Bulletin of Education and Research
June 2014, Vol. 36, No. 1 pp. 1-14

Gender Differential Academic Achievement of Students in Single-sex and Coeducational Primary Schools in Pakistan

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Abstract

Single or separate sex schools have traditionally been a trend in the public sector in Pakistan whilst only in Sindh province, there are coeducational schools in the public sector. The present study was designed to find out the differential academic performance of boys and girls in the separate sex and coeducational schools. From eight randomly selected districts of Punjab, eight coeducational and eight separate sex (equally divided by sex) schools were selected randomly yielding a total sample of 128 schools. All the students in 5thgrade of the selected schools constituted the sample of the study making a total of 4448 students, 957 girls and 943 boys from the separate sex schools and 2548 students from the coeducational schools. The age of students (for both boys and girls) ranged from 9 to12 years with the mean age of 10 years. The academic achievement was operationalized in terms of students' scores in 5thgrade primary board examination. The 2x2 Analysis of Variance was carried out to explore the significance of the two main effects i.e. gender and type of school and the interaction of the two variables on the scores obtained by the students. The t-test was also applied to compare the mean scores of boys and girls in the separate sex and coeducational schools. The results indicated better academic achievement for students in the separate sex as compared to that in the coeducational schools. The study concludes that the academic achievement of students, (both boys and girls), was better in separate sex schools as than those in coeducational schools. The study also found that girls' academic achievement was more adversely affected in coeducational schools as compared with boys.

Keywords: Gender Differential, Academic Achievement, Single-sex Primary Schools, Coeducational Primary School

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Introduction

In the early years, learning occurs at a very fast rate and the patterns established at this stage have far-reaching implications for the future life. It is during these years that children realize their own identity and their relationship to the external world. At this stage of life, schooling is one of the most important socialization process through which a child interacts with people outside the family. Children learn gender roles and look for "appropriate" behaviors through which they, later on, develop images about men and women in the society. A study of 4th and 5th graders in a school in USA found that children portrayed women as weak, emotional, soft hearted, sentimental, sophisticated, and affectionate, whilst men are seen as strong, tough, violent, confident, harsh, determined and dominant. Thus, gender role typing starts at an early age, 1st and 2nd graders search for rules and ways of setting their own world. After getting awareness about gender identity, a 6 to 7 years old girl or a boy desires to know how a girl/boy is supposed to behave in the society. Thus, the schools and teachers play a vital role in the child's formative years. According to Tyack & Hansot (1990) although schools differ in the socialization process but they all give importance to the gender issues. Further, Weiler (1998) and Anyon (1984) have underlined the active role schools can play and also teachers in assisting the process of gender role socialization.

An important factor in the study of the influence of schools on students is the gender composition of schools i.e. coeducational or separate sex. The environment of the two types of schools is quite different in nature. Most importantly the gender roles before the students in the two types of schools are different. For example, in an all boys' school, the students mostly find males in the administration, as teachers, and on positions of authority, even the student leaders, top academic students, star-athletes all are males. Hence, it would be very difficult for a boy groomed in such an environment to accept females at a higher authority position. The same is true for girls in an all girls' schools.

The countries around the world have various combinations and sequences of separate and coeducational schools, i.e. from America to Japan to Pakistan, it remains a topic of abiding interest. There have been extensive debates everywhere around the relative merits and demerits of separate sex and coeducational schools at all levels. Although coeducation is generally accepted for earlier grades, in USA and other Western Counties, but in the Middle East and most of the other Islamic countries including Pakistan, separate schooling has generally been a practice in the public sector at all levels of education.

The research studies making comparison of separate and coeducational schools started since the beginning of the twentieth century (Lee and Bryk, 1986; Lee and Marks, 1990). The most contentious debates were on the impact of separate sex and coeducational schooling on the academic achievement of students. It includes overall achievement scores as well as achievement scores by subjects such as mathematics, science, languages, social studies etc. A variety of academic achievement tests are used in different countries and at different levels of education. The overall achievement test scores are obtained by the complete mastery over defined skills or content areas (mathematics, languages, science) in a given time period (Murphy and Ivinson, 2000).

