

4-1-2007

Examining Gender-based Achievement Gaps in Math and Science at Trinity College

Erin Daly
Trinity College

Follow this and additional works at: <http://digitalrepository.trincoll.edu/theses>

Recommended Citation

Daly, Erin, "Examining Gender-based Achievement Gaps in Math and Science at Trinity College". Senior Theses, Trinity College, Hartford, CT 2007.
Trinity College Digital Repository, <http://digitalrepository.trincoll.edu/theses/37>

Examining Gender-Based Achievement Gaps in Math and Science at Trinity College

Erin Daly
Education 400 – Senior Research Project
Trinity College
Fall 2006

Introduction

On of the most interesting and actively debated areas in educational research concerns the gender-based achievement gaps in math and science. Despite research efforts and statistical data backing up the notion that girls are falling behind in math and science, there still continues to be significant gender-based achievement gaps that are perpetuated by “insidious gender lessons, micro-inequities...that chip away at girls’ achievement and self-esteem” (Sadker & Sadker, 1994). Research studies shed light on significant decreases in girls’ achievement rates in math and science as early as middle school that continues to decrease into high school. Although the achievement gap in math has declined in recent years (AAUW, 1999), girls consistently score lower on the SAT and ACT than boys do, and the gap does not narrow in college. According to the AAUW report in 1999, girls self-select out of math, science and computer technology classes because of lower achievement rates. In college, boys are more likely to pick the upper-level math and science courses, whereas girls are more likely to enroll in English and humanities courses. Due to the fact that females are self-selecting out of these courses in college, careers in math and science are overwhelmingly male.

The significance for this research is threefold. First, in a world that is becoming more technologically advanced by math and science every day, gender-based achievement gaps in these areas are only driving one gender to move forward.

Second, a further look into the scope of why gender-based achievement gaps in math and science exist at Trinity College is the major case for significance of this research project and may help to eliminate this gender-gap in years to come. Third, gender-based achievement gaps exist not only in math and science, but in all facets of education.

Through my research I hope to find out why this self-selection out of upper-level math and science classes occurs. Do gender-based achievement gaps exist in upper-level math and science classes at Trinity College? If so, are these gender-based achievement gaps in upper-level math and science classes significant, and why? Based on my research and existing literature: (1) Gender-based achievement gaps do exist in upper-level math and science classes at Trinity College; (2) Gender-based achievement gaps in upper-level math and science classes may be seen through taking a closer look at enrollment gaps and attitudinal differences; (3) Gender-based achievement gaps may affect perceptions of occupational attainment.

Literature Review

Enrollment Gaps

According to the AAUW report (1996) on how schools shortchange girls, girls self-select out of math, science and computer technology classes because of lower achievement rates. Enrollment gaps start in middle school and high school and continue to increase in college. In high school, state law requires males and females to take a certain number of math and science credits to graduate. However, as Campbell & Evans (1993) explain, boys are more likely to enroll in advanced math and science classes than females are, and this enrollment gap continues to exist into college. In high school and in

college, research shows that teachers, guidance counselors and professors may actually discourage females from taking upper-level math and science classes. Further, Campbell et al. (1993) found that females often do not enroll or drop out of upper level math and science courses because they are “unaware that these courses are prerequisites for college majors and graduate degrees leading to high level professions.” Research also suggests that in college, boys are more likely to pick the upper-level math and science courses, whereas girls are more likely to enroll in English and humanities courses.

In the book *Failing At Fairness: How Our Schools Cheat Girls* by Myra and David Sadker, the authors outline the reasons for why and how traditional schools are failing girls. Sadker et al. (1994), explain that females self-select out of math and science classes due to gender-based lessons that favor males and inequalities in teaching techniques. By the time males and females enter into college, there is already a strong gender divide for which classes males and females are going to choose. When females’ enrollment rates decreases in math, science and computer technology courses, they are making decisions that will ultimately affect career choices. Perceptions on occupational attainment in these areas of study are significantly affected in a negative way. Due to the fact that females are self-selecting out of these courses in college, careers in math and science are overwhelmingly male.

