The Relationship between Gender and Student Engagement in College

Jillian Kinzie[1]
Indiana University Bloomington

Robert Gonyea
Indiana University Bloomington

George D. Kuh
Indiana University Bloomington

Paul Umbach
University of Iowa

Charlie Blaich
Wabash College

Ali Korkmaz
Indiana University Bloomington

[1] Address correspondence to: Jillian Kinzie, Center for Postsecondary Research, 1900 E 10th St., #419 Eigenmann Hall, Indiana University, Bloomington, IN 47406. E-mail: jikinzie@indiana.edu phone: 812-856-1430, Fax: 812-856-5150.

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Abstract

This paper examines the engagement patterns of male and female undergraduates in different types of baccalaureate-granting institutions. Descriptive statistics and hierarchical linear modeling show that on balance, undergraduate women participate more frequently than their male counterparts in educationally purposeful activities. Male first-year and senior students devote less time and effort to academic challenge tasks, such as working hard to meet expectations and spending time studying; senior males also participated less often in active and collaborative learning activities. Institutional type is unrelated to gender differences in engagement. The results point to areas where institutions could focus efforts to enhance the quality of the undergraduate experience for all students.

The Relationship between Gender and Student Engagement in College

For more than a quarter century, undergraduate women have outnumbered their male counterparts at U.S. colleges and universities (U.S. Department of Education, 2001; Peter & Horn, 2005). Although the *number* of bachelor's degrees awarded to men has increased during this period (King, 2006), undergraduate enrollment at most baccalaureate-granting institutions is about 55% female and rising (Wilson, 2007). In fact, for every 100 men, one hundred and thirty-three women receive a bachelor's degree (U.S. Department of Education, 2001). Mortenson (1999, 2006) contends the growing disparity between degrees awarded to men and women signals an unfortunate downturn in the engagement and educational attainment of male students. These trends have prompted some policy makers and university administrators to conclude that the educational system faces a "boy crisis."

On the one hand, focusing on male students may temporarily divert attention from persistent and pervasive inequities in higher education (King, 2000). On the other hand, to redress gender inequities in education requires a reasoned, balanced examination of the quality of male undergraduate students' experiences relative to that of women (King, 2000, 2006; Weaver-Hightower, 2003). In addition, educational researchers are ethically bound to better understand the experiences of men in college in order to help create the conditions to foster success for all students (Weaver-Hightower, 2003). The manner in which this work is done is also important. For example, in its *Women at Work* report, the American Association of University Women (AAUW, 2003) cautions against asking research questions that advantage one gender over another because such an approach does not raise the quality of education for all.

This study compares the engagement patterns of male and female undergraduates at a broad array of baccalaureate-granting institutions. The *student engagement* concept represents

two key components (Kuh, 2001; 2003). The first is the amount of time and effort students put into their studies and other educationally purposeful activities. For example, if men are less engaged in educational activities, is the deficit concentrated in one or two areas, or is it manifested across the spectrum of college activities? The second is how institutions of higher education deploy resources and organize the curriculum, other learning opportunities, and support services to encourage students to participate in activities associated with desired outcomes, such as persistence, learning, and degree attainment. What the institution does is of particular interest, as it may represent what the institution contributes to student engagement.

In this study, we take into account both student- and institution-level variables to examine the engagement of undergraduate men and women. Of additional interest is whether any observed gender differences are conditional, such as varying within or between different types of institutions. Toward these ends, two questions guided the study:

1. To what degree is gender related to differences in the intensity and extensity of undergraduate student engagement?
2. If gender differences exist, do they differ by institutional type?

What the Literature Says About Gender and Student Success in College

Two strands of research are especially pertinent to understanding the role of gender in the undergraduate experience. The first focuses on the educational pipeline, or the rates by which women and men prepare for and enroll in college and subsequently attain a baccalaureate degree. The second emphasizes the nature and quality of the collegiate experiences of men and women, with an emphasis on student engagement, a concept consistent with Pace's (1980) quality of effort measures and Astin's (1984) theory of involvement.

College Preparation, Enrollment and Attainment

Research on gender and academic achievement in K-12 education reveals some intriguing and at times disconcerting differences between how boys and girls learn and what they experience in schools (American Association of University Women, 1992, 1999; Berkam, Lee & Smerdon, 1997; Sax, 2005). Some differences are fairly well-established, such as girls being more motivated and performing better on tests of reading and writing (Sadker & Sadker, 1994); boys score higher on standardized tests, particularly those that feature questions on math and science (Berkam, Lee & Smerdon, 1997). Nonetheless, since the mid-1990s, the gender gap has narrowed in science and math performance and academic achievement (Freeman, 2004).

The gender gap has also closed in educational access since the 1970s. In fact, the nearly 20% increase over the past 30 years of new high school graduates in college is mostly due to the admission of more women, lower-income students, as well as students of color (Peter & Horn, 2005). Women earned 57% of all bachelor's degrees in 2001-02, a slightly higher proportion than their representation among undergraduates that year (U.S. Department of Education, 2004). The number of women earning degrees within six years exceeds the number of men who did the same by more than 85,000 students (Carey, 2005) a pattern that persists for all racial-ethnic categories. Older African-American females and Latinas are much more likely than their male counterparts to attend college, especially in the two-year sector (King, 2000, 2006). Also, men remain underrepresented in traditionally female-dominated fields such as education, nursing, and areas in the humanities (Flood, Bates, & Potter, 2000; Lackland & De Lisi, 2001).