Advocates of separate sex education claimed that this type of schooling leads to better academic scores both for the girls and boys. In UK, Spielhofer, O'Donnel, Bruton, Schagen, and Schagen (2002) compared performance of students in the GCSE examinations conducted in 2001 with their results in the stage II examinations held in 1996. The data consists of 3, 69,341 students. The researchers found that at the end of primary school, girls in the separate sex comprehensives had better results than those in the coeducational comprehensives. Differences favoring separate sex schools were also found among grammar boys. Sax (2005) conducted a three year study and compared separate classrooms with coeducational classrooms in America with a sample size of 322 students. After one year, it was found that among the 4^{th} class boys in the coeducational classrooms, 37 percent boys scored 3.5 or higher grade on the writing test, whilst among the 4^{th} class girls assigned to coeducational classrooms, 59 percent girls got 3.5 or higher grade. On the other hand, out of the 4^{th} class boys in separate sex classrooms, 86 percent earned 3.5 or higher grades while 75 percent of girls in separate sex classrooms scored 3.5 or higher grade. Thus, the separate sex classes not only improved academic achievement but also narrowed down the gender gap in achievement. Singh, Vaught and Mitchell (1998) compared 5^{th} grade students in the coeducational and separate sex classes and found that academic achievement were consistently higher for both boys and girls in the separate classes.

Price and Rosemier (1972) examined academic achievement of class one children in the areas of arithmetic, word meaning and reading in the separate sex and coeducational schools. Boys in the separate sex schools were found doing better in arithmetic, word meaning and reading as compared to boys in the coeducational schools. However, reverse situation was found in case of girls in the same class.

The evidence from the developing world particularly the Islamic countries are almost negligible, where there are more separate sex compared to coeducational schools. In Pakistan, in the public sector, the coeducational primary schools exist only in the Sindh province, whilst in the remaining three provinces/areas and the Federal areas, there are separate sex schools for boys and girls. Furthermore, there are Junior Model Primary Schools which are both coeducational and separate sex. These schools were established as Model Schools in 1971 as a project and are very few in number. In the Punjab province, it has been observed that in some separate sex schools boys and girls study together under the same roof (Anderabi & Khawaja, 2002). Such a situation occurs, when parents instead of sending their children to the same sex school prefer to send them to the opposite-sex school. The reasons for parents' making choice against the same-sex school could be many such as shortage or absence of teachers, lack of basic facilities (drinking water, boundary wall, toilets particularly for girls), more distance from home, younger siblings (boy/girl) prefer to accompany elder brother or sister in their school etc. But such practices are limited and highly uncommon. Furthermore, in the public schools education is free up to primary level. Thus, there is a strong possibility that private separate sex school may exist in the area, however parents choose to send their children to the public separate sex schools.

In Pakistan, there is hardly any research to identify differences between the students' achievement in single sex (separate) and coeducational schools. And most importantly, due to improper cataloging and limited dissemination, the work if done is not easily accessible. The empirical evidence available is mostly from the western countries having different socio-cultural environments and needs. Therefore, the present study was a milestone in this direction, providing basic information and paving way for further research in this area. The study aimed at finding out students' differential academic achievement in the single sex and coeducational primary schools. **The specific objectives of the study** include:

- analyzing the gender differences in the academic achievement of students in the single sex and coeducational primary schools;
- providing guidelines for policy formulation at the government level for establishing optimally useful type of schools.

Based on the objectives of the study, four hypotheses of no differences were formulated.

H_{01}: There is no significant difference in the academic achievement mean scores of students in the single sex and coeducational schools at the primary level.

H_{02}: There is no significant difference in the academic achievement mean scores of boys in the single sex and coeducational schools at the primary level.

H_{03}: There is no significant difference in the academic achievement mean scores of girls in the single sex and coeducational schools at the primary level.

H_{04}: The difference between the academic achievement mean scores of boys and girls is same in the single sex schools and coeducational schools at the primary level.

Sample: The study employed multi-stage random sampling technique. Out of thirty-four districts of Punjab, eight districts were randomly selected. These include Bahawalpur, Faisalabad, Gujaranwala, Lahore, Mianwali, Multan, Rawalpindi, and Sargodha. From each of the selected district, eight coeducational and eight single-sex (four male and four female each) primary schools were randomly selected, making a total of 128 primary schools. All the students in 5^{th} grade who gave fifth grade public examination in the 2006 constituted the sample of the study. The total number of students was 4448, 2185 boys and 2263 girls.