Attitudinal Differences

There have been a number of ethnographic studies done in college classrooms that have explored the gender-based achievement gaps in college. In 1994, researchers at the University of Michigan conducted a study in math and science classrooms to examine the

behavior of men and women (Sadker et al., 1994). Researchers found that boys spoke louder and more often, were more confident in their answers, and that although there were very few girls taking these classes, girls were less confident in their answers and felt reluctant to speak (Sadker et al., 1994). Research confirms the idea that girls' self-esteem significantly decreases in middle school and throughout high school (Pell, 1996). This drop in self-esteem may drastically affect performance in math and science and cause females to have negative attitude towards these courses. Attitudinal differences are due to an array of inequalities that exist in traditional schooling such as, unequal treatment of males and females by teachers, gender inequities in curriculum and socialization of both teachers and students that perpetuate the notion that males are stronger at math and science.

According to Sadker (1994), girls are “more anxious and less confident about their math ability, girls perceive the subject as cold, impersonal, and with little clear application to their lives or to society” (pg. 122). Many studies allude to the fact that a decrease in female self-esteem largely contributes to attitudinal differences that come before diminished academic achievement in math and science. Unequal treatment of males and females by professors in college may be one explanation for attitudinal differences that exist amongst males and females at Trinity. Pell (1996) also found that females in college are less likely to report positive attitudes on math and science for two reasons: the first, girls are less likely to take math and science classes in college unless they would like to pursue a technological career; the second, girls who are enrolled in math and science classes are not as likely to achieve as high as males.

Perceptions on Occupational Attainment

In most colleges and universities, selection of college courses may determine interests in career paths. One of the goals of educational research is focused on decreasing the gap between males' and females' perceptions of occupational attainment. Sax (1996) found that "the strongest predictor of women's enrollment in SME graduate programs was to have a pre-college interest in making a theoretical contribution to science". A major purpose for reducing this gap is to ensure that females do not exclude themselves from potential career opportunities by neglecting to enroll in math and science classes in college. Campbell & Beaudry (1998) found that while the gender gap in math and science careers such as finance and medicine may be decreasing, the gap between males in females in careers such as engineering and scientific research is increasing. According to Davis & Rimm (2004), women consistently occupy stereotypical careers despite the fact that female numbers are increasing in male-dominated careers. Interestingly enough, the Women's Bureau of the United States Department of Labor in 2005 released the 20 leading occupations for employed women – the first leading occupation was secretarial positions, followed by cashiers, registered nurses and elementary school teachers, respectively. Eleven years later, females are still occupying stereotypical careers, while males continue to occupy careers in math and science.

Females in college who do enroll in upper-level math and science courses are still not as likely to choose careers in math and science (Sax, 1996). If women in college have positive attitudes of math and science courses, they will be more likely to have positive perceptions towards occupational attainment of math and science careers. This

gender disparity in career paths can be most attributed to perceptions in occupational attainment (Sax, 1996). .

Methodology

This is a qualitative study focused on highlighting the key factors for why gender-based achievement gaps may exist in upper-level math and science classes at Trinity College. This study cannot and will not touch on all factors contributing to gender-based achievement gaps in math and science at Trinity College. Therefore, the methods that I used limit my research to identifying enrollment gaps, attitudinal differences and perceptions in occupational attainment. My study contains three different types of qualitative research: interviews, field notes from a discussion group entitled “Women In Trinity Classrooms” conducted by the Women’s Center, and statistical data analyzed by Dr. James Hughes.

Interviews

Altogether I tape-recorded a series of 15 in-depth interviews with students and professors at Trinity as part of my qualitative research data. Out of those 15 people, 13 were students and 2 were professors. The breakdown of the student interviews was as such: 2 female math majors, 2 female physical science majors, 3 male math majors, 2 male physical science majors, 2 female political science majors and 2 male psychology majors. I randomly selected these students based on their major and their willingness to partake in an interview with me. I then interviewed a female math professor and a male science professor. Through speaking to the students and the professors, I was hoping to gain a sense of two things: any attitudinal differences between males and females and

perceptions of occupational attainment. At first, I was going to analyze any tracking differences that may exist between males and females in high school. This was particularly difficult for me to analyze because I could not acquire a condensed list of exactly what courses males and females were enrolled in during high school. For this reason, I asked my interviewees questions about their courses in high school to further explore the possibility that tracking might be a contributing factor to gender-based achievement gaps. There were no significances in data, and therefore, I decided not to further explore tracking as part of my research.