Despite these trends toward parity, gender differences persist in terms of educational attainment, subject area achievement, and choice of majors and careers. For example, although similar percentages of men and women high school seniors complete the traditional college preparatory curriculum (U.S. Department of Education, 2001) and highest level of high school

mathematics courses (Peter & Horn, 2005), men are disproportionately represented at both ends of the achievement spectrum – the strongest and poorest performers (Mickelson, 2003; Mortenson, 2006). Men also have lower educational aspirations (Bae, Choy, Geddes, Sable, & Snyder, 2000). In part, women get better grades in high school because they are more engaged than men; that is, they study more hours, interact more often with their teachers, and so forth (Epstein, Elwood, Hey, & Maw, 1998; McCarthy & Kuh, 2006; Mortenson, 2006). Low income African American males are least likely to complete the traditional college prep curriculum (King, 2000). As a result, more men start college less inclined to read or actively take part in various aspects of campus life (McCarthy & Kuh, 2006). No wonder that men's grades in college on average tend to be lower than those of women (Gose, 1999).

Quality of and Participation in the Undergraduate Experience

Although women are better prepared academically for college than their male counterparts, studies of undergraduate perceptions of the learning climate indicate that women tend to view their campus to be less supportive of their academic and social needs, which in turn adversely affects their learning and personal development (Belenky, Clinchy, Goldberger & Tarule, 1986; Pascarella et al., 1997; Sandler, Silverberg, & Hall, 1996). For example, moderately sized negative relationships were found between women's perceptions of campus climate and selected intellectual and personal development outcomes, such as gains in writing and thinking skills, science knowledge, and arts and humanities knowledge (Pascarella et al., 1997; Whitt, Edison, Pascarella, Nora, & Terenzini, 1999).

Men and women also differ in terms of participating in activities that are positively linked to higher levels of student learning and development. For example, as in high school, women undergraduates tend to spend more time preparing for class and they read and write more (Hu &

Kuh, 2002, 2003). Some of these differences may be a function of major, as women tend to be overrepresented in areas that demand more writing than others, such as the humanities and social sciences compared with science, technology, engineering, and mathematics (STEM) fields. Certain of these advantages vary, depending on whether women attend a two- or a four-year college. For example, women at baccalaureate-granting colleges gain more than men in critical thinking over the course of college, whereas women attending two-year colleges tend to gain less during the first year than do men (Pascarella & Terenzini, 2005).

The educational value of student-faculty interaction is almost unequivocal (Kuh & Hu, 2001; Pascarella & Terenzini, 2005). Frequent, meaningful interactions between students and faculty, both inside and outside the classroom, are important to learning and personal development, and a host of gains including academic skill development, social self-confidence, academic and social integration, and leadership (Astin, 1993; Pascarella & Terenzini, 1991; 2005; Smart, Feldman, & Ethington, 2000). While little of this research examines gender differences (Pascarella & Terenzini, 2005), some research has shown no difference (Kuh & Hu, 2001), while others have found that women have more frequent and positive interactions with their faculty than do men (Sax, Bryant & Harper, 2005).

Male students are less likely to seek academic assistance from tutors, perhaps because of gender-related socio-linguistic factors and cultural pressures (Wright, 2003). Yet, men more frequently work on research projects with faculty members (Drew & Work, 1998), gain more in quantitative mathematical problem-solving strategies (Baker & Jones, 1993; Halpern, 2000; Stumpf & Stanley, 1996), and report higher levels of satisfaction with digital learning environments (Blum, 1999). Some of these advantages are evident as early as the first grade (Fennema, et al., 1998). Even though girls tend to earn better grades in high school mathematics

classes, once in college men enroll in and complete higher level STEM courses (Davis, et al., 1996; Nelson & Rogers, 2004). Another study showed that women majoring in math and science gain more in math self-concept than men during college (Pascarella & Terenzini, 2005).

In terms of co-curricular involvement, men tend to be overrepresented in higher status campus leadership positions on coeducational campuses (Astin, 1993; Valian, 1998). Men are also more likely to participate in intercollegiate athletics, and intramural and recreational athletics, but are less likely to study abroad (Open Doors, 2004) or take part in service learning (Campus Compact Statistics, 2003) and internships.

Not all the findings from studies examining gender effects offer conclusive results. Some studies show that men more frequently participate in class discussions than females (Fassinger, 1995; Tannen, 1990), other studies found no effect (Howard, James & Taylor, 2002), while others indicate that women contribute to class more frequently (Drew & Work, 1998). Although Fritschner (2000) found no gender effect on active participation in class, gender had some influence on student fears (of professor's criticism and peer disapproval), confidence, and preparation that might affect learning in other ways including interaction with faculty and academic performance. Few if any significant gender differences exist in terms of self-reported educational gains in broad areas such as general education, openness to diversity, vocational training, and specialization (Drew & Work, 1998; Pascarella & Terenzini, 2005).

Gender and Institutional Type

Although the research is limited, the gender gap appears to play out differently across institutions. The greatest enrollment imbalance is at liberal arts colleges -- particularly those without intercollegiate sports programs (Gose, 1999) and at some co-ed Historically Black Colleges and Universities where the proportion of women reaches 70 percent (Wilson, 2007).

Private baccalaureate-granting liberal arts institutions have experienced greater declines in the percent of degrees awarded to men than public institutions overall (Mortenson, 2001). These imbalances prompted initiatives to attract and retain men, including focused recruitment efforts, expanded athletic opportunities, and promotion of majors that appeal to men (Wilson, 2007).

Some research suggests that women's colleges provide a qualitatively different experience for women compared to coeducational institutions, including higher levels of academic challenge, opportunities for active and collaborative learning, and greater support for women in STEM majors (Kinzie, Thomas, Palmer, Kuh & Umbach, 2007; Pascarella & Terenzini, 1991). Given the few men's colleges remaining, research on differences between attending a men's college versus a coeducational college for men is limited.

Summary

On balance, research suggests that gender differences that exist prior to college persist as students move through postsecondary education. However, before declaring a crisis for male students, more information is needed to determine whether men underperform in terms of participating in effective educational practices and whether the engagement patterns of men and women differ systematically across colleges and universities. Studying these issues is challenging because it is possible that focusing on gender may obscure other conditional effects, such as college environments, socio-economic status and race and ethnicity in mediating the nature and quality of student experiences in college (Pascarella & Terenzini, 2005).

