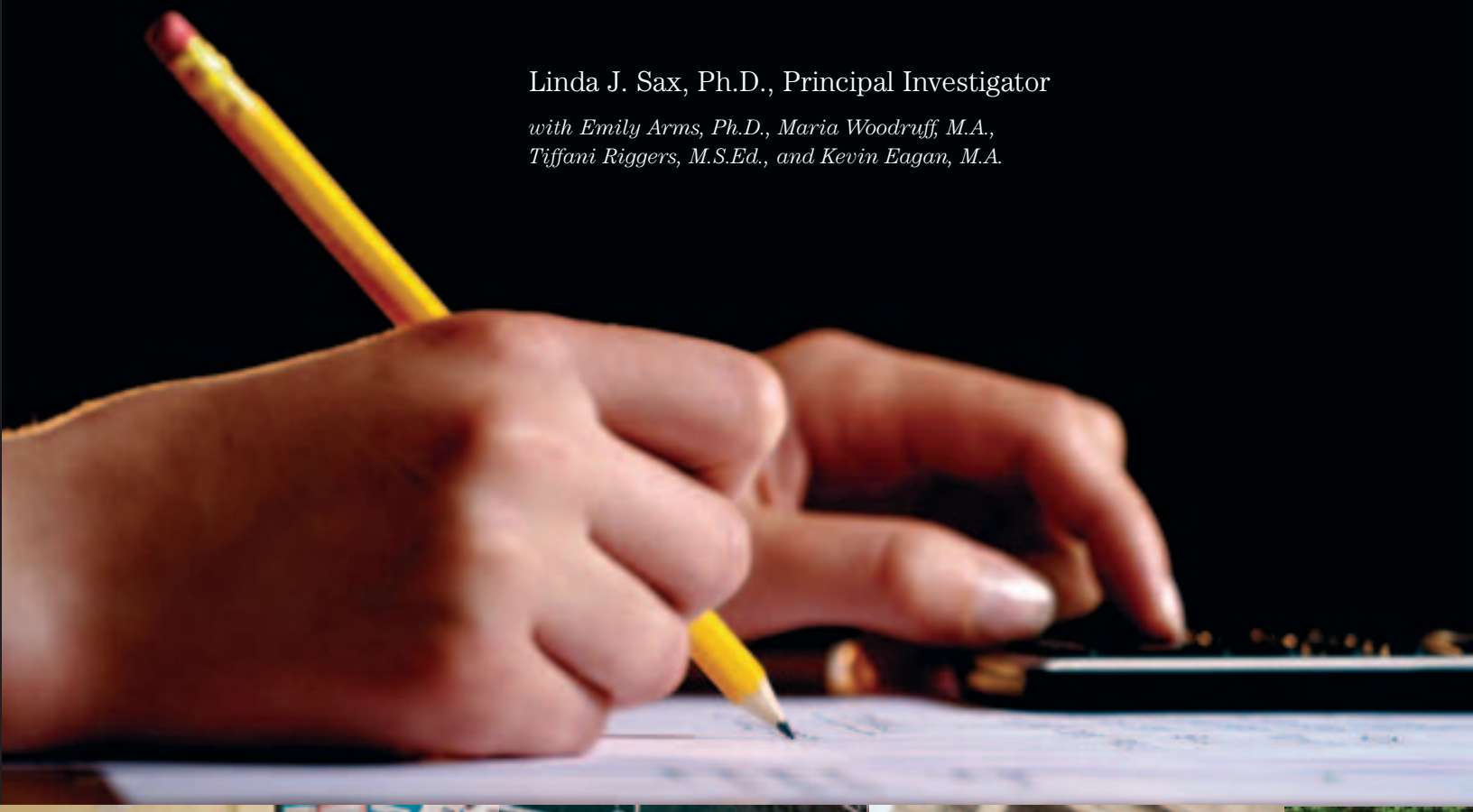
Women Graduates of Single-Sex and Coeducational High Schools: Differences in their Characteristics and the Transition to College

Linda J. Sax, Ph.D., Principal Investigator

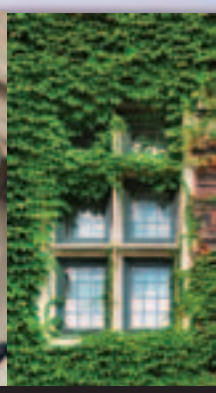
with Emily Arms, Ph.D., Maria Woodruff, M.A., Tiffani Riggers, M.S.Ed., and Kevin Eagan, M.A.











The Sudikoff Family Institute For Education & New Media

- Bringing Scholarship To The Public Forum -

GSE&IS

UCLA Graduate School of Education & Information Studies



THE SUDIKOFF FAMILY INSTITUTE FOR EDUCATION & NEW MEDIA

- Bringing Scholarship To The Public Forum -

Published by:
The Sudikoff Family Institute for Education & New Media
UCLA Graduate School of Education & Information Studies
www.gseis.ucla.edu/sudikoff

2341 Moore Hall, Box 951521
Los Angeles, CA 90095-1521
(310) 206-0513

Los Angeles, California, March 2009

GSE&IS

UCLA Graduate School of Education & Information Studies

Enhancing awareness of critical issues related to education and information studies, The Sudikoff Family Institute utilizes the popular press and other media to disseminate the work of UCLA Graduate School of Education & Information Studies scholars to policymakers, educators, and the general public. Sudikoff Fellows are chosen each year from the GSE&IS faculty to provide expertise and inform the public on a number of critical issues in education and new media. The Institute serves as a liaison between Fellows and the greater public, providing communications support and expertise.

Associate Professor of Education Linda J. Sax, a 2007–08 Sudikoff Fellow, studies gender differences in college student development, and women in particular, to determine how institutional characteristics, peer and faculty environments, and forms of student involvement may affect women and men college students differently.

"Women Graduates of Single-Sex and Coeducational High Schools: Differences in their Characteristics and the Transition to College," analyzes the effects of attending single-sex high schools on students' transition to college. The Sudikoff Family Institute for Education & New Media at the UCLA Graduate School of Education & Information Studies made publication of this report possible.

To download a copy of the full report, please visit: www.gseis.ucla.edu/sudikoff.

Table of Contents

Table of Contents 2

List of Tables 4

List of Figures 5

Executive Summary 6

Acknowledgements 12

Introduction 13

Overview of Research on Single-Sex Schooling 14

Methodological Challenges in Research on Single-Sex Education 18

Study Objectives 20

Description of the Data 21

A Descriptive Comparison of Single-Sex and Coeducational Graduates 25

Demographic Background 26

College Choice 29

Academics 31

Free Time 36

Psychological and Physical Well-Being 37

Degree, Major, and Career Aspirations 38

Leadership and Community Orientation 39

Political and Social Views 40

Religion 43

Summary of Descriptive Results 44

Assessing the Net Effects of Single-Sex Education through Multilevel Modeling 46

Selection of Outcome Variables 47

Selection of Independent Variables 48

Analytic Approach 48

Results for Independent School Graduates 51

Results for Catholic School Graduates 55

Interaction Effects…… 59
Discussion and Implications for Future Research…….…….. 61
Overview of Findings…….. 61
Directions for Future Research……... 63
Concluding Thoughts…….. 64
References……..... 66
Appendix A: 2005 CIRP Questionnaire……. 70
Appendix B: Complete Descriptive Results……... 74
Appendix C: Description of Dependent Variables…… 97
Appendix D: Dependent Variable Factors…… 98

List of Tables

Table 1. Counts for Students, High Schools, and Colleges by School Type.

Table 2. Distribution of the Sample by High School and College Characteristics.

Table 3. Racial/Ethnic Composition by School Type.

Table 4. Mean SAT Scores by School Type.

Table 5. Dependent Variables.

Table 6. Independent Variables.

Table 7. Multilevel Modeling Results for Independent School Graduates.

Table 8. Multilevel Modeling Results for Catholic School Graduates.

List of Figures

Figure 1. Percent of Students Reporting Family Income over $150,000.

Figure 2. Percent of Students Whose Fathers Have a College Degree.

Figure 3. Percent of Students Whose Mothers Have a College Degree.

Figure 4. Reasons for Going to College.

Figure 5. Reasons for Selecting a Particular College.

Figure 6. Percent Studying/Doing Homework 11 or more Hours per Week.

Figure 7. Percent Frequently Studying with Other Students.

Figure 8. Self-Rated Mathematical Ability.

Figure 9. Self-Rated Computer Skills.

Figure 10. Political Orientation.

Figure 11. Goal – Keep up to Date with Politics.

Figure 12. Frequently Discussed Politics in High School.

Figure 13. Belief that Abortion should be Legal.

Executive Summary

Interest in single-sex education has been on the rise over the past two decades, first in the private sector and more recently in the public sector following the U.S. Department of Education's 2006 authorization of single-sex classes in public schools. As opportunities for public and private single-sex education have expanded, the debate surrounding this issue has become more heated. Sex-segregated schools and classrooms are viewed by many as a possible antidote to gender inequities that have been documented throughout all levels of education. Others, however, raise concerns that single-sex settings run the risk of reinforcing sex-based stereotypes and exacerbating gender gaps in educational opportunity.

The ongoing debate over single-sex education has led to greater demand for evidence of its effectiveness. Researchers, educators, policymakers, and the public-at-large are anxious to know whether single-sex education makes a difference, and if so, how, and for whom? Recent reviews of research on single-sex education have concluded that the evidence is mixed, due in large part to the difficulty of attributing differences between single-sex and coeducational students specifically to the single-sex nature of their experience. All reviews emphasize the need for more research on single-sex education, especially that which examines a variety of outcomes, uses large and representative samples, and relies on sophisticated methodologies that can disentangle the effects of single-sex schooling from other confounding influences.

Commissioned by the National Coalition of Girls' Schools (NCGS), this report contributes new data to the debate over single-sex education, with a focus exclusively on the experience of female students from single-sex and coeducational high schools. Drawing from the renowned Freshman Survey, an annual, nationwide study of students entering their first year of college conducted by UCLA's Higher Education Research Institute, the study compares the backgrounds, behaviors, attitudes, and aspirations of 6,552 women graduates of 225 private single-sex high schools with 14,684 women who graduated from 1,169 private coeducational high schools; the database also includes responses of male students, though they are not examined in this report. The research separately considers female students from independent and Catholic school sectors, and distinguishes the effects

of single-sex schooling from the role played by other high school characteristics as well as the demographic backgrounds of females who attend all-girls schools. Due to its large, national sample and number of control variables, this current study aims to make a notable contribution to the research on single-sex education.

Key Findings

Differences between single-sex and coeducational alumnae were assessed in two ways. The first involved simple descriptive comparisons between these groups within independent and Catholic school sectors, and the second involved a multilevel analysis that accounted for differences in the single-sex and coeducational groups in terms of their background characteristics and features of the high school they attended.

Descriptive Results

The descriptive results reveal significant differences between single-sex and coeducational alumnae. Though generally small, distinctions extend across multiple categories, including self-confidence, political and social activism, life goals, and career orientation. Although future research will need to tell us whether such differences are sustained throughout college and beyond, at least at the point of college entry, most results are favorable to single-sex graduates. These include the following statistically significant differences:

Greater Academic Engagement. Women graduates of single-sex schools exhibit higher academic engagement than do their coeducational counterparts as measured by survey questions on time spent studying or doing homework, studying with other students, tutoring other students and talking with teachers outside of class:

- Nearly two-thirds (62 percent) of women graduates of independent single-sex schools report spending 11 or more hours per week studying or doing homework in high school, compared to less than half (42 percent) of independent coeducational graduates. Study levels are comparatively lower among Catholic school alumnae, though the gap between single-sex and

coeducational graduates remains significant (35 percent for Catholic single-sex versus 24 percent for Catholic coeducational graduates).

- Students from single-sex schools are also more likely to engage in group study, with a full 53 percent of independent single-sex graduates reporting that they study with other students on a frequent basis, compared with 45 percent among independent coeducational graduates. Within Catholic schools, this difference is 40 percent for Catholic single-sex graduates versus 34 percent of Catholic coeducational graduates.
- Additional evidence of peer-based academic engagement is seen in the finding that nearly two-thirds (65 percent) of women graduates of independent single-sex schools report frequently or occasionally tutoring other students in high school, compared with 58 percent among women who attended independent coeducational schools.
- Single-sex graduates also report more time talking with teachers outside of class, especially in the independent school sector, where 37 percent of single-sex graduates reported spending three or more hours per week meeting with teachers apart from class, compared to 30 percent among women graduates of independent coeducational schools.

Higher SAT Scores. Women who attended single-sex schools tended to outscore their coeducational counterparts on the SAT. Mean SAT composite scores (Verbal plus Math) are 43 points higher for single-sex graduates within the independent school sector, and 28 points higher for single-sex alumnae in the Catholic school sector.

Greater Interest in Graduate School. Women who attended single-sex schools are slightly more likely than those who attended a coeducational school to say that they are going to college to prepare for graduate school (71 percent to 66 percent) and to choose a college because its graduates are admitted to top graduate schools (45 percent to 41 percent).

Higher Academic Self-Confidence. In addition to reporting higher levels of academic engagement, single-sex graduates—especially those from independent schools—tend to exhibit slightly higher levels of academic self-confidence:

- 81 percent of women graduates of independent single-sex schools rate themselves "above average" or in the "highest 10 percent" for academic

ability, compared to 75 percent of women graduates of independent coeducational schools.

- Nearly 60 percent of women graduates of independent single-sex schools rate themselves "above average" or in the "highest 10 percent" with regard to intellectual self-confidence, compared to 54 percent of their independent coeducational school counterparts.
- 64 percent of women graduates of independent single-sex schools rate their writing ability "above average" or in the "highest 10 percent" compared to 59 percent of independent coeducational school graduates.
- 45 percent of women graduates of independent single-sex schools rate their public speaking ability "above average" or in the "highest 10 percent," compared to 39 percent of women graduates of independent coeducational schools.

Higher Confidence in Mathematical Ability and Computer Skills. Graduates of single-sex schools also arrive at college with greater confidence in their mathematical and computer abilities:

- The gap in math confidence is most pronounced in the independent school sector, where 48 percent of female graduates of independent single-sex schools rate their math ability "above average" or in the "highest 10 percent" compared to 37 percent of independent coeducational graduates.
- With regard to computer skills, 36 percent of women graduates of independent single-sex schools rate themselves in the highest categories, compared to 26 percent of women graduates of independent coeducational schools. A similar gap in computer skill self-confidence exists for Catholic school alumnae, with 35 percent of single-sex graduates rating their computer skills as above average or in the highest 10 percent compared to 27 percent of coeducational graduates.

Greater Interest in Engineering Careers. Career aspirations are largely similar for graduates of single-sex and coeducational schools, except when it comes to engineering. Single-sex school alumnae are more likely than their coeducational peers to state that they plan to become engineers. The single-sex versus coeducation gap is greatest in the

independent schools, where single-sex alumnae are three times more likely than women graduates of coeducational schools to report that they intend to pursue a career in engineering (4.4 versus 1.4 percent).

Stronger Predisposition Towards Co-Curricular Engagement. Graduates of single-sex schools are more likely than their coeducational counterparts to report that there is a very good chance they will participate in student clubs or groups while they are in college. This is especially true in the independent sector, where 70 percent anticipate involvement in campus organizations, compared to 60 percent of coeducational alumnae.

Greater Political Engagement. Female graduates of single-sex schools are more likely than their coeducational counterparts to report that they frequently discuss politics in class and with friends. Political engagement is especially strong at independent schools, where 58 percent of independent single-sex graduates report that it is "very important" or "essential" for them to keep up to date with political affairs, compared to 48 percent of women graduates of independent coeducational schools. Women at Catholic single-sex schools also are more likely to value political engagement (43 percent compared to 36 percent).

RESULTS OF MULTILEVEL ANALYSES

Though the descriptive analyses reveal more than one hundred statistically significant differences between women graduates of single-sex and coeducational schools, what is most noteworthy is the number of differences that remain statistically significant when accounting for background differences between these two populations, including student demographics (e.g., race/ethnicity, family income, and parental education) as well as characteristics of the high schools they attended (e.g., enrollment and course offerings).

Specifically, the second part of our analyses used hierarchical linear modeling (HLM) to reveal that all-girls schools—whether independent or Catholic-affiliated—produce graduates who enter college slightly more academically and politically engaged than women from similar backgrounds who attended coeducational private schools. Girls' schools also produce alumnae who possess more confidence in their mathematical and computer skills, and are more likely to desire careers in engineering. Additional benefits are found specifically within the Catholic school sector, where attendance at an all-girls school

enhances students' scientific orientation (especially for Latinas), predicts higher SAT scores, and promotes an orientation towards college that is more educationally-motivated and less economically-motivated than is found among female graduates of Catholic coeducational schools.

CONCLUSIONS

This study identifies several areas in which single-sex education appears to produce favorable outcomes for female students, especially in terms of their confidence, engagement, and aspirations, most notably in areas related to math and science. Thus, while the benefits of single-sex education are fairly small, they tend to be in areas that have historically favored men and therefore represent a potentially effective vehicle for mitigating longstanding gender gaps.

Yet, the report also acknowledges that we cannot draw unilateral conclusions about single-sex education, as such determinations depend on which populations are studied, which student and school characteristics are considered, and which outcomes are examined. Thus, the study points the way towards an important research agenda on this topic: How and why do single-sex schools produce positive outcomes and which conditions could be transferred to coeducational schools? Which types of students benefit most from single-sex education? Do the benefits of single-sex education persist throughout college and beyond? In addition, how do the effects of single-sex education compare for males versus females? Attention to these questions using carefully designed and executed studies will add vital context to the ongoing debate regarding public and private single-sex schooling.

Acknowledgements

A number of individuals and organizations were instrumental in making this report possible. The Higher Education Research Institute at UCLA provided the student data that were essential in conducting the research. We are indebted to the graduate students who worked on early phases of the project, especially Jennifer Curley Mallen, Julie Park, Casey Eznekier Shapiro and Hanna Song Spinosa. Their efforts were instrumental in crafting the student databases, coding data for thousands of high schools, and conducting preliminary analyses that served as a framework for the present study. Our appreciation also extends to Professor James Catterall of UCLA and Professor Amanda Datnow of UC San Diego, who provided constructive and insightful feedback on the draft report. We also thank Dean Aimée Dorr, Kathy Wyer, and the Sudikoff Institute for Education & New Media at UCLA for providing support and resources for the dissemination of this report. Finally, we are grateful to the National Coalition of Girls' Schools, who provided financial support for the development of this report and who have demonstrated a commitment to supporting quality research on single-sex education.

Introduction

In the 1990s, a growing number of students, parents, and educators began to view single-sex education as a possible antidote to gender inequities that were being documented in mixed-sex educational settings. Reports such as *How Schools Shortchange Girls* (American Association of University Women (AAUW), 1992) and *Failing at Fairness: How Schools Cheat Girls* (Sadker & Sadker, 1994) had raised awareness about gender bias in K-12 coeducation by reporting that male students received the majority of teachers' time and attention, called out more in the classroom, and were more likely to receive increased feedback and criticism from instructors than were their female peers. Gender inequities in the classroom were found to be even more pronounced in traditionally-male subject areas such as math, science, and technology (Lee, Marks, & Byrd, 1994). Such reports heightened concerns about whether coeducational schooling was inhibiting the opportunities and potential of female students.

Consequently, after decades of declining enrollment, the 1990s witnessed a resurgence in the number of all-girls private schools with corresponding increases in applications and enrollment (Datnow & Hubbard, 2002), a trend that continued into the next decade (Salomone, 2006). More recently, public single-sex schools have also increased in number, particularly since the 2006 modifications to Title IX legislation, which allowed public schools to offer single-sex classes and activities, rationalizing that single-sex environments may be educationally beneficial to some students (Salomone, 2006). Today, the National Association for Single Sex Public Education lists over 400 public schools offering single-sex education in some form to boys and girls (NASSPE, 2008).

Growing interest in single-sex schooling also led to greater demand for evidence regarding the outcomes of single-sex education. Does single-sex education make a difference? If so, how? And for whom? Numerous reports and reviews of research have provided educators and the public with information about the impact of single-sex education on the achievement, aspirations, and attitudes of both boys and girls (see Morse, 1998; U.S. Department of Education (DOE), 2005; and Salomone, 2006). These reviews have concluded that evidence regarding single-sex schooling is decidedly mixed, and that more research is necessary, particularly that which identifies and measures alternative

outcomes (Morse, 1998; DOE, 2005; Salomone, 2006) such as leadership and career development, development of diversity skills (e.g., the ability to work in diverse groups), and effects on life and disciplinary issues (e.g., teen pregnancy, dropout rates, etc). Additionally, the reviews note the particular need for longitudinal research tracing the progress of students through their collegiate experiences and into work-related, long-term outcomes. The U.S. Department of Education (2005) emphasizes the need for improved statistical reporting, including "correlational studies with adequate statistical controls" (p. 87), and studies which include descriptive statistics and effect sizes.

This report contributes new data to the debate over single-sex schooling through the use of an annual, nationwide study of students entering their first year of college. Drawing from the well-known Freshman Survey conducted by UCLA's Higher Education Research Institute, this study compares the backgrounds, behaviors, attitudes, and aspirations of more than 6,000 female alumnae of 225 private, all-girls high schools with over 14,000 graduates of more than 1,000 private, coeducational high schools. It also distinguishes the effects of single-sex schooling from the role played by the confounding influence of other important high school characteristics as well as the demographic backgrounds of students who attend single-sex schools. The findings reported here help to sharpen our understanding of the unique influence that attending a single-sex school has on women as they begin their postsecondary careers.

Overview of Research on Single-Sex Schooling

Critics on both sides of the debate have noted that research on single-sex education in the U.S. is slim, and much of it inconclusive (Datnow & Hubbard, 2002; Spielhagen, 2008). Lee (1998) noted a "file drawer problem" (p. 42), where only a select few of the studies on this topic are published—and only those showing statistically significant results—leaving studies that show no difference in the populations in the researcher's file cabinets, thus biasing the research pool. The lack of determinant results leaves policymakers, educators, and parents unsure of the impact of single-sex education and wondering what type of education is most effective, and for whom (Datnow & Hubbard, 2002).

Many valuable reviews of research on single-sex education have been published over the past decade. Prominent among these are those conducted by the American Association

of University Women (Morse, 1998), the U.S. Department of Education (2005), and Rosemary Salomone (2006). Together, these reviews provide a useful synthesis of existing research on single-sex education conducted both within the United States and internationally. Each of the reviews discusses the challenges of identifying empirical research on this topic and notes the resultant difficulty in identifying benefits or costs from single-sex schooling. Though it is beyond the scope of this report to review the full body of research on single-sex education, it is worthwhile to summarize major findings across key studies conducted in the United States, especially in the three areas that have received the most attention in single-sex research and which are addressed in the present study: achievement, aspirations, and attitudes. Following that, we also offer a summary of pertinent international research that may have implications for single-sex education in the U.S.

Achievement Differences. Research on the achievement of girls who attend single-sex and coeducational schools tends to compare their standardized test scores, grades, or graduation rates (U.S. Department of Education, 2005). Some studies have found benefits for girls who attend single-sex schools; others studies have identified no significant differences. For example, Riordan (1985; 1990) and Marsh (1991) reported higher academic achievement for girls in single-sex Catholic schools when compared to their coeducational counterparts, and Shmurak (1998) found that single-sex schools deliver specific academic advantages such as higher Advance Placement test scores. Carpenter and Hayden (1987) likewise noted significantly higher achievement test scores for girls in single-sex schools. Advantages for girls in single-sex schools have also been identified in the areas of science (Lee & Bryk, 1986; Riordan, 1990) and vocabulary (Riordan, 1990).

Other studies, however, have revealed no differences in academic achievement between students who attended single-sex and coeducational schools. A 1996 study comparing students in Catholic single-sex and coeducational schools showed no significant differences in mathematics or verbal achievement (as measured by SAT scores) (Conway, 1996). Harker and Nash (1997) likewise noted no significant differences in math, science, or vocabulary achievement for girls in single-sex schools when controlling for variables such as socio-economic status, ethnic group, and initial ability. Additionally, Shmurak (1998) documented few differences in achievement between students at coeducational schools and

all-girls schools and, in fact, reported that girls at coeducational schools took more science courses and were accepted to more selective colleges when compared to girls from single-sex schools.

While the preceding studies examined academic achievement for majority-white samples, Riordan (1990) studied the effect of single-sex education specifically on racial/ethnic minority students. After controlling for initial ability and socioeconomic background, Hispanic and African-American girls at single-sex schools showed higher achievement than their counterparts in mixed-sex schools, most notably in science and civics, by almost one full letter grade (Riordan, 1990). Riordan (1990) noted improvements for African-American girls, in particular, across all categories, citing increases in cognitive achievement (as noted above), self-esteem, internal control, and less stereotypical attitudes towards traditional women's gender roles.