I purposely left many of my interview questions to be open ended so that the interview was more of a dialogue. It was beneficial to my research to ask open ended interview questions because much of my rich data comes from people engaging in informal conversation about the experiences that they have had in math and science courses.

Discussion Group on Women In the Trinity Classroom

On Monday, November 6, 2006 there was a discussion on gender dynamics in Trinity classrooms sponsored by Zeta Omega Eta and the Women's Center. This discussion mainly focused around women in Trinity classrooms and how it feels to be a woman on the Trinity College campus. Professors and students engaged in active discussion and shed light on many interesting and hotly debated issues. Professors gave accurate descriptions of what it feels like to be a professor on a classroom where it is distinctly obvious that "boys are more likely to run the class and more likely to feel comfortable in class than girls". From attending this discussion, I was hoping to gain a

sense of attitudes and beliefs from students and professors. I realized through my interviews that engaging in open, informal dialogue was the most effective way to gain a sense of how students and professors really feel about the inequities that exist in math and science classrooms at Trinity.

Qualitative Statistical Data Analysis

For my last piece of qualitative research data, I reached out a professor by the name of Dr. Hughes. Dr. Hughes is the Associate Director of Institutional Research and Planning, and a Visiting Lecturer in Public Policy. He is involved with analyzing the results of the quantitative math literacy exam that all incoming freshman take, and has conducted numerous surveys on attitudinal and statistical differences between males and females in math and science classes at Trinity. Dr. Hughes has provided me with statistical data on SAT scores, GPA differences, enrollment differences and self-reported attitudinal differences between men and women since 1973-2006. Due to confidentiality issues, I was not permitted to see the raw data myself. Dr. Hughes graciously offered to analyze the raw data for me, and provided me with comprehensive charts and graphs. Through analyzing this data, I hoped to gain statistical information to inform and contextualize my other qualitative findings.

Analysis and Interpretation of Data

Analysis and interpretation of my qualitative data will be divided into the three parts (1) Analysis and interpretation of the interviews; (2) Analysis an interpretation of the field notes taken from the discussion group Women In Trinity Classrooms; (3)

Analysis and interpretation of statistical data on males and females at Trinity College. Participants' names in the interviews and field notes will be pseudonyms used for confidentiality purposes.

Analysis of Interviews

The interviews I conducted support the last two parts of my thesis: (2) Gender-based achievement gaps in upper-level math and science classes may be seen through taking a closer look at enrollment gaps and attitudinal differences; (3) Gender-based achievement gaps may affect perceptions of occupational attainment.

I. Enrollment Gaps

Enrollment gaps are defined as the differences in numbers of males and females voluntarily enrolled in particular classes. This study focuses on enrollment gaps in upper-level math and science classes only. The strongest evidence to support the notion that enrollment gaps exist between males and females in these math and science classes can be seen through comparison of self-selected classes. For example, when asked about what classes senior Katy McMillan, Political Science major, enrolled in and why she stated:

10/31/06

“I would never take a math or science class at Trinity. I have always done poor in math and therefore, would never feel inclined to take a class here. Same thing for science, I have taken one science class here (Forensic Chemistry) and just knew that it was never going to be my thing. Besides, I knew coming to Trinity that I was purposely not ever going to take math or science classes here... that was one of my reasons for coming here in the first place.”

This quote is an example of how females self-select out of math and science classes in college. When Katy states that she was “purposely not ever going to take a math or

science” class at Trinity, she is showing the exact self-selection process that females partake in when they reach the college level. This quote is also an example of the self-selection process that takes place due to low achievement rates in high school, as Katy states, “I have always done poor in math and therefore, would never feel inclined to take a class here”. Not only is this quote touching on enrollment, it is also conveying poor self-esteem contributing to low achievement.

Juxtapose this position with a male, junior by the name of Keith Fitzpatrick, majoring in English with a minor in Cognitive Science. Although Keith is not majoring in natural science, he is more reluctant to express any discerning feelings about self-selecting out of math and science classes at Trinity:

11/10/06

“I was suppose to be an Engineering major when I got to Trinity because that was something that I was totally interested in before I came here and because my high school counselors thought it would be a good match. I knew that Trinity had a really intense Engineering program, but when I got here I changed my mind after awhile. I think once I hit Calc. III, I knew my Engineering days were over...but part of me wishes I stayed with it.”