Methods

The data for this study are from the National Survey of Student Engagement (NSSE) project which annually collects data from hundreds of thousands of undergraduates at four-year colleges and universities in the U.S. and Canada. NSSE assesses the extent to which students are engaged in empirically-derived good educational practices and what they gain from their college

experience (Kuh, 2001). The main content of the survey represents student behaviors that are positively correlated with desirable learning and personal development outcomes of college.

The sample for this study consisted of 472,985 randomly sampled first-year and senior undergraduate students attending 487 different baccalaureate-granting colleges and universities who completed the NSSE survey in 2005 or 2006. Thirty six percent were male and 91% were enrolled full-time. Seven percent were African American, 5% Asian American or Pacific Islander, 5% Latino/a, less than 1% Native American, and 75% White. Almost half (46%) lived on campus and 15% percent were adult students over 25 years of age. About two fifths (39%) of the seniors started college at a different institution. The institutions varied in terms of their Barron's *Profiles of American Colleges 2005* (2004) selectivity rating (mean=3.3 on a scale of 1 through 6) and undergraduate enrollment size (mean=5,873 students, median=3,173 students).

The data were analyzed in three steps. In step one we reviewed descriptive statistics which provided a partial answer to the first research question – whether men and women differ in terms of their level of engagement in educationally purposeful activities. Specifically, we examined the individual items contributing to the five scales described in Table 1: academic challenge, student-faculty interaction, active and collaborative learning, experiences with diversity, and supportive campus environment. We focused on activities where, after collapsing the item frequencies into dichotomous values, there was more than 5% difference between men and women. Because of the very large sample size overall sampling error was no greater than +/- 0.03%, so the 5% difference is not likely due to sampling error. We also took mean differences into account by computing effect size differences based on the respective item scale (i.e. 4-point or 7-point scale). Effect sizes of an absolute value of .10 or greater were considered sizeable enough for consideration as a gender difference.

<Insert Table 1 here >

In step two we built separate models for first-year students and seniors to examine the effect of gender on engagement levels. Because of the nested nature of the data and our desire to estimate institutional effects, we used hierarchical linear modeling (HLM) (Raudenbush & Bryk, 2002). At the student level we controlled for race/ethnicity, transfer status (seniors only), enrollment status, living on campus, parental education, age, and major. At the institution level we controlled for institution type using the Basic 2005 Carnegie classification (Carnegie Foundation for the Advancement of Teaching, 2005), Barron's (2004) selectivity, and institutional control (public, private). We allowed the intercept to vary, thereby partitioning the variance that can be attributed to institution-level effects.

In step three we randomized the slope of the variable 'male,' (i.e., gender coded as male=1 and female=0) in order to partition the variance that may exist due to institutional differences in the dependent variable attributable to being male. The continuous independent and dependent measures are standardized, meaning that the unstandardized coefficients in all of the tables represent effect sizes. An effect size is the proportion of a standard deviation change in the dependent variable as a result of a one-unit change in an independent variable. The larger the effect size the more likely the differences between groups represent performance that warrants serious discussion and, perhaps, institutional action. As suggested by Rosenthal and Rosnow (1991), we consider an effect size of .10 or less to represent a trivial difference, between .10 and .30 small, between .30 and .50 moderate, and greater than .50 large. Because statistical significance is sensitive to sample size, effect sizes are particularly important for consideration in this study. The large number of cases used at both the student- and institution-level makes it more likely that very small differences will be statistically significant.

Results

The first research question focused on whether gender was related to different levels of engagement in educationally purposeful activities. Tables 2 and 3 list the activities that were done more frequently by men and women respectively. In general, both first-year and senior male students devoted more time to non-academic activities, such as relaxing and socializing, exercising and participating in physical fitness, and co-curricular activities. Men also more often came to class unprepared than their female counterparts. The one activity counter to this pattern is that male students more frequently discussed ideas with faculty members outside of class.

In contrast, female students devoted more time and effort to academic activities such as studying, preparing multiple drafts of papers, and making class presentations. They also attended more art exhibits and plays, participated more often in community-based projects and in a learning community, and communicated more frequently with their instructors via email. Senior female students spent more time taking care of their dependents. Women also report higher grades than men, a difference that grows between the first to the senior year of college.

< Insert Table 2 here>
< Insert Table 3 here>

Table 4 displays the differences in engagement for men and women majoring in STEM fields. As noted earlier, fewer women pursue STEM majors. In general, the gender differences reflected in Tables 2 and 3 also hold for men and women in STEM majors. Table 4 shows only activities where differences exist that do not appear in Table 2 and Table 3. For example, female students report more memorizing and synthesizing in their coursework. They also report greater gains in personal development, which includes self understanding, and understanding people of other racial and ethnic groups. Female students more often talked about their career plans with faculty, discussed readings with others, and received more feedback. On the other hand, male

students reported greater gains in solving complex, real-world problems, and more frequently tutored other students and worked with classmates outside of the class on academic matters.

< Insert Table 4 here>

Table 5 presents the variance components for the dependent variables in the unconditional two-level models (i.e., the models having no student- or institution-level variables entered). The *total* variance is approximately equal to one for each variable because they were standardized. The variance *between* institutions represents the dispersion of institutional mean scores for the dependent variables, and the variance *within* institutions is a measure of the dispersion of individual students' scores on the dependent variables. The male slope variance represents the amount that any differences in male and female engagement vary among institutions. The *proportion between institutions* is computed by dividing the total variance by the between institution variance. This between institution variance, ranging from 4.7% to 8.9%, is small compared to the within-institution variance which is well above 90% for all variables. This means that students within institutions can vary greatly from low to high engagement while institutional means vary less. This point is relevant to this study because the second research question asks if gender differences vary by institutional type. Because a relatively small amount of variance exists at the institution level, it is also a given that gender differences between institutions, where they do exist, cannot account for much of the overall variance.