Instrument for the Study

The composite academic achievement scores of students in the fifth grade public examination for the year 2006 were obtained from the Punjab Examination Commission to assess the academic achievement of students. The fifth grade public examinations were administered by the Punjab Examination Commission in all districts of the Punjab. The students' composite achievement scores along with other basic information were recorded by school on the Basic Information Proforma (BIP) developed for the purpose.

Data Analysis: The 2x2 Analysis of Variance (ANOVA) was carried out to explore the significance of two main effects i.e. gender and school type and their interaction on the scores obtained by the students for the independent variable. The t-test was used to have comparisons between the mean scores of boys and girls in the separate and coeducational schools.

Results of the Study

Students' academic achievement was measured through their scores obtained in the fifth grade primary board examination. The scores of boys and girls in the separate and coed (coeducational) schools are given in Table 1.

Table 1: *Academic Mean Achievement Scores of Boys and Girls by Type of School*

Gender	Type of School						Total (Single-sex plus Coeducation)		
	Single Sex			Coeducation					
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Boys	943	154.0	34.0	1242	135. 9	51.8	2185	145.0	44.9
Girls	957	158.6	28.2	1306	134.0	40.7	2263	146.5	37.8
Total (Boys plus Girls)	1900	156.3	31.4	2548	134.9	46.2	4448	145.6	41.4

Analysis of Variance (ANOVA) was carried out to find out significance of difference of two main effects i.e. gender and school type and their interaction effect on the scores obtained by the students.

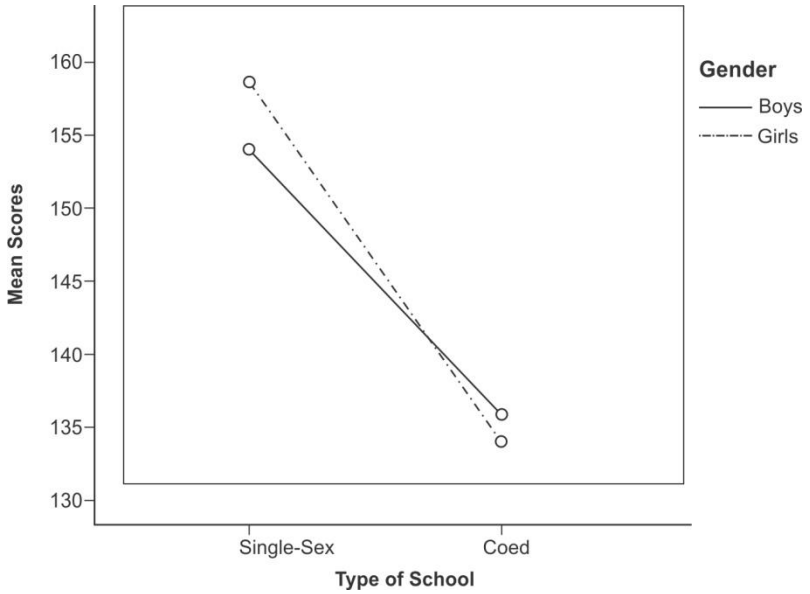

Figure: Interaction effect of gender and type of school on students' academic achievement mean scores

The analysis showed the following results:

i) The effect of gender was not significant at 0.05 level of significance. The overall mean scores of boys (145.0) and girls (146.5) were not different statistically at 0.05 level of significance.

ii) The effect of the type of school was significant at alpha 0.05. The students' mean score in separate schools was 156.3 against the mean score of 134.9 in coed schools. Thus, the null hypothesis H_{01} stating no difference in students' mean scores in the separate and coeducational schools is rejected. The academic achievement mean score of students was much lower in the coeducational schools as compared to that in the single-sex schools.

iii) The interaction effect of gender and school type was also significant at 0.05. Thus, the null hypothesis of difference between the boys' and girls'mean scores on academic achievement is same in the separate and coeducational schools is rejected. The results also shows that girls were affected more by the type of school as they scored better than the boys in the single sex-schools with mean score of 158.6 against 154.0 and lower than the boys in coed schools with mean score of 134.0 against 135.9.

iv) Another interesting finding is the bigger value of standard deviation (SD) in the coed schools as compared to that in the separate schools. It means students of separate schools were more homogeneous in academic performance as compared with the students in coed schools.