This quote is a good example of a male, who has taken upper-level math and science classes at Trinity, and decided to self-select out of these classes later on; whereas, Katy had already self-selected out of these classes before she arrived at Trinity as a freshman. When Keith states, “I was suppose to be an Engineering major when I got to Trinity...” and “but part of me wishes I stayed with it”, shows his willingness and comfort to take these types of classes. Keith’s willingness and comfort may stem from the fact that his high school guidance counselors had pushed him to select these types of classes at Trinity as he explains above, “my high school counselors thought it would be a good match.”

Literature on the enrollment gaps elucidates the fact that guidance counselors may actually serve as a obstacle for females when selecting math and science classes and may serve as a gateway for males.

II. Attitudinal Differences

Attitudinal differences are defined as the differences in perspectives between men and women pertaining to math and science classes. It has been noted that once females reach middle school and high school, their self-esteem drops significantly leaving them more susceptible to lower achievement rates (Pell, 1996). A drop in self-esteem is just one explanation for attitudinal differences between males and females in regards to their perspectives on math and science. The quote below is from a sophomore, female majoring in Psychology named Charlotte, as she expresses her attitudes towards math and science:

11/02/06

“Ever since I was in elementary school I knew that I was just horrible at math. I was always in the stupid group and in high school I was always in regents. So because I was in regents math, I was also put in regents science. I didn’t really care about science that much like that just became a lost cause after awhile because I knew that in regents classes I wasn’t expected to do anything really smart (making a quotation hand gesture) so I just stopped trying. (Laughs)”

In this quote, Charlotte clearly expresses her low-self esteem and negative attitudes towards math and science, which is signature of a female, non-major in natural science. Not just Charlotte, but many of the females that I interviewed expressed negative experiences in math and science as one female named Diana stated, “I hated math in high school and I almost failed Math 101 here...go figure.” Although a causal connection cannot be explicitly named, research provides strong evidence that low self-esteem in girls is one of the factors to consider when looking at gender-based achievement gaps.

Below is a quote from a male, sophomore named John who is majoring in American Studies. Unlike Charlotte, John expresses confidence in taking math and science class in high school:

11/15/06

“I was always pretty decent at both in high school but I don’t want to be a scientist and I don’t want to be a mathematician either. I do a lot of math and take math classes because I’m an Econ. Major, but I think that if I were to take science classes here I would be ok...especially physics because that’s really math-based”

Comparatively, these two quotes are distinctly different in showing the attitudes of students who are non-math or science majors. Although this quote only speaks to one part of my thesis, males are more likely to be confident in their attitudes towards math and science, which makes the more likely to enroll in these types of classes (Sadker et al., 1994).

III. Occupational Attainment

Perceptions of occupational attainment is a strong predictor of what types of classes people will take in college and what types of jobs people will apply for once they have graduated (Sax, 1996). During this set of interviews, I hoped to gain a sense of any differences that may exist between males’ and females’ perceptions of occupational attainment. I found that males and females who are enrolled in math and/or science classes had different perceptions of occupational attainment in their respective fields. Below is a quote from a senior, male, engineering major named Tim (pseudonym). Tim expresses his perceptions of occupational attainment once he graduates from Trinity:

11/7/06

“I am an Engineering major and I really hope to get a job as an engineer with a good firm. I haven’t come all this way and busted my butt this whole time to not be an engineer! I just always knew that I was going to

be an engineer and so I took the right classes. But if I were really bad at math and science, there's no way I would have taken these classes to get where I am. People don't just take these classes for fun...there's a whole big idea involved."

This quote is a good example of a male that has positive attitudes towards his major and has high expectations for starting a career in engineering. Tim indicates that majoring in engineering is something that he has been considering before he enrolled at Trinity College. As the literature suggests, taking classes in high school and college is also a strong predictor of having positive perceptions towards occupational attainment in the respective field (Sax, 1996).