Tables 6 (first-year students) and 7 (seniors) present the level 2 effect sizes and significance levels for both the unconditional models (i.e., those with no predictors added), and the full models that include student and institutional characteristics. These tables present the variance components between institutions, within institutions, and in the distribution of male slopes among institutions. In HLM, the intercept is interpreted as the average of the institutional means of the dependent variable. By allowing the intercepts to vary, HLM is able to estimate the amount and significance of the variance in the distribution of institutional means. Predictors

within these intercept models are listed in the top panel of Tables 6 and 7 and include the Carnegie types, sector (private=1, public=0), and *Barron's* selectivity. It is also possible to allow the institutional coefficients (slopes) to vary, thus creating a second type of institution-level variance that can be modeled.

< Insert Table 5 here>
< Insert Table 6 here>
< Insert Table 7 here>

To answer the first research question, "to what degree do gender differences exist in engagement?', we examined the significance and magnitude of the male slope coefficients in the unconditional and full models. This coefficient represents the average institutional difference between men (1) and women (0) on the dependent variable.

Academic Challenge. Both first-year and senior women scored significantly higher than men on academic challenge; the effect sizes of -.15 ($p<.001$) for first-year students and -.18 ($p<.001$) for seniors were larger than those of any other dependent variables. Student and institutional controls reduced the magnitude of the effect sizes only slightly, indicating that there is a small, persistent, gender effect on the level of academic challenge reported by students. The effect size for seniors in the full model indicate that men score on average about one-sixth of a standard deviation lower than women in academic challenge. Randomizing the male slope explained a statistically significant, but tiny amount of additional variance in both first year and senior models (.006; $p<.001$), indicating that the gap in academic challenge between men and women varies slightly across different institutional types. Consistent with all models, student level variables were statistically significant in both the first-year and senior academic challenge models, although they generally explained only a trivial amount of the within variance. Senior engineering and physical science majors reported moderately strong levels of challenge relative to business majors. Institution-level variables explained 62% of the between-institution variance for first year students and 60% for seniors. Small to moderate institutional differences were

found between institutional types on academic challenge for seniors favoring baccalaureate-arts and sciences colleges (the omitted Carnegie type), private, and selective institutions.

Active and Collaborative Learning. Significant gender effects also emerged on the active and collaborative learning scale, although in opposite directions for first-year students and seniors. In the full models, first-year men report more active and collaborative learning than their female counterparts, although the difference is trivial in magnitude with an effect size of .03 ($p<.001$) indicating that men score on average a trivial .03 of a standard deviation higher than women on active and collaborative learning. On the other hand, senior men score *lower* than senior women on this measure, though the effect size of -.07 ($p<.001$) is still in the trivial range. However, the net shift of -.10 (from .03 in the first year to -.07 in the senior year) is worth noting and may be considered non-trivial. That is, men in the first year are at least on par with women, if not slightly higher on this measure, but senior men seem to fall below women. Do women learn to become more engaged through their undergraduate careers, or do men decrease their participation in this form of engagement over the years?

Randomizing the male slope explained a statistically significant, but tiny amount of additional variance in both first year (.007) and senior models (.008), indicating that the gender gap in active and collaborative learning varies slightly across different institutional types. Again, student-level variables were a small factor in explaining engagement. Black and Latino students reported more such activities (relative to Whites) and full-time students had a modest effect size, especially for seniors. Contrary to the patterns with academic challenge, senior business majors compared favorably with several of the other disciplines in terms of active and collaborative learning. Institution-level variables explained 45% of the between-institution variance for first-year students and 44% for seniors. In the full models, doctoral-level institutions had a small

negative effect on active and collaborative learning relative to the baccalaureate-arts and sciences colleges; private schools have a small positive effect.

Student-Faculty Interaction. Senior men and women do not differ significantly with regard to their interactions with faculty members. While first-year males scored significantly higher on this measure, the effect size is a trivial .05 ($p<.001$) in the full model. Recall that the male slope coefficient represents the average gender differences among institutions, indicating whether any gender difference varies from one institution to the next. Randomizing the male slope accounted for a statistically significant but again very small amount of additional variance for both first year and senior students (in full models both are equal to .006; $p<.001$), indicating that the gender gap in student-faculty interaction varies slightly across different institutional types. First-year and senior full-time, Black and Latino students interact more with faculty than their counterparts. In the senior year, major plays a moderately strong role where students in most disciplines have more contact with their faculty compared with business majors; biological and physical science majors interact more frequently than any other group. Institution-level variables explained 49% of the between-institution variance for first year students and 67% for seniors. The full model shows that, especially among senior students, baccalaureate-arts and sciences colleges have small, positive effects relative to the other Carnegie groups. Private institutions also have a small positive effect. Consistent with other studies, selectivity has no net effect on student-faculty interaction (Kuh & Pascarella, 2004; Pascarella, Cruce, et al, 2006).

Experiences with Diversity. No significant differences were found in male and female experiences with diversity. Randomizing the male slope explained a statistically significant, but slim amount of additional variance for both first-year students (.004; $p<.001$) and seniors (.005; $p<.001$), indicating that any differences in diversity experiences between men and women vary

only slightly across different institutional types. Institution-level variables only explained 35% and 16% of the between-institution variance for first-year and senior students respectively. Students of color, full-time students, and those living on campus report more experiences with diversity. The effects by major field are generally weak, with social sciences showing the largest of the effect sizes (.18 for first-year and, 19 for senior students) relative to business. Little of the variance in this dependent measure is explained by institutional type.

Supportive Campus Environment. Both first-year and senior men perceive their campus environments to be less supportive than women, though again the magnitudes are trivial (-.04 for first year students and -.07 for seniors). Randomizing the male slope explained a statistically significant, but slim amount of additional variance (.006) for both first-year students and seniors, indicating that any gender difference varies only slightly across different institutional types. Student-level variables explained but 1.1% of the variance in both first-year and senior full models with generally small to trivial coefficient sizes. Black and Latino students are somewhat more favorable in their ratings of the campus environment relative to Whites; living on campus, at least for first-year students, had a small positive effect. Institution-level variables explained 56% of the between-institution variance for first-year students and 45% for seniors. All Carnegie types with the exception of baccalaureate-diverse and smaller program master's institutions have small to moderate negative effects relative to the baccalaureate-arts and sciences institutions. Also, being a private institution has a small positive effect in the models.

