Gender Issues: Some Thoughts from a School District

By Marjorie Clegg
Coordinator of Quality Assurance
Ottawa-Carleton District School Board

Prepared for the Statistics Canada-John Deutsch Institute –WRNET Conference on Empirical Issues in Canadian Education, November 23-24, 2001
A Discussion Paper on:

Gender Differences in Large Scale, Quantitative Assessments of Mathematics and Science Achievement
By Darren Lauzon

I am very pleased to comment on the issues raised in this paper, as I think it is one which continues to concern educators and parents. Ironically, the main focus of attention at this point is the performance of boys in reading and writing. Perhaps this is an indication that there is at least a perception that the achievement gap in math and science has closed to some degree.

As part of my work for the Ottawa-Carleton District School Board, I began looking at a variety of data we have related to gender and achievement of our own students. It is from this perspective that I would like to make some comments on the paper we've just heard.

My comments fall into 4 categories:

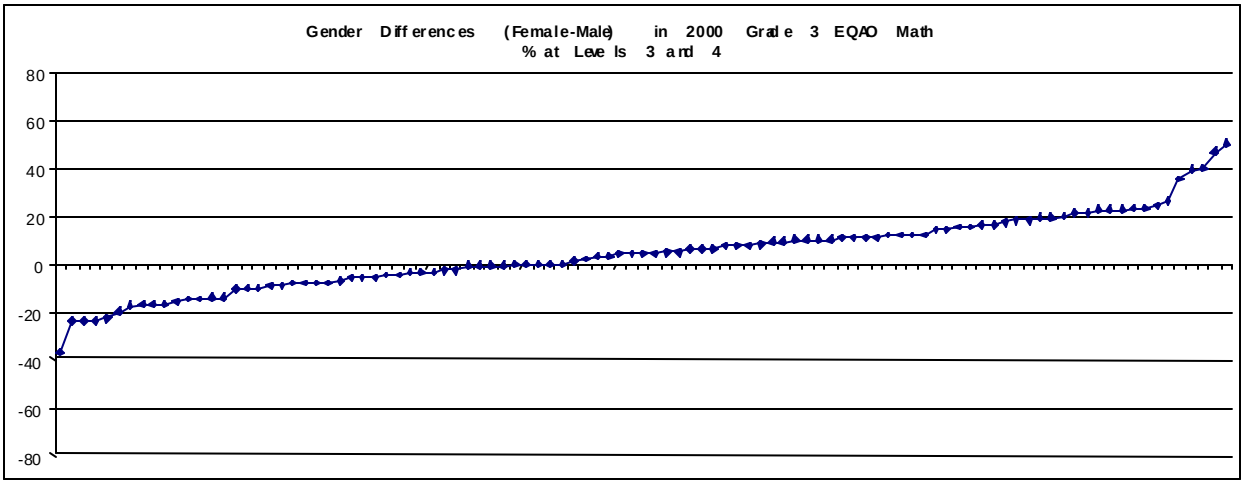
1. Some issues in interpreting the data
2. Additional data
3. Mediating influences
4. Some thoughts for future research

1. Some issues in interpreting the data

- EQAO testing. The EQAO assessment in Mathematics is composed of two types of testing: multiple-choice, which is used to adjust the overall scores to make them comparable from year to year, and open-ended performance tasks. The performance tasks are highly literacy-based and we know that the girls do far better in the reading and writing assessments, particularly in Grade 3.

• Variability of results.

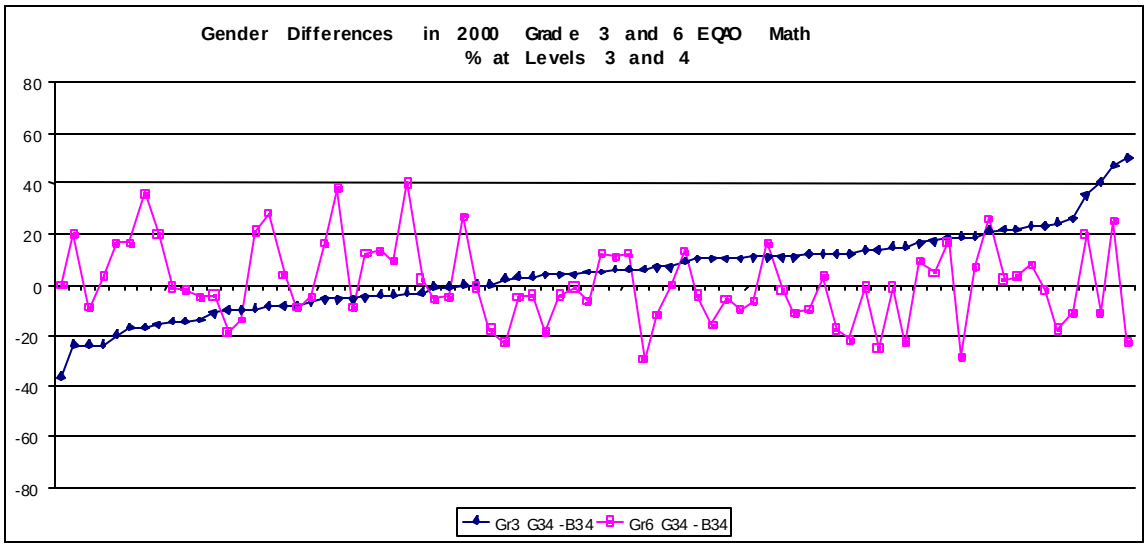
Though results often suggest gender differences in achievement – in favour of girls – these differences are not apparent in all schools. For example, this is a graph of the EQAO Grade 3 Mathematics assessment...