Aspiration Differences. Several studies have suggested that attending single-sex schools promotes higher degree and career aspirations, often defined as an interest in traditionally male-dominated fields and stereotypically high-prestige fields (Watson, Quatman, & Elder, 2002). In 2002, Watson, et al., found that girls at single-sex schools aspired to more prestigious careers than both girls and boys who attended coeducational schools, and that this effect did not diminish from 8th to 12th grade, as it did for students at coeducational schools. Women who attend single-sex schools have also been found to have more favorable views toward traditionally male subject areas such as mathematics (Gwizdala & Steinback, 1990; Streitmatter, 1999). Additionally, Thompson (2003) noted that girls who graduated from single-sex high schools (both Catholic and independent) were less likely to pursue traditionally female fields or college majors (such as nursing, education, and library science), than women who attended coeducational schools. Thompson's (2003) results were somewhat mixed, however, and identified that girls who attended Catholic elementary schools (in addition to a Catholic single-sex high school) were more likely to major in traditionally female fields than their classmates.

There is also some evidence that initial differences in declared majors among women who attend single-sex versus coeducational high schools dissipate by college graduation (Karpiak, Buchanan, Hosey, & Smith, 2007). This seems to indicate that although women who attend single-sex schools are more likely to choose gender atypical majors early in their

college careers, they are as equally likely as women who attended coeducational schools to graduate in gender traditional majors.

Attitude Differences. Research examining students' attitudes toward stereotypical sex roles and socio-emotional outcomes also has been mixed. Lee and Bryk (1986) revealed that women who attended single-sex schools tended to demonstrate less stereotypical attitudes about male and female sex roles when compared to those who attended coeducational schools. And Riordan (1990) showed that girls who attended single-sex schools were more accepting of working women than their counterparts at coeducational schools. Other research, however, has found no significant differences between single-sex and coeducational students' attitudes toward women or sex-stereotyped activities (Karpiak, et al., 2007; Lee & Marks, 1990; Signorella, Frieze, & Hershey, 1996).

Regarding socio-emotional outcomes, research in the U.S. is limited. Lee and Bryk (1986) discovered that girls in single-sex classrooms were more likely to have an internal locus of control and higher self-concept than their counterparts at coeducational schools. Marsh (1991) reported that girls at single-sex schools scored higher in tests of academic self-concept, though no differences were found in their attitudes toward school. Graduates of single-sex high schools, interviewed by Slattery (2005) during their first year of college study, reported increases in academic self-esteem, and Slattery noted that, universally, they held expectations of success in their intended fields of study. Slattery also stated, however, that there was a commensurate fall in social self-esteem upon transition from high school to their first year of college study.

In the area of civic engagement, research by Lee and Marks (1990) seems to indicate a difference in views on active citizenship for girls at single-sex schools, finding that these students are more likely to be involved in political activities than girls at coeducational schools. In 1994, Riordan identified increased opportunity for leadership roles for girls who attended single-sex Catholic high schools compared to their counterparts at coeducational Catholic schools, though Garcia (1998) noted no differences in membership or leadership between girls at coeducational schools and those at single-sex schools.

From 1998 to 2000, Hubbard and Datnow (2005) conducted a series of interviews with low-income, minority students in experimental single-gender academies in California's public school system. They identified differences in attitudes of the female students in

particular, noting that the students felt freer to make independent decisions about appearance without boys present in the classroom. Girls also reported feeling less distracted by what boys were thinking and utilized the support of their teachers more frequently in the single-sex environment than when they were (previously) in a coeducational school (Hubbard & Datnow, 2005).

International Research on Single-Sex Education. Internationally, single-sex schooling has been subject to considerably larger study, due to the higher number of single-sex classrooms and schools. Though there are contextual differences between U.S. and foreign educational settings, some of the research informs the present study. For example, an Australian study (Rowe, 1988) reported increased comfort of girls in single-sex math and science courses, as well as more favorable attitudes and greater confidence, than those in coeducational math and science courses, though as noted by Salomone (2006), the author later refuted those claims (Marsh & Rowe, 1996). In 1990, Cairns found increases in self-esteem and internal locus of control for girls in single-sex classrooms in Northern Ireland (as cited in Haag, 1998). In a study of matched pairs, Granleese and Joseph (1993) (also in Northern Ireland) showed that girls in the single-sex environment were less critical of themselves when compared to their matched counterparts in a coeducational school.

In a longitudinal study of single-sex schooling in Great Britain, Sullivan (2008a) observed that girls from single-sex schools felt more confident about their abilities in math than girls at coeducational schools. Echoing findings from the United States, Sullivan also reported that girls from single-sex schools were more likely to major in gender-atypical subjects in college. However, in another similarity to American findings, Sullivan (2008b) identified no lasting positive effect of single-sex schools on educational attainment. She suggests that girls from coeducational environments may "catch up" to their cohort from single-sex schools while at college. Further, the single-sex versus coeducational differences that do exist in college preparatory exam scores and degree attainment tend to disappear once the school sector (i.e., private vs. public) is controlled (Sullivan, 2008b).

Methodological Challenges in Research on Single-Sex Education

With decades of research on single-sex schooling in the U.S. and abroad, why are the findings so mixed? Why has it been difficult to draw firm conclusions on the role played by school gender? Quite likely, it is because of the numerous methodological challenges that

arise when conducting research on single-sex schools (Mael, 1998; U.S. Department of Education, 2005; Arms, 2007). The central concerns with quantitative research on single-sex schools include: the problem of generalizability, confounding treatment variables, selection bias, and inconsistencies across studies in comparative measures or indicators. Each of these methodological challenges is summarized below and discussed more fully in Arms (2007).

Generalizability. A key methodological issue is the tendency of researchers to make inferences from a specific study or group of studies to other contexts or populations. Most often this occurs when results from a study on a private, religiously-affiliated, single-sex school are extrapolated to all single-sex schools (sectarian and non-sectarian, private and public). Other common over-generalizations on single-sex schooling occur when research on single-sex colleges (in particular, women's colleges) has been applied to single-sex secondary schools or research on single-sex schools in foreign countries is applied to schools in the United States.

Confounding Variables. A second methodological challenge centers on confounding treatment variables, particularly in large, quantitative studies. Specifically, there is a tendency for research on single-sex schools to attribute positive outcomes solely to the gender composition of the school. This is particularly risky when the study focuses on private or religiously-affiliated schools that may differ substantially from public schools on a variety of other factors beyond the school gender (Bryk, Lee & Holland, 1993; Haag, 1998). Without controlling for confounding factors such as pedagogy, curriculum, religious affiliation, geographic location, size, or selectivity, it is difficult to draw conclusions about the impact of single-sex schooling.

Selection Bias. Related to the issue of confounding variables is the problem of selection bias in research on single-sex schools (Haag, 1998). Ideally, researchers would rely on random assignment of students when comparing coeducational and single-sex schools. However, attendance at a single-sex school is a voluntary decision made by students and their parents. Even in the case of public single-sex schools, recent legislation demands that student participation be voluntary. This self-selection limits the use of random assignment in conducting research on single-sex schools. Riordan (1990) adds that a student's home background is one of the most influential characteristics impacting results in single-sex education. He notes that students from "good homes are likely to attend good schools" (p.

82), making it difficult to determine the cause of any single-sex effect. Thus, positive outcomes associated with single-sex schooling may have more to do with student, parent, or school background characteristics than with school gender.

Inconsistency in Comparative Measures or Indicators. Another methodological challenge associated with research on single-sex schooling is the myriad measures, outcomes, and indicators that are used. Studies that have examined student achievement or self-esteem at single-sex schools rarely use the same measures. Some studies look at process indicators or use short-term measures like classroom tests, while others track long-term outcomes like graduation rates or college/career aspirations. The use of multiple measures, along with conflicting findings, compromises our ability to draw conclusions about the impact of single-sex schooling.

These four methodological challenges make it difficult to conduct high quality, rigorous studies on single-sex schools. More importantly, these issues make it nearly impossible to draw accurate and reliable conclusions about this type of schooling. With these methodological challenges in mind, we turn now to the current study, which seeks to address at least some of the methodological challenges inherent in research on single-sex schooling, and to provide new knowledge on the impact of private single-sex secondary education.

Study Objectives

In an effort to contribute new, national data to the knowledge base on single-sex education, this study is guided by the following broad research questions:

1. How do female graduates of private single-sex and coeducational high schools differ from each other at the point of college entry in terms of achievement, aspirations, attitudes, and other attributes?
2. What are the "net effects" of single-sex secondary schooling after controlling for students' demographic background and other high school characteristics? Do these effects depend on students' race/ethnicity or class?

Due to its reliance on a large, national database and an extensive questionnaire, this study aims to overcome several key methodological challenges inherent in research on single-sex education. First, when it comes to generalizability, this study includes a large representative sample of private high schools in the United States, and considers

independent and Catholic-affiliated high schools separately. As detailed by Bryk, Lee, and Holland (1993), separate consideration of Catholic schools is necessary given their particular religious mission and unique demographics (e.g., historically located in urban centers and serving students from lower-incomes and more diverse communities).

Second, though it is not possible to account for all possible confounding variables, this study uses a statistical procedure increasingly recommended for research on school effects—multilevel modeling—to examine whether the impact of single-sex schooling is significant after controlling for other school characteristics, including religious affiliation, geographic location, size, selectivity, racial composition, AP course offerings, and urbanicity. Additionally, the multilevel modeling approach enables us to minimize selection bias by considering the impact of school gender after accounting for the race/ethnicity, religious affiliation, family income, parental education, and grades of students attending those schools.

Finally, the survey used in this present study is an ongoing, annual, national instrument, thus presenting the opportunity to improve measure consistency by reassessing these same questions in future administrations of the Freshman Survey. Further, because the Freshman Survey involves periodic follow-up surveys that directly post-test a large number of items from the initial measure, the present study serves as a valuable baseline for longitudinal research on the effects of single-sex education.

Description of the Data

This study utilizes data from the Freshman Survey conducted by the Cooperative Institutional Research Program (CIRP) at UCLA's Higher Education Research Institute. Established in 1966 at the American Council on Education, the CIRP is the oldest and largest longitudinal study of American higher education. Each fall, the CIRP collects data from approximately 350,000 first-year college students from over 600 institutions across the United States. Typically administered at new student orientation, the CIRP survey requests detailed demographic information and asks students about their high school experiences, college expectations, self-concepts, values, and life goals as well as their academic and career aspirations. (See Appendix A for a copy of the survey instrument.) This study uses data from the 2005 CIRP Freshman Survey, which is the only year in which the survey

asked students to indicate the name, city, and state of the high school from which they graduated. Complete details on the 2005 CIRP study can be found in Pryor, et. al. (2005).

In order to identify which high schools were single-sex and which were coeducational, the Freshman Survey data file was merged with the 2000 College Board High School Data File and the Department of Education's 2003 – 2004 Private School Survey. The College Board file is thought to be the most current and comprehensive dataset on public and private U.S. high schools, and includes a high school gender variable which identifies the single-sex high schools in the dataset. It also includes other variables such as the schools' minority student population percentages, Advanced Placement course offerings, students' post-graduate plans, the top and bottom quartile SAT and ACT scores, and number of college counselors. As there were several high schools in our sample that did not report their minority student population to The College Board, we turned to the Department of Education private school data for that additional information. Ultimately, we created an unprecedented educational database—one that combines wide-ranging characteristics of students with those of the high school and college they attended.

For the purposes of this study, we identified a subset of women from the national sample who attended private high schools. This included 6,842 women who graduated from 250 all-girls high schools, and 19,327 women alumnae of 2,047 coeducational high schools.[1] Given the different religious affiliations within the single-sex and coeducational school samples, and the fact that the Catholic high schools tended to overpower the sample, it was necessary for us to further disaggregate the single-sex and coeducational school samples into three categories: independent, Catholic, and "other" religious affiliation. We chose to eliminate students who had attended schools with "other" religious affiliations (e.g., Episcopalian, Jewish, Quaker, Islamic, etc.) as they were typically too varied a group to be included as a stand-alone comparison group. Thus, in order to make meaningful comparisons between graduates of single-sex and coeducational high schools, graduates of independent and Catholic-affiliated high schools are examined separately.

The final sample used for this study includes 6,552 women who had graduated from 225 private all-girls high schools (39 independent and 186 Catholic) and 14,684 women who

[1] Though the present study is restricted to female students, the database also includes 5,990 male students from 179 all-boys high schools, thus presenting an opportunity for additional research on single-sex education for boys.

had graduated from 1,169 private coeducational high schools (589 independent and 580 Catholic) (see Table 1).

Table 1
Counts for Students, High Schools, and Colleges by School Type

	Independent		Catholic	
	Single-Sex	Coeducational	Single-Sex	Coeducational
Number of Students	825	5587	5727	9097
Number of High Schools Attended	39	589	186	580
Number of Colleges Attended	189	422	439	500

The distribution of the single-sex and coeducational graduates by selected high school and college characteristics is shown in Table 2. Among the independent school graduates, single-sex alumnae tended to come from smaller high schools located in suburban and/or East coast settings and to attend private four-year colleges more often than their coeducational counterparts. Within the Catholic school sample, single-sex alumnae were more likely than coeducational graduates to have attended smaller, urban high schools located on the East or West coasts, and to have attended private universities. When it comes to selectivity, however, only marginal differences are observed, with median SAT scores slightly higher within the high schools and colleges attended by the single-sex sample (whether independent or Catholic). Interestingly, the independent and Catholic single-sex high school alumnae in this sample were slightly less likely than their coeducational counterparts to have attended a women's college.

Table 2
Distribution of the Sample by High School and College Characteristics

	Independent		Catholic	
	Single-Sex N=825	Coeducational N=5587	Single-Sex N=5727	Coeducational N=9097
High School Variables				
Median 12th grade enrollment	52	77	116	169
SAT Math 75th percentile	660	670	590	590
SAT Verbal 75th percentile	680	660	620	590
Region				
East	41.3%	33.1%	41.6%	33.5%
West	22.1%	24.7%	23.6%	20.8%
South	23.9%	32.1%	7.6%	14.2%
Midwest	12.1%	9.6%	26.8%	31.2%
Urbanicity				
Urban	23.3%	21.1%	40.4%	33.6%
Rural	9.8%	17.5%	.3%	7.0%
Suburban	66.9%	61.2%	59.3%	58.9%
College variables				
Median selectivity (SAT composite or equivalent ACT scores)	1258	1219	1139	1118
Control and type				
Public university	13.3%	17.2%	16.8%	20.1%
Public four-year college	4.0%	7.3%	12.4%	16.3%
Private university	37.0%	50.8%	24.6%	18.3%
Private four-year college	45.7%	24.7%	46.1%	45.3%
Institutional sex				
Women's college	5.9%	7.0%	3.8%	4.9%
Coeducational college	94.1%	93.0%	96.2%	95.1%

A Descriptive Comparison of Single-Sex and Coeducational Graduates

Our first research question aims to provide a descriptive comparison of women from single-sex and coeducational private high schools at the point of college entry. How do they differ in terms of their family backgrounds, orientations, aspirations, and values? How do they compare in terms of academics, self-confidence, and career goals? Are there differences in their motivations for and expectations about college? This section of the report examines these differentials across a range of Freshman Survey items, which we have grouped together into the following themes: Demographic Background; College Choice; Academics; Free Time; Physical and Psychological Well-Being; Degree, Major, and Career Aspirations; Leadership and Community Orientation; Political and Social Views; and Religion.

Within each of these categories, we focus on the following two sets of comparisons: (1) graduates of single-sex versus coeducational private independent high schools, and (2) graduates and single-sex versus coeducational private Catholic high schools. Comparisons were made using either t-tests (for ordinal variables of at least six values)[2] or Chi-square analysis (for variables with five or fewer values that were re-coded into dichotomous measures reflecting high versus low categories). Single-sex versus coeducational differences were considered statistically significant at $p<.01$ for the Catholic school sample, and $p<.05$ for the independent school sample (given its smaller sample size). Given the large number of survey items examined (over one hundred), this section summarizes the major findings within each category. Appendix B provides a full reporting of percentages and statistical tests for all items within each category. Appendix B also includes comparison data for women graduating from public high schools as well as schools that are members of the National Coalition of Girls' Schools (NCGS).[3]

As discussed earlier, the decision to examine independent and Catholic school graduates separately is important: combining all single-sex or all coeducational graduates

[2] Though the t-tests were conducted using means, results (with the exception of SAT) are displayed as percentages for ease of interpretation.
[3] Results for the NCGS schools closely mirror those of the independent single-sex sample.

into one group overlooks the fact that a school's religious affiliation tends to relate more strongly to student characteristics than does its gender composition. In fact, differences within the single-sex population are far greater than the differences between single-sex and coeducational populations.[4] As these differences are not the focus of the report, they are not elaborated here.

DEMOGRAPHIC BACKGROUND

One of the questions raised when comparing graduates of single-sex and coeducational learning environments is: Are these different populations from the start? So it is important to begin our presentation of findings by exploring similarities and differences in the demographic characteristics of women graduates of single-sex and coeducational schools. Financial background, parental education level, and race/ethnicity are examined.

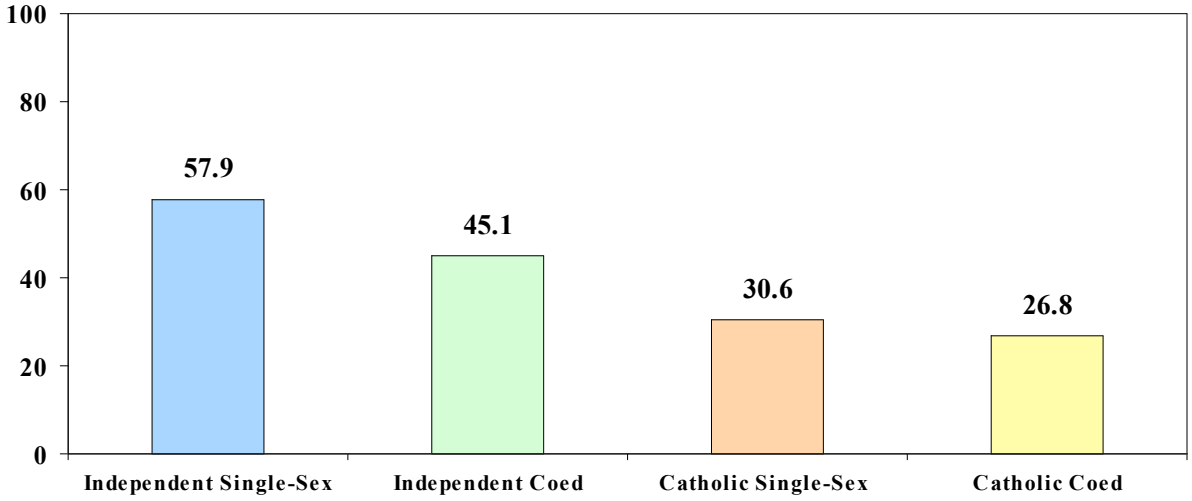
Financial background. The largest demographic differences between single-sex and coeducational graduates relate to their economic backgrounds, with women graduates of single-sex schools—both independent and Catholic—reporting higher annual family incomes than their coeducational counterparts. As shown in Figure 1, the income gap is particularly wide among graduates of independent schools, with 57.9 percent of independent single-sex graduates hailing from families with an annual income over $150,000 compared to 45.1 percent among independent coeducational graduates.

Given these income differentials, it is perhaps not surprising to find that graduates of coeducational schools are more likely than their peers from single-sex schools to have held a job during their senior year of high school. For example, 29.0 percent of independent coeducational graduates worked for pay six or more hours per week, compared to 20.6 percent at independent single-sex schools. Employment rates are higher within the Catholic school population, although differences based on school-gender are smaller: 52.4 percent of

[4] For example, among all single-sex alumnae, those from independent schools tend to come from wealthier families and face fewer financial constraints in their college decision-making than do women from Catholic schools. Further, levels of academic engagement and self-confidence are higher among women graduates of independent schools than those from Catholic schools. Independent school graduates also are more likely to view college as an opportunity to become more cultured and to prepare for lives as community leaders, whereas Catholic school graduates are motivated by the economic and job opportunities provided by college attendance. In addition, independent school graduates tend to be more politically active and more politically liberal than women from Catholic schools, who view themselves as more religious in their orientations. Readers interested in the statistical significance of the difference between graduates of independent single-sex and Catholic single-sex high schools should consult Appendix B.

Catholic coeducational graduates worked at least six hours per week, compared to 47.4 percent of Catholic single-sex graduates.

Figure 1. Percent of Students Reporting Family Income over $150,000



Parental education level. Small but significant differences also are evident when we examine parental education level, with women attending single-sex schools more likely than those from coeducational schools to have college-educated parents. This difference holds true within both the independent and Catholic school sector (see Figures 2 and 3). A full 85.1 percent of women who attended independent single-sex schools report that their father holds at least a four-year college degree relative to 77.9 percent of their peers at independent coeducational schools. This gap is also statistically significant, though much smaller, among Catholic school graduates, with 65.8 percent of women from single-sex schools reporting that their father graduated from college, compared to 63.3 percent of those from coeducational schools. Similar differences are observed with respect to mothers' educational attainment.

Figure 2. Percent of Students Whose Fathers Have a College Degree

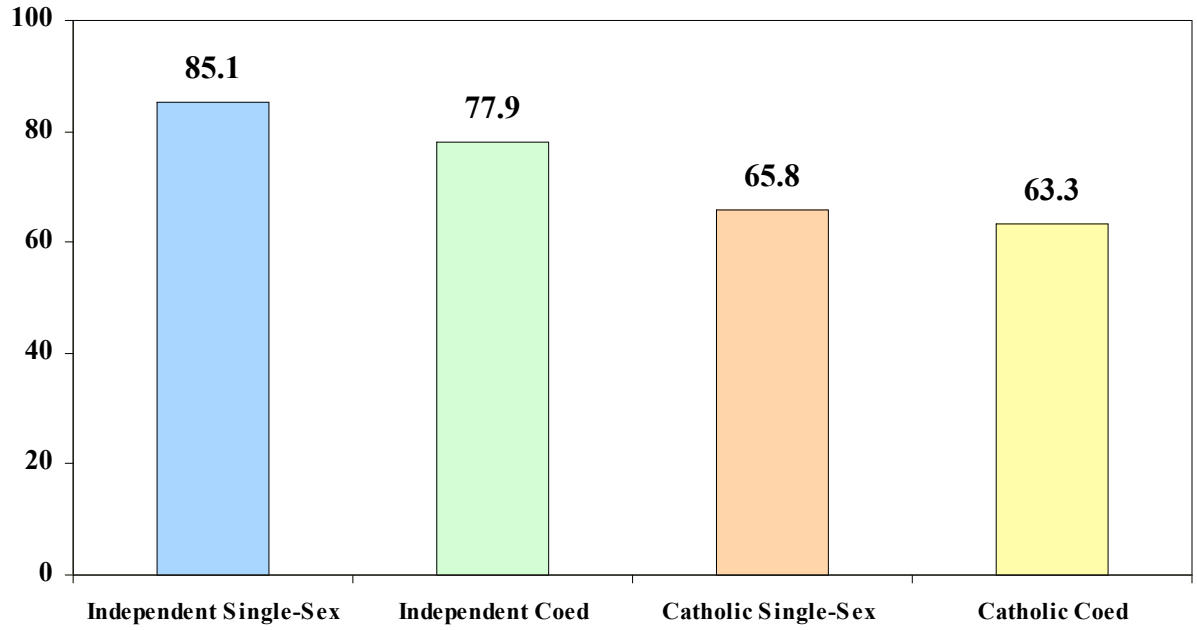
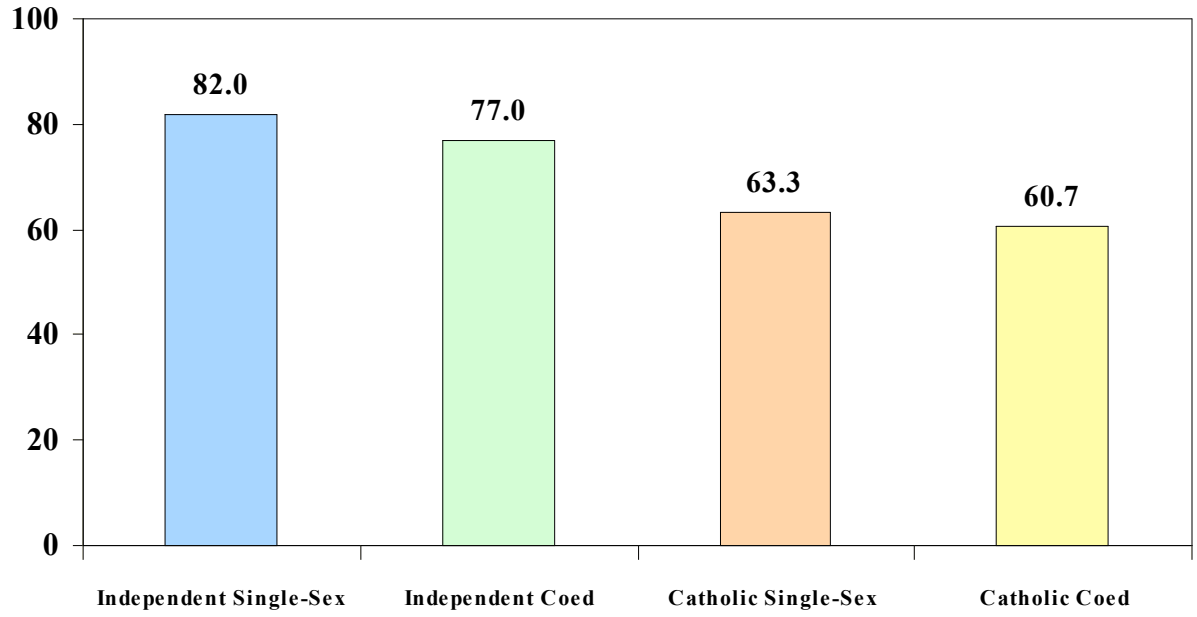


Figure 3. Percent of Students Whose Mothers Have a College Degree



Race/ethnicity. Despite the differences in family income and parental education between single-sex and coeducational graduates, single-sex alumnae are fairly similar to their coeducational counterparts when it comes to race/ethnicity. As shown in Table 3, approximately three-quarters of single-sex and coeducational graduates—from both independent and Catholic schools—report their race/ethnicity as White/Caucasian.