To answer the second research question, "where gender differences exist, do they differ by institutional type?", we observed the size and statistical significance of the male slope variance. The male slope variances, although significant at the $p<0.001$ level in all of the models, were minute, ranging from .004 to .008. These tiny amounts of variance in gender difference

among institutions were not sufficient to model using institution-level variables. An example of this slim variance is shown in Table 8 which lists the number and percent of institutions within various effect size ranges on the academic challenge benchmark; that is, the male/female mean difference divided by the standard deviation. Table 8 also shows that more than 90% of institutions have small gender differences that are clustered near the observed gender gap favoring women on this benchmark, similar to the coefficients of the male slope in other tables. Thus, though the size of the gender gap varies somewhat between institutions, they do not appear to range far from the center. Indeed, only about 4% of institutions show positive effect sizes over .20 favoring males. This finding suggests that though the gender gap varies somewhat from one institution to the next, factors such as campus culture which are not represented in the institutional variables used in this analysis may contribute to these differences.

<Insert Table 8 here>

Limitations

Although the institutions that participated in NSSE 2005 and 2006 mirror all U.S. colleges and universities in terms of institutional characteristics such as Carnegie classification and control, generalizations are limited because institutions elect to participate.. This means that our results and conclusions most appropriately apply to institutions in this study. In addition, comparisons made between students at different types of institutions are made without controlling for pre-college measures of students' levels of engagement or their predispositions toward college. Consequently, it is possible that differences between students may be due to institutional cultures and other contextual variables or entering student characteristics.

Discussion and Implications

Over the past several decades, most of the research on gender differences in college student experiences concluded that women were shortchanged in a variety of ways. With two

exceptions, the results of this study suggest that any differences in undergraduate student engagement generally are small and mixed. The major area of concern is academic challenge where male students are systematically less engaged than their female counterparts. This is more than mildly troubling, inasmuch as this cluster of educationally purposeful activities represents core academic experiences such as the amount of time spent preparing for class, working up to one's potential in meeting instructors' standards, rewriting papers to produce crisp, persuasive prose, and completing challenging assignments that require the integration and synthesis of ideas and information from a variety of sources. In addition, male seniors participate less often in active and collaborative learning activities, such as contributing to class discussions, making class presentations, and working with peers on projects during class. In fact, senior males are much less likely to engage in such activities than first-year men, a somewhat perplexing finding. Although there is some evidence that men are more inclined to be independent learners (Drew & Work, 1998), this situation is disconcerting as these are the kinds of experiences that purportedly help prepare students for the messy, unscripted problems they will encounter during and after college. Equally important, working effectively with co-workers is considered an essential skill in the 21st century (Association of American Colleges and Universities, 2007).

Although gender differences in engagement are slight, they illuminate aspects of undergraduate education long associated with qualitative differences in the learning experiences of men and women. For example, the descriptive results indicate that women dedicate greater effort to working hard to meet an instructor's standards or expectations, checking in with faculty via email, serving others via community-based projects and service, and caring for dependents. Unlike their male counterparts who devote more time to interacting with faculty members about ideas and are actively involved in co-curricular activities and exercise, female students are more

likely to dedicate time to working hard and serving others. These differences illustrate the persistence of gender-related patterns of behavior and learning and warrant further investigation for the differential impact they may have on student learning and success.

Gender stereotypes, prior experiences, aspirations, and expectations explain some of the gender differences in student engagement. For example, it is sad but not surprising that the pattern of low male student engagement in academic activities evident in high school persists in the postsecondary environment. In the case of women, even though increasing numbers are enrolling in postsecondary education, many continue to gravitate toward what have been traditionally female-dominated occupations and dedicate themselves to a greater extent than males to activities such as community service that strengthen social relations among groups. Thus, it is not surprising that male undergraduates are less involved in service learning and seniors report less involvement in doing community service or volunteer work in college. Similarly, shibboleths such as the humanities and social sciences are "female domains" and math and science are "male domains" perpetuate tendencies for educators and parents to overestimate and underestimate abilities based on gender. This has the untoward effect of male students believing that because they are not "expected" to do well in English or writing there is little payoff for devoting time and effort to these subjects; the effect for females is that what may be authentic interest and talent in science and math are repressed and subjugated for channeling their energy to other venues such as writing. Thus, gendered expectations may well influence the extent to which male and female students engage in various educationally purposeful activities.

Although the advancement of women in STEM fields has been a longstanding concern of educational policymakers, gender gaps persist in terms of choice of major, persistence to degree, and participation in STEM graduate and professional school. Given the real gender gap, it is not

surprising that the gender differences identified in our descriptive results hold for STEM majors, and a few more emerge. Notably, female students spend more time interacting with faculty about career plans and receiving feedback. Combined, these activities suggest that women in STEM fields are more reliant on faculty to gauge how well they are doing. The practice of receiving feedback is particularly relevant given concerns about the retention of women in STEM. Women attach more informational value to feedback (Roberts, 1991) and report that feedback, particularly negative, contained more information relevant to their abilities (Roberts & Nolen-Hoeksema, 1989). Considering the relationship of self-concept and belief in ones ability (Sax, 1994) to women's participation and progress in STEM fields, it is important to insure that STEM faculty members are sensitive to gender-related patterns regarding feedback. In addition, women's tendency to participate in community-based research and service learning suggests pedagogical practices that could more effectively engage and support women in STEM fields.

The results of this study corroborate existing research demonstrating gender differences in activities that complement and enrich undergraduate education. Male students are less inclined to take advantage of enriching learning activities including study abroad, attending arts events, and completing foreign language coursework, while women are less likely to participate in co-curricular activities on campus. Again, the gender gaps in these areas expose qualitatively different undergraduate experiences for men and women. It would be instructive to examine this particular gender gap at an institutional level to better understand the extent to which programmatic interventions could be designed to monitor and address the imbalance.