Table 2: *Summary of ANOVA for Students' Academic Achievement Scores by Gender and Type of School*

Source	Levels	df	Sum of Squares	Mean Squares	F
Gender	2	1	1887.7	1887.7	1.18
Type of School	2	1	479027.384	479027.384	299.82**
Gender* Type of School	2 x 2	1	10974.147	10974.147	6.87**

***p<.001*

School Academic Achievement of Students by Gender

The calculated value of 't' shows that boys' and girls' academic achievement mean scores were significantly lower in coed schools as compared with that in the single-sex schools. Therefore, the null hypothesis Ho2,of no significant difference in the boys' mean scores andH_{03} stating no significant difference in the girls' mean scores in the separate sex and coed schools were rejected. There is an effect size of 0.3 between the academic achievement of boys in the separate sex and coed schools, which is a moderate difference whilst an effect size of 0.6 between the academic achievement of girls in the separate sex and coed schools is considered as a large difference (Cohen, 1998).

Table 3: *By Gender Academic Achievement Mean Scores of Students in Single-Sex and Coed Schools*

Gender	Type of School	N	Mean	SD	Mean Diff	t
	Single-Sex	943	154.03	34.03		
Boys	Coed	1242	135.89	51.84	18.14	9.35**
	Single-Sex	957	158.60	28.15		
Girls	Coed	1306	134.00	40.37	24.60	15.92**

***p<.001*

Discussion

The results of the study indicated better academic achievement for boys and girls in the separate sex schools than the boys and girls in the coeducational schools. The results of the present study are in consonance with the results reported by many researchers in the earlier studies. (Spielhofer, et al, 2002; Singh et al, 1998; Wood et al, 1999; Robinson & Smithers, 1990 and National Association for Single Sex Public Education, 2006). The findings of this study also exhibited adverse effect of coeducational schools more on girls' academic achievement than that on boys. These results are also supported by many researchers like Carpenter & Hayden, 1987; Caspi, 1995; Lee and Bryk, 1986; Riorden, 1994; and Hannan et al, 1996.The study has also indicated that boys and girls were adversely affected in the coeducational schools; particularly the effect size was more for girls. One possible explanation lies in the socio-cultural traditions in which boys and girls are not encouraged to mingle together and they feel pressure in the presence of each other. Another possible explanation is the learning style differences between boys and girls. According to Sax

(2005) "the kind of learning environment that is best for boys is not necessarily best for girls." (p.9). Hawley as cited in Caplice (1994) also believes that, "Physiological and psychological differences between girls and boys require different teaching techniques at different times." (p.7). In separate sex schools, the teacher can concentrate to improve the learning abilities of one sex and use different teaching pedagogies to bring out the maximum potential in each student. Martino et al. (2005) noted that teachers supervises discipline and are stricter in the coeducational classrooms. Warrington et al., (2003) and Francis et al. (2003) found that in situations where girls and boys work together, boys are more troublemakers and dominant in the classroom. Jones and Dindia (2004) conducting Meta-Analysis of eleven studies about classroom interaction concluded that teachers have negative behaviors (scolding, disapproval) more often towards boys as compared to girls. Derry and Philps (2004) suggested that girls' same sex classes provides them more time for improved learning and also more students are able to interact with teachers. Streitmatter (1999) reported that in all girls' classrooms, teacher is able to have continuous dialogue with the students and encouraged girls to discuss their problems. Balier and Sanford (1999) carried out an observational study on girls and boys in separate sex classrooms. They found that teachers were able to give more attention to teaching pedagogies in the separate sex classrooms as compared to monitoring students' behavior in the coeducational classes. All these studies, thus, suggest that in the separate sex schools, the teacher was not over burdened with behavior management task. He/she had more time to facilitate all aspects of the instructional process leading towards higher academic achievement and better personality development. "Single sex environment allows teachers to adjust their curriculum and teaching style to the particular behavioral patterns of males or females", (p.235) (Caplice, 1994). The students in the single sex schools are more able to get involved in discussions and engage in learning process without coming into unnecessary competition.

In the context of Pakistan, the need for the separate sex schools becomes more imperative. Although, the literacy and enrolment rates at various levels of education have improved over time, but still Pakistan is doubtful about fulfilling its commitment to achieve Millennium Development Goals by 2015. The participation of females at the primary level compared to males is much lower than many other neighboring countries. For example, Iran has a disparity in favor of females with a gender parity index of 1.15, while in Pakistan the GPI at primary level was 0.85 in 2005-06. The universalization of primary education has always been the top priority of the government. However, The National Plan of Action on Education for All (2001-2015) and Medium Term Development Framework (2005-2010) suggests that government has plans to establish new primary schools as coeducational with female teachers.