However, small but noteworthy differences are evident for some racial/ethnic minority groups. Specifically, at independent schools, single-sex graduates are slightly more likely to identify themselves as African American (SS=6.5%; Coed=4.3 %) or Asian American (SS=10.2%; Coed=7.6%). Asian Americans are also slightly more prevalent at single-sex Catholic schools (5.8 percent) relative to coeducational Catholic schools (4.1 percent).

Table 3
Racial/Ethnic Composition by School Type

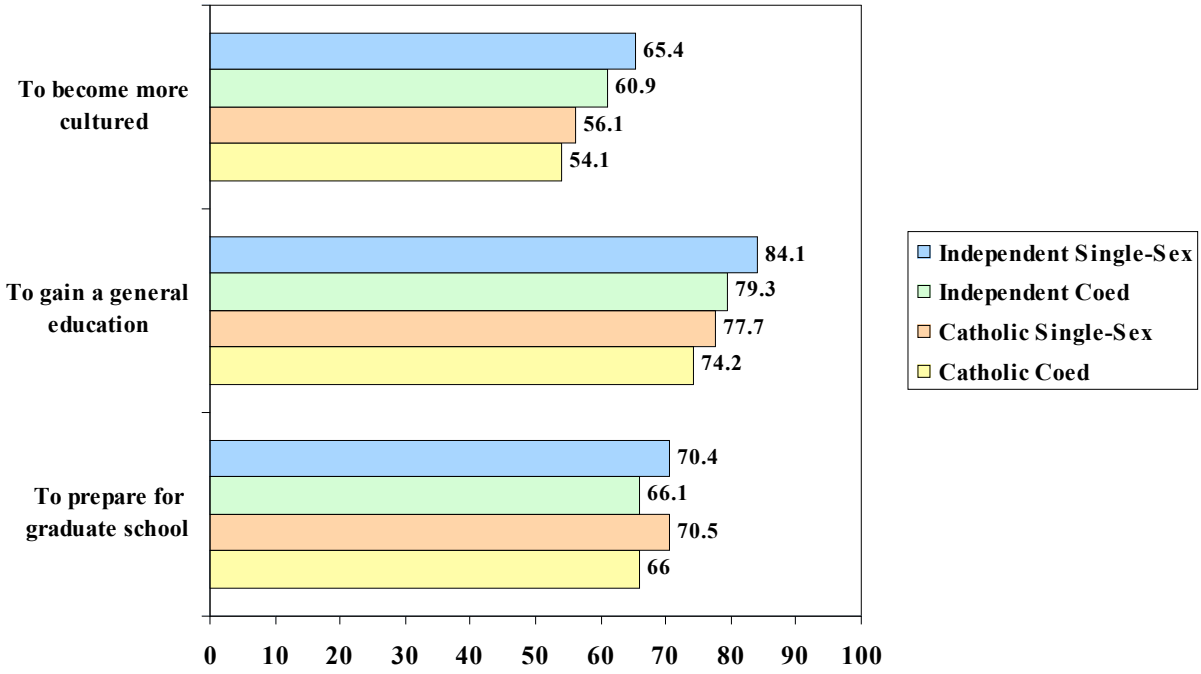
	Independent		Catholic	
Student's Race/Ethnicity	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)
White/Caucasian	74.4	76.5	72.7	75.4
African American/Black	6.5	4.3	5.4	5.5
Asian-American/Asian	10.2	7.6	5.8	4.1
Hispanic/Latino	3.5	3.7	6.2	6.4
American Indian	1.2	1.5	1.0	1.1
Other	4.2	6.4	8.9	7.5

College Choice

Noting the demographic differences between single-sex and coeducational graduates identified in the prior section, might we also anticipate differences in their orientation towards college? For the most part, single-sex and coeducational populations profess similar reasons for attending college, with students from all schools most often citing "to learn more about things that interest me" as very important reasons for attending college (percentages range across all four groups from 83.3 to 90.1).

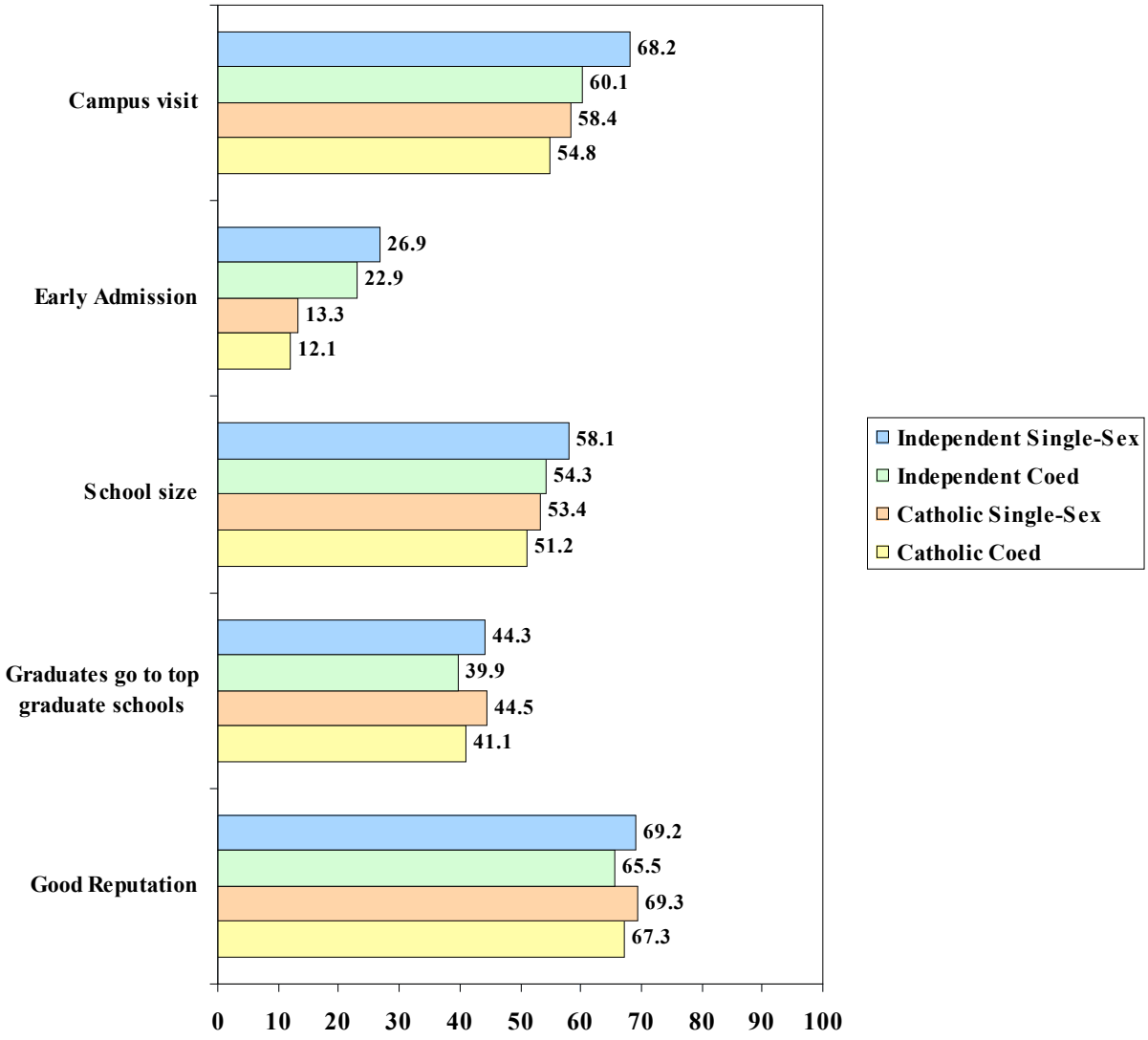
Some small differences are revealed in students' college orientation, however, with single-sex graduates within both independent and Catholic sectors more likely than their coeducational peers to cite the following as very important reasons for attending college: to prepare for graduate school, to gain a general education and appreciation of ideas, and to become a more cultured person (see Figure 4). We also find, at least within the independent sector, that graduates of single-sex schools are less likely than their peers from coeducational schools to report that they are attending college to "get training for a specific career" (SS=50.0%; Coed=56.6%). Thus, we might conclude that single-sex schools produce graduates who place greater value on the intellectual benefits of college.

Figure 4. Reasons for Going to College (% noting "very important")



When asked the reason they chose to attend their particular college, graduates of independent and Catholic schools provided fairly similar responses. Across all groups, the college's academic reputation was the most important factor in students' selection of a college—noted by approximately two-thirds of women from each group—though graduates of single-sex high schools tended to place slightly higher priority on academic reputation than did women from coeducational schools. Other differences are also worth noting. Specifically, single-sex graduates—whether at independent or Catholic schools— are more likely to select a college for the following reasons: they were attracted to the size of the school, they had made a visit to the campus, they were admitted through an Early Decision or Early Action program, and because the college's graduates are admitted to top graduate schools (see Figure 5).

Figure 5. Reasons for Selecting a Particular College (% noting "very important")



It is worth noting that despite some distinctions in the reasons for college between women graduates of coeducational and single-sex schools, there is very little difference in the percentages who predict that they will be happy with their college choice. Across all four groups, nearly two-thirds of women believe it is "very likely" that they will be satisfied with their college experience.

ACADEMICS

Advocates of single-sex education often make the case that an all-girls environment will provide women with a "safe space" to thrive academically without the distraction or competition of boys in the classroom, though, as noted earlier, prior research has been

inconsistent in drawing this conclusion. This section takes a thematic look at similarities and differences in the academic realm, and reveals that single-sex graduates tend to exhibit equal or marginally greater academic performance and self-confidence than their coeducational counterparts.

SAT scores. Women who attended single-sex schools scored significantly higher than their coeducational counterparts on the SAT. As shown in Table 4, the mean SAT composite scores (Verbal plus Math) of independent single-sex graduates is 1266, a full 43 points higher than the mean SAT scores for women from independent coeducational high schools. Within Catholic schools, SAT composite scores also favor single-sex graduates, with an average difference of 28 points.

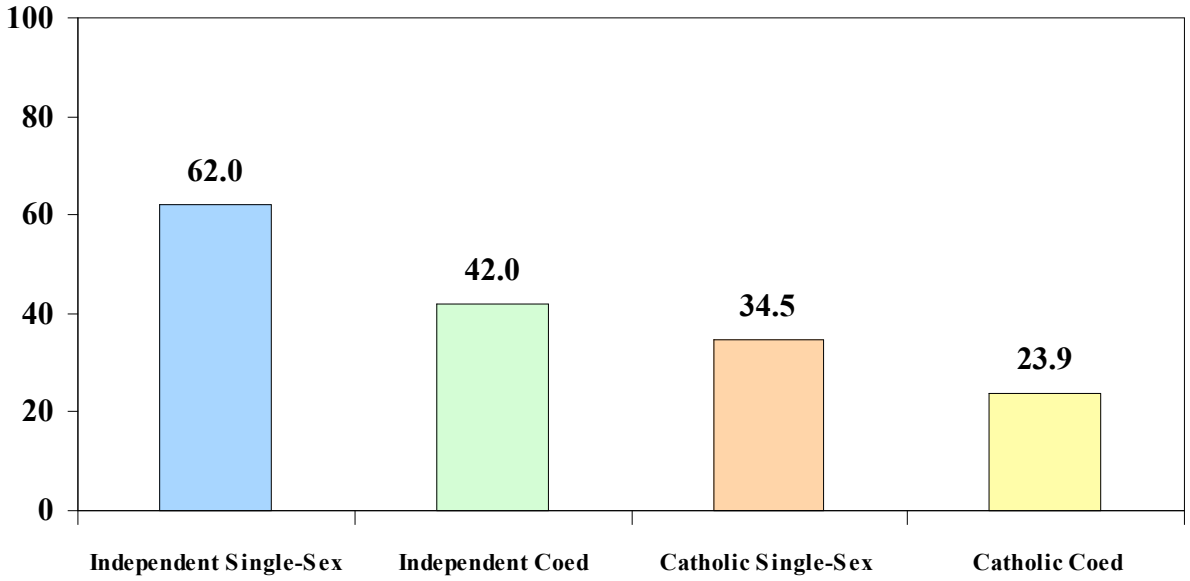
Table 4
Mean SAT[a] Scores by School Type

	Independent		Catholic	
	Single-Sex	Coeducational	Single-Sex	Coeducational
SAT Composite	1310	1267	1196	1168
SAT Verbal	660	639	605	592
SAT Math	650	628	591	576

[a] For students who took only the ACT, scores were converted to their SAT equivalent.

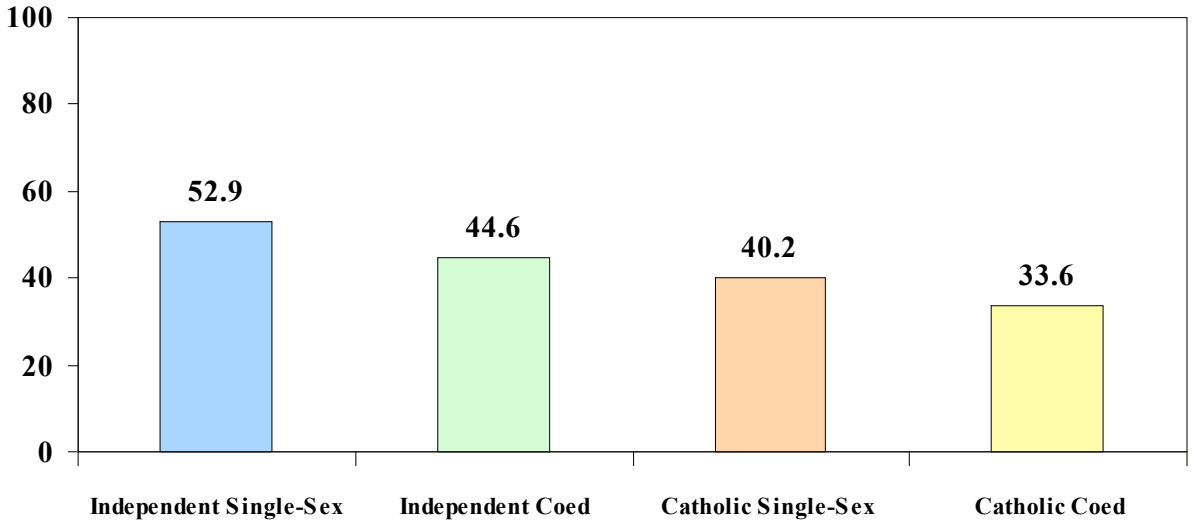
Academic engagement. In addition to higher SAT scores, women graduates of single-sex schools exhibit greater academic engagement than women from mixed-gender schools, as measured by survey questions regarding time spent on studying/homework, studying with other students, talking with teachers outside of class, and tutoring other students. For example, 62.0 percent of graduates of independent single-sex schools report spending eleven or more hours per week studying or doing homework in high school compared to 42.0 percent of independent coeducational graduates. This gap is also significant, though smaller, among Catholic school graduates (SS=34.5%; Coed=23.9%) (see Figure 6).

Figure 6. Percent Studying/Doing Homework 11 or More Hours per Week



For both single-sex and coeducational graduates, much of their study time is spent in groups, though even more so for students from independent high schools. In fact, 52.9 percent of independent single-sex graduates study with other students on a frequent basis, compared with 44.6 percent among independent coeducational graduates. A similar differential is observed among Catholic school graduates, where 40.2 percent from single-sex schools participate in study groups relative to 33.6 percent from mixed-gender schools (see Figure 7). Additional evidence of peer-based academic engagement is seen in the finding that nearly two-thirds (64.7 percent) of women graduates of independent single-sex schools report frequently or occasionally tutoring another student in high school, compared to 58.0 percent of women who attended independent coeducational schools.

Figure 7. Percent Frequently Studying with Other Students



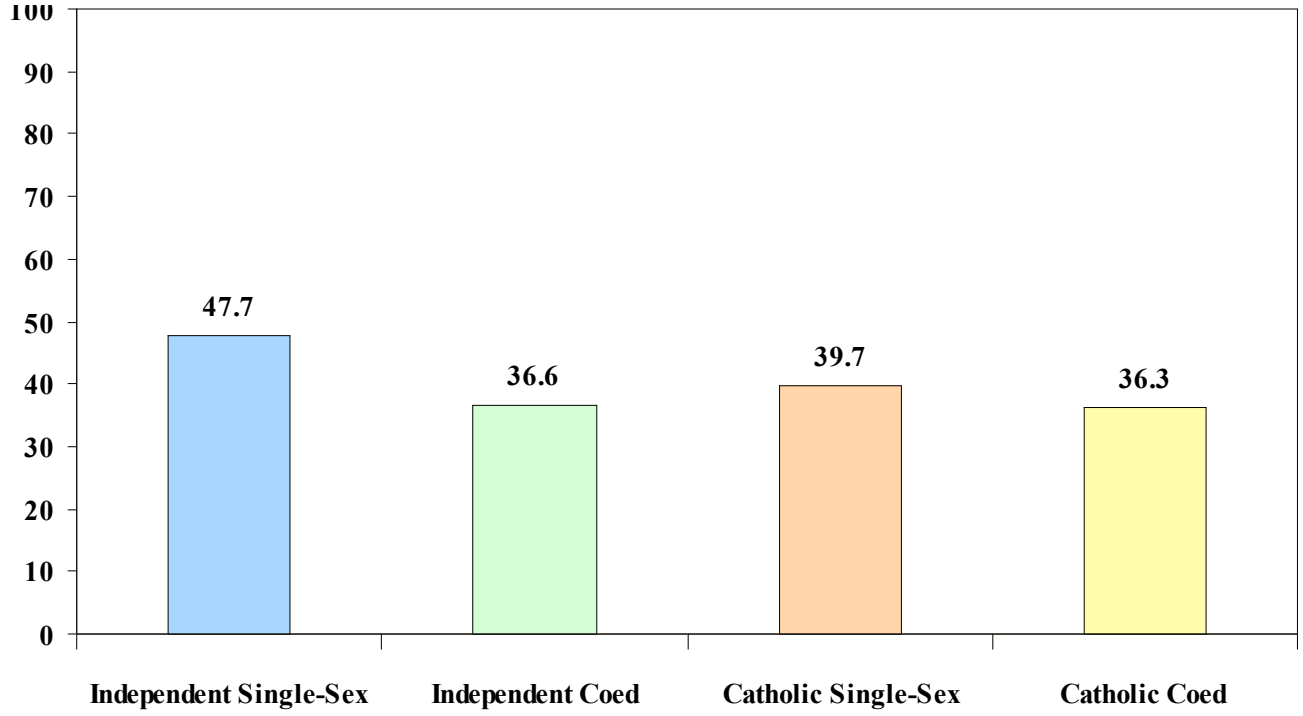
Women from single-sex schools also report more frequent interaction with their teachers. Specifically, 36.7 percent of independent single-sex graduates spend three or more hours per week talking with teachers outside of class, compared to 29.6 percent among graduates of independent coeducational schools. Single-sex high school graduates also report asking teachers for advice more frequently than graduates of coeducational schools. This difference is greatest among independent school graduates, with 50.1 percent of women from single-sex schools frequently asking for a teacher's advice compared to 42.2 percent of coeducational graduates.

Academic self-confidence. In addition to reporting higher levels of academic engagement, single-sex graduates—especially those from independent schools—tend to exhibit slightly higher levels of academic self-confidence. For example, 80.8 percent of female graduates of independent single-sex schools rate themselves "above average" or in the "highest 10 percent" in academic ability compared to 75.1 percent of women graduates of independent coeducational schools. Similarly, women from independent single-sex schools rate themselves higher than women from coeducational independent schools when it comes to intellectual self-confidence (SS=59.2%; Coed=53.7%) and writing ability (SS=64.2%; Coed=58.8%).

Higher academic and intellectual confidence among single-sex graduates also extends to specific academic subjects. For example, women graduates of single-sex schools are more likely to rate their mathematical ability as "above average" or in the "highest 10

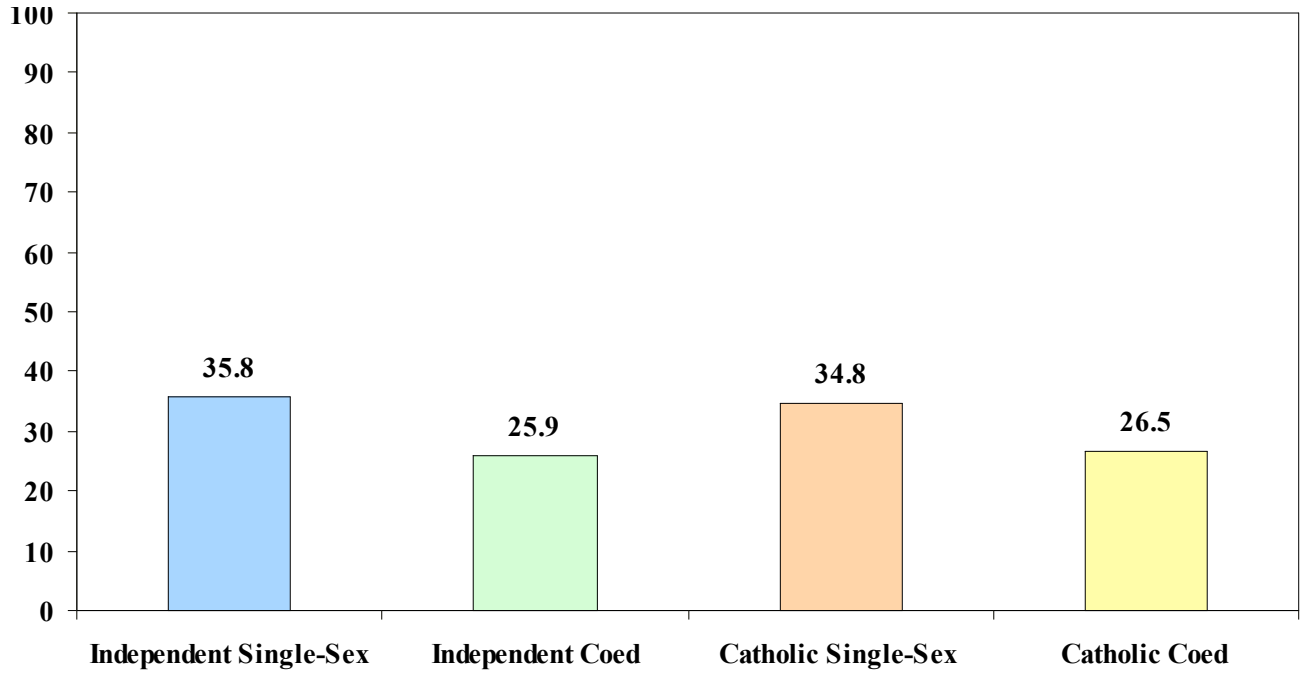
percent" compared to women graduates of coeducational schools. This is most pronounced in the independent sector, where 47.7 percent of those from single-sex schools place their math ability in the highest categories compared to 36.6 percent of independent coeducational graduates (see Figure 8.)

Figure 8. Self-Rated Mathematical Ability (% rating "above average" or "highest 10%")



Self-ratings of computer ability also are higher for single-sex graduates, where 35.8 percent of independent girls' school graduates report high levels of confidence in their computer abilities, relative to 25.9 percent among independent coeducational graduates. The single-sex versus coeducational gap in computer confidence is nearly as large among Catholic school graduates, where top ratings are reported by 34.8 percent of single-sex graduates and 26.5 percent of coeducational graduates (see Figure 9).

Figure 9. Self-Rated Computer Skills (% rating "above average" or "highest 10%")



Perhaps as a consequence of their greater self-confidence in math, computers, and overall academic ability, women from single-sex high schools more frequently aspire to "make a theoretical contribution to science," though the level of interest from all groups is low. Only 19 percent of women from Catholic and independent single-sex high schools indicate that this goal is "very important" or "essential" compared to 16 percent of coeducational graduates. Given these differences and those noted above, it is also important to point out an area where single-sex and coeducational graduates do not differ: their drive to achieve. Over three-quarters of college women from all four groups consider their drive to achieve to be least above average.

Free Time

We have already seen that women from single-sex and coeducational high schools make different choices regarding time allocation. Those from single-sex schools tend to devote more time to academics—studying, tutoring, talking with teachers—and less time on paid employment. Do these groups of women also differ when it comes to how they spend their "free" time? This section examines similarities and differences in how college women

from single-sex and coeducational schools spent their time in the year prior to college entry as well as how they anticipate spending their time in college.

Behavioral differences are evident between single-sex and coeducational graduates in a few areas. First, female single-sex graduates are significantly more likely than their coeducational peers to socialize with someone of another racial/ethnic group on a frequent basis. This difference is largest in the independent sector, where 84.9 percent of women report frequent cross-race socialization, relative to 77.6 at coeducational schools. This likely reflects the slightly greater racial/ethnic diversity among the single-sex schools in this sample.