The magnitudes of differences in student engagement between men and women in this study are not large enough to declare that the college male is in crisis. At the same time, the results give us pause because they indicate that men -- on average -- do not put as much into or

by their own report get as much out of their studies as do women. Given the empirical and conceptual links of student engagement to student learning, persistence, and educational attainment (Kuh, Kinzie, Buckley, Bridges & Hayek, 2007), it is essential to determine the factors and conditions that contribute to these differences and develop interventions to ameliorate them. For example, because men appear to be less challenged academically and senior men less often take part in active and collaborative learning activities, institutions could consider educational practices that require students to spend more time on educationally purposeful tasks. Among these potentially "high impact" practices are learning communities, first-year seminars, writing-intensive courses, student-faculty research, study abroad, internships, and capstone seminars (Association of American Colleges and Universities, 2007; Kuh et al., 2007). Some educationally effective institutions assign peer writing tutors to courses with demanding writing assignments; students are required to share drafts with a tutor before submitting assignments to the instructor (Kuh, Kinzie, Schuh, Whitt & Associates, 2005). Of course, practices that encourage students to participate in these activities will benefit all students, not just males.

As with other studies, the results of this investigation indicate that students at baccalaureate-arts and sciences colleges and private institutions are more engaged than their peers at comprehensive colleges and research universities (Hu & Kuh, 2002; Kuh et al., 2007). However, gender differences by institutional type as defined by Carnegie were generally trivial. This is probably because the effects of gender socialization are institution-neutral, especially as campus boundaries become increasingly permeable to societal values and mores. Colleges and universities both influence and mirror societal norms, including gender socialization processes. Centuries of socialization that shape male and female behavior are difficult to overturn once students matriculate. But this does not mean that institutions should not continue to develop

programs and policies to counter these unacceptable, often deleterious patterns of beliefs and behaviors. Taken together, these findings suggest that individual institutions should identify aspects of the undergraduate experience where male students may be lagging, and develop approaches to foster male academic challenge, and sustained active and collaborative learning opportunities for upper division courses. Equally important, the results of this study underscore the need to develop a more balanced, nuanced understanding of the effect of gender on important aspects of the undergraduate experience. Finally, it would be instructive to identify institutions where men and women engage equally at high levels in educationally productive activities so that other schools might learn from them.

Conclusion

Compared with their female counterparts, male undergraduates engage less frequently in academically challenging activities; in addition, senior men participate less often in active and collaborative learning activities, a disappointing reversal from their performance in the first college year. Since little of the gender gap can be explained by institutional type and other institutional characteristics, more information including entering students' expectations and preparation is necessary to better understand the proximal causes of gender differences and to identify those male students who are under-engaged in college. Even though the scales appear to have tipped with women undergraduates being the majority in postsecondary education, it is premature to conclude that men are now systematically disadvantaged in terms of educational opportunity. At the same time, it is important to continue to monitor the nature and quality of college experiences for both men and women in order to advocate for policies and practices that enhance the quality of education for all.

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Table 1
List of Dependent Variables and Component Items

Dependent Variables	Component Items
Academic Challenge	• Amount of assigned reading; assigned number of large, mid-sized, and small papers; • Coursework that emphasizes analysis, synthesis, making judgments, and applying the material; • Time (hours per week) spent in academic preparation; and • Belief that campus environment emphasizes spending time on studying and academic work.
Student-Faculty Interaction	• Discussing grades or assignments; • Discussing ideas outside of class; • Discussing career plans; and • Receiving prompt feedback.
Active and Collaborative Learning	• Asking questions or contributing to class discussion; • Making class presentations; • Working in groups during class; • Working in groups outside of class; • Tutoring other students; • Participating in a community-based project as part of a course; and • Discussing ideas from classes with others outside of class.
Experiences with Diversity	• Having serious conversations with students of a different race or ethnicity; • Having serious conversations with students who differ religiously, politically, or personally; and • Belief that campus environment emphasizes contact among diverse students.
Supportive Campus Environment	• Belief that campus environment emphasizes support for academic success, non-academic responsibilities, and thriving socially; and • Opinions about relationships with other students, faculty members, and administrative personnel

Table 2
More Frequent Activities of Male Students

Activity	Class	Male	Female	Difference (Effect Size)
Discussed ideas from your readings or classes with faculty members outside of class	FY	22%	17%	5% (.17)
	SR	32%	27%	5% (.13)
Participating in co-curricular activities (6 hours or more)	FY	38%	28%	10% (.23)
	SR	33%	25%	8% (.20)
Exercised or participated in physical fitness activities	FY	66%	59%	7% (.17)
	SR	61%	54%	7% (.16)
Come to class without completing readings or assignments	FY	23%	16%	7% (.19)
	SR	27%	19%	8% (.20)
Relaxing and socializing 6 hours or more	FY	79%	72%	7% (.23)
	SR	75%	65%	10% (.28)

Table 3

More Frequent Activities of Female Students

Activity	Class	Male	Female	Difference (Effect Size)
Used e-mail to communicate with an instructor	FY	69%	76%	7% (.19)
	SR	80%	86%	6% (.20)
Prepared two or more drafts of a paper or assignment before turning it in	FY	51%	56%	5% (.14)
	SR	41%	47%	6% (.15)
Made a class presentation	FY	-	-	-
	SR	59%	65%	6% (.15)
Worked harder than you thought you could to meet an instructor's standards or expectations	FY	48%	56%	8% (.19)
	SR	51%	62%	11% (.26)
Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments	FY	-	-	-
	SR	55%	65%	10% (.24)
Participated in a community-based project (e.g., service learning) as part of a regular course	FY	-	-	-
	SR	14%	21%	7% (.20)
Did community service or volunteer work	FY	35%	44%	9% (.29)
	SR	56%	67%	11% (.24)
Gained knowledge and skills related to contributing to the welfare of your community	FY	-	-	-
	SR	42%	50%	8% (.18)
Participated in a learning community or some other formal program where groups of students take two or more classes together	FY	-	-	-
	SR	23%	29%	6% (.11)
Did a practicum, internship, field experience, co-op experience, or clinical assignment	FY	-	-	-
	SR	53%	59%	6% (.14)
Completed foreign language coursework	FY	20%	27%	7% (.17)
	SR	40%	48%	8% (.16)
Attended an art exhibit, gallery, play, dance, or other theater performance	FY	26%	32%	6% (.18)
	SR	-	-	-
Spent 6 hours or more per 7-day week caring for dependents living with you	FY	-	-	-
	SR	19%	25%	6% (.20)
Mostly A or A- grades	FY	33%	40%	7% (.19)
	SR	38%	48%	10% (.24)

