defined as no state requirement on the part of the homeschool parents to initiate any contact with the state.

Moderate regulation – defined as the state requiring homeschool parents to send to the state notification of homeschooling or achievement test scores and/or evaluation of the student’s learning by a professional.

High regulation – defined as the state requiring homeschool parents to send to the state notification of homeschooling or achievement test scores and/or evaluation by a professional and, in addition, having other requirements (e.g., curriculum approval by the state, teacher qualifications of parents, or home visits by state officials).

Population, Sample, and Instruments

The target and sample populations for this study were the same, all college-bound homeschool students from the 50 U.S. states and the District of Columbia who took the college-admission SAT test during one year. The SAT publisher called them “2001 college-bound seniors.” The SAT publisher provided to the authors data related to all 6,170 of these students; 2,887 (46.8%) were male and 3,283 (53.2%) were female.

The instrument used for arriving at students’ college-aptitude scores was the widely used and well-known college-admissions SAT that is administered by the College Board and published by Educational Testing Service. Although debate continues about precisely how valid the SAT is (FairTest, n.d.a, n.d.b: Spanier, 2001), it is generally considered to be adequately valid and reliable. Its reliability coefficients are generally in the .90s (College Board, 2006). Many studies reveal that its scores provide significant information for dependably predicting a student’s likely success in most colleges (Boldt, 1986; Zwick, 2007). Furthermore, regardless of whether it is considered by the majority of measurement specialists as technically valid and reliable, it is widely treated as such by college admissions personnel, policymakers, and the general public. Data regarding the SAT scores of “college-bound [homeschooled] seniors” were provided by the publisher of the SAT. The group data, not individual student’s scores, were available and received for each of the 50 states and the District of Columbia. The data for each state included the number of male and female students, their average verbal score, and their average math score.

The data regarding the states’ degree of state regulation of homeschooling were generated by the attorneys at the Home School Legal Defense Association (HSLDA), the largest homeschool advocacy organization of its kind, representing about 85,000 member families, mostly in the United States. HSLDA has been studying homeschool laws since 1983 and is the best-qualified organization to access historical information about the states and their homeschool laws and regulations and to

categorize the states according to degree of regulation. The authors of this study reviewed and double-checked the data provided by HSLDA before conducting the statistical analysis.

Variables

The dependent variables for this study were the homeschool students' verbal, math, and total SAT scores. The between-group variable for this study was degree of state regulation of homeschooling, with three levels (low, moderate, and high).

Analysis

The null hypotheses that there would be no significant difference in SAT scores according to degree of state regulation of homeschooling were tested. Analysis of variance (ANOVA) and the Brown-Forsythe test of equality of means were used to test the hypotheses. An effort was made both to include as many states as possible in the analysis (so that the maximum number of states and their regulations would be included in the findings) and to maintain reasonable statistical power (Cohen, 1988), while not using states with extremely few test takers in them. Based on this objective and the central limit theorem related to sample sizes, a state was included if its score was based on 7 or more test takers (Hopkins, Glass, & Hopkins, 1987). The unit of analysis was the state. North Dakota and South Dakota were the two states excluded due to sample sizes that did not meet the minimum. SPSS software (version 11.5.1; SPSS, Inc., 2002) was used for statistical analyses.

Limitations and Delimitations

It was assumed that SAT test takers correctly identified themselves as having been homeschooled. Based on the data that the SAT test publisher collected, neither the publisher nor the authors of the present study were able to verify for how many years test takers were homeschooled or for how many years they lived in a particular state. This was a cross-sectional, descriptive study (i.e., a Type 2 kind of study per Johnson, 2001) that examined whether a correlation existed between two variables. It was neither experimental nor causal-comparative (Borg & Gall, 1989).

Findings

The SAT scores of homeschool students from low-, moderate-, and high-regulation states were first compared for states whose degree of regulation had not changed for the 10 years preceding and including the year of SAT testing. Tables 1, 2, and 3 present the descriptive information and ANOVA source tables for these analyses. There were no significant differences between students' SAT scores in the three groups (of state regulation of homeschooling) for any of the three test scores (verbal, $F(2, 40) = 0.58$, $p = .57$; math, $F(2,40) = 1.527$, $p = .23$; total, $F(2,40) = 1.070$, $p = .35$). In all cases, the states with the highest degree of state regulation had the lowest average SAT scores. As previously explained, the unit of analysis was the state.

Table 1. Verbal-Score ANOVA and Descriptive Statistics for States with Same Degree of Regulation for 10 Years.

Descriptives for Verbal

Degree of State Regulation	N ¹	Mean	Std. Deviation
Low	8	586.13	26.101
Moderate	22	584.45	21.613
High	13	576.62	25.012
Total	43	582.40	23.261

ANOVA for Verbal

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	638.873	2	319.436	.579	.565
Within Groups	22085.406	40	552.135		
Total	22724.279	42			

¹States not included in the analysis due to small sample size or degree of state regulation not the same for 10 years: Alaska, Arizona, District of Columbia, Michigan, North Dakota, New Mexico, South Carolina, and South Dakota.