Time spent "partying" in their senior year of high school is also greater for single-sex graduates, especially those from independent schools, where one in four (25.6 percent) report partying six or more hours per week, compared to one in five (20.3 percent) in coeducational schools. Despite this, the reported frequency of specific behaviors related to partying—smoking cigarettes and drinking alcohol—do not differ between single-sex and coeducational graduates.

Involvement in athletics also reveals differences in time allocation between single-sex and coeducational graduates. In the Catholic schools, 45.6 percent of single-sex alumnae devoted at least six hours per week to sports and exercise during their senior year of high school, relative to 52.1 percent of women from Catholic coeducational schools. Perhaps as a result, single-sex graduates are slightly less likely to predict that that they will play varsity/intercollegiate athletics in college. This difference holds true within both Catholic schools (SS=13.7%; Coed=15.7%) and independent schools (SS=14.2%; Coed=17.9%).

Other questions about anticipated time allocation elicit differences between single-sex and coeducational graduates, as well. For example, single-sex alumnae are more likely to say that there is a very good chance that they will be active in student clubs and groups during college (independent: 70.4 percent to 60.1 percent, and Catholic: 58.0 percent to 54.6 percent). Further, among independent school graduates, intentions to join a social sorority are stronger among those from single-sex schools (SS=22.6%; Coed=17.1%).

Psychological and Physical Well-Being

Despite the many single-sex versus coeducational differences noted throughout this report, when it comes to psychological and physical well-being, we find few distinctions

between these groups. Self-ratings of emotional and physical health are virtually identical for single-sex and coeducational graduates, and these two groups are equally likely to anticipate seeking personal counseling in college. The one exception in this category is that 42.8 percent of independent single-sex attendees reported frequently feeling overwhelmed by their responsibilities compared to 38.0 percent of women from independent coeducational schools. This difference may reflect the greater amount of time that women from single-sex schools devote to their studies, since study time—whether independent or in groups—is associated with higher levels of time-stress for students (Sax, 2008).

Degree, Major, and Career Aspirations

As noted earlier in this report, previous studies suggest that an all-girls educational experience heightens degree aspirations and may promote interest in traditionally-male fields. Though the specific mechanisms behind these outcomes are not well-understood, it is useful to take a look at our national data to see whether prior claims are upheld.

Degree aspirations. When it comes to their long-term degree aspirations, graduates of single-sex and coeducational schools are quite similar. Across all four private school categories, approximately 85 percent of women aspire to earn post-baccalaureate degrees. The only significant difference in degree aspiration is that single-sex graduates are slightly more likely to aspire to earn law (J.D.) degrees. This holds true among both independent school graduates (SS=11.6%; Coed=8.9%) and Catholic school graduates (SS=8.1%; Coed=6.3%).

Majors and careers. Major choices are largely similar for single-sex and coeducational graduates, though some slight differences are worth noting. The largest difference in major selection is found among independent school graduates, where 5.9 percent of women from single-sex schools plan to major in engineering, compared to only 2.0 percent among women from coeducational schools. Engineering also produces the largest single-sex/coeducational differential when it comes to career choice, where 4.4 percent of women from single-sex independent schools aspire to become engineers, relative to 1.4 percent from coeducational schools. Among Catholic school graduates, engineering is a more popular career option for women from single-sex schools, though the magnitude of the differential is much smaller than is found in the independent sector (2.9 versus 2.1 percent). Other small, but statistically significant, differences are that girls' school graduates

from Catholic schools are more interested in majoring in history or political science (SS=6.1%; Coed=4.8%) and graduates from independent schools are more interested in pursuing math/statistics (SS=1.3%; Coed=0.5%).

Leadership and Community Orientation

Advocates of single-sex education often extol the leadership opportunities existing at schools where student governments, yearbooks, and other extra-curricular activities are led exclusively by female students. As these women transition into college, do we find them to be more confident in themselves as leaders and participants in the larger surrounding community?

Interestingly, female graduates of single-sex and coeducational high schools are actually quite similar in a number of areas related to leadership and community orientation. Specifically, we find no significant difference in the proportion of single-sex and coeducational graduates who rate themselves "above average" or in the "highest 10%" in leadership ability: this percentage hovers around 60 percent for all four groups. We also find no difference between single-sex and coeducational graduates when it comes to self-ratings in other traits that may characterize good leaders: social self-confidence, cooperativeness, and understanding of others. Nevertheless, we do find that single-sex graduates express more confidence in their public speaking abilities than do graduates of coeducational schools, especially in the independent sector, where 44.6 percent of single-sex alumnae rate their public speaking abilities highly, relative to 38.5 percent from coeducational independent schools. These findings point to a potential advantage of single-sex environments: the opportunity for women to express themselves publicly without the level of self-consciousness that may exist in mixed-sex settings.

We also find small differences in students' outward or communal orientation, primarily in the Catholic sector, where single-sex graduates report stronger commitments than their coeducational peers to goals such as promoting racial understanding (SS=38.3%; Coed=35.2%) and improving their understanding of other countries and cultures (SS=59.6%; Coed=56.7%). Graduates of Catholic single-sex schools are slightly more likely

than their coeducational peers to report that they frequently performed volunteer work in high school (44.7 vs. 42.2 percent).[5]

Political and Social Views

Educational research clearly shows that students' political and social attitudes are influenced in large part by their peers, and that females tend to espouse somewhat more liberal political and social beliefs than males (Sax, 2008). With this in mind, can we expect that an all-girls environment would produce graduates whose political and social views differ from those of women who are educated in mixed-sex environments? This section examines similarities and differences in how college women who attended single-sex and coeducational schools describe their political affiliation and political engagement, as well as how they rate their views on social and political beliefs and attitudes.

Political orientation. Within the independent school sector, graduates of single-sex schools and coeducational schools share very similar political orientations, with nearly one-half indicating "Liberal" or "Far Left" ideologies, a full third identifying themselves as "Middle of the Road," and less than one quarter considering themselves "Conservative" or "Far Right." Differences in political orientation are more evident in the Catholic sector, where single-sex graduates are more likely than coeducational graduates to align themselves with liberal ideologies (SS=32.0%; Coed=28.1%) (see Figure 10).

Political engagement. Some differences are found between single-sex and coeducational graduates in the area of political engagement. Female graduates of single-sex schools are more likely than their coeducational counterparts to report that it is "very important" or "essential" for them to keep up to date with politics. This goal is strongest among women at independent schools, where 57.9 percent of independent single-sex graduates prioritize keeping up to date with political affairs, compared to 47.7 percent of women graduates of independent coeducational schools (see Figure 11). Women who attended single-sex high schools also are more likely to report that they frequently or occasionally discussed politics in class, with friends, or with family. As shown in Figure 12, this single-sex/coeducational difference is significant for graduates of both independent and Catholic schools. Finally, a higher percentage of women from single-sex independent

[5] The survey does not distinguish between self-initiated volunteer service and service that may be a school requirement.

schools believe that there is a very good chance that they will participate in student government in college, though the numbers are low from both groups (SS=11.0%; Coed=7.5%).

Figure 10. Political Orientation

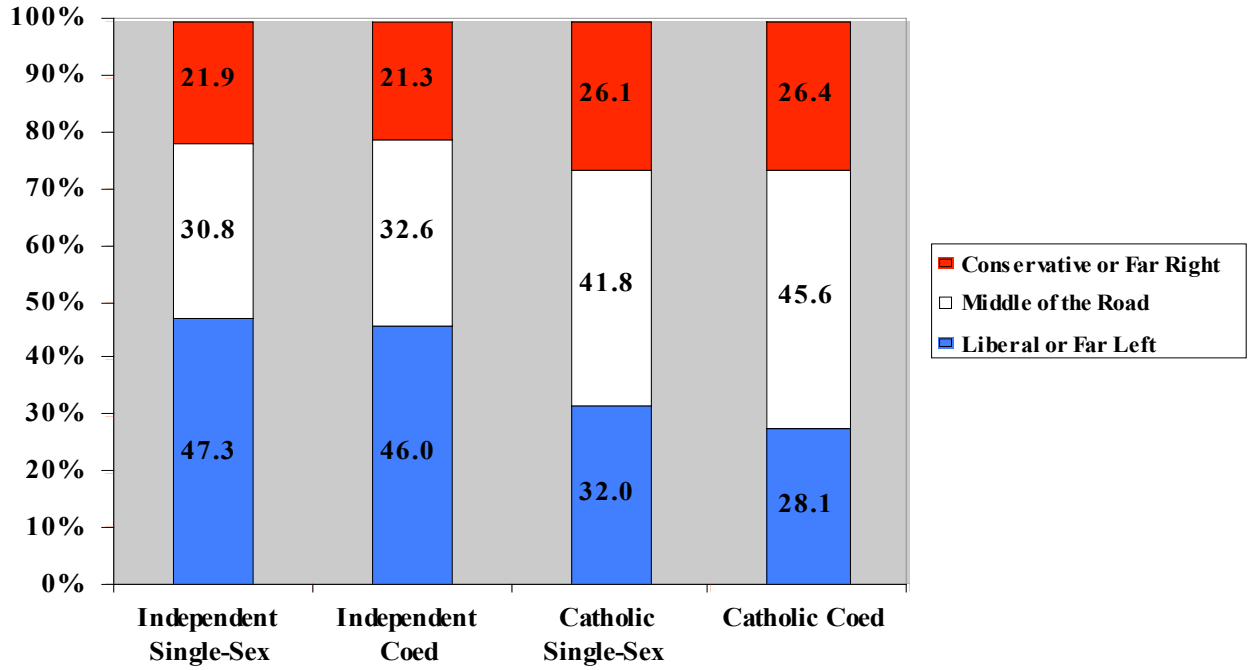
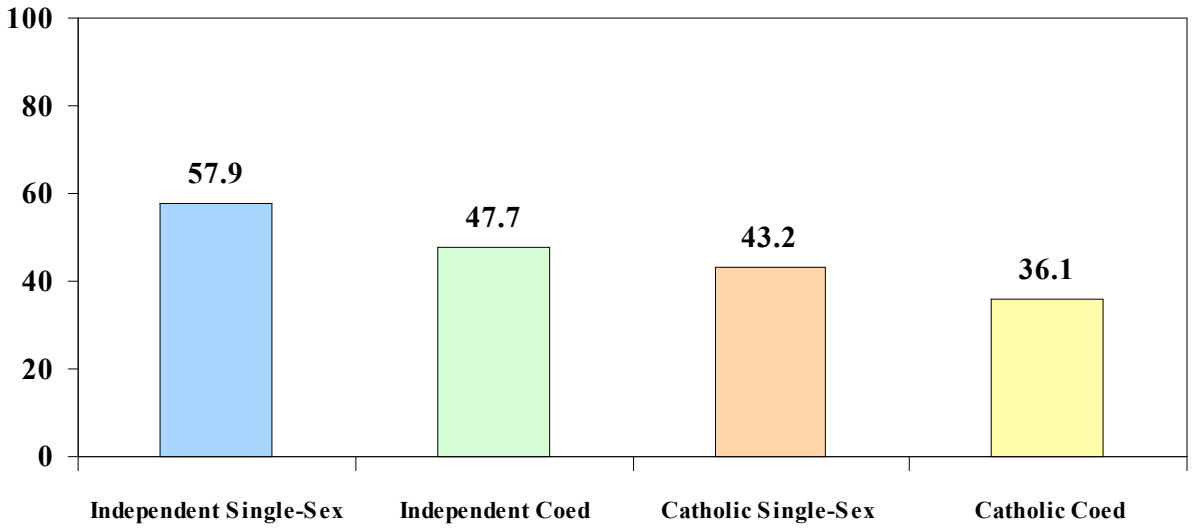


Figure 11. Goal – Keep Up to Date with Politics (% indicating "very important" or "essential")



Political and social attitudes. When it comes to attitudes on specific political and social issues, single-sex and coeducational graduates share similar views when it comes to such topics as taxation, health care, the environment, federal military spending, legalization of marijuana, and casual sex. In some areas, however, differences between single-sex and coeducational graduates are evident. For example, the belief that abortion should be legal is held by 79.5 percent of independent single-sex graduates, compared to 74.7 percent independent coeducational students. We find an even larger gap in pro-choice sentiments among single-sex Catholic schools (SS=45.2%; Coed=38.4%). (see Figure 13.)

Independent and Catholic single-sex graduates also differ from their coeducational counterparts when it comes to gay rights. The proportion of students who believe that same sex couples should have the right to legal marital status is higher among single-sex alumnae within both the independent (SS=79.4%; Coed=75.8%) and Catholic (SS=72.3%; Coed=66.0%) sectors. Some single-sex/coeducational differences are evident solely within the Catholic school population, where single-sex graduates are more likely to support gun control and to oppose capital punishment and mandatory military service.

Figure 12. Frequently Discussed Politics in High School

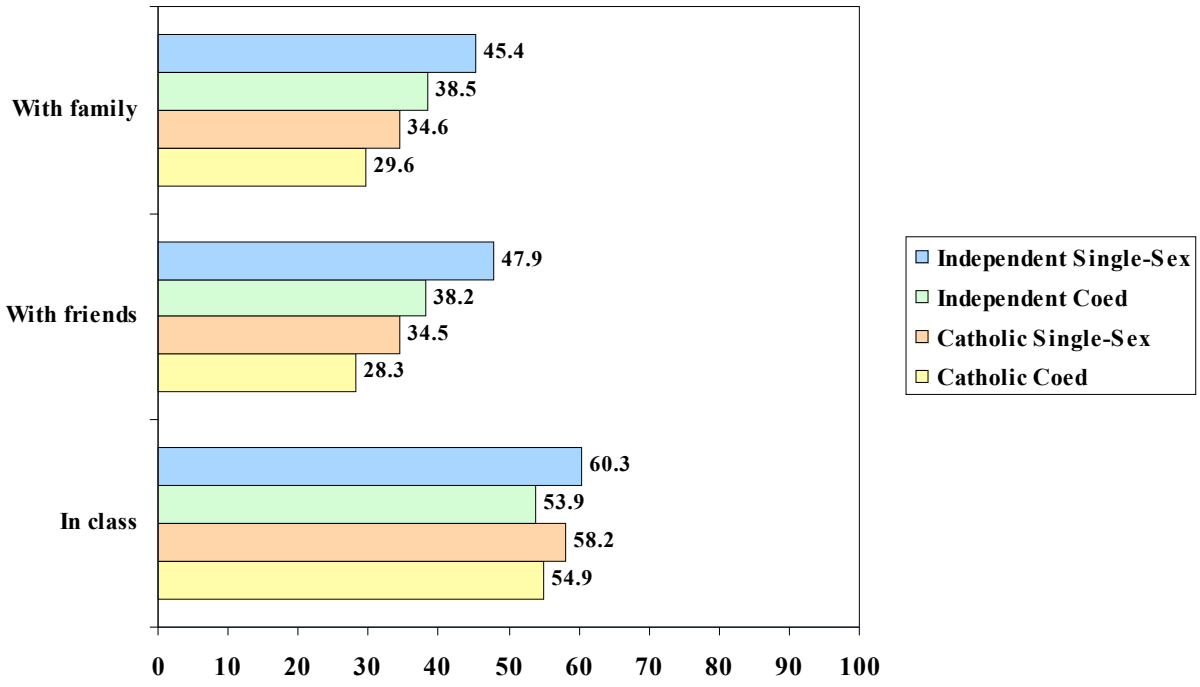
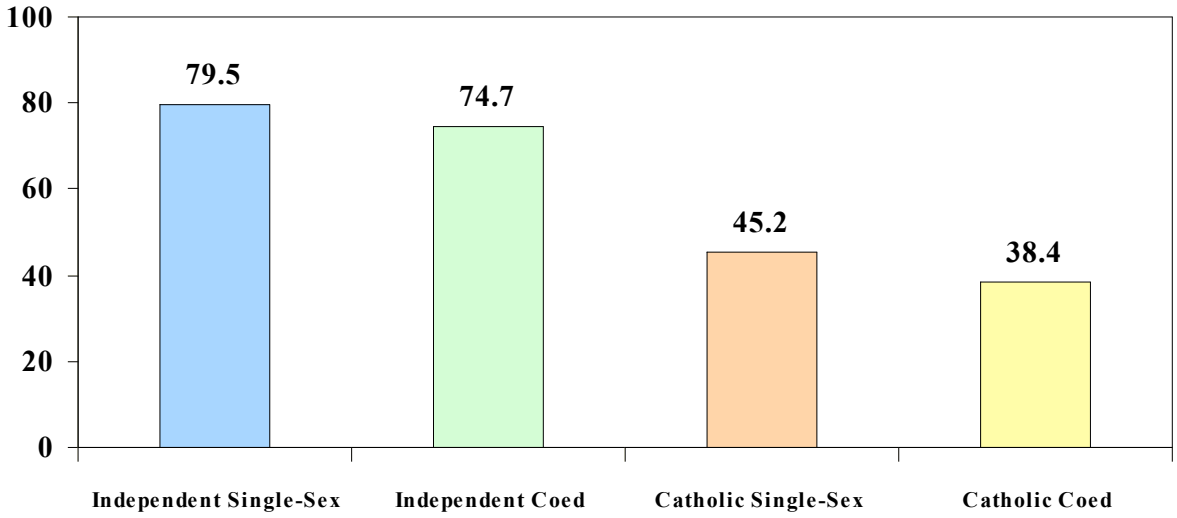


Figure 13. Belief that Abortion Should be Legal (% indicating "agree somewhat" or "strongly")



RELIGION

Though the development of religious convictions is not a central goal of single-sex education, particularly within the independent school sector, it is worth considering whether students' religious identities are similar across single-sex and coeducational environments. In fact, within the independent sector, the survey reveals practically no difference in the

religious convictions among graduates of single-sex and coeducational schools. However, slight differences are found between graduates of single-sex and coeducation in the Catholic schools. Specifically, compared to their coeducational counterparts, graduates of single-sex Catholic high schools are less likely to rate their religiousness "above average" or in the "highest ten percent" (SS=38.2%; Coed=41.8%), less likely to attend religious services on a frequent basis (SS=58.5; Coed=61.9%) and less likely to discuss religion on a frequent basis (SS=59.6%; Coed=62.4%). Yet while single-sex alumnae of Catholic schools tend to exhibit lower religiosity than their coeducational peers, they do report a slightly stronger commitment to "developing a meaningful philosophy of life" (SS=52.9%; Coed=50.4%). Thus, these findings raise the question of whether, even within a religious school setting, the single-sex experience encourages women to challenge traditional religious tenets and to search in other ways for their purpose in life.

Summary of Descriptive Results

The descriptive results reveal significant differences between single-sex and coeducational alumnae. Though generally small, distinctions extend across multiple categories, including self-confidence, political and social activism, life goals, and career orientation. Although future research will need to tell us whether such differences are sustained throughout college and beyond, at least at the point of college entry, most results are favorable to single-sex graduates. These include the following statistically significant differences:

- Higher levels of academic engagement among single-sex alumnae;
- Higher SAT scores among single-sex alumnae;
- Greater interest in graduate school among single-sex alumnae;
- Higher self-confidence in academic, mathematical, and computer skills among single-sex alumnae;
- Greater interest in engineering careers among single-sex alumnae;
- Stronger predisposition towards co-curricular engagement among single-sex alumnae; and
- Greater political engagement among single-sex alumnae.

The next section examines the extent to which differences between single-sex and coeducational alumnae remain statistically significant when accounting for background differences between these two populations, including student demographics (e.g., race/ethnicity, family income, and parental education) as well as characteristics of the high schools they attended (e.g., enrollment and course offerings).

Assessing the Net Effects of Single-Sex Education through Multilevel Modeling

Thus far, this report has revealed many statistically significant (albeit small) differences between graduates of girls' schools and female graduates of coeducational high schools. It has also shown that the magnitude of the "single-sex versus coeducation" differential often depends on the type of high school, whether Catholic or independent. Awareness of these differences certainly sheds light on what we can anticipate for these women when they arrive at college, but sheer differences between graduates of single-sex and coeducation are only part of the story. Developing a clear sense of the "impact" of single-sex education requires that we consider other factors as well. Thus, our second research question focuses on the extent to which the single-sex effect persists once we control for (a) other characteristics of those schools, such as enrollment, location or course offerings, and (b) the demographic backgrounds of the women who attend all-girls schools, as indicated by race, class and other forces in students' upbringing. The importance of applying these controls has been forcefully articulated by Lee (2000), Mael (1998), Salomone (2003, 2006), and the U.S. Department of Education (2005), among others.

An appropriate method for simultaneously considering student-level and school-level effects is multilevel modeling. Multilevel modeling allows us to distinguish between the effects of a school characteristic (such as gender composition) and the effects associated with differences across students enrolled at those schools (Lee, 2000). Multilevel modeling, also known as hierarchical linear modeling (HLM), appropriately partitions variation in the outcome variable to the individual and school levels, respectively (Raudenbush & Bryk, 2002). Use of single-level statistical techniques, such as ordinary least squares regression, may mask individual-level effects or inflate the influence of school-level variables on the outcome measure (Raudenbush & Bryk, 2002). In the case of this study, all the students are nested within high schools. Single-level statistical techniques assume that all students are independent of one another when in fact they may share several unobserved qualities by the very nature of attending the same high school. HLM appropriately accounts for the unique

stimuli that students may experience within their high school contexts (Raudenbush & Bryk, 2002). Mael (1998) specifically argues for the use of HLM in addressing effects of single-sex education.

Given the more robust statistical results provided by HLM, this part of the study relies on multilevel modeling to assess the unique contribution made by school gender once we account for key individual differences among single-sex and coeducational graduates due to their demographic backgrounds as well as characteristics of their high schools other than gender composition. We also examine a question that has emerged as a central consideration in discussions over single-sex education: What is the interplay between students' socioeconomic background and the effects of school gender? As discussed earlier, Riordan (1990) documented particular advantages of single-sex education for African American and Hispanic students, and Salomone (2003, 2006) also makes the case for investigating the extent to which the impact of school gender is shaped by students' race and class.

SELECTION OF OUTCOME VARIABLES

The descriptive analyses conducted for this study revealed more than one hundred significant differences between single-sex and coeducational graduates in their responses to individual items on the Freshman Survey. Since it would be unwieldy to conduct separate analyses predicting each and every characteristic that was found to differ between single-sex and coeducational graduates, we used factor analysis to help narrow our list of outcome measures. To the extent possible, we clustered together items that indicated statistically significant differences between the single-sex and coeducational graduates (for either the independent or Catholic samples). T-tests were conducted to confirm that the factors (and not just the individual items) produced statistically significant differences ($p<.05$) between single-sex and coeducational groups. HLM analyses were run only if the t-test indicated statistically significant differences for either the independent or Catholic school sample. Table 5 displays the final set of 25 dependent variables[6], including 14 individual items and 11 factors, and indicates whether the outcome was used in multilevel models conducted for

6 We deleted one dependent variable from the analyses for Catholic schools (majoring in mathematics or statistics). The model could not converge in HLM based on too little variability within and across schools in students' intention to major in mathematics or statistics.

graduates of independent schools, Catholic schools, or both. These 25 dependent variables are organized across three broad categories reflecting categories considered in other research on single-sex education: Academic Engagement and Self-Confidence (six measures), Aspirations and Expectations (nine measures), and Attitudes and Social Behaviors (ten measures) (see Table 5).

Selection of Independent Variables

This study incorporates a number of control variables that are designed to equate the single-sex and coeducational samples as much as possible in terms of their demographic backgrounds and the characteristics of the high schools they attended. At the student level (level-one), these include: race/ethnicity, family income, parental education, religious preference, and high school grade point average. At the high school level (level-two), these include: school gender, size, median SAT scores, geographic region, urbanicity, number of Advanced Placement course offerings, percent students of color, counselor-to-student ratios, grade span (high school only), and whether the school provides opportunities for dual enrollment (i.e., college course-taking in high school). By accounting for these differences between single-sex and coeducational graduates, we are in a better position to assess the unique role played by school gender composition. A list of all independent variables and their coding is provided in Table 6.

Analytic Approach

First, since HLM requires variation both within and across schools, we eliminated schools (and the respondents in those schools) that had fewer than 5 respondents. This resulted in a total of 5,850 students from 358 independent single-sex and coeducational high schools and 14,470 students from 607 single-sex and coeducational Catholic high schools.

Table 5
Dependent Variables

	Used for Independent School Analysis	Used for Catholic School Analysis
Academic Achievement and Self-Confidence		
Academic self-confidence[a]	X	X
Self-rated computer skills	X	X
Self-rated mathematical ability	X	X
Academic engagement[a]	X	X
SAT scores	X	X
Goal: Make theoretical contribution to science	X	X
Aspirations and Expectations		
Intended major: Engineering	X	X
Intended major: History or Political Science		X
Intended degree: Law/JD	X	X
Future activity: Participate in student government	X	X
Reasons for college: Economic[a]		X
Reasons for college: Graduate school preparation[a]	X	X
Reasons for college: Educational[a]	X	X
Future activity: Participate in student clubs/groups	X	X
Future activity: Join a social fraternity or sorority	X	
Attitudes and Social Behaviors		
Political orientation		X
Political engagement[a]	X	X
Future activity: Participate in student protests or demonstrations	X	X
Community orientation[a]	X	X
Religiousness[a]		X
Hours per week: Sports/Exercise[a]		X
Hedonism[a]	X	X
Frequently socialized with someone of other ethnic group	X	X
Liberal social views[a]	X	X
Goal: Develop a meaningful philosophy of life		X
Frequently felt overwhelmed	X	

[a] See Appendix D for factor loadings and reliabilities.