Note. For emphasis, only frequencies where differences were identified are shown. Dash marks indicate no meaningful differences between men and women were found for that particular class.

Table 4

Activities Students Reporting Differently in STEM Fields

Activity	Class	Male	Female	Difference
Memorizing facts, ideas or methods from your courses and readings so you can repeat them in pretty much the same form	FY	65%	74%	9%
	SR	58%	68%	10%
Synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships	FY	-	-	-
	SR	72%	78%	6%
Tutored or taught other students (paid or voluntary)	FY	23%	17%	6%
	SR	32%	27%	5%
Worked with classmates outside of class to prepare class assignments	FY	53%	47%	6%
	SR	-	-	-
Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)	FY	-	-	-
	SR	59%	66%	7%
Talked about career plans with a faculty member or advisor	FY	-	-	-
	SR	42%	49%	7%
Number of assigned textbooks, books, or book-length packs of course readings (at least 5)	FY	76%	81%	5%
	SR	65%	72%	7%
Received prompt written or oral feedback from faculty on your academic performance	FY	-	-	-
	SR	63%	69%	6%
Gained substantially in deepened sense of spirituality	FY	30%	35%	5%
	SR	24%	30%	6%
Gained substantially in writing clearly and effectively	FY	64%	72%	8%
	SR	67%	73%	6%
Gained substantially in understanding people of other racial and ethnic backgrounds	FY	46%	51%	5%
	SR	41%	49%	8%
Gained substantially in self understanding	FY	56%	61%	5%
	SR	55%	63%	8%
Gained substantially in developing a personal code of values and ethics	FY	-	-	-
	SR	50%	57%	7%
Gained substantially in solving complex real-world problems	FY	58%	52%	6%
	SR	65%	59%	6%
Gained substantially in working effectively with others	FY	-	-	-
	SR	75%	81%	6%

Note. For emphasis, only frequencies where differences were identified are shown. Dash marks indicate no meaningful differences between men and women were found for that particular class.

Table 5

Component Amounts of Variance within the Dependent Variables from Unconditional Models

	Academic challenge	Active and collaborative learning	Student-faculty interaction[1]	Experiences with diversity	Supportive campus environment
FY students					
Total variance	1.00	1.01	1.00	1.00	1.00
Variance within institutions	0.91	0.95	0.96	0.94	0.93
Variance male slope	0.006	0.007	0.007	0.004	0.006
Variance between institutions	0.09	0.06	0.05	0.06	0.07
Proportion between institutions	8.9%	6.1%	4.7%	6.2%	6.8%
Seniors					
Total variance	1.01	1.01	1.02	1.01	1.00
Variance within institutions	0.95	0.96	0.94	0.95	0.94
Variance male slope	0.006	0.008	0.006	0.006	0.006
Variance between institutions	0.06	0.05	0.08	0.05	0.07
Proportion between institutions	5.9%	4.7%	7.4%	5.3%	6.5%

[1] The item 'research with faculty' is not included in this scale in the first-year student models.

Table 6

Level 1 and 2 Model Coefficients and Variance Components from the Unconditional and Full Models: First-Year Students

		Academic Challenge				Active/Coll. Learning				Stu-Fac Interaction				Exp with Diversity				Supp Camp Env			
Level 1 Independent Variables		uncond mod		full model		uncond mod		full model		uncond mod		full model		uncond mod		full model		uncond mod		full model	
Race/Ethnicity	Afr. Amer.			.03	**			.14	***			.18	***			.16	***			.08	***
(ref: White)	Asian/Pac. Isl			-.01				-.04	**			.01				.06	***			-.02	
	Latino			.06	***			.07	***			.10	***			.16	***			.13	***
	Other			.01				.05	*			.08	***			.15	***			-.04	
Full time enrollment				.02				.17	***			.12	***			.12	***			.05	**
Living on campus				.00				.05	***			.01				.13	***			.13	***
Adult student (>24 yrs.)				.07	***			.08	***			-.01				-.10	***			.05	*
Parents' Educ. (approx. total years)				.00	***			.01	***			.00	***			.00	**			.00	**
Major	Arts/Humanities			.07	***			.05	***			.13	***			.18	***			-.05	***
(ref: Business)	Biological Sci			.17	***			.07	***			.10	***			.10	***			.00	
	Education			.06	***			.16	***			.13	***			.08	***			.07	***
	Engineering			.09	***			.12	***			-.06	***			.03	*			.00	
	Physical Sci			.05	**			.06	**			.06	***			.08	***			.01	
	Professional			.14	***			.02				.06	***			.04	***			.02	
	Social Sci			.13	***			.03	**			.10	***			.18	***			-.05	***
	Other			-.02	*			.00				.05	***			.04	***			-.01	
	Undecided			-.19	***			-.26	***			-.21	***			-.08	***			-.18	***
Male slope		-.15	***	-.13	***	.03	***	.03	***	.03	***	.05	***	.00		.00		-.05	***	-.04	***
Level 2 Independent Variables																					
Intercept		.04	***	-.35	***	.01		-.30	***	.02	*	-.19	***	-.01		-.43	***	.03	**	-.22	***
Selectivity (Barron's)				.10	***			.00				.00				.04	***			.03	***
Private institution				.22	***			.20	***			.19	***			.09	***			.23	***
Carnegie	*Bac Div*			-.21	***			.03				.00				-.13	**			-.07	*
Type	*MA_S*			-.13	**			.02				-.05				-.12	**			-.04	
(ref:	*MA_M*			-.13	***			-.01				-.09	**			-.09	**			-.08	**
Bac AS)	*MA_L*			-.17	***			-.06	*			-.11	***			-.09	**			-.12	***
	Doc_DRU			-.18	***			-.04				-.12	***			-.02				-.22	***
	Doc_RUH			-.21	***			-.12	***			-.18	***			-.08	*			-.20	***
	Doc_RUVH			-.21	***			-.21	***			-.25	***			.01				-.26	***
	Other type			-.11				.11				-.04				-.06				.00	
Variance Components																					
Total variance		1.00		.92		1.01		.93		1.00		.96		1.00		.95		1.00		.95	
Variance between institutions		.09	***	.03	***	.06	***	.03	***	.05	***	.02	***	.06	***	.04	***	.07	***	.03	***
Variance within institutions		.91		.88		.95		.90		.96		.93		.94		.90		.93		.92	
Variance male slope		.006	***	.005	***	.007	***	.008	***	.007	***	.006	***	.004	***	.004	***	.006	***	.006	***
Proportion between institutions		8.9%				6.1%				4.7%				6.2%				6.8%			
Variance between explained				62%				45%				49%				35%				56%	
Variance within explained				2.7%				5.3%				2.6%				3.9%				1.1%	