However, the results of the present study did not support coeducation at the primary level. In addition to the empirical evidence provided by the study, there are other factors as well hampering girls' enrolment at schools and contributing to high dropout among girls. These include the most traditional attitude towards girls' education particularly in the rural and most disadvantage areas of the country, cultural and social attitudes emphasizing girls' modesty, protection and seclusions, poverty etc. These alongside with other factors limit parents' willingness to send their girls to schools specially, if the school is coeducational. Lloyd, Mete and Sathar (2002) concluded that while some girls attend boys' primary schools, particularly in rural villages, it is rare to find girls progressing beyond first few grades in boys' schools. Furthermore, when girls attend coeducational primary schools, their attendance rates are very low. The study also indicated that during the survey of rural primary schools in 12 villages, girls' attendance was found 36 percent in the coeducational schools compared with 88 percent in the girls' schools. Therefore, in the present socio-cultural scenario of the country, it is expected that coeducational schools will further reduce girls' enrolment and will contribute towards higher dropout at the primary level. For boys, too the separate-sex schools appeared to be more advantageous as compared to the coeducational schools.

Moreover, choices about teaching-learning approaches, learning tools and resources to use are made both on their availability and appropriateness for those who take decisions about developing and defining pedagogical methods. The classroom learning environment is a determinant of students' academic achievement and behavior. The teacher is responsible for creating conducive classroom environment for facilitating different learning needs of boys and girls. However, very little attention has been paid to gender development of teachers. Halai (2006) conducted a study in Pakistani classrooms and concluded that teachers tend to assume that with the “same national curriculum and prescribed textbooks” boys and girls had the same opportunities for learning. Despite the need for gender responsive teaching and learning materials, text books still reinforce gender stereotyping. A review of the text books revealed that all the text books in use had serious gender stereotyping (Mirza, 2004). A matter of more concern is the fact the teachers who are using these textbooks in the schools are not aware of any gender differential portrayal in textbooks while some of them have been teaching for over twenty years. Therefore, there is a need that courses on gender responsive pedagogy should be included in the teacher education curricula. In-service teachers should be given training on different learning needs of boys and girls before initiating the policy of establishing coeducational schools in the country.

Recommendations

The following recommendations are made on the basis of results of the study:

1. Separate-sex schooling is more appropriate than coeducation both for boys and girls at the primary level.
2. There is relatively little research done on classroom practices in the separate sex and coed schools and the research that may have taken place is not properly catalogued or easily accessible. Universities particularly departments of Women/Gender Studies should document all the available research on separate sex and coeducational schools.
3. Courses on gender responsive pedagogy should be included in the teacher education curricula. In-service teachers should be given training on learning-style differences between boys and girls.
4. Similar studies should be conducted in other provinces of the country, particularly in Sindh, where coeducational primary schools in the public sector are in greater number.
5. Comparative study of the two types of schools in the private and public sector should be undertaken, controlling the variables like socio-economic background, educational ability of students, educational level of parents etc.
6. The academic achievement of students in different subjects offered at the primary level should be explored to fully understand the educational performance of the students in the separate sex and coeducational schools.

References

Andrabi, T. J. Das and A.I. Khawaja (2002). The rise of private schooling in Pakistan: Catering to the urban elite or educating the rural poor? *The World Bank Mimeo*, Washington DC.

Anyon, J. (1984). Intersections of gender and class: Accommodation and resistance by working-class and affluent females to contradictory sex roles ideologues, *Journal of Education*, 166, 25-48.

Blair, H., and Sanford, K. (1999). *Single-sex classrooms: A plan for transformation of policy and practice*. Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Canada.

Caplice, K. (1994). The case for public single-sex education. *Harvard Journal of Law & Public Policy.* 18(1), 227-291.

Carpenter, P. and Hayden, M. (1987). Girls' academic achievements: Single-sex versus co-educational schools in Australia. *Sociology of Education*, 60, 156-67.

Caspi, A. (1995). Puberty and the gender organization of schools: How biology and social context shape the adolescent experience. In: Crockett, L.J. and Crouter, A.C. (Eds.) *Pathways through adolescence: Individual development in relation to social contexts*. pp (57-74). Mahwah, N.J.: Erlbaum.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* (2nd Ed.). New Jersey: Lawrence Erlbaum.