Compare the quote above to a female, junior, engineering major on the topic of occupational attainment. Julia (pseudonym) expresses her intent on going into a career pertaining to her major:

11/8/06

"Umm...well that's a hard question but I have thought about it a lot. I don't know if I'm going to go into an engineering career. Like, my grades in my major have been just okay, and to be an engineer and to get a good job, you have to have good grades. At this point in time, I don't know if I would say I have "good" grades, ya know? But we'll see how it goes when the time comes to really start thinking about it, I guess."

Julia is debating whether or not she would like to go into the field of engineering as a career when she graduates from Trinity, based on her perceptions of low achievement in her engineering classes. If women in college have positive attitudes of math and science courses, they will be more likely to have positive attitudes towards occupational attainment of math and science careers. It is not as though Julia has negative attitudes towards her engineering courses, but it would be interesting to see what career she ends up going into after graduating from Trinity. It has been suggested that even women who

do enroll in upper-level math and science classes are still not as likely as men to go into these career paths.

Analysis of Field Notes From “Women In Trinity Classrooms” Discussion

The field notes I had taken during the discussion speak strongly to the attitudinal differences among males and females in Trinity classrooms. Although my study only focuses on gender-based achievement gaps amongst Trinity students, I also gained knowledge about attitudinal differences between male and female professors. Below are field notes pertaining to the attitudes of females in this discussion group:

- Men are more likely to talk during class time
- Female students are discouraged by male students and their willingness to speak up
- Girls in the classroom are less likely to speak up when there are boys in the class – not as likely to express their opinion
- Gentleness of female students and professors are seen as weak, niceness is seen as weakness
- Women fall into the stereotype and are more likely to take authority from men because they are not as nice and gentle
- Women internalize what it means to be a stereotypical woman – therefore, women succumb to authority and tend not to speak up
- Women are more willing to speak up in class when they are confident about what they are saying – men will speak up whenever they have something to say, confident or not
- Women are more likely to be cut off the by men in class because men feel entitled to say something
- Quote from Cara (pseudonym used for confidentiality purposes):
11/6/06
“I’ll talk my head off in my English class, but there’s no way I’m going to say something in a math class”

It cannot be generalized that all female students at Trinity hold the same, or even similar attitudes, as the females at this discussion did. It is interesting though that much of the literature that speaks to attitudinal differences between males and females is reflected in how these females feel in Trinity classrooms. Due to the fact that they feel overpowered by their male counterparts and feel as though they are seen as weak, females are less likely to speak up in class and more likely to internalize “what it means to be a stereotypical woman.”

Below are field notes pertaining to the attitudes of female professors in this discussion:

- Female teachers think they are being taken advantage of by boys in their class
- Female teachers often times feel powerless
- Gentleness of teachers or niceness of teachers is often seen as weakness
- Male professors take themselves more seriously and do not take the laughing or judging as seriously as women
- Women professors feel a general lack of respect coming from male students
- Teaching a subject other than math or science is generally not respected – dynamics of the classroom contributes to how the professor is treated
- One female Professor does not like mixed classes with both men and women because she feels that men tend to sit there and relax. She feels as though this is because she is a woman
- At Trinity, there are hierarchical issue of men in classes – Women, Gender & Sexuality classes have much lower numbers of men than Economics classes
- One professor actually had an experience of a colleague talking down on Women, Gender & Sexuality classes because they were not Economics classes.

Much like the female students, the female professors also express negative attitudes of teaching inside a Trinity classroom. These female professors feel as though they are taken advantage of by male students, not taken seriously by male students, and feel a

general lack of respect due to the fact that they are female. Comparatively, both female students and professors feel belittled in some way by other male students and professors. It seems as though these feelings and experiences in the classroom have contributed to an overall negative attitude amongst the female students and professors in this discussion group.

Analysis of Statistical Data

This statistical data provided by Dr. Hughes supports the first two parts of my thesis: (1) Gender-based achievement gaps do exist in upper-level math and science classes at Trinity College; (2) Gender-based achievement gaps in upper-level math and science classes may be seen through taking a closer look at enrollment gaps and attitudinal differences. Each Graph has been broken down to show enrollment gaps or attitudinal differences among male and female students at Trinity College from 1973-2006.