Table 7

Level 1 and 2 Model Coefficients and Variance Components from the Unconditional and Full Models: Seniors

		Academic Challenge				Active/Coll. Learning				Stu-Fac Interaction				Exp with Diversity				Supp Camp Env			
Level 1 Independent Variables		uncond mod		full model		uncond mod		full model		uncond mod		full model		uncond mod		full model		uncond mod		full model	
Race/Ethnicity	Afr. Amer.			.03	*			.16	***			.10	***			.19	***			.10	***
(ref: White)	Asian/Pac. Isl			.02				-.08	***			-.04	**			.07	***			.06	***
	Latino			.07	***			.10	***			.06	***			.14	***			.11	***
	Other			.04	*			.07	***			.08	***			.13	***			-.03	
Full time enrollment				.11	***			.31	***			.25	***			.17	***			.10	***
Transfer student				.03	***			-.06	***			-.10	***			-.04	***			-.06	***
Living on campus				-.01				.02	*			.07	***			.09	***			.07	***
Adult student (>24 yrs.)				.05	***			-.01				-.07	***			-.06	***			.03	**
Parents' Educ. (approx. total years)				.00	***			.01	***			.01	***			.00	***			.00	
Major	Arts/Humanities			.14	***			-.20	***			.25	***			.17	***			-.08	***
(ref: Business)	Biological Sci			.06	***			-.18	***			.38	***			.08	***			-.06	***
	Education			.15	***			.28	***			.22	***			.11	***			.06	***
	Engineering			.26	***			.01				.18	***			.03	*			.00	
	Physical Sci			-.01				-.09	***			.45	***			.04	**			-.02	
	Professional			.31	***			.12	***			.26	***			.12	***			.04	*
	Social Sci			.17	***			-.17	***			.26	***			.19	***			-.07	***
	Other			-.07	***			-.10	***			.15	***			.03	***			-.02	*
	Undecided			-.35	*			-.65	***			-.07				-.33	**			-.58	***
Male slope		-.18	***	-.15	***	-.09	***	-.07	***	-.01		.00		-.01		.01		-.07	***	-.07	***
Level 2 Independent Variables																					
Intercept		.09	***	-.24	***	.05	***	-.09	*	.05	***	-.25	***	.01		-.20	***	.07	***	.05	
Selectivity (Barron's)				.06	***			-.01				.00				.00				-.01	
Private institution				.15	***			.09	***			.10	***			.03				.19	***
Carnegie	*Bac Div*			-.25	***			-.07	*			-.09	**			-.16	***			-.04	
Type	*MA_S*			-.17	***			-.02				-.10	**			-.10	*			-.04	
(ref:	*MA_M*			-.19	***			-.07	**			-.14	***			-.07	*			-.09	**
Bac AS)	*MA_L*			-.22	***			-.07	**			-.19	***			-.07	*			-.14	***
	Doc_DRU			-.22	***			-.06				-.16	***			-.03				-.21	***
	Doc_RUH			-.27	***			-.19	***			-.27	***			-.08	*			-.26	***
	Doc_RUVH			-.31	***			-.34	***			-.38	***			-.01				-.35	***
	Other type			-.13				-.07				-.19	**			-.07				-.11	
Variance Components																					
Total variance		1.01		.95		1.01		.93		1.02		.93		1.01		.97		1.00		.96	
Variance between institutions		.06	***	.02	***	.05	***	.03	***	.08	***	.03	***	.05	***	.04	***	.07	***	.04	***
Variance within institutions		.95		.93		.96		.90		.94		.91		.95		.92		.94		.92	
Variance male slope		.006	***	.005	***	.008	***	.007	***	.006	***	.006	***	.006	***	.005	***	.006	***	.006	***
Proportion between institutions		5.9%				4.7%				7.4%				5.3%				6.5%			
Variance between explained				60%				44%				67%				16%				45%	
Variance within explained				2.5%				6.3%				3.9%				3.5%				1.1%	

Table 8

Distribution of Institution-Level Gender Difference Effect Sizes for Academic Challenge

Distribution of Gender Difference (male-female) Effect Sizes	Number and Percent of Institutions			
	First-year		Senior	
	N	%	N	%
> .50	1	0.1%	2	0.3%
Between .20 and .50	24	3%	15	2%
Between -.20 and .20	424	57%	388	53%
Between -.20 and -.50	270	37%	294	40%
< -.50	19	3%	37	5%
Total	738		736	