Table 2. Math-Score ANOVA and Descriptive Statistics for States With Same Degree of Regulation for 10 Years.

Descriptives for Math

Degree of State Regulation	N ¹	Mean	Std. Deviation
Low	8	545.50	27.034

Moderate	22	541.59	25.203
High	13	529.23	18.404
Total	43	538.58	24.023

ANOVA for Math

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1718.839	2	859.420	1.527	.230
Within Groups	22519.626	40	562.991		
Total	24238.465	42			

¹States not included in the analysis due to small sample size or degree of state regulation not the same for 10 years: Alaska, Arizona, District of Columbia, Michigan, North Dakota, New Mexico, South Carolina, and South Dakota.

Table 3. Total-Score ANOVA and Descriptive Statistics for States with Same Degree of Regulation for 10 Years.

Descriptives for Total Verbal & Math

Degree of State Regulation	N ¹	Mean	Std. Deviation
Low	8	1131.63	50.942
Moderate	22	1126.05	45.601
High	13	1105.85	42.144
Total	43	1120.98	45.669

ANOVA for Total Verbal & Math

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4448.455	2	2224.227	1.070	.353
Within Groups	83148.522	40	2078.713		
Total	87596.977	42			

¹States not included in the analysis due to small sample size or degree of state regulation not the same for 10 years: Alaska, Arizona, District of Columbia, Michigan, North Dakota, New Mexico, South Carolina, and South Dakota.

Next, the SAT scores of homeschool students from low-, moderate-, and high-regulation states were compared for states whose degree of regulation had not changed for only the 5 years preceding and including the year of SAT testing. For all three original ANOVAs, the Levene statistic was significant for the test of homogeneity of variances (verbal, $p = .049$; math, $p = .038$; total, $p = .037$). Ergo Brown-Forsythe (BF) tests were run as robust tests of the equality of means. Tables 4, 5, and 6 present the descriptive information and Brown-Forsythe source tables for these analyses. There were no significant differences between students' SAT scores in the three groups (of state regulation of homeschooling) for any of the three test scores (verbal, $BF(2, 23.81) = 0.44$, $p = .65$; math, $BF(2, 22.80)$, $p = .44$; total, $BF(2, 23.05)$, $p = .54$). In all cases, the states with the highest degree of state regulation had the lowest average SAT scores.

Table 4. Verbal-Score Brown-Forsythe and Descriptive Statistics for States with Same Degree of Regulation for 5 Years.

Descriptives for Verbal

Degree of State Regulation	N ¹	Mean	Std. Deviation
Low	11	578.00	36.047
Moderate	23	585.09	21.333

High	13	576.62	25.012
Total	47	581.09	26.062

Test of Equality of Means for Verbal

	Statistic(a)	df1	df2	Sig.
Brown-Forsythe	.436	2	23.808	.652

a – Asymptotically F distributed.

¹States not included in the analysis due to small sample size or degree of state regulation not the same for 5 years: Alaska, North Dakota, New Mexico, and South Dakota.

Table 5. Math-Score Brown-Forsythe and Descriptive Statistics for States with Same Degree of Regulation for 5 Years.

Descriptives for Math

Degree of State Regulation	N ¹	Mean	Std. Deviation
Low	11	536.27	35.120
Moderate	23	541.52	24.626
High	13	529.23	18.404
Total	47	536.89	25.960

Test of Equality of Means for Math

	Statistic(a)	df1	df2	Sig.
Brown-Forsythe	.840	2	22.798	.444

a – Asymptotically F distributed.

¹States not included in the analysis due to small sample size or degree of state regulation not the same for 5 years: Alaska, North Dakota, New Mexico, and South Dakota.

Table 6. Total-Score Brown-Forsythe and Descriptive Statistics for States with Same Degree of Regulation for 5 Years.

Descriptives for Total Verbal & Math

Degree of State Regulation	N ¹	Mean	Std. Deviation
Low	11	1114.27	69.890
Moderate	23	1126.61	44.635
High	13	1105.85	42.144
Total	47	1117.98	50.598

Test of Equality of Means

Total Verbal & Math

	Statistic(a)	df1	df2	Sig.
Brown-Forsythe	.625	2	23.052	.544

a – Asymptotically F distributed.

¹States not included in the analysis due to small sample size or degree of state regulation not the same for 5 years: Alaska, North Dakota, New Mexico, and South Dakota.

Discussion and Conclusions

What do these findings say and how might they be used? At least the following three matters should be considered. First, the simple fact is that no significant statistical relationships were found between the degree of state regulation of homeschooling and students' SAT verbal, math, and total scores. No p-

values were under .05. In addition, no significant differences were found in SAT scores regardless of whether the same degree of state regulation of homeschooling existed in a given state for the periods of the past 5 years or past 10 years.