Figure I. shows a gender-based achievement gap based on “Gender, Intent to Major In Natural Sciences (1991-2000) and Final Division of Major for 1995-2004 Trinity College Graduates. This chart is showing the differences between genders in intent to major in natural sciences, major in something else, and differences between genders in actually receiving the intended degree. The most interesting finding here is that 102 males intended to major in natural science and received a degree, compared to 97 females intended to major in natural science and received a degree. This finding supports the notion that less females intend to major in the natural sciences and even less females actually end up receiving a degree in the natural sciences. Fewer females intending to major in natural science at Trinity College may depend on self-selection of

classes. It is known that female's self-select out of these classes in college due to low achievement in high school. Therefore, it is likely that because fewer females intend to major in natural science, they will not enroll in natural science classes during college.

Figure II. "Majors Categorized as Natural Sciences For Trinity College Graduates, Classes 1993-2006". This chart is showing enrollment differences between males in females in upper-level science majors. Engineering had the fewest females majors with 39 and the second highest for males with 132. Computer science had the second fewest number of female majors with 25 and male majors with 113. It is interesting to see that female that majors outnumber male math majors 34 to 32. This data supports the notion that gender-based achievement gaps in math are declining (AAUW, 1999). Altogether, the number of males majoring in natural sciences, 590, outweighs the number of females majoring in math and science, 432. Although it is not true to state males outnumber females in all majors of natural science, not as many females are selecting natural science majors which supports the literature that suggests that females are self-selecting out of science classes in college due to lower achievement rates.

Figure III. is "Satisfaction of Seniors With Their Education by Major and Gender" between male non-natural science majors, male natural science majors, female non-natural science majors and female natural science majors. Overall, female natural science majors were less likely to report satisfaction with their education in 1994, 1998 and 2006, than compared to female non-natural science majors, male non-natural science majors and male natural science majors. Satisfaction with education in a major can show attitudinal differences. Females are less likely to report positive experiences in math and

science classes, whereas males are more likely to report positive experiences. These reported differences in satisfaction, or differences in attitudes, with education may influence low achievement of females. Figure IV. “Percent of Male and Female Graduates Who Majored In the Natural Science at Trinity College, 1993-2006. This chart gives percentages of females compared to males and clearly indicates that the number of females majoring in natural science in 1993 is about the same as the percentage of females majoring in natural science in 2006. This number has not changed all that drastically within those years, which suggests that achievement gap in science is not declining at Trinity College between males and females.

Conclusions

Gender-based achievement gaps do exist at Trinity College in upper-level math and science classes. By taking a closer look at enrollment gaps and attitudinal differences, this research project may help to contextualize why these gender-based achievement gaps exist at Trinity College. Perceptions of occupational attainment are an accurate exemplar of how gender-based achievement gaps are disadvantaging female students at Trinity College and later on in life. Females are being left behind in our technologically advanced world, while accelerating males ahead. While math achievement gaps are slowly but surely declining at Trinity College and nationwide, the progress in decreasing science achievement gaps seems to be stagnant. Through existing research and the data obtained through this study, it is clear to see that females are at a disadvantage compared to their male counterparts. Therefore, it is vitally important for

researchers to further examine gender-based achievement gaps to ensure a gender equal education and an equal opportunity for females to thrive and accelerate like they deserve.

Enrollment gaps, attitudinal differences and perceptions of occupational attainment are not the only modules that need to be examined when studying gender-based achievement gaps. Research suggests that gender-based achievement gaps can be seen in every facet of our education and are plagued by lack of research, lack of funding and lack of education (Sadker et al., 1994). Math and science are an extremely important part of world today, and females are being put at a disadvantage due to gender-based achievement gaps. Implications for further research, funding and education could aid in declining these achievement gaps by giving clear and concise explanations for why gender-based achievement gaps continue to exist, and how we can save females from falling behind in our schools and in our society.

Limitations

There are a few limitations to this study to consider when evaluating this project. First, Trinity College is a small institution and findings from Trinity College cannot be projected onto any other institution. Second, Trinity College is a liberal arts institution where students enroll in a wide variety of classes and do not specifically select their major until sophomore year. For this reason, freshmen were left out of this study. Third, although research is suggestive of gender-based achievement gaps in math and science nationwide, these findings and implications are for the purposes and uses of Trinity College only.

Acknowledgements

I would like to thank Professor Dyrness, Professor Jack Dougherty, Dr. James Hughes, Rachael Barlow and Professor Janet Bauer for their guidance, helpful feedback and encouragement on this research project – without of which, this project would not have been possible.