Table 6
Independent Variables

Variable	Coding Scheme
Student Demographics (Level-one)	
Race/Ethnicity: Black, American Indian, Asian, Latino, White/Caucasian[a]	All dichotomous: 1 (not marked), 2 (marked)
Student Religion: Catholic, Protestant, Jewish, Other[a]	All dichotomous: 1 (not marked), 2 (marked)
Family Income	14-pt scale: 1 (Less than $10K) to 14 ($250K +)
Parents' Education Level	8-pt scale: 1 (Grammar school or less) to 8 (Graduate degree)
High School GPA	8-pt scale: 1 (D) to 8 (A or A+)
High School Characteristics (Level-two)	
School Gender	Dichotomous: 1 (coed), 2 (single-sex)
12th Grade Enrollment	Continuous
High School Region: East, Midwest, West, South[a]	All dichotomous: 1 (not marked), 2 (marked)
Grade Span: High school only	Dichotomous: 1 (K-12), 2 (9-12)
Counselor-to-student ratio	Continuous
Percent Students of Color	Continuous
SAT 75th Percentile Composite	Continuous
School Environment: Urban, Suburban, Rural[a]	All dichotomous: 1 (not marked), 2 (marked)
Permits Dual Enrollment (high school & college)	Dichotomous: 1 (not marked), 2 (marked)
Number of Advanced Placement Courses Offered	Continuous

[a] Represents excluded category.

For each outcome variable, we then calculated the intra-class correlation coefficient (ICC), which indicates the proportion of total variability in the outcome variable that is due to differences between schools. Next, we developed two models for each outcome. Model 1 included all student-level (level-one) control variables as well as school gender at level-two. Model 2 included both student (level-one) and high school (level-two) controls. Several of our outcome variables were dichotomous in nature (e.g., intention to major in engineering) or were 3-point scales converted to dichotomous outcomes given their skewed distributions (e.g., felt overwhelmed). For those outcomes, we used a special form of HLM

known as hierarchical generalized linear modeling (HGLM), which appropriately adjusts the distribution in the model to reflect the dichotomous nature of the dependent variable.

In each analysis, the focus is on the predictive power of the "school gender" variable (1=coeducational; 2=single-sex). The significance of school gender was examined after controlling for all independent variables in the two categories of variables described above: (1) student demographics (level-one); and (2) high school characteristics (level-two). If the relationship between school gender and a dependent variable was significant after both levels of control were considered, we have evidence of an "effect" of single-sex education on that particular student characteristic.

In cases where we found a significant association between an outcome and students' race or socioeconomic status, we then examined whether these effects significantly varied across high schools by enabling the random variance component in HLM. This allowed us to detect whether the effect of race or socioeconomic status was stronger at some high schools and weaker at other schools. In cases where we found significant variation across schools in the effects of race or socioeconomic status, we observed the extent to which this variation could be attributed to school gender. In doing so, we ask the question of whether school gender mitigates or enhances the association between a student's race or socioeconomic status and the outcome measure.

RESULTS FOR INDEPENDENT SCHOOL GRADUATES

Table 7 provides a summary of results from the HLM analyses conducted for the independent school sample.[7] For each dependent variable, this includes the intra-class correlation (ICC) (where applicable) and summary statistics (beta and gamma coefficients for level-one and level-two, respectively; standard errors; significance; and R^2) for school gender variable at two stages: (1) at model 1, when only student background characteristics (level-one variables) have been controlled; and (2) at model 2, when student characteristics (level-one) and high school characteristics (level-two) have been controlled. The latter is the most stringent test of the "single-sex effect" in this study. Finally, we report Delta-p statistics for dependent variables used in HGLM. These indicate changes in the predicted probability of an outcome based on attendance at a single-sex high school.

[7]Readers may contact the first author for complete models that include coefficients for each Level 1 and Level 2 predictor.

For the independent school sample, the ICCs range from a high of 29.5% (for SAT) to a low of 1.8% (for the goal of making a theoretical contribution to science)[8]. This reveals, for example, that more than a quarter of the variation in students' SAT scores is due to differences across schools, whereas the range of scores on students' scientific goals is only marginally a function of high school context, with nearly all of the variance occurring at the student level. We now turn to whether the effects of attending a single-sex high school are statistically significant at the different stages of our analysis.

Significant effects of independent single-sex education. The most stringent test of single-sex schooling in this study is whether the predictive power of school gender remains significant even when student background characteristics (level-1) and high school characteristics (level-2) have been controlled. This criterion is met for nearly half of the dependent variables (8 of 19) in the independent school sample, though it is important to note that the majority of these statistically significant effects are quite small.

Specifically, results suggest modest benefits of single-sex education in the form of higher self-rated math and computer skills, greater academic and political engagement, stronger interest in engineering, and greater propensity to participate in student government and other student organizations while in college. In other words, attendance at an all-girls school is related to slightly higher scores on these measures, even when accounting for the socioeconomic backgrounds of these women as well as a range of important school characteristics.

[8] Some (e.g., Lee, 2000) have argued that multilevel modeling is unnecessary when ICCs are less than 10%, however others (e.g., Hoffman, 1997) suggest that multilevel modeling is appropriate regardless of the size of the ICC since it is inherently wise to distinguish between school-level and student-level effects.

Table 7

Multilevel Modeling Results for Independent School Graduates

		Model 1					Model 2				
Outcome measure	ICC	Coef.	S.E.	Sig	R^2	Delta-p	Coef.	S.E.	Sig	R^2	Delta-p
Academic Achievement and Self-Confidence											
Self-rated computer skills	3.8%	0.16	0.05	***	6.8%	n/a	0.18	0.05	***	6.8%	n/a
Self-rated mathematical ability	3.9%	0.18	0.05	***	44.5%	n/a	0.19	0.05	***	44.5%	n/a
Goal: Make theoretical contribution to science	1.8%	0.06	0.04		23.8%	n/a	0.06	0.04		23.8%	n/a
SAT score	29.5%	26.23	16.06		27.7%	n/a	8.87	13.12		52.1%	n/a
Academic self-confidence	4.4%	0.20	0.10	*	28.6%	n/a	0.15	0.10		35.1%	n/a
Academic engagement	14.3%	0.84	0.13	***	26.0%	n/a	0.56	0.12	***	42.1%	n/a
Aspirations and Expectations											
Intended major: Engineering[a]	n/a	1.03	0.22	***	49.3%	4.97%	1.03	0.21	***	66.8%	4.97%
Intended degree: Law/JD[a]	n/a	0.19	0.11		11.9%	1.84%	0.09	0.12		33.9%	0.84%
Reasons for college: Educational	4.4%	0.07	0.04		41.3%	n/a	0.01	0.04		70.6%	n/a
Reasons for college: Graduate school preparation	5.2%	0.03	0.06		22.9%	n/a	-0.01	0.05		42.2%	n/a
Future activity: Participate in student government	5.4%	0.20	0.05	***	28.1%	n/a	0.21	0.05	***	28.1%	n/a
Future activity: Join a social fraternity or sorority	13.7%	0.06	0.07		42.8%	n/a	0.09	0.06		71.4%	n/a
Future activity: Participate in student clubs/groups	5.4%	0.11	0.03	***	25.6%	n/a	0.08	0.04	*	62.8%	n/a

Table 7 (continued)
Multilevel Modeling Results for Independent School Graduates

		Model 1					Model 2				
Outcome measure	ICC	Coef.	S.E.	Sig	R^2	Delta-p	Coef.	S.E.	Sig	R^2	Delta-p
Attitudes and Social Behaviors											
Community orientation	3.8%	0.17	0.13		25.5%	n/a	0.08	0.13		33.3%	n/a
Hedonism	10.3%	0.23	0.15		17.6%	n/a	0.04	0.14		29.4%	n/a
Liberal social views	28.4%	0.28	0.12	*	29.8%	n/a	-0.10	0.12		55.4%	n/a
Frequently felt overwhelmed[a]	n/a	0.19	0.09	*	2.1%	4.60%	0.20	0.10	*	51.0%	4.85%
Frequently socialized with someone of other ethnic group[a]	n/a	0.52	0.20	*	20.2%	7.06%	0.25	0.19		48.1%	3.70%
Political engagement factor	5.4%	0.35	0.08	***	24.6%	n/a	0.29	0.09	**	39.7%	n/a

[a] Dichotomous outcome requiring HGLM.
* p<.05. ** p<.01. *** p<.001.

The one outcome that reveals an unfavorable effect of independent single-sex schooling is student stress. Women attending single-sex institutions report feeling frequently overwhelmed by all they have to do slightly more often than their peers at co-educational high schools.

Effects of independent single-sex education accounted for by other high school characteristics. For three outcome measures, differences between single-sex and coeducational graduates remained significant after controlling for student demographic characteristics (level-1) but became nonsignificant once high school characteristics (level-2) were added to the equation. These three variables are: academic self-confidence, liberal social views, and socializing with someone of another race/ethnicity. In other words, higher scores observed for single-sex alumnae on these three outcomes are not a function of school gender per se, but of other school characteristics measured in this study, such as size, selectivity, and geographic region.

Nonsignificant effects of independent single-sex education. Finally, for about half (9 of 19) of the outcomes examined in the independent school sample, differences between single-sex and coeducational graduates that had been significant in the initial descriptive analyses were not significant when using the more robust HLM statistical technique. Several of these relate to academic orientations, including: SAT scores, educational reasons for college, graduate school preparation as a reason for college, and law school aspirations. In each of these cases, variables such as parental education or family income were more salient predictors and usurped the predictive power of school gender.

Results for Catholic School Graduates

Table 8 provides a summary of results from the HLM analyses conducted for the Catholic school sample. As with the independent school sample, intra-class correlations (ICCs) vary widely for students from Catholic high schools—from a high of 22.6% to a low of 1.0%. Once again, this reveals that differences between schools account for a relatively small proportion of the total variance in most dependent variables.

Significant effects of Catholic single-sex education. Of the 23 outcomes examined for the Catholic school sample, a full three-quarters (17 outcomes) pass our most stringent test of the single-sex effect. That is, gender explains a significant proportion of between-school variance even when controlling for relevant student background and high school

characteristics. The largest effect of single-sex education in the Catholic school sample is on SAT scores. Here, we find that 22.6% of the variation in SAT scores is accounted for by differences between schools, with school gender accounting for more than half (52.1%) of that variance. The significant positive effect of Catholic girls' schools on SAT scores remains significant after all other student and school-level variables are controlled.

Other positive effects of single-sex Catholic education are appreciably smaller, though noteworthy, given that they maintain statistical significance despite the number of control variables included. These benefits include higher self-confidence in math and computer skills, greater scientific orientation and stronger interest in engineering careers. In addition, all-girls Catholic schools produce graduates who are more academically engaged and who value college more for its intrinsic or academic purposes, and less for its extrinsic or economic functions, than do graduates of coeducational Catholic schools. Further, graduates of Catholic single-sex high schools report stronger orientations toward political engagement and student government opportunities than women from coeducational Catholic schools. And, while neither a positive or negative result, Catholic girls' schools tend to promote more liberal social views (e.g., towards abortion and gay rights) than their Catholic coeducational counterparts.

Table 8

Multilevel Modeling Results for Catholic School Graduates

		Model 1					Model 2				
Outcome measure	ICC	Coef.	S.E.	Sig	R^2	Delta-p	Coef.	S.E.	Sig	R^2	Delta-p
Academic Achievement and Self-Confidence											
Self-rated computer skills	3.8%	0.14	0.02	***	48.7%	n/a	0.14	0.02	***	48.7%	n/a
Self-rated mathematical ability	2.3%	0.05	0.02	*	25.0%	n/a	0.06	0.02	*	29.7%	n/a
Goal: Make theoretical contribution to science	1.0%	0.03	0.01	*	21.7%	n/a	0.05	0.02	**	21.7%	n/a
SAT score	22.6%	23.56	0.68	***	52.1%	n/a	19.92	6.32	**	76.0%	n/a
Academic engagement	6.1%	0.51	0.05	***	38.7%	n/a	0.37	0.06	***	54.0%	n/a
Aspirations and Expectations											
Intended major: Engineering[a]	n/a	0.27	0.11	*	28.7%	0.60%	0.30	0.14	*	28.7%	0.02%
Intended major: History or Political Science[a]	n/a	0.23	0.07	**	37.1%	1.21%	0.12	0.09		44.9%	0.60%
Intended degree: Law/JD[a]	n/a	0.26	0.08	**	25.1%	1.89%	0.18	0.09		31.9%	1.27%
Reasons for college: Educational	1.5%	0.06	0.02	***	25.1%	n/a	0.04	0.02	*	70.0%	n/a
Reasons for college: Economic	2.5%	-0.09	0.02	***	24.3%	n/a	-0.07	0.02	***	47.0%	n/a
Reasons for college: Graduate school preparation	2.6%	0.09	0.02	***	18.0%	n/a	0.07	0.02	***	34.4%	n/a
Future activity: Participate in student government	2.4%	0.09	0.02	***	16.8%	n/a	0.06	0.02	**	22.0%	n/a
Future activity: Participate in student clubs/groups	2.8%	0.04	0.02	**	33.6%	n/a	0.02	0.02		33.6%	n/a

Table 8 (continued)
Multilevel Modeling Results for Catholic School Graduates

		Model 1					Model 2				
Outcome measure	ICC	Coef.	S.E.	Sig	R^2	Delta-p	Coef.	S.E.	Sig	R^2	Delta-p
Attitudes and Social Behaviors											
Community orientation	3.7%	0.18	0.06	***	34.0%	n/a	0.07	0.06		54.6%	n/a
Political engagement	5.2%	0.34	0.04	***	41.0%	n/a	0.27	0.05	***	57.1%	n/a
Religiousness	6.6%	-0.20	0.06	**	21.7%	n/a	-0.17	0.07	*	39.1%	n/a
Hours per week: Sports and exercise	3.0%	-0.28	0.05	***	56.5%	n/a	-0.34	0.05	***	62.7%	n/a
Hedonism	6.1%	0.10	0.06		20.6%	n/a	0.16	0.06	*	37.1%	n/a
Liberal social views	14.4%	0.42	0.07	***	23.3%	n/a	0.29	0.07	***	37.9%	n/a
Political orientation	6.3%	0.06	0.02	**	27.9%	n/a	0.04	0.02		51.9%	n/a
Goal: Develop a meaningful philosophy of life	1.5%	0.05	0.02	*	29.5%	n/a	0.04	0.02	*	71.8%	n/a
Frequently socialized with someone of other ethnic groupa	n/a	0.27	0.09	**	18.2%	4.98%	0.09	0.08		48.9%	1.74%
Future activity: Participate in student protests or demonstrations	2.7%	0.07	0.02	***	3.7%	n/a	0.06	0.02	**	22.9%	n/a

[a] Dichotomous outcome requiring HGLM.

* p<.05. ** p<.01. *** p<.001.

A few findings point towards outcomes that might be considered negative from the standpoint of Catholic schooling. The first is that graduates of Catholic girls' schools tend to exhibit lower levels of religiousness and a greater propensity for hedonistic behaviors (e.g., drinking and smoking) than is observed among women from Catholic coeducational schools. We also find lower rates of sports and exercise reported among women from Catholic girls' schools, relative to their peers from coeducational schools.

Effects of Catholic single-sex education accounted for by other high school characteristics. For five outcomes examined for the Catholic school sample, effects of school gender were significant after controlling for student demographic characteristics (level-1), but became nonsignificant once high school characteristics (level-2) were added to the equation. These are: interest in law, history and political science, as well as community orientation, interest in participating in student clubs, and frequency of cross-race social interactions. These results reveal that higher scores for single-sex alumnae on these outcomes are not a function of school gender, but are due to other school characteristics measured in this study, such as size, selectivity, and geographic region. In the case of cross-racial social interactions, for example, level-2 variables proving more salient than school gender are the percent students of color in the high school and being located in the western region of the United States.

Nonsignificant effects of Catholic single-sex education. Finally, of the 23 outcomes examined for the Catholic school sample, only one—political orientation—indicates a difference between single-sex and coeducational graduates that became nonsignificant when student- and school-level variance could be considered separately. In this case, the more liberal leanings of women attending Catholic girls' schools (as described earlier in this report) are more a reflection of their higher family incomes than of the single-gender status of their school, since income is associated with more liberal political orientations for the students in this sample.

Interaction Effects

The final aspect of our analysis was a consideration of whether the effects of students' race or income on the outcome measures varied significantly across high schools and whether this variance could be accounted for by school gender. Across all outcomes examined, we found only one case where school gender interacted with either race or class

in predicting student outcomes. That is, within the Catholic schools, Latina students' scientific orientation was even greater for those attending single-sex high schools compared to their peers in coeducational schools. From that we might conclude that, relative to Catholic coeducational schools, Catholic girls' schools prove especially beneficial in promoting Latina students' interest in science as they transition into college.

Discussion and Implications for Future Research

In an effort to contribute to the ongoing discourse regarding single-sex education for girls, this report has drawn from a large national dataset on entering college students to assess differences between female graduates of single-sex and coeducational high schools across a wide range of attributes. The report also aims to clarify the extent to which such differences are specifically attributable to school gender, rather than to the other characteristics of those schools or the students who attend them. In doing so, the study advances research on single-gender schooling in the United States, while also pointing to a number of fruitful avenues for future study.

Overview of Findings

Similar to a conclusion drawn in the U.S. Department of Education's (2005) major review of research on single-sex education, the vast majority of results identified in this study are either slightly favorable to single-sex education or suggest no difference between single-sex and coeducational graduates. Simple descriptive comparisons between single-sex and coeducational graduates generally depict single-sex alumnae as slightly more academically oriented, more intellectually confident, more politically engaged, and more likely to prioritize extracurricular involvement in their schools. While advocates of single-sex education can certainly point to these results as evidence of beneficial outcomes associated with all-girls schooling, this report has emphasized the importance of distinguishing effects of single-sex schooling from other school characteristics as well as the characteristics associated with the students who choose to attend single-sex schools. The use of multilevel modeling was critical in allowing us to do this.

Overall, the multilevel analyses suggest that all-girls secondary schooling does play a small role in fostering the development of particular attributes that are beneficial to women as they transition into college. Specifically, all-girls schools—whether independent or Catholic-affiliated—appear to produce graduates who enter college more academically and politically engaged, as well as more confident in their mathematical and computer skills, than women from equivalent backgrounds who attend coeducational schools. Single-sex

graduates are also more likely to begin college aspiring to become engineers. It is worth noting that most of these apparent benefits of single-sex education are in areas that have historically witnessed gender gaps favoring men. In fact, decades of research have shown first-year college women to consistently rate themselves lower than men on their academic abilities, especially when it comes to math and science, and to show less interest in politics (Sax, 2008). Thus, this study highlights areas in which single-sex education may help to mitigate longstanding gender gaps.

The results also remind us that we must avoid over-generalizing when we talk about the "effects" of single-sex education. Indeed, to describe single-sex education as either "favorable" or "unfavorable" to female students is far too dualistic. Among the many considerations that need to be taken into account in research on this topic is the specific school population under study. In this study, analyses were conducted separately for independent and Catholic school graduates, as combining all single-sex alumnae into one large population would obscure the results. Indeed, single-sex independent school graduates differ from single-sex Catholic school graduates in numerous ways, many reflecting the generally wealthier, more liberal, and less religious backgrounds of women from independent schools. Thus, it was important to consider the single-sex versus coeducation differential separately for these school types.

A second important consideration is the number of control variables included. Some measures, such as academic and political engagement, reveal significant differences between single-sex and coeducational graduates that remain statistically significant despite the inclusion of numerous controls. For other measures, such as SAT scores for independent school graduates and political liberalism for Catholic school graduates, differences that favor single-sex alumnae are not directly attributable to the single-gender aspect of the high school, but are a reflection of the students who choose to attend single-sex schools. In these cases, whether or not we detect an "effect" of single-sex education depends on what other control variables are considered.

This report has also shown that the effects of single-sex education depend on the outcome in question. Whereas we find positive effects related to academic and political engagement as well as in the preparation of scientists and engineers, we also find some

single-sex graduates arriving at college with greater levels of stress and less participation in sports and exercise, than their coeducational counterparts.

Directions for Future Research

Despite the many contributions made by this research, the limitations we encountered point towards numerous important avenues for future research. First, as with all social science research, we were unable to control for all of the potentially important differences between single-sex and coeducational graduates. Ideally, we would minimize self-selection bias by knowing why these students chose to attend (or not to attend) a single-sex high school. Are they or their parents making a "proacademic choice" as suggested by Riordan (2002)? Are they intentionally selecting an environment that will promote success in math and science? Lee and Marks (1992) reveal the choice to attend a single-sex secondary school as a function of factors such as religiosity, student and family educational background, and the value placed on the academic opportunities provided by the choice of secondary school. Future research ought to control for such criteria when assessing the impact of single-sex schooling.

It would also be preferable to distinguish the effects of school "gender" from effects associated with school "climate" as determined by school mission and leadership, teacher attitudes, course content, pedagogy, student leadership opportunities, and myriad other forces that can also contribute to student outcomes. As suggested by Riordan (2002), factors such as more equitable curricula, more favorable student-teacher interactions, and more active pedagogy may help to explain why we observe benefits of single-sex education. To the extent that school "climate" rather than school "gender" explain the benefits of single-sex education, research would then need to address the extent to which successful elements of single-sex education could be replicated in coeducational settings. The latter is a particularly murky question given the difficulty of disentangling single-sex settings from the environments they create.

The present study also focuses on a specific segment of education: private secondary schools. Future research must continue to address these questions by examining private K-8 schooling, and also ought to explore the importance of duration of single-sex enrollment. How long should a student enroll in a single-sex school in order to derive the benefits documented in this report? Further, and perhaps more importantly, research will need to

give careful consideration to single-sex education in the public sector. Though this study did not examine public single-sex education, it is clearly an area ripe for research, especially that which takes into account the multiple considerations that are addressed in this study—such as student background and school characteristics—as well as other contextual factors that this study could not address.

Another important line of inquiry is the question of who benefits most from single-sex education. This study has shown, for example, that Catholic single-sex schools may be especially beneficial in promoting scientific interest among Latina students. Future research should continue to examine the interplay between race, class, and school gender, but should also consider a broader range of student characteristics that may influence the role played by single-sex schooling, such as self-confidence, values, or career orientation. The use of multilevel modeling will be especially useful in addressing these questions.

Finally, this study examines the effects of single-sex education at a single-point in time: college entry. While this represents an important transition point for students, ultimately the research will need to address longer-term questions. Specifically, do the benefits of single-sex education persist throughout college? How does single-sex education affect women's adjustment to college and their ability to establish same-sex and cross-sex friendships or other relationships? Are single-sex secondary effects different for students who attend women's colleges? How long-lasting are the effects beyond college and specifically on career attainment and leadership? Ideally, research that considers such questions will attend to the many considerations that shaped the current study, including appropriate comparison groups and the inclusion of relevant control variables.

Concluding Thoughts

Many readers may be interested in getting to the bottom line: Is single-sex education better for female students? Individuals on both sides of the debate may find support for their cause in the pages of this report. Advocates of all-girls schooling may view these results as an affirmation of their efforts to create environments that foster the development of intellectually engaged and self-confident young women. Critics of single-sex education, on the other hand, may conclude that the marginal benefits do not justify the potential threats to gender equity brought on by academic sex segregation.

Given the importance of this issue, and the many factors that could not be considered in this study, it would be unwise to draw unilateral conclusions about whether single-sex education is superior to coeducation. As shown throughout this report, conclusions on this matter depend on which school type is considered (Catholic or independent), which control variables are incorporated (student or school characteristics), and which outcomes are examined. The threshold one sets for statistical and practical significance also plays a key role in reaching determinative conclusions. Ideally, continued discussions on all-girls schooling, in both the policy and scholarly communities, will be more mindful of these considerations and more vigilant in advocating for new research that attends to the complexity of the single-sex experience.

REFERENCES

AAUW. (1992). *How schools shortchange girls: A study of major findings on girls and education.* Washington, D.C., American Association of University Women Educational Foundation.

Arms, E. (2007). Gender equity in coeducational and single-sex environments. In S. S. Klein, B. Richardson, D.A. Grayson, L.H. Fox, C. Kramarae, D.S. Pollard, et. al. (Eds.), *Handbook for achieving gender equity through education* (2nd ed., pp. 171-190). Mahweh, NJ: Lawrence Erlbaum Associates.

Bryk, A. S., Lee, V. E., & Holland, P. B. (1993). *Catholic schools and the common good.* Cambridge, Mass: Harvard University Press.

Carpenter, P., & Hayden, M. (1987). Girls' academic achievements: Single-sex vs. coeducational schools in Australia. *Sociology of Education, 60*(3), 156-167.

Conway, K. E. (1996). Differential effects of single-sex versus coed education on the mathematical reasoning ability, verbal reasoning ability, and self-concept of high school girls. *Dissertation Abstracts International*, 57(12), 5047A.