Second, one must cautiously use the findings in light of at least two points pertaining to the study's design and the nature of the data. One is that some notable limitations adhere to the data. For example, it was not possible to ascertain for how many years, on average, students in a particular state were home educated, nor was it possible to determine for how long, on average, students had lived in a particular state. Ergo, it was not possible to know, in experimental terms, these elements of the homeschooling "treatment" that the students had experienced. Mitigating these confines of the data, research generally supports the conclusion that the large majority of college-bound seniors who would self-identify as "homeschooled" would likely have been homeschooled for most of their K to 12 years, and especially at least the last 5 or more; relatively few students begin homeschooling at grade 7 or 8 (Ray, 1997, 2004; Rudner, 1999). The other point is that the data used were the most useful available data for the purposes of this study, and therefore for informing policy.

Third, the use of these findings in education policy largely depend upon the socio-political worldview of the person considering what policy should exist. At one of the most fundamental levels, the issue is whether the parents or the state should have primary authority over and responsibility for the education and upbringing of a child. If one believes that the state should be the default authority and responsible party rather than the parents, that person might look at these findings and argue that since there appears to be no harm done to students in high-regulation states, then the state is free to (or should) exercise tight regulations and strong controls over homeschool families in order to make sure that certain needs of the state are met even though there is no empirical evidence to substantiate that such objectives will be met. This person might also argue that more regulation by the state would cause more contact between state-licensed personnel and family and thus make it less likely that any given home-educated child would be educationally neglected or harmed by his parents. Persons of this worldview might argue the time, energy, and money spent by the state in regulating homeschool families might be well spent if it prevented even a small number of children from not receiving an adequate education or being abused by their parents.

On the other hand, if one thinks that parents should have primary authority and responsibility over their children's education, that person would likely argue that the parents should be allowed to design and execute the home-based education of the children without legal or regulatory intrusion from the state unless there was significant evidence that a practice such as homeschooling generally harms children and youth. They would point out that most state constitutions simply give the states authority to make schools available to children, not to regulate the education of all children. Those of this perspective might also argue that these findings do not reveal a correlational relationship between state regulation and SAT scores and therefore advocates of regulation have no basis for claiming that increased state regulation of homeschooling might cause better preparedness for college. Persons of this worldview might further argue that even if the state should exercise more authority to control homeschooling, the findings indicate no significant relationship between degree of state regulation and SAT scores and therefore the cost of increasing state regulation (e.g., time, energy, money, political battles) would not be warranted.

Whether one holds the former or latter worldview just mentioned, even if some statistically significant

relationships had been found between degree of state regulation of homeschooling and SAT scores in this one study, experts who develop professional standards (e.g., American Educational Research Association, American Psychological Association, and the National Council on Measurement in Education, 1999) (AERA/APA/NCME) advise policymakers, legislators, academics, educators, and psychologists to exercise caution in the use of tests and scores derived from them. It is salient to keep this in mind as related to this study because regulation often includes state-mandated testing. For example, AERA/APA/NCME include the following in their Standards for Educational and Psychological Testing:

As the stakes of testing increase ... the importance of considering additional evidence to document the validity of score interpretations and the fairness in testing increases accordingly (p. 141) Large-scale testing is increasingly viewed as a tool of educational policy. From this perspective, tests used for program evaluation are also viewed as a means to influence curriculum and instruction Beyond any intended policy goals, it is important to consider potential unintended effects that may result from large-scale testing programs. (p. 142).

With such standards in mind, there is no basis to make legislative decisions affecting millions of current and future homeschool students when there is no research evidence to support the underlying assumption of the regulations.

The authors of this study find no evidence from their analysis that supports the claim that states should exercise more regulation of homeschool families and students in order to assure better academic success in general or improved higher-education success in particular. On the contrary, the findings of this study are consistent with other research findings that homeschool students perform well academically – typically above national averages on standardized achievement tests and at least on par with others on college-admissions tests – and do so regardless of whether they live in a state that applies low, moderate, or high governmental regulation of homeschooling.

Certain kinds of studies would provide more decisive findings than are available from this cross-sectional, descriptive study and most preceding research. As challenging as it is to access home-educated students and adults who were home educated, researchers should make healthy and creative efforts to find ways to gather more complete data regarding these persons' demographics and educational history. In addition, scholars should strive to execute and find the resources to conduct more cross-sectional, predictive and cross-sectional, explanatory studies (Johnson, 2001) in order to significantly advance the knowledge base about children, youth, and adults who are and were involved in homeschooling. Solid information would help those discussing the lives of homeschool students and their families and help others understand this growing community that "...could have a much larger impact on ..." the educational system, "... both in the short and long run," than other recent changes [e.g., charter schools] in the system (Bauman, 2002).

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[1] Examples of state legislative efforts to control homeschooling are consistently monitored by homeschool advocacy organizations such as the Home School Legal Defense Association; throughout the year their "legislation watch" section posted online at www.hslda.org tracks such efforts.

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