Derry, J. A., and Phillips, D. A. (2004). Comparisons of selected student and teacher variables in all-girls and coeducational physical education environments. *Physical Educator*, 61(1), 23-34.

Francis, B., Hutchings, M., Archer, L. and Melling, L. (2003). Subject choice and occupational aspirations among pupils at girls' schools. *Pedagogy, Culture and Society*, 11, 425-442.

Govt. of Pakistan (2002). *National plan of action of education for all (2001-2015). Second draft.* Islamabad: Ministry of Education.

Govt. of Pakistan (2003). *Education sector reforms action plan 2001-2005: Pakistan.* Islamabad: Ministry of Education.

Govt. of Pakistan (2005). *Medium term development framework 2005-10.* Islamabad: Planning Commission.

Halai, A. (2006) Boys are better mathematicians: Gender issues from mathematics classrooms in

Hannan, D.F., Smyth, E., McCullagh, J., O' Leary, R., and McMahon, D. (1996). *Coeducation and gender equality: Exam Performance, stress, and personal development.* Dublin: Oak Tree Press.

Hannan, D.F., Smyth, E., McCullagh, J., O' Leary, R., and McMahon, D. (1996). *Coeducation and gender equality: Exam Performance, stress, and personal development.* Dublin: Oak Tree Press.

Houston, J., Bee H. and Rimm D. (1985). *Essentials of Psychology*. (2nd Ed). pp. (300-3001).New York: Harcourt, Brace and Jovanovich Publishers.

Jones, S. and Dindia, K. (2004). A meta-analytic perspective on sex equity in the classroom. *Review of Education Research,* 74(4), 443-471.

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

Lee, V.E. and Bryk, A.S. (1986). Effects of single-sex secondary schools on student achievement and attitudes. *Journal of Educational Psychology*, 78, 381-395.

Llyod, Cynthua B., Cen Mete and Zeb A. Sathar (2002). *The effect of gender differences in primary school access choice and quality on the decision to enroll in rural Pakistan.* New York: Population Council Mimeo.

Martino, W., Mills., and Lingard, B. (2005). Interrogating single-sex classes as a strategy for addressing boys' educational and social needs. *Oxford Review of Education*, 8, 213-236.

Mirza, S.M. and Hameed, A. (1995). *Differential achievement of primary school students and the cost effectiveness by school types*. Islamabad: Ministry of Education.

Murphy, P. and Ivinson, G. (2000). *Construction of knowledge, social identities and pedagogy in single and mixed sex groupings.* Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans.

National Association for Single Sex Public Education (2006). *Single-sex vs. Co-ed: The evidence*. Retrieved on November 6, 2003 from www.singlesexschools.org/evidence.html

Price, E., and Rosemier, R. (1972). Some cognitive and effective outcomes of same-sex versus coeducational grouping in first grade. *Journal of Experimental Education*, 40(4), 70-77.

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

Robinson, P. and Simthers, A. (1990). Should the sex be separated for secondary education comparisons of single-sex and coeducational schools. *Research Papers in Education: Policy and Practice* 14(1), 23-49.

Sax, L. (2005). *Why Gender Matters*. New York: Doubleday.

Singh, K., Vaught, C., and Mitchell, E.W. (1998). *Single-sex classes and academic achievement in two inner-city schools.* Retrieved on Jan. 31, 2007 from www.jstor.org.

Spielhofer, T., O'Donnell, L., Bruton, T., Schagen, S. and Schagen, I. (2002). *The Impact of School Size and Single-Sex Education on Performance*. LGA Research Report 33. Slough: National Foundation for Educational Research.

Streitmatter, J.L. (1999). *For girls only: Making a case for single-sex schools.* New York: State University of New York Press.

Tyack, D., & Hansot, E. (1990). *Learning together: A history of coeducation in American schools*. New Haven, CT: Yale University Press.

Warrington, M. and Younger, M. (2003). We decided to give it a twirl: Single-sex teaching in English comprehensive schools. *Gender and Education,* 15, 339-350.

Weiler, K. (1998). *Women teaching for change: Gender class, and power*. South Hadely: Mass: Bergin and Garvey Publishers.

Woodward, L.J., Fergusson, D.M., and Harwood, L.J. (1999). Effects of single-sex and co-educational secondary schooling on children's academic achievement. *Australian Journal of Education*, 43, 142-156.