Datnow, A., & Hubbard, L. (Eds.). (2002). *Gender in policy and practice: Perspectives on single-sex and coeducational schooling*. New York: Routledge Falmer.

Garcia, D. M. (1998). Single-sex vs. coeducational public schooling for girls: A high school comparison study. *Dissertation Abstracts International,* 59(07), 2434A.

Granleese, J., & Joseph, F. (1993). Self-perception profile of adolescent girls at a single-sex and mixed-sex school. *Journal of Genetic Psychology, 154*(4), 525-530.

Gwizdala, J., & Steinbeck, M. (1990). High school females' mathematics attitudes: an interim report. *School Science and Mathematics, 90(*3), 215-222.

Haag, P. (1998). Single-sex education in grades K-12: What does the research tell us? In S. Morse (Ed.), *Separated by sex: A critical look at single-sex education for girls.* (pp. 13-38). Washington, D.C., American Association of University Women Educational Foundation.

Harker, R., & Nash, R. (1997, March). *School type and the education of girls: Co-ed or girls only?* Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL. (ERIC Document Reproduction Service No. ED410633).

Hubbard, L., & Datnow, A. (2005). Do single-sex schools improve the education of low-income and minority students? An investigation of California's public single-gender academies. *Anthropology and Education Quarterly 36*(2), 115-131.

Karpiak, C. P., Buchanan, J. P., Hosey, M., & Smith, A. (2007). University students from single-sex and coeducational schools: Differences in majors and attitudes at a Catholic university. *Psychology of Women Quarterly,* 31, 282-289.

Lee, V. E. (1998). Is single-sex secondary schooling a solution to the problem of gender inequity? In S. Morse (Ed.), *Separated by sex: A critical look at single-sex education for girls* (pp.41-53).Washington, DC: AAUW Educational Foundation.

Lee, V. E. (2000). Using hierarchical linear modeling to study social contexts: The case of school effects. *Educational Psychologist, 35*(2), 125-141.

Lee, V. E., & Bryk, A.S. (1986). Effects of single-sex secondary schools on student achievement and attitudes. *Journal of Educational Psychology, 78*(5), 381-385.

Lee, V.E., & Marks, H. M. (1990). Sustained effects of the single-sex secondary school experience on attitudes, behaviors, and values in college. *Journal of Educational Psychology, 82*(3), 578-592.

Lee, V. E., & Marks, H. M. (1992). Who goes where? Choice of single-sex and coeducational independent secondary schools. *Sociology of Education*, *65*(3), 226-253.

Lee, V. E., Marks, H. M., & Byrd, T. (1994). Sexism in single-sex and coeducational independent secondary school classrooms. *Sociology of Education*, 67, 92-120.

Mael, F. A. (1998). Single-sex and coeducational schooling: Relationships to socioemotional and academic development. *Review of educational research 68*(2), 101-129.

Marsh, H.W. (1991). Public, Catholic single-sex, and Catholic coeducational high schools: Their effects on achievement, affect, and behaviors. *American Journal of Education 99*(3), 320-356.

Marsh, H. W., & Rowe, K. J. (1996). The effects of single-sex and mixed-sex mathematics classes within a coeducational school: A reanalysis and comment. *Australian Journal of Education, 40*(2), 147-162.

Morse, S. (Ed.) (1998). *Separated by sex: A critical look at single-sex education for girls.* Washington, DC: AAUW Educational Foundation.

National Association for Single Sex Public Education (NASSPE). (2008). Retrieved October 1, 2008 from http://www.singlesexschools.org/schools-schools.htm.

Pryor, J. H., Hurtado, S., Saenz, V. B., Lindholm, J. A., Korn, W. S., & Mahoney, K. M. (2005). *The American freshman: National norms for fall 2005.* Los Angeles: Higher Education Research Institute, UCLA.

Raudenbush, S. W., & Bryk, A. S. (2002). *Heirarchical linear models: Applications and data analysis methods (2nd ed.).* Newbury Park, CA: Sage Publications, Inc.

Riordan, C. (1985). Public and Catholic schoolings: The effects of gender context policy. *American Journal of Education,* 93, 518-540.

Riordan, C. (1990). *Girls and boys in school: Together or separate?* New York: Teachers College Press.

Riordan, C. (1994). Single-gender schools: Outcomes for African and Hispanic Americans. *Research in Sociology of Education and Socialization,* 10, 177-205.

Riordan, C. (2002). What do we know about the effects of single-sex schools in the private sector? Implications for public schools. In A. Datnow, & L. Hubbard (Eds.), *Gender in Policy and Practice* (pp. 10-30). New York: Routledge Falmer.

Rowe, K. J. (1988). Single-sex and mixed-sex classes: The effects of class type on student achievement, confidence, and participation in mathematics. *Australian Journal of Education, 32*(2), 180-202.

Sadker, M., & Sadker, D. (1994). *Failing at fairness: How our schools cheat girls.* New York: Simon and Schuster.

Salomone, R. C. (2003). *Same, different, equal: Rethinking single-sex schooling.* New Haven, Conn: Yale University Press.

Salomone, R. C. (2006). Single-sex programs: Resolving the research conundrum. *Teachers College Record 108*(4), 778-802.

Sax, L. J. (2008). *The gender gap in college: Maximizing the developmental potential of women and men.* San Francisco: Jossey-Bass.

Shmurak, C. B. (1998). *Voices of hope: Adolescent girls at single-sex and coeducational schools.* New York: Peter Lang.

Signorella, M. L., Frieze, I. H., & Hershey, S. W. (1996). Single-sex versus mixed-sex classes and gender schemata in children and adolescents. *Psychology of Women Quarterly*, *20*(4), 599-607.

Slattery, E. A. (2005). *Reflections on the gendered environment: Self-esteem development in women transitioning from a single-sex high school to a coeducational college*. Unpublished doctoral dissertation, University of California, Los Angeles.

Spielhagen, F. R. (2008). Single-sex education: Policy, practice, and pitfalls. *Teachers College Record,* Date Published: October 7, 2008.

Streitmatter, J. L. (1999). *For girls only: Making a case for single-sex schooling.* Albany, NY: SUNY Press.

Sullivan, A. (2008a). *Academic self-concept, gender and single-sex schooling.* British Education Research Journal, June 2008, 1-30.

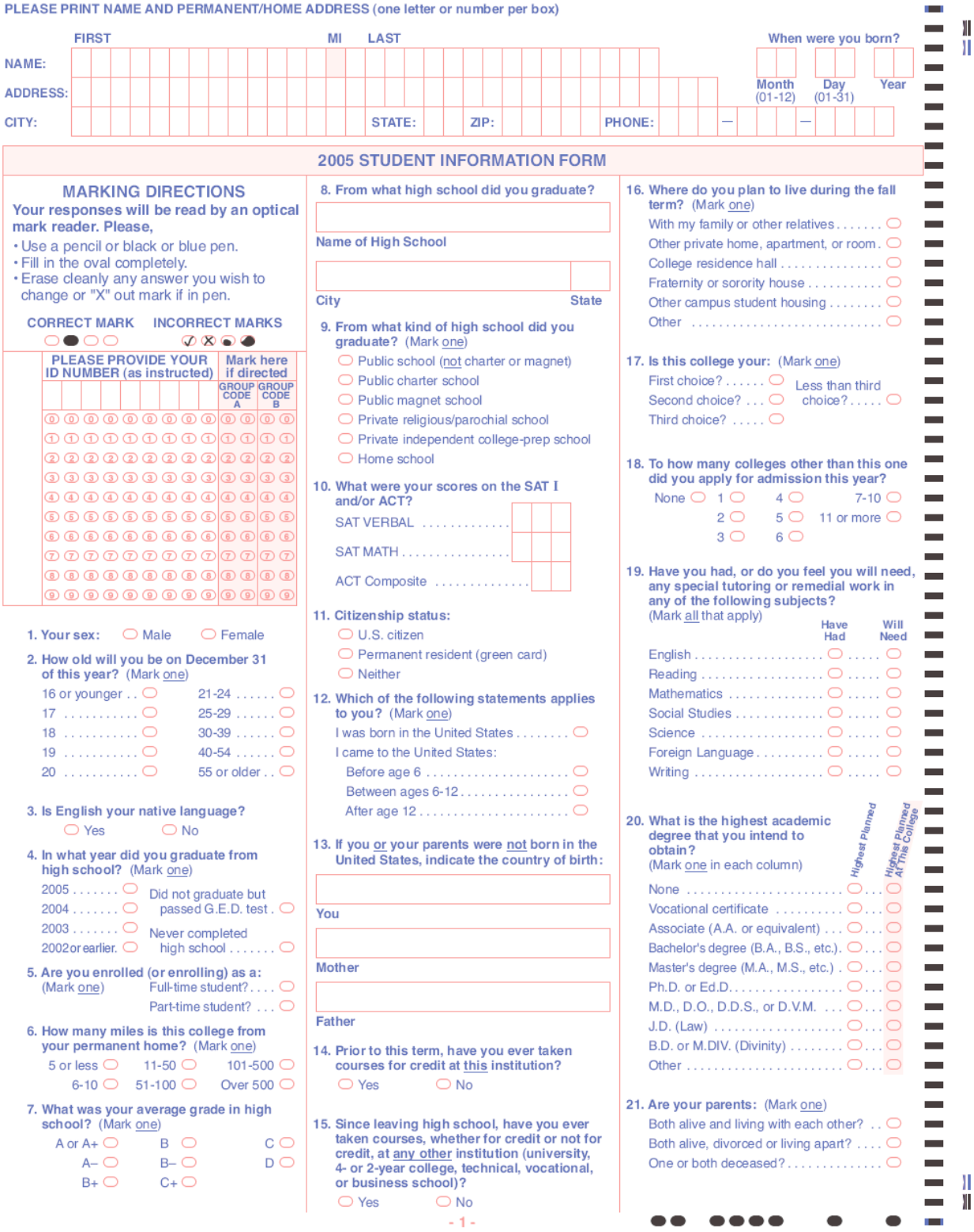
Sullivan, A. (2008b). *Single-sex schooling and academic attainment at school and through the lifecourse*. Manuscript submitted for publication.

Thompson, J. S. (2003). The effect of single-sex secondary schooling on women's choice of college major. *Sociological Perspectives, (46)*2, 257-278.

U. S. Department of Education (2005). *Single-sex versus coeducational schooling: A systematic review.* Washington, D.C.: Office of Planning, Evaluation and Policy Development.

Watson, C. M., Quatman, T., & Elder, E. (2002). Career aspirations of adolescent girls: Effects on achievement level, grade, and single-sex school environment. *Sex Roles, 46* (9/10), 323-335.

APPENDIX A
2005 CIRP QUESTIONNAIRE



PLEASE PRINT NAME AND PERMANENT/HOME ADDRESS (one letter or number per box)

FIRST MI LAST

NAME:

ADDRESS:

CITY: STATE: ZIP: PHONE: — —

When were you born? Month (01-12) Day (01-31) Year

2005 STUDENT INFORMATION FORM

MARKING DIRECTIONS

Your responses will be read by an optical mark reader. Please,

- Use a pencil or black or blue pen.
- Fill in the oval completely.
- Erase cleanly any answer you wish to change or "X" out mark if in pen.

CORRECT MARK INCORRECT MARKS

PLEASE PROVIDE YOUR ID NUMBER (as instructed) | Mark here if directed: GROUP CODE A, GROUP CODE B

1. **Your sex:** Male Female

2. **How old will you be on December 31 of this year?** (Mark one)
   16 or younger / 17 / 18 / 19 / 20 / 21-24 / 25-29 / 30-39 / 40-54 / 55 or older

3. **Is English your native language?** Yes No

4. **In what year did you graduate from high school?** (Mark one)
   2005 / 2004 / 2003 / 2002 or earlier / Did not graduate but passed G.E.D. test / Never completed high school

5. **Are you enrolled (or enrolling) as a:** (Mark one) Full-time student? Part-time student?

6. **How many miles is this college from your permanent home?** (Mark one)
   5 or less / 6-10 / 11-50 / 51-100 / 101-500 / Over 500

7. **What was your average grade in high school?** (Mark one)
   A or A+ / A– / B+ / B / B– / C+ / C / D

8. **From what high school did you graduate?**
   Name of High School
   City State

9. **From what kind of high school did you graduate?** (Mark one)
   Public school (not charter or magnet) / Public charter school / Public magnet school / Private religious/parochial school / Private independent college-prep school / Home school

10. **What were your scores on the SAT I and/or ACT?**
    SAT VERBAL / SAT MATH / ACT Composite

11. **Citizenship status:**
    U.S. citizen / Permanent resident (green card) / Neither

12. **Which of the following statements applies to you?** (Mark one)
    I was born in the United States
    I came to the United States: Before age 6 / Between ages 6-12 / After age 12

13. **If you or your parents were not born in the United States, indicate the country of birth:**
    You
    Mother
    Father

14. **Prior to this term, have you ever taken courses for credit at this institution?** Yes No

15. **Since leaving high school, have you ever taken courses, whether for credit or not for credit, at any other institution (university, 4- or 2-year college, technical, vocational, or business school)?** Yes No

16. **Where do you plan to live during the fall term?** (Mark one)
    With my family or other relatives / Other private home, apartment, or room / College residence hall / Fraternity or sorority house / Other campus student housing / Other

17. **Is this college your:** (Mark one)
    First choice? / Second choice? / Third choice? / Less than third choice?

18. **To how many colleges other than this one did you apply for admission this year?**
    None / 1 / 2 / 3 / 4 / 5 / 6 / 7-10 / 11 or more

19. **Have you had, or do you feel you will need, any special tutoring or remedial work in any of the following subjects?** (Mark all that apply)

	Have Had	Will Need
English		
Reading		
Mathematics		
Social Studies		
Science		
Foreign Language		
Writing		

20. **What is the highest academic degree that you intend to obtain?** (Mark one in each column)

	Highest Planned	Highest Planned At This College
None		
Vocational certificate		
Associate (A.A. or equivalent)		
Bachelor's degree (B.A., B.S., etc.)		
Master's degree (M.A., M.S., etc.)		
Ph.D. or Ed.D.		
M.D., D.O., D.D.S., or D.V.M.		
J.D. (Law)		
B.D. or M.DIV. (Divinity)		
Other		

21. **Are your parents:** (Mark one)
    Both alive and living with each other? / Both alive, divorced or living apart? / One or both deceased?

- 1 -

22. How much of your first year's educational expenses (room, board, tuition, and fees) do you expect to cover from each of the sources listed below? (Mark one answer for each possible source)

	None	Less than $1,000	$1,000-2,999	$3,000-5,999	$6,000-9,999	$10,000+
Family resources (parents, relatives, spouse, etc.)	○	○	○	○	○	○
My own resources (savings from work, work-study, other income)	○	○	○	○	○	○
Aid which need not be repaid (grants, scholarships, military funding, etc.)	○	○	○	○	○	○
Aid which must be repaid (loans, etc.)	○	○	○	○	○	○
Other than above	○	○	○	○	○	○

23. What is your best estimate of your parents' total income last year? Consider income from all sources before taxes. (Mark one)

- ○ Less than $10,000
- ○ $10,000-14,999
- ○ $15,000-19,999
- ○ $20,000-24,999
- ○ $25,000-29,999
- ○ $30,000-39,999
- ○ $40,000-49,999
- ○ $50,000-59,999
- ○ $60,000-74,999
- ○ $75,000-99,999
- ○ $100,000-149,999
- ○ $150,000-199,999
- ○ $200,000-249,999
- ○ $250,000 or more

24. Current religious preference: (Mark one in each column)

	Yours	Father's	Mother's
Baptist	Ⓨ	Ⓕ	Ⓜ
Buddhist	Ⓨ	Ⓕ	Ⓜ
Church of Christ	Ⓨ	Ⓕ	Ⓜ
Eastern Orthodox	Ⓨ	Ⓕ	Ⓜ
Episcopalian	Ⓨ	Ⓕ	Ⓜ
Hindu	Ⓨ	Ⓕ	Ⓜ
Islamic	Ⓨ	Ⓕ	Ⓜ
Jewish	Ⓨ	Ⓕ	Ⓜ
LDS (Mormon)	Ⓨ	Ⓕ	Ⓜ
Lutheran	Ⓨ	Ⓕ	Ⓜ
Methodist	Ⓨ	Ⓕ	Ⓜ
Presbyterian	Ⓨ	Ⓕ	Ⓜ
Quaker	Ⓨ	Ⓕ	Ⓜ
Roman Catholic	Ⓨ	Ⓕ	Ⓜ
Seventh Day Adventist	Ⓨ	Ⓕ	Ⓜ
Unitarian/Universalist	Ⓨ	Ⓕ	Ⓜ
United Church of Christ/Congregational	Ⓨ	Ⓕ	Ⓜ
Other Christian	Ⓨ	Ⓕ	Ⓜ
Other Religion	Ⓨ	Ⓕ	Ⓜ
None	Ⓨ	Ⓕ	Ⓜ

25. Are you: (Mark all that apply)

- ○ White/Caucasian
- ○ African American/Black
- ○ American Indian/Alaska Native
- ○ Asian American/Asian
- ○ Native Hawaiian/Pacific Islander
- ○ Mexican American/Chicano
- ○ Puerto Rican
- ○ Other Latino
- ○ Other

26. For the activities below, indicate which ones you did during the past year. If you engaged in an activity frequently, mark Ⓕ. If you engaged in an activity one or more times, but not frequently, mark Ⓞ (Occasionally). Mark Ⓝ (Not at all) if you have not performed the activity during the past year. (Mark one for each item)

	Frequently	Occasionally	Not at all
Attended a religious service	Ⓕ	Ⓞ	Ⓝ
Was bored in class	Ⓕ	Ⓞ	Ⓝ
Participated in organized demonstrations	Ⓕ	Ⓞ	Ⓝ
Tutored another student	Ⓕ	Ⓞ	Ⓝ
Studied with other students	Ⓕ	Ⓞ	Ⓝ
Was a guest in a teacher's home	Ⓕ	Ⓞ	Ⓝ
Smoked cigarettes	Ⓕ	Ⓞ	Ⓝ
Drank beer	Ⓕ	Ⓞ	Ⓝ
Drank wine or liquor	Ⓕ	Ⓞ	Ⓝ
Felt overwhelmed by all I had to do	Ⓕ	Ⓞ	Ⓝ
Felt depressed	Ⓕ	Ⓞ	Ⓝ
Performed volunteer work	Ⓕ	Ⓞ	Ⓝ
Played a musical instrument	Ⓕ	Ⓞ	Ⓝ
Asked a teacher for advice after class	Ⓕ	Ⓞ	Ⓝ
Voted in a student election	Ⓕ	Ⓞ	Ⓝ
Socialized with someone of another racial/ethnic group	Ⓕ	Ⓞ	Ⓝ
Came late to class	Ⓕ	Ⓞ	Ⓝ
Used the Internet for research or homework	Ⓕ	Ⓞ	Ⓝ
Performed community service as part of a class	Ⓕ	Ⓞ	Ⓝ
Used a personal computer	Ⓕ	Ⓞ	Ⓝ
Discussed religion	Ⓕ	Ⓞ	Ⓝ
Discussed politics:			
In class	Ⓕ	Ⓞ	Ⓝ
With friends	Ⓕ	Ⓞ	Ⓝ
With family	Ⓕ	Ⓞ	Ⓝ
Worked on a local, state, or national political campaign	Ⓕ	Ⓞ	Ⓝ

27. Did your high school require community service for graduation?

○ Yes ○ No

28. What is the highest level of formal education obtained by your parents? (Mark one in each column)

	Father	Mother
Grammar school or less	○	○
Some high school	○	○
High school graduate	○	○
Postsecondary school other than college	○	○
Some college	○	○
College degree	○	○
Some graduate school	○	○
Graduate degree	○	○

29. In deciding to go to college, how important to you was each of the following reasons? (Mark one answer for each possible reason)

	Very Important	Somewhat Important	Not Important
My parents wanted me to go	Ⓥ	Ⓢ	Ⓝ
I could not find a job	Ⓥ	Ⓢ	Ⓝ
Wanted to get away from home	Ⓥ	Ⓢ	Ⓝ
To be able to get a better job	Ⓥ	Ⓢ	Ⓝ
To gain a general education and appreciation of ideas	Ⓥ	Ⓢ	Ⓝ
There was nothing better to do	Ⓥ	Ⓢ	Ⓝ
To make me a more cultured person	Ⓥ	Ⓢ	Ⓝ
To be able to make more money	Ⓥ	Ⓢ	Ⓝ
To learn more about things that interest me	Ⓥ	Ⓢ	Ⓝ
To prepare myself for graduate or professional school	Ⓥ	Ⓢ	Ⓝ
A mentor/role model encouraged me to go	Ⓥ	Ⓢ	Ⓝ
To get training for a specific career	Ⓥ	Ⓢ	Ⓝ
To find my purpose in life	Ⓥ	Ⓢ	Ⓝ

30. How would you characterize your political views? (Mark one)

- ○ Far left
- ○ Liberal
- ○ Middle-of-the-road
- ○ Conservative
- ○ Far right

31. Rate yourself on each of the following traits as compared with the average person your age. We want the most accurate estimate of how you see yourself. (Mark one in each row)

	Highest 10%	Above Average	Average	Below Average	Lowest 10%
Academic ability	○	○	○	○	○
Artistic ability	○	○	○	○	○
Computer skills	○	○	○	○	○
Cooperativeness	○	○	○	○	○
Creativity	○	○	○	○	○
Drive to achieve	○	○	○	○	○
Emotional health	○	○	○	○	○
Leadership ability	○	○	○	○	○
Mathematical ability	○	○	○	○	○
Physical health	○	○	○	○	○
Public speaking ability	○	○	○	○	○
Religiousness	○	○	○	○	○
Self-confidence (intellectual)	○	○	○	○	○
Self-confidence (social)	○	○	○	○	○
Self-understanding	○	○	○	○	○
Spirituality	○	○	○	○	○
Understanding of others	○	○	○	○	○
Writing ability	○	○	○	○	○

32. Mark only three responses, one in each column.

(M) Your mother's occupation
(F) Your father's occupation
(Y) Your probable career occupation

NOTE: If your father or mother is deceased, please indicate his or her last occupation.

	Y	F	M
Accountant or actuary	○	○	○
Actor or entertainer	○	○	○
Architect or urban planner	○	○	○
Artist	○	○	○
Business (clerical)	○	○	○
Business executive (management, administrator)	○	○	○
Business owner or proprietor	○	○	○
Business salesperson or buyer	○	○	○
Clergy (minister, priest)	○	○	○
Clergy (other religious)	○	○	○
Clinical psychologist	○	○	○
College administrator/staff	○	○	○
College teacher	○	○	○
Computer programmer or analyst	○	○	○
Conservationist or forester	○	○	○
Dentist (including orthodontist)	○	○	○
Dietitian or nutritionist	○	○	○
Engineer	○	○	○
Farmer or rancher	○	○	○
Foreign service worker (including diplomat)	○	○	○
Homemaker (full-time)	○	○	○
Interior decorator (including designer)	○	○	○
Lab technician or hygienist	○	○	○
Law enforcement officer	○	○	○
Lawyer (attorney) or judge	○	○	○
Military service (career)	○	○	○
Musician (performer, composer)	○	○	○
Nurse	○	○	○
Optometrist	○	○	○
Pharmacist	○	○	○
Physician	○	○	○
Policymaker/Government	○	○	○
School counselor	○	○	○
School principal or superintendent	○	○	○
Scientific researcher	○	○	○
Social, welfare, or recreation worker	○	○	○
Therapist (physical, occupational, speech)	○	○	○
Teacher or administrator (elementary)	○	○	○
Teacher or administrator (secondary)	○	○	○
Veterinarian	○	○	○
Writer or journalist	○	○	○
Skilled trades	○	○	○
Laborer (unskilled)	○	○	○
Semi-skilled worker	○	○	○
Unemployed	○	○	○
Other	○	○	○
Undecided	○		

33. Mark one in each row:

(1) Disagree Strongly
(2) Disagree Somewhat
(3) Agree Somewhat
(4) Agree Strongly

	4	3	2	1
There is too much concern in the courts for the rights of criminals	○	○	○	○
Abortion should be legal	○	○	○	○
The death penalty should be abolished	○	○	○	○
Marijuana should be legalized	○	○	○	○
It is important to have laws prohibiting homosexual relationships	○	○	○	○
Racial discrimination is no longer a major problem in America	○	○	○	○
Realistically, an individual can do little to bring about changes in our society	○	○	○	○
Wealthy people should pay a larger share of taxes than they do now	○	○	○	○
Colleges should prohibit racist/sexist speech on campus	○	○	○	○
Same-sex couples should have the right to legal marital status	○	○	○	○
Affirmative action in college admissions should be abolished	○	○	○	○
The activities of married women are best confined to the home and family	○	○	○	○
Federal military spending should be increased	○	○	○	○
If two people really like each other, it's all right for them to have sex even if they've known each other for only a very short time	○	○	○	○
The federal government should do more to control the sale of handguns	○	○	○	○
Only volunteers should serve in the armed forces	○	○	○	○
The federal government is not doing enough to control environmental pollution	○	○	○	○
A national health care plan is needed to cover everybody's medical costs	○	○	○	○
Grading in the high schools has become too easy	○	○	○	○
Undocumented immigrants should be denied access to public education	○	○	○	○
Through hard work, everybody can succeed in American society	○	○	○	○
Dissent is a critical component of the political process	○	○	○	○

34. During your last year in high school, how much time did you spend during a typical week doing the following activities?