Works Cited

- Campbell, J., & Beaudry, J. (1998). Gender Gap Linked to Different Socialization for High-Achieving Senior Mathematics Students. *The Journal of Educational Research, 91*, 140-147.
- Campbell, K., & Evans, C. (1993). Gender Issues and the Math/Science Curricula: Effects on Females. *Mid-South Educational Research Association. 2-18*.
- Davis, G., & Rimm, S. (2004). "Education of the Gifted and Talented: Fifth Edition". Boston, Massachusetts: Allyn & Bacon.
- Employment Status of Women and Men in 2005*. U.S. Department of Labor: Women's Bureau.
- Gender Gaps: Where Schools Still Fail Our Children*. (1999). Washington D.C.: The AAUW Educational Foundation and National Education Association.
- Pell, A. (1996). Fixing the Leaky Pipeline: Women Scientists In Academia. *Department of Animal Science, 75*, 2843-2848.
- Sax, L. (1996). The Impact Of College on Post-College Commitment to Science Careers: Gender Differences In a Nine-Year Follow-Up of College Freshman. *Association for the Study of Higher Education, 1-36*.
- Sadker, M. & Sadker, D. (1994). "Failing at Fairness: How Our Schools Cheat Girls". (pp.14, 124-125) New York, New York: Touchstone
- The AAUW Report: How Schools Shortchange Girls*. (1992). Washington D.C.: The AAUW Educational Foundation and National Education Association.

Appendix

**Figure I. Gender, Intent to Major in Natural Sciences (1991-2000)
and Final Division of Major for 1995-2004 Trinity College Graduates**

	Did not Intend to Major in Natural Science		Intended to Major in Natural Science	
	Male	Female	Male	Female
Did not graduate with natural science degree	580	626	72	87
Received natural science degree	53	43	102	97

**Figure II. Majors Categorized as Natural Sciences for Trinity College
Graduates, Classes 1993-2006**

	Female	Male	All
Biology	154	140	294
Engineering	39	132	171
Neuroscience	87	53	140
Computer Science	25	113	138
Biochemistry	32	37	69
Math	34	32	66
Environ Science	5	9	14
Physics	3	8	11
Double Major or INDS involving Natural Science	11	25	36
Total	432	590	1022

Figure III. Satisfaction of Seniors with their Education by Major and Gender

		1994	1998	2006
Encourage a HS senior to attend Trinity? (3 = Neutral, 4 = Agree, 5 = Strongly Agree)	Male Non-NS Senior	3.7	3.7	3.9
	Male NS Senior	3.8	4.3	3.5
	Female Non-NS Senior	3.8	4.0	3.9
	Female NS Senior	3.6	4.1	3.6
Satisfaction with courses in your major (3 = Satisfied, 4 = Very satisfied)	Male Non-NS Senior	3.4	3.3	3.6
	Male NS Senior	3.6	3.5	3.6
	Female Non-NS Senior	3.5	3.4	3.6
	Female NS Senior	3.3	3.3	3.2

Figure IV. Percent of Male and Female Graduates Who Majored in the Natural Sciences at Trinity College, Classes 1993-2006

	Males	Females
1993	20%	17%
1994	20%	17%
1995	18%	21%
1996	24%	15%
1997	21%	12%
1998	20%	19%
1999	19%	17%
2000	19%	16%
2001	18%	10%
2002	20%	12%
2003	17%	11%
2004	18%	13%
2005	22%	11%
2006	20%	16%

Figure V. Mean Incoming SAT scores of Natural Science Graduates, by Gender and Graduating Year

	Year	SAT cum		Verbal		Math	
		Male	Female	Male	Female	Male	Female
received degree	1995	1250	1234	616	617	635	617
	1996	1265	1236	618	621	645	613
	1997	1261	1225	605	604	656	621
	1998	1294	1251	641	621	653	630
	1999	1255	1285	604	647	651	638
	2000	1273	1260	611	628	662	632
	2001	1280	1290	626	647	654	643
	2002	1292	1278	625	620	667	658
	2003	1313	1301	640	640	673	662
	2004	1365	1264	662	638	702	627
	2005	1339	1273	657	610	682	663
2006	1323	1302	635	640	687	662	