Hours per week:	None	Less than 1 hour	1-2	3-5	6-10	11-15	16-20	Over 20
Studying/homework	○	○	○	○	○	○	○	○
Socializing with friends	○	○	○	○	○	○	○	○
Talking with teachers outside of class	○	○	○	○	○	○	○	○
Exercise or sports	○	○	○	○	○	○	○	○
Partying	○	○	○	○	○	○	○	○
Working (for pay)	○	○	○	○	○	○	○	○
Volunteer work	○	○	○	○	○	○	○	○
Student clubs/groups	○	○	○	○	○	○	○	○
Watching TV	○	○	○	○	○	○	○	○
Household/childcare duties	○	○	○	○	○	○	○	○
Reading for pleasure	○	○	○	○	○	○	○	○
Playing video/computer games	○	○	○	○	○	○	○	○
Prayer/meditation	○	○	○	○	○	○	○	○

35. Do you have any concern about your ability to finance your college education? (Mark one)

- None (I am confident that I will have sufficient funds) ○
- Some (but I probably will have enough funds) ○
- Major (not sure I will have enough funds to complete college) ○

36. Below are some reasons that might have influenced your decision to attend this particular college. How important was each reason in your decision to come here? (Mark one answer for each possible reason)

	Very important	Somewhat important	Not important
My relatives wanted me to come here	○	○	○
My teacher advised me	○	○	○
This college has a very good academic reputation	○	○	○
This college has a good reputation for its social activities	○	○	○
I was offered financial assistance	○	○	○
The cost of attending this college	○	○	○
High school counselor advised me	○	○	○
Private college counselor advised me	○	○	○
I wanted to live near home	○	○	○
Not offered aid by first choice	○	○	○
This college's graduates gain admission to top graduate/professional schools	○	○	○
This college's graduates get good jobs	○	○	○
I was attracted by the religious affiliation/orientation of the college	○	○	○
I wanted to go to a school about the size of this college	○	○	○
Rankings in national magazines	○	○	○
Information from a website	○	○	○
I was admitted through an Early Action or Early Decision program	○	○	○
A visit to the campus	○	○	○

37. Below is a list of different undergraduate major fields grouped into general categories. Mark only one oval to indicate your probable field of study.

ARTS AND HUMANITIES
- Art, fine and applied ..... (1)
- English (language and literature) ..... (2)
- History ..... (3)
- Journalism ..... (4)
- Language and Literature (except English) ..... (5)
- Music ..... (6)
- Philosophy ..... (7)
- Speech ..... (8)
- Theater or Drama ..... (9)
- Theology or Religion ..... (10)
- Other Arts and Humanities .. (11)

BIOLOGICAL SCIENCE
- Biology (general) ..... (12)
- Biochemistry or Biophysics ..... (13)
- Botany ..... (14)
- Environmental Science ..... (15)
- Marine (Life) Science ..... (16)
- Microbiology or Bacteriology ..... (17)
- Zoology ..... (18)
- Other Biological Science .... (19)

BUSINESS
- Accounting ..... (20)
- Business Admin. (general) .. (21)
- Finance ..... (22)
- International Business ..... (23)
- Marketing ..... (24)
- Management ..... (25)
- Secretarial Studies ..... (26)
- Other Business ..... (27)

EDUCATION
- Business Education ..... (28)
- Elementary Education ..... (29)
- Music or Art Education ..... (30)
- Physical Education or Recreation ..... (31)
- Secondary Education ..... (32)
- Special Education ..... (33)
- Other Education ..... (34)

ENGINEERING
- Aeronautical or Astronautical Eng ..... (35)
- Civil Engineering ..... (36)
- Chemical Engineering ..... (37)
- Computer Engineering ..... (38)
- Electrical or Electronic Engineering ..... (39)
- Industrial Engineering ..... (40)
- Mechanical Engineering .... (41)
- Other Engineering ..... (42)

PHYSICAL SCIENCE
- Astronomy ..... (43)
- Atmospheric Science (incl. Meteorology) ..... (44)
- Chemistry ..... (45)
- Earth Science ..... (46)
- Marine Science (incl. Oceanography) ..... (47)
- Mathematics ..... (48)
- Physics ..... (49)
- Statistics ..... (50)
- Other Physical Science ..... (51)

PROFESSIONAL
- Architecture or Urban Planning ..... (52)
- Family & Consumer Sciences . (53)
- Health Technology (medical, dental, laboratory) .... (54)
- Library or Archival Science .. (55)
- Medicine, Dentistry, Veterinary Medicine ..... (56)
- Nursing ..... (57)
- Pharmacy ..... (58)
- Therapy (occupational, physical, speech) ..... (59)
- Other Professional ..... (60)

SOCIAL SCIENCE
- Anthropology ..... (61)
- Economics ..... (62)
- Ethnic Studies ..... (63)
- Geography ..... (64)
- Political Science (gov't., international relations) .... (65)
- Psychology ..... (66)
- Social Work ..... (67)
- Sociology ..... (68)
- Women's Studies ..... (69)
- Other Social Science ..... (70)

TECHNICAL
- Building Trades ..... (71)
- Data Processing or Computer Programming ... (72)
- Drafting or Design ..... (73)
- Electronics ..... (74)
- Mechanics ..... (75)
- Other Technical ..... (76)

OTHER FIELDS
- Agriculture ..... (77)
- Communications ..... (78)
- Computer Science ..... (79)
- Forestry ..... (80)
- Kinesiology ..... (81)
- Law Enforcement ..... (82)
- Military Science ..... (83)
- Other Field ..... (84)
- Undecided ..... (85)

DO NOT WRITE IN THIS AREA

38. Please indicate the importance to you personally of each of the following: (Mark one for each item)

(E) Essential (V) Very Important (S) Somewhat Important (N) Not Important

	E	V	S	N
Becoming accomplished in one of the performing arts (acting, dancing, etc.)	E	V	S	N
Becoming an authority in my field	E	V	S	N
Obtaining recognition from my colleagues for contributions to my special field	E	V	S	N
Influencing the political structure	E	V	S	N
Influencing social values	E	V	S	N
Raising a family	E	V	S	N
Having administrative responsibility for the work of others	E	V	S	N
Being very well off financially	E	V	S	N
Helping others who are in difficulty	E	V	S	N
Making a theoretical contribution to science	E	V	S	N
Writing original works (poems, novels, short stories, etc.)	E	V	S	N
Creating artistic work (painting, sculpture, decorating, etc.)	E	V	S	N
Becoming successful in a business of my own	E	V	S	N
Becoming involved in programs to clean up the environment	E	V	S	N
Developing a meaningful philosophy of life	E	V	S	N
Participating in a community action program	E	V	S	N
Helping to promote racial understanding	E	V	S	N
Keeping up to date with political affairs	E	V	S	N
Becoming a community leader	E	V	S	N
Integrating spirituality into my life	E	V	S	N
Improving my understanding of other countries and cultures	E	V	S	N

39. What is your best guess as to the chances that you will: (Mark one for each item)

(V) Very Good Chance (S) Some Chance (L) Very Little Chance (N) No Chance

	V	S	L	N
Change major field?	V	S	L	N
Change career choice?	V	S	L	N
Participate in student government?	V	S	L	N
Get a job to help pay for college expenses?	V	S	L	N
Work full-time while attending college?	V	S	L	N
Join a social fraternity or sorority?	V	S	L	N
Play varsity/intercollegiate athletics?	V	S	L	N
Make at least a "B" average?	V	S	L	N
Participate in student protests or demonstrations?	V	S	L	N
Transfer to another college before graduating?	V	S	L	N
Be satisfied with your college?	V	S	L	N
Participate in volunteer or community service work?	V	S	L	N
Seek personal counseling?	V	S	L	N
Communicate regularly with your professors?	V	S	L	N
Socialize with someone of another racial/ethnic group?	V	S	L	N
Participate in student clubs/groups?	V	S	L	N
Strengthen your religious beliefs/convictions?	V	S	L	N
Participate in a study abroad program?	V	S	L	N

40. Do you give the Higher Education Research Institute (HERI) permission to include your ID number should your college request the data for additional research analyses? HERI maintains strict standards of confidentiality and would require your college to sign a pledge of confidentiality. ○ Yes ○ No

The remaining ovals are provided for questions specifically designed by your college rather than the Higher Education Research Institute. If your college has chosen to use the ovals, please observe carefully the supplemental directions given to you.

41. (A) (B) (C) (D) (E)	48. (A) (B) (C) (D) (E)	55. (A) (B) (C) (D) (E)
42. (A) (B) (C) (D) (E)	49. (A) (B) (C) (D) (E)	56. (A) (B) (C) (D) (E)
43. (A) (B) (C) (D) (E)	50. (A) (B) (C) (D) (E)	57. (A) (B) (C) (D) (E)
44. (A) (B) (C) (D) (E)	51. (A) (B) (C) (D) (E)	58. (A) (B) (C) (D) (E)
45. (A) (B) (C) (D) (E)	52. (A) (B) (C) (D) (E)	59. (A) (B) (C) (D) (E)
46. (A) (B) (C) (D) (E)	53. (A) (B) (C) (D) (E)	60. (A) (B) (C) (D) (E)
47. (A) (B) (C) (D) (E)	54. (A) (B) (C) (D) (E)	61. (A) (B) (C) (D) (E)

© Prepared by the Higher Education Research Institute, University of California, Los Angeles, California 90095-1521

THANK YOU!

Data Recognition Corp.-6G5044-6034-54321

APPENDIX B
COMPLETE DESCRIPTIVE RESULTS

Student and High School Samples in Appendix B Tables

Subgroup	# of Women	# of High Schools
Independent single-sex	825	39
Independent coeducational	5,587	589
Catholic single-sex	5,727	186
Catholic coeducational	9,097	580
Public	113,917	8,955
NCGS	1,462	60

Table B1

Demographics and Financial Background by School Type

Category	Independent [a] Single-Sex (%)	Independent [a] Coeducational (%)	Catholic [a] Single-Sex (%)	Catholic [a] Coeducational (%)	Within Single-Sex Differences [b]	NCGS (%)	Public (%)
Race/Ethnicity							
White/Caucasian	74.4	76.5	72.7	75.4**		75.2	77.3
African American/Black	6.5**	4.3	5.4	5.5		5.4	9.2
Asian American/Asian	10.2*	7.6	5.8**	4.1	Independent**	9.6	7.6
Latino	3.5	3.7	6.2	6.4	Catholic**	3.9	7.5
American Indian	1.2	1.5	1.0	1.1		1.1	1.9
Parental Education (Bachelors Degree or Higher)							
Father	85.1**	77.9	65.8**	63.3	Independent**	84.6	52.8
Mother	82.0*	77.0	63.6**	60.7	Independent**	81.1	52.1
Income	++		++				
Over $250,000	37.8	27.4	14.6	11.7	Independent++	36.1	5.7
$200,000 - 249,999	9.4	7.8	6.0	5.1		9.1	3.2
$150,000 - 199,999	10.7	9.9	10.0	10.0		10.6	6.9
$100,000 - 149,999	15.0	15.6	20.3	19.6		14.8	16.4
$60,000 - 99,999	12.8	17.6	23.3	26.3		13.7	27.3
$30,000 - 59,999	10.6	14.4	17.2	19.1		12.0	24.7
Less than $30,000	3.7	7.3	8.5	8.2		3.9	15.8
Concerns about financing college							
Some or major concerns	43.6	50.1**	65.1	66.4	Catholic**	45.5	72.2

Table B1 (continued)

Demographics and Financial Background by School Type

Category	Independent [a] Single-Sex (%)	Independent [a] Coeducational (%)	Catholic [a] Single-Sex (%)	Catholic [a] Coeducational (%)	Within Single-Sex Differences [b]	NCGS (%)	Public (%)
Reasons for college choice (very important)							
Low tuition cost	16.9	19.8	30.3	29.4	Catholic**	18.7	31.3
Financial aid offers	24.4	28.4*	40.5	41.8	Catholic**	24.6	41.3
Graduates get "good jobs"	55.1	52.7	61.9	60.6	Catholic**	56.6	56.4
Reason for going to college (very important)							
Make more money	55.4	52.9	61.8	64.8**	Catholic**	54.5	68.2
Get better job	61.0	59.9	66.4	69.9**	Catholic**	59.3	72.6
Hours per week working for pay		++		++	Catholic++		
None	58.1	52.4	36.3	32.3		57.5	28.0
1 to 5	21.2	18.6	16.4	15.4		20.0	13.5
6 to 10	8.9	10.2	15.1	14.4		9.0	12.9
11 to 15	4.9	7.2	13.1	14.1		5.9	14.9
16 to 20	3.4	5.6	11.1	13.3		3.9	15.3
over 20	3.4	6.0	8.1	10.6		3.6	15.5
Future Activity (very good chance)							
Get a job to help pay for college	32.4	34.0	46.3	49.8**	Catholic**	32.6	54.3
Work full-time while attending college	1.7	3.3*	5.1	5.2	Catholic**	2.0	7.2
Future Goals (very important or essential)							
Be well off financially	67.6*	63.5	71.5	71.0		68.4	71.3
Be successful in own business	40.8	40.5	40.5*	38.7		41.0	36.4

[a] Significance tests compare single-sex and coeducational graduates within independent or Catholic schools. The higher scoring group is indicated by + (for t-test) or * (for chi-square).

[b] Compares single-sex independent with single-sex Catholic graduates. The higher scoring group is indicated.

* Chi-square significant at p<.05. ** Chi-square significant at p<.01.

+ T-test significant at p<.05. ++ T-test significant at p<.01.

Table B2

College Choice by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS (%)	Public (%)
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)			
Choice of College							
Attending first choice	63.3	66.6	69.0	70.1	Catholic**	63.6	73.0
Attending second choice	21.6	21.1	21.4	21.9		21.9	19.8
Attending third or less	15.1*	12.3	9.6**	8.0	Independent**	14.6	7.2
College satisfaction (very good chance)							
How likely will you be satisfied with your college?	66.1	63.0	61.0	59.9	Independent**	64.4	59.4
Miles from home	+			+	Independent++		
1 to 10 miles	5.1	5.1	13.1	10.1		6.1	10.2
11 to 100 miles	15.6	20.0	34.9	37.6		16.6	41.8
101 to 500 miles	37.9	36.4	31.4	34.6		37.2	34.2
Over 500 miles	41.4	38.5	20.5	17.7		40.0	13.7
Where do you plan to live?							
With my family or relatives	1.1	3.4**	14.0**	10.7	Catholic**	2.2	12.6
On campus	97.7**	93.7	84.5	86.7**	Independent**	96.5	83.1
Other	1.2	2.9**	1.5	2.6**		1.3	4.3
Reasons for attending college (very important)							
My parents wanted me to go	41.8	39.3	47.1	46.5	Catholic**	43.5	44.4
I could not find a job	3.3	3.4	5.1	5.4	Catholic*	3.5	6.3
Wanted to get away from home	21.9	20.7	20.2	21.4		21.3	21.7
To be able to get a better job	61.0	59.9	66.4	69.9**	Catholic**	59.3	72.6
To gain a general education	84.1**	79.3	77.7**	74.2	Independent**	82.2	71.7
There was nothing better to do	3.7	3.2	2.4	2.5	Independent*	3.4	3.0
To make me a more cultured person	65.4*	60.9	56.1*	54.1	Independent**	65.3	49.8
To be able to make more money	55.4	52.9	61.8	64.8**	Catholic**	54.5	68.2

Table B2 (continued)

College Choice by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS (%)	Public (%)
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)			
To learn more about things that interest me	90.1	87.9	83.9	83.3	Independent**	89.6	82.2
To prepare myself for graduate school	70.4*	66.1	70.5**	66.0		70.1	62.6
A mentor encouraged me to go	15.0	14.9	17.2	16.2		15.4	15.7
To get training for a specific career	50.0	55.6**	69.0	70.3	Catholic**	52.5	71.4
To find my purpose in life	46.7	50.1	61.8	61.3	Catholic**	49.2	56.0
Reasons for choosing this college (very important)							
My parents wanted me to come here	11.2	9.5	11.9**	10.3		11.6	10.2
My teacher advised me	6.7	5.9	5.6**	4.6		6.6	4.8
This college has a very good academic reputation	69.2*	65.5	69.3*	67.3		69.1	65.0
This college has a good reputation for social activities	33.3	32.3	33.8	33.4		34.2	33.1
I was offered financial assistance	24.4	28.4*	40.5	41.8	Catholic**	24.6	41.3
The cost of attending this college	16.9	19.8	30.3	29.4	Catholic**	18.7	31.3
High school guidance counselor advised me	13.7	12.3	10.1**	8.5	Independent**	13.0	6.4
Private college counselor advised me	7.0	5.9	4.3*	3.6	Independent**	5.8	2.3
I wanted to live near home	7.8	11.1**	19.7	18.6	Catholic**	8.7	20.0
Not offered aid by first choice	5.0	5.1	6.6	7.2		5.1	6.6
This college's graduates admitted to top graduate schools	44.3*	39.9	44.5**	41.1		45.0	36.6
This college's graduates get good jobs	55.1	52.7	61.9	60.6	Catholic**	56.6	56.4

Table B2 (continued)
College Choice by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS (%)	Public (%)
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)			
I was attracted by the religious affiliation of the school	3.6	5.5*	13.1	13.3	Catholic**	6.8	8.9
I wanted to go to a school this size	58.1*	54.3	53.4**	51.2	Independent*	57.2	46.1
Rankings in national magazine	23.2	20.7	22.4**	18.7		24.0	18.7
Information from a website	20.4	18.1	19.8**	17.1		20.0	19.1
Admitted through Early Decision or Early Action	26.9*	22.9	13.3*	12.1	Independent**	24.6	12.4
A visit to campus	68.2**	60.1	58.4**	54.8	Independent**	64.8	49.5

[a] Significance tests compare single-sex and coeducational graduates within independent or Catholic schools. The higher scoring group is indicated by + (for t-test) or * (for chi-square).
[b] Compares single-sex independent with single-sex Catholic graduates. The higher scoring group is indicated.
* Chi-square significant at p<.05. ** Chi-square significant at p<.01.
+ T-test significant at p<.05. ++ T-test significant at p<.01.

Table B3

Academic Self-Confidence and Engagement by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS	Public
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)		(%)	(%)
Self-ratings (above average or highest 10 percent)							
Intellectual self-confidence	59.2**	53.7	55.3	53.9	Independent*	56.9	54.7
Mathematical ability	47.7**	36.6	39.7**	36.3	Independent**	43.1	39.3
Academic ability	80.8**	75.1	69.2	69.3	Independent**	76.9	71.3
Drive to achieve	78.4	76.5	76.2	76.6		76.6	77.8
Writing ability	64.2**	58.8	51.5	50.5	Independent**	61.7	50.7
Computer skills	35.8**	25.9	34.8**	26.5		34.9	28.4
Hours per week studying or doing homework	++		++		Independent++		
None	0.1	0.4	0.2	0.5		0.1	1.3
Any to 2	4.6	12.6	15.5	21.9		5.7	31.3
3 to 5	13.6	19.9	24.2	28.3		14.8	29.8
6 to 10	19.7	25.1	25.6	25.2		20.5	20.5
11 or more	62.0	42.0	34.5	23.9		58.8	17.2
Hours per week in student clubs and groups	++		++				
None	6.8	17.4	11.5	16.1		7.8	19.2
Any to 2	49.9	45.9	46.5	46.8		49.2	42.1
3 to 5	27.6	21.6	24.3	20.7		26.2	20.9
6 to 10	10.0	8.9	10.1	9.5		10.1	9.5
11 or more	5.7	6.1	7.6	6.8		6.6	8.3

Table B3 (continued)
Academic Self-Confidence and Engagement by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS (%)	Public (%)
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)			
Hours per week talking with teachers	+++		++		Independent++		
None	1.4	2.7	4.8	5.9		2.1	8.2
Any to 2	62.0	67.9	75.9	77.6		65.7	76.0
3 to 5	25.3	21.8	14.5	12.1		23.4	11.3
6 to 10	7.1	4.9	3.1	2.9		5.9	2.9
11 or more	4.3	2.9	1.6	1.4		2.9	1.6
Additional high school behaviors (frequently)							
Tutored another student	19.0**	13.7	13.8**	11.7	Independent**	16.1	12.8
Came late to class	8.5	10.0	6.2	7.5**	Independent*	8.8	8.8
Was bored in class	29.1	32.4	33.8	38.3**	Catholic**	30.9	40.1
Used the internet for research or homework	86.5*	83.7	89.8**	86.4	Catholic**	88.7	84.2
Used a personal computer	94.7**	90.7	89.5**	87.4	Independent**	94.2	87.2
Studied with other students	52.9**	44.6	40.2**	33.6	Independent**	50.6	31.3
Asked a teacher for advice after class	50.1**	42.2	30.1**	27.1	Independent**	45.7	26.9
Was a guest in a teachers home	10.6	10.3	2.4	2.3	Independent**	8.1	3.0

Table B3 (continued)

Academic Self-Confidence and Engagement by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS (%)	Public (%)
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)			
Students had remedial work in the following							
English	7.8*	6.0	5.1	5.2	Independent*	7.9	4.5
Reading	5.0	4.3	4.3	4.5		5.2	3.9
Mathematics	20.5	21.1	19.2*	17.8		21.1	13.2
Social Studies	3.3	2.9	2.5	2.9		3.1	2.7
Science	8.2	7.9	5.8	5.5	Independent**	8.2	4.4
Foreign Language	8.0	7.1	6.3**	4.8		9.8	4.0
Writing	6.8	5.6	4.2	4.1	Independent**	7.2	3.6
Students feel they need remedial work in the following							
English	5.7	6.1	6.7	6.3		6.3	7.3
Reading	2.2	2.9	2.6	3.0		2.5	3.2
Mathematics	14.9	23.1**	22.3	24.9**	Catholic**	17.0	25.2
Social Studies	2.1	2.5	2.0	2.8**		2.0	3.1
Science	10.1	11.5	10.9	12.9**		9.4	12.4
Foreign Language	8.7	9.3	10.5	10.4		10.3	10.8
Writing	9.3	9.6	9.0	10.1*		10.1	10.5
Future activities (very good chance)							
Make at least a "B" Average	62.9	64.3	64.2	64.4		62.3	63.4
Future goals (very important or essential)							
Make a theoretical contribution to science	19.3*	15.7	18.5**	16.4		18.0	16.8

Table B3 (continued)

Academic Self-Confidence and Engagement by School Type

Category	Independent [a] Single-Sex (%)	Independent [a] Coeducational (%)	Catholic [a] Single-Sex (%)	Catholic [a] Coeducational (%)	Within Single-Sex Differences [b]	NCGS (%)	Public (%)
Grades				+	Catholic+		
A or A+	16.4	20.7	26.4	28.7		18.5	30.8
B+ or A-	59.4	57.6	49.5	48.2		57.4	46.8
B	18.4	16.1	17.3	16.6		17.8	15.3
B- or C+	5.3	5.2	6.3	6.0		6.0	6.3
C or less	0.5	0.4	0.6	0.4		0.3	0.8
Mean SAT[c] Scores							
SAT Composite	1310++	1267	1196++	1168	Independent++	1290	1173
SAT Verbal	660++	639	605++	592	Independent++	650	587
SAT Math	650++	628	591++	576	Independent++	640	586

[a] Significance tests compare single-sex and coeducational graduates within independent or Catholic schools. The higher scoring group is indicated by + (for t-test) or * (for chi-square).

[b] Compares single-sex independent with single-sex Catholic graduates. The higher scoring group is indicated.

* Chi-square significant at p<.05. ** Chi-square significant at p<.01.

+ T-test significant at p<.05. ++ T-test significant at p<.01.

Table B4

Free Time by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS (%)	Public (%)
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)			
Hours per week spent socializing with friends				+	Independent+		
None	0.0	0.1	0.1	0.1		0.0	0.2
Any to 2	4.3	5.2	5.0	5.1		4.4	7.5
3 to 5	14.7	15.7	17.6	16.8		15.7	19.6
6 to 10	28.2	27.8	28.5	27.5		27.9	27.2
11 or more	52.8	51.2	48.8	50.5		52.0	45.6
Hours per week spent exercising or playing sports				++	Independent++		
None	1.8	2.4	4.4	4.2		2.5	5.8
Any to 2	19.7	19.3	28.6	24.1		21.2	29.5
3 to 5	21.6	20.1	21.3	19.6		22.0	20.2
6 to 10	26.5	24.3	18.2	20.8		24.9	17.9
11 or more	30.5	33.9	27.5	31.3		29.4	26.5
Hours per week spent partying	++		++				
None	19.3	22.4	17.8	19.8		19.6	30.1
Any to 2	32.9	34.4	31.2	33.1		32.1	33.7
3 to 5	22.2	23.0	24.9	23.2		22.6	18.3
6 to 10	16.3	13.0	15.9	14.3		16.0	10.6
11 or more	9.3	7.3	10.2	9.6		9.5	7.2

Table B4 (continued)

Free Time by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS	Public
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)		(%)	(%)
Hours per week spent watching TV		++			Catholic++		
None	11.3	9.9	5.8	5.6		10.1	5.8
Any to 2	45.8	41.2	42.6	41.6		43.2	42.1
3 to 5	25.1	28.4	29.2	29.9		27.0	28.4
6 to 10	12.9	13.3	14.4	14.6		13.4	14.4
11 or more	4.9	7.1	7.9	8.4		6.3	9.2
Hours per week spent on household/childcare		++		++	Catholic++		
None	26.6	25.3	13.4	12.5		13.3	19.6
Any to 2	55.4	51.3	58.2	56.9		53.4	53.7
3 to 5	13.2	16.3	19.2	20.5		19.2	17.6
6 to 10	3.5	4.5	6.0	6.1		6.1	5.5
11 or more	1.3	2.6	3.3	4.0		4.5	3.7
Hours per week spent reading for pleasure					Independent+		
None	15.8	15.9	19.3	19.6		16.3	18.0
Any to 2	55.9	53.6	56.5	53.7		56.1	52.3
3 to 5	18.2	19.1	14.5	16.5		17.3	17.8
6 to 10	6.7	7.0	6.1	6.2		6.5	7.3
11 or more	3.5	4.5	3.6	4.0		3.6	4.7
Hours per week spent playing video games		++			Catholic++		
None	77.3	70.9	64.7	64.4		76.5	60.9
Any to 2	18.4	24.0	28.7	29.6		19.2	31.4
3 to 5	2.5	3.1	4.0	3.7		2.6	4.6
6 to 10	1.3	1.1	1.5	1.3		1.1	1.8

Table B4 (continued)

Free Time by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS	Public
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)		(%)	(%)
11 or more	0.5	0.8	1.0	1.0		0.7	1.3
Activities (frequently)							
Socialized with someone of another ethnic group	84.9**	77.6	75.2**	71.8	Independent**	81.6	71.7
Activities (frequently plus occasionally)							
Drank beer	58.2	55.4	48.5	48.4	Independent**	57.3	39.5
Smoked cigarettes	25.7	24.9	21.3	20.6	Independent**	26.4	16.9
Drank wine/liquor	68.5	66.1	59.0	60.1	Independent**	67.3	50.9
Socialized with someone of another ethnic group	98.6	98.0	98.3	98.1		98.5	97.7
Future Activities (very good chance)							
Join a social fraternity or sorority	22.6**	17.1	12.2	11.8	Independent**	22.1	11.3
Play varsity/intercollegiate athletics	14.2	17.9**	13.7	15.7**		14.8	13.1
Participate in student clubs or groups	70.4**	60.1	58.0**	54.6	Independent**	65.7	52.6
Socialize with someone of another ethnic group	77.9	78.0	73.0	71.7	Independent**	76.9	71.5

[a] Significance tests compare single-sex and coeducational graduates within independent or Catholic schools. The higher scoring group is indicated by + (for t-test) or * (for chi-square).

[b] Compares single-sex independent with single-sex Catholic graduates. The higher scoring group is indicated.

* Chi-square significant at p<.05. ** Chi-square significant at p<.01.

+ T-test significant at p<.05. ++ T-test significant at p<.01.

Table B5

Psychological Well-Being by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS	Public
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)		(%)	(%)
Self-Ratings (above average or highest 10%):							
Emotional health	50.7	50.0	51.4	50.6		52.4	49.9
Physical health	56.2	53.4	50.7	51.3	Independent**	54.9	47.5
Activities past year							
Frequently felt overwhelmed	42.8**	38.0	37.4	36.2	Independent**	42.3	36.4
Frequently felt depressed	9.7	8.2	7.1	8.0*	Independent**	9.4	8.3
Future Activities (very good chance)							
Seek personal counseling	8.8	10.1	9.4	9.0		9.4	8.3

[a] Significance tests compare single-sex and coeducational graduates within independent or Catholic schools. The higher scoring group is indicated by * (for chi-square).

[b] Compares single-sex independent with single-sex Catholic graduates. The higher scoring group is indicated.

* Chi-square significant at $p<.05$. ** Chi-square significant at $p<.01$.

Table B6

Major, Degree, and Career Aspirations by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS (%)	Public (%)
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)			
Major							
Agriculture or Forestry	0.1	0.3	0.2	0.2		0.1	0.4
Biological Sciences	7.9	9.5	8.4	8.3		8.1	8.2
Business	11.4	11.0	14.5	13.8	Catholic*	12.4	12.0
Computer Science	0.2	0.2	0.2	0.1		0.2	0.2
Education	2.8	7.7	8.5	9.0	Catholic**	2.7	10.8
Engineering	5.9**	2.0	2.9**	2.1	Independent**	4.4	2.6
English	8.1	9.4	16.2	16.7	Catholic**	9.1	15.1
Fine Arts	6.5	6.3	4.9	4.7	Independent*	7.3	
History or Political Science	9.5	7.7	6.1**	4.8	Independent**	8.7	4.8
Humanities	6.3	6.2	3.8	3.6	Independent**	6.4	4.0
Mathematics or Statistics	1.3**	0.5	0.6	0.6	Independent*	0.8	0.7
Physical Sciences	2.3	1.9	1.5	1.5		2.0	2.0
Social Sciences	9.3	11.2	7.8	9.0**		9.9	8.7
Technical/Applied Majors	0.8	1.0	1.4	1.2		0.6	1.3
Undecided	10.0	9.5	8.5	7.9		9.3	7.4
Degree Aspirations							
B.A. or B.S	13.2	15.1	15.9	18.6**		13.1	21.4
M.A. or M.Div.	36.3	38.7	43.4	43.7	Catholic**	38.3	41.9
Ph.D.	20.6	19.5	17.8*	16.1		19.9	17.8
M.D.	16.4	14.8	12.6	12.5	Independent**	15.9	11.0
J.D.	11.6*	8.9	8.1**	6.3	Independent**	10.1	5.2
Career Aspirations							
Artist	9.1	12.0	9.1	8.2		9.8	9.2
Business	11.6	10.5	11.6	11.3		11.1	10.3
Business Clerical	0.0	0.3	0.4	0.4		0.0	0.5
Clergy	0.1	0.2	0.1	0.1		0.1	0.3

Table B6 (continued)
Major, Degree, and Career Aspirations by School Type

Category	Independent [a] Single-Sex (%)	Independent [a] Coeducational (%)	Catholic [a] Single-Sex (%)	Catholic [a] Coeducational (%)	Within Single-Sex Differences [b]	NCGS (%)	Public (%)
College Teacher	0.6	0.6	0.4	0.3		1.0	0.5
Computer Programmer	0.4	0.1	0.3	0.2		0.3	0.3
Doctor/Dentist/Physician	11.8	9.3	9.0	8.6	Independent*	10.8	7.6
Education (Primary)	1.8	2.6	4.9	5.7*		2.0	6.8
Education (Secondary)	1.8	2.3	3.0	3.7*	Catholic**	1.6	4.7
Engineer	4.4**	1.4	2.4*	1.9	Independent**	3.2	2.0
Farmer/Forester	0.2	0.6	0.2	0.2		0.3	0.3
Health Professional	4.5	5.7	7.7	8.9**	Catholic**	4.0	8.2
Homemaker	0.5	0.2	0.1	0.2	Independent*	0.5	0.1
Lawyer	7.3	5.5	5.7	4.9		6.7	4.0
Military	0.1	0.3	0.2	0.2		0.2	0.3
Nurse	1.5	2.6	6.5	6.4	Catholic**	2.3	5.6
Research Scientist	1.7	2.0	1.6	1.5		1.7	1.8
Social Worker	0.4	1.0	0.8	1.2**		0.5	1.3
Undecided	20.6	20.9	15.2	14.8	Independent**	21.3	13.7

[a] Significance tests compare single-sex and coeducational graduates within independent or Catholic schools. The higher scoring group is indicated by * (for chi-square).
[b] Compares single-sex independent with single-sex Catholic graduates. The higher scoring group is indicated.
* Chi-square significant at $p<.05$. ** Chi-square significant at $p<.01$.

Table B7

Leadership and Community Orientation by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS (%)	Public (%)
	Single-sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)			
Self-rating (above average or highest 10%)							
Leadership ability	63.7	62.2	59.3	59.4	Independent*	62.8	60.0
Public speaking ability	44.6**	38.5	38.3**	35.4	Independent**	42.7	35.3
Social self-confidence	49.9	48.1	50.2	49.3		49.5	48.9
Understanding of others	72.5	73.5	71.6	71.3		73.7	69.3
Cooperativeness	76.6	73.7	77.3	76.6		76.5	74.8
Goals (very important or essential):							
Influence social values	43.8	43.7	47.4	46.5		44.4	43.7
Raise a family	70.3	72.8	80.0	81.7*	Catholic**	72.9	75.5
Help others in difficulty	74.8	71.7	74.6	75.4		72.8	72.2
Becoming involved to clean environment	25.9	26.6	21.4**	19.5	Independent**	25.8	21.4
Participate in community programs	36.6	34.2	34.6	33.0		35.9	29.6
Promote racial understanding	42.1	39.3	38.3**	35.2	Independent*	41.5	34.9
Becoming a community leader	42.8*	38.8	37.4*	35.4	Independent**	42.5	34.0
Improving my understanding of other cultures	71.8	68.4	59.6**	56.7	Independent**	71.3	55.0
Activities (frequently)							
Performed volunteer work	40.6	37.7	44.7**	42.2	Catholic*	41.7	33.7
Performed community service as part of a class	21.3	21.0	33.8	36.1**	Catholic**	26.0	15.8

Table B7 (continued)

Leadership and Community Orientation by School Type

Category	Independent [a] Single-sex (%)	Independent [a] Coeducational (%)	Catholic [a] Single-Sex (%)	Catholic [a] Coeducational (%)	Within Single-Sex Differences [b]	NCGS (%)	Public (%)
Activities (frequently or occasionally)							
Performed volunteer work	93.5*	91.2	93.8	93.4		94.0	86.9
Performed community service as part of a class	67.5	65.4	77.0	78.0	Catholic**	71.6	53.8
Future activity (very good chance):							
Volunteer or community service	48.3*	43.8	42.8*	40.9	Independent**	45.1	36.6

[a] Significance tests compare single-sex and coeducational graduates within independent or Catholic schools. The higher scoring group is indicated by * (for chi-square).

[b] Compares single-sex independent with single-sex Catholic graduates. The higher scoring group is indicated.

* Chi-square significant at $p<.05$. ** Chi-square significant at $p<.01$.

Table B8

Political Engagement and Attitudes by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS (%)	Public (%)
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)			
Political Orientation							
Far right	1.0	1.0	1.0	1.3		1.3	1.2
Conservative	20.9	20.3	25.1	25.1	Catholic**	23.0	21.5
Middle of the road	30.8	32.6	41.8	45.6**	Catholic**	32.2	43.6
Liberal	42.4	40.5	29.5**	26.1	Independent**	39.0	30.6
Far left	4.9	5.5	2.5*	2.0	Independent**	4.4	3.2
Political views (agree somewhat or strongly):							
There is too much concern in the courts for the rights of criminals	40.1	44.5*	45.7	49.4**	Catholic**	42.8	55.5
The death penalty should be abolished	47.6	44.1	53.3**	51.0	Catholic**	49.4	35.6
Marijuana should be legalized	47.6	47.0	34.8	34.4	Independent**	46.1	33.7
Wealthy people should pay a larger share of taxes than they do now	50.4	50.3	53.9	53.8		48.2	59.5
Same sex couples should have the right to legal marital status	79.4*	75.8	72.3**	66.0	Independent**	76.8	65.3
Affirmative action in college admission should be abolished	47.5	46.4	49.2*	47.3		48.7	45.7
If two people really like each other it's all right for them to have sex even if they've known each other for only a short time	50.4	49.5	28.0	27.6	Independent**	45.8	34.4

Table B8 (continued)

Political Engagement and Attitudes by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS (%)	Public (%)
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)			
There should be laws prohibiting homosexual relationships	10.6	13.5*	13.6	16.7**	Catholic*	11.1	20.3
The activities of married women should be confined to the home and family	7.3	10.1	12.3*	13.0	Catholic**	9.2	14.1
Realistically, an individual can do little to bring about changes in our society	19.2	20.9	18.9	19.0		19.8	22.9
Racial discrimination is no longer a major problem in America	11.3	13.7	15.1	16.0	Catholic**	12.7	16.6
Abortion should be legal	79.5**	74.7	45.2**	38.4	Independent**	74.3	57.2
A national health care plan is needed to cover everyone's medical costs	75.6	75.5	77.3	77.1		76.2	75.9
Federal government is not doing enough to control environmental pollution	86.7	84.6	80.7	79.7	Independent**	85.7	80.6
Colleges should prohibit racist speech on campus	62.6	62.1	64.4	63.4		62.9	61.9
Federal government should do more to control the sale of guns	87.4	86.1	88.3**	85.9		87.4	84.6
Federal military spending should be increased	25.1	27.7	30.3	31.7	Catholic**	26.0	30.6
Only volunteers should serve in the armed forces	68.4	67.6	64.4**	62.1	Independent*	69.1	62.7

Table B8 (continued)

Political Engagement and Attitudes by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS	Public
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)		(%)	(%)
Undocumented immigrants should be denied access to higher education	31.5	32.4	34.6	35.4		32.1	36.8
Through hard work everybody can succeed in American society	55.9	63.0**	74.9	76.5*	Catholic**	60.4	77.7
Dissent is a critical component of the political process	72.5	69.9	64.5	63.1	Independent**	72.2	61.7
Goals related to politics (very important or essential):							
Keep up to date with political affairs	57.9**	47.7	43.2**	36.1	Independent**	56.1	35.6
Influence the political structure	22.9	22.4	22.4**	19.9		23.9	19.7
Political activities in past year (frequently)							
Participated in organized demonstrations	10.1	10.2	13.6	13.0	Catholic**	11.1	12.9
Worked on local, state, or national campaign	4.0	4.2	4.1**	2.9		4.0	2.7
Activities in the past year (frequently or occasionally)							
Participated in organized demonstrations	38.0	44.4**	49.3	50.5	Catholic**	39.8	49.8
Worked on local, state, or national campaign	18.6	16.3	18.0**	13.2		18.5	12.9
Frequently discussed politics							
In class	60.3**	53.9	58.2**	54.9		58.7	45.8
With friends	47.9**	38.2	34.5**	28.3	Independent**	45.5	27.2
With family	45.4**	38.5	34.6**	29.6	Independent**	43.8	27.4

Table B8 (continued)

Political Engagement and Attitudes by School Type

Category	Independent [a]		Catholic [a]		Within Single-Sex Differences [b]	NCGS	Public
	Single-Sex (%)	Coeducational (%)	Single-Sex (%)	Coeducational (%)		(%)	(%)
Future Activities (very good chance)							
Participate in student government	11.0**	7.5	8.9**	7.6		10.2	9.1
Participate in student protests or demonstrations	11.7	11.6	8.2**	7.0	Independent**	10.6	7.3

[a] Significance tests compare single-sex and coeducational graduates within independent or Catholic schools. The higher scoring group is indicated by * (for chi-square).

[b] Compares single-sex independent with single-sex Catholic graduates. The higher scoring group is indicated.

* Chi-square significant at $p<.05$. ** Chi-square significant at $p<.01$.

Table B9

Religion & Spirituality by School Type

Category	Independent [a] Single-Sex (%)	Independent [a] Coeducational (%)	Catholic [a] Single-Sex (%)	Catholic [a] Coeducational (%)	Within Single-Sex Differences [b]	NCGS (%)	Publics (%)
Self ratings (above average or highest 10%)							
Religiousness	22.6	24.3	38.2	41.8**	Catholic**	28.0	31.7
Self-understanding	60.3	58.3	55.6*	53.5	Independent*	59.9	53.3
Spirituality	35.9	36.0	44.6	46.4*	Catholic**	39.7	38.7
Past activity (frequently):							
Attended religious service	31.6	31.7	58.5	61.9**	Catholic**	43.5	42.2
Discussed religion	39.8	39.3	59.6	62.4**	Catholic**	48.3	35.2
Hours per week spent in prayer/meditation		+		++	Catholic++		
None	50.1	47.5	20.9	19.4		40.9	35.9
Any to 2	43.3	45.6	68.4	68.5		51.3	53.7
3 or more	6.7	7.0	10.7	12.0		7.8	10.5
Future activity (very good chance):							
Strengthen religious beliefs/convictions	24.6	24.7	32.3	33.1	Catholic**	27.4	30.2
Goals (very important or essential)							
Developing a meaningful philosophy of life	55.0	52.8	52.9**	50.4		56.1	45.7
Integrating spirituality into my life	37.5	38.8	48.3	51.0**		41.9	43.6

[a] Significance tests compare single-sex and coeducational graduates within independent or Catholic schools. The higher scoring group is indicated by + (for t-test) or * (for chi-square).

[b] Compares single-sex independent with single-sex Catholic graduates. The higher scoring group is indicated.

* Chi-square significant at p<.05. ** Chi-square significant at p<.01.

+ T-test significant at p<.05. ++ T-test significant at p<.01.

APPENDIX C
DESCRIPTION OF DEPENDENT VARIABLES

Variable	Coding Scheme
Academic Achievement and Self-Confidence	
Academic self-confidence	Composite Measure: 5 items (see Appendix D)
Self-rated computer skills	5-pt scale: 1 (lowest 10%) to 5 (highest 10%)
Self-rated mathematical ability	5-pt scale: 1 (lowest 10%) to 5 (highest 10%)
Academic engagement	Composite Measure: 6 items (see Appendix D)
SAT composite scores	Continuous (400- 1600)
Goal: Make theoretical contribution to science	4-pt scale: 1 (not important) to 4 (essential)
Aspirations and Expectations	
Intended major: Engineering	Dichotomous: 1 (not marked), 2 (marked)
Intended major: History or Political Science	Dichotomous: 1 (not marked), 2 (marked)
Intended degree: Law/JD	Dichotomous: 1 (not marked), 2 (marked)
Future activity: Participate in student government	4-pt scale: 1 (no chance) to 4 (very good chance)
Reasons for college: Economic	Composite Measure: 2 items (see Appendix D)
Reasons for college: Graduate school preparation	Composite Measure: 2 items (see Appendix D)
Reasons for college: Educational	Composite Measure: 3 items (see Appendix D)
Future activity: Participate in student clubs/groups	4-pt scale: 1 (no chance) to 4 (very good chance)
Future activity: Join a social fraternity or sorority	4-pt scale: 1 (no chance) to 4 (very good chance)
Attitudes and Social Behaviors	
Political views (liberal)	5-pt scale: 1 (far right) to 5 (far left)
Political engagement	Composite Measure: 5 items (see Appendix D)
Community orientation	Composite Measure: 6 items (see Appendix D)
Religiousness	Composite Measure: 4 items (see Appendix D)
Sports/Exercise	Composite Measure: 3 items (see Appendix D)
Hedonism	Composite Measure: 4 items (see Appendix D)
Frequently socialized with someone of other ethnic group	Dichotomous: 1 (not marked), 2 (marked)
Liberal social views	Composite Measure: 5 items (see Appendix D)
Goal: Develop a meaningful philosophy of life	4-pt scale: 1 (not important) to 4 (essential)

APPENDIX D
DEPENDENT VARIABLE FACTORS

Academic Self-Confidence (Cronbach's alpha = .69)	Loading
Self-rating: Academic ability[a]	.62
Self-rating: Intellectual self-confidence[a]	.59
Self-rating: Writing ability[a]	.63
Self-rating: Public speaking ability[a]	.64
Self-rating: Drive to achieve[a]	.65

Academic Engagement (Cronbach's alpha = .61)	Loading
Hours per week: Studying/Homework[b]	.51
Hours per week: Talking with teacher outside of class[b]	.47
Hours per week: Student clubs/groups[b]	.52
Past activity: Tutored another student[c]	.54
Past activity: Asked a teacher for advice after class[c]	.53
Past activity: Studied with other students[c]	.54

Reasons for college: Economic (Cronbach's alpha = .68)	Loading
Reason: To be able to make more money[d]	.87
Reason: To be able to get a better job[d]	.87

Reasons for college: Graduate School Preparation (Cronbach's alpha = .58)	Loading
Reason: To prepare myself for graduate or professional school[d]	.84
Choose: This college's graduates gain admission to top graduate schools[d]	.84

Reasons for college: Educational (Cronbach's alpha = .68)	Loading
Reason: To gain a general education and appreciation of ideas[d]	.53
Reason: To make me a more cultured person[d]	.57
Reason: To learn more about things that interest me[d]	.62

Political Engagement (Cronbach's alpha = .74)	Loading
Goal: Influencing the political structure[e]	.62
Goal: Keep up to date with political affairs[e]	.74
Discussed politics: In class[c]	.64
Discussed politics: With friends[c]	.80
Discussed politics: With family[c]	.78

Dependent Variable Factors (continued)

Community Orientation (Cronbach's alpha = .79)	Loading
Goal: Helping to promote racial understanding[e]	.74
Goal: Improving my understanding of other countries and cultures[e]	.76
Goal: Becoming involved in programs to clean up the environment[e]	.77
Goal: Becoming a community leader[e]	.76
Goal: Participating in a community action program[e]	.73
Future Activity: Participate in volunteer or community service work[f]	.79
Religiousness (Cronbach's alpha = .76)	**Loading**
Past Activity: Discussed religion[c]	.80
Hours per week: Prayer/meditation[b]	.72
Self-rating: Religiousness[a]	.62
Self-rating: Spirituality[a]	.64
Sports/Exercise (Cronbach's alpha = .67)	**Loading**
Future Activity: Play varsity/intercollegiate athletics[f]	.49
Hours per week: Exercise or sports[b]	.49
Self-rating: Physical health[a]	.57
Hedonism Factor (Cronbach's alpha = .68)	**Loading**
Past Activity: Drank beer[c]	.88
Past Activity: Drank wine or liquor[c]	.87
Past Activity: Smoked cigarettes[c]	.66
Hours per week: Partying[b]	.74
Liberal Social Views (Cronbach's alpha = .79)	**Loading**
View: Abortion should be legal[g]	.76
View: Recode of prohibit homosexual relationships (to "do not prohibit")[g]	.75
View: If two people really like each other, it's all right for them to have sex even if they have known each other for only a short time[g]	.58
View: Same sex couples should have the right to legal marital status[g]	.84
How would you characterize your political views?[h]	.75

[a]Five-point scale: 1 = *lowest 10%* to 5 = *highest 10%*

[b]Eight-point scale: 1 = *none* to 8 = *Over 20 hours*

[c]Three-point scale: 1 = *not at all* to 3 = *frequently*

[d]Three-point scale: 1 = *not important* to 3 = *very important*

[e]Four-point scale: 1 = *not important* to 4 = *essential*

[f]Four-point scale: 1 = *no chance* to 4 = *very good chance*

[g]Four-point scale: 1 = *disagree strongly* to 4 = *agree strongly*

[h]Five-point scale: 1 = *far right* to 5 = *far left*

ABOUT THE AUTHOR

Linda J. Sax is Associate Professor of Higher Education in the Graduate School of Education & Information Studies at UCLA, where she also serves as faculty director of the Master's in Student Affairs program. Dr. Sax teaches graduate courses in research methodology, evaluation of higher education, and gender issues in higher education. She received her B.A. degree in 1990 in political economy from the University of California, Berkeley, and her M.A. (1991) and Ph.D. (1994) degrees in higher education from UCLA. From 1994–2005, Dr. Sax served as Director of the Cooperative Institutional Research Program (CIRP) and Associate Director of the Higher Education Research Institute (HERI) at UCLA, where she oversaw nationwide surveys of college students and faculty.

Dr. Sax's research focuses on gender differences in college student development, and specifically examines how institutional characteristics, peer and faculty environments, and forms of student involvement may differentially affect male and female college students. Her book, *The Gender Gap in College: Maximizing the Developmental Potential of Women and Men* (Jossey-Bass, 2008), explores the impact of college experiences on numerous student outcomes in the areas of academic achievement, self-concept, life goals, career development, physical and emotional health, and political and social attitudes. The book addresses the interests and needs of researchers and practitioners developing student programs and services in higher education.

Dr. Sax was also recently co-principal investigator on a National Science Foundation-funded project to increase women's pursuit of graduate degrees in the physical sciences and engineering.

In addition to having been awarded a 2007-08 Fellowship from the Sudikoff Family Institute for Education & New Media, Dr. Sax is a recipient of the 2005 Scholar-in-Residence Award from the American Association of University Women, and was honored with the 1999 Early Career Award from the Association for the Study of Higher Education. She has authored over 50 publications, including book chapters, monographs, and articles in journals such as *Research in Higher Education, The Review of Higher Education, The Journal of Higher Education, The Journal of College Student Development,* and *Educational Record*. She has served on the Editorial Boards for *The Review of Higher Education* and *Research in Higher Education*.



The Sudikoff Family Institute For Education & New Media

- Bringing Scholarship To The Public Forum -

Published by:
The Sudikoff Family Institute for Education & New Media
UCLA Graduate School of Education & Information Studies

www.gseis.ucla.edu/sudikoff

2341 Moore Hall, Box 951521
Los Angeles, CA 90095-1521
(310) 206.0513

GSE&IS

UCLA Graduate School of Education & Information Studies



National Coalition of Girls' Schools
champions for girls' education

This report was made possible by a gift from the National Coalition of Girls' Schools
www.ncgs.org