You can see that though most of the schools showed gender gaps in favour of girls (i.e., above the line), many showed the reverse. And the size of the gap varied considerably across schools.

In schools where there is a difference in Grade 3, there is not necessarily a difference in Grade 6. When results were compared for the 78 schools with results for both Grade 3 and Grade 6, there was a correlation of -.20 between the gender gap in Grade 3 and the gender gap in Grade 6.

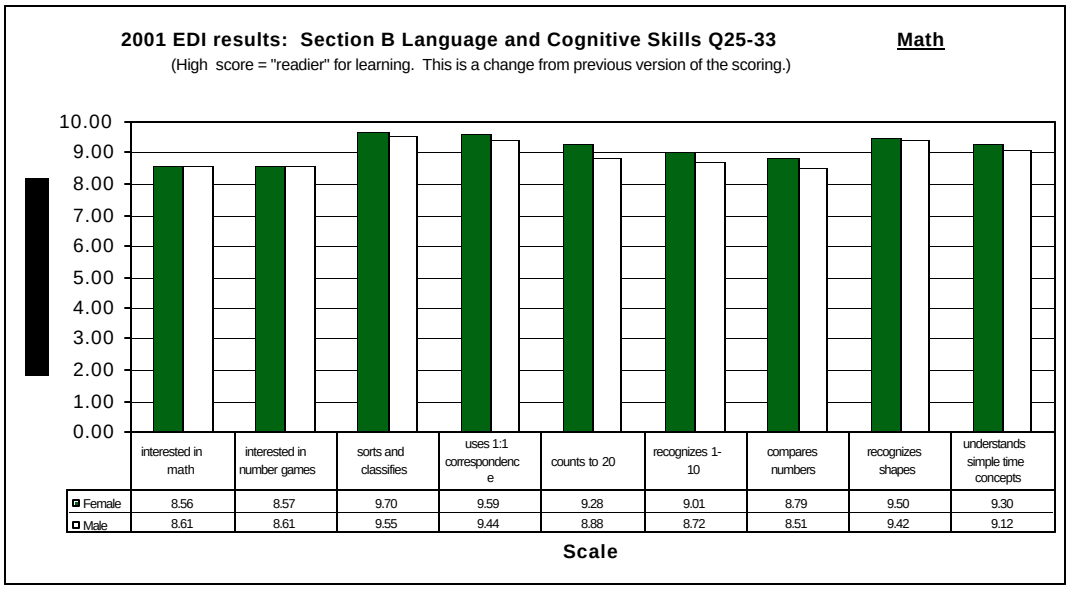
Please note that these are NOT the same students…



2. Additional achievement data

- For the past few years, we have been collecting information on the "readiness to learn" of our Senior Kindergarten students. For this purpose, we have teachers complete the Early Development Instrument (**EDI**). The scales on this instrument focus on the areas of physical health and well-being, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge. Included in the language and cognitive development section are some specific questions concerning skills in reading, writing, and math.

  Girls appear to be ahead on the academic areas of reading and writing, but there is little difference in math.



- According to self-report by high school students of marks obtained in Grade 8, achievement in Science and Math did not appear to differ by gender, though it is of note that Math was the only subject for which males reported [minimally] higher marks.

Average Final Marks (estimated)	M	F
Science		
Current Grade 11 Cohort	75.7%	77.7%
Current Grade 12 Cohort	77.3%	78.8%
Math		
Current Grade 11 Cohort	77.0%	76.7%
Current Grade 12 Cohort	78.3%	77.3%

Looking at the distributions gives a slightly different perspective. For the Grade 12 cohort, a higher percentage of males than of females reported marks in the highest range (91-100) in their Grade 8 Math courses; this was not true for the Grade 11 cohort. In Science, a higher percentage of females than of males reported marks in the 81-90 range; there was a similar difference for the Grade 11 cohort.

Science	LT 50%	51-60	61-70	71-80	81-90	91-100
Male (N=1382)	2.6	8.5	19.0	33.7	**27.8**	8.5
Female (N=1354)	1.8	7.2	17.9	33.1	**32.3**	7.7

Math	LT 50%	51-60	61-70	71-80	81-90	91-100
Male (N=1380)	3.5	9.3	15.7	29.8	28.5	**13.3**
Female (N=1364)	3.7	9.4	18.9	27.9	30.9	**9.2**

- In his paper, I believe Darren wondered about the more advanced math courses. We happen to have data on the OAC Calculus course since it is one of the subjects for which we have district-wide examinations.

  In the first semester of the 2000-2001 school year, 50.3% of those taking Calculus were male, 49.7% female.

  The percentage passing the district-wide exam was very similar for males (80.4%) and females (78.5%). The average marks were almost identical for males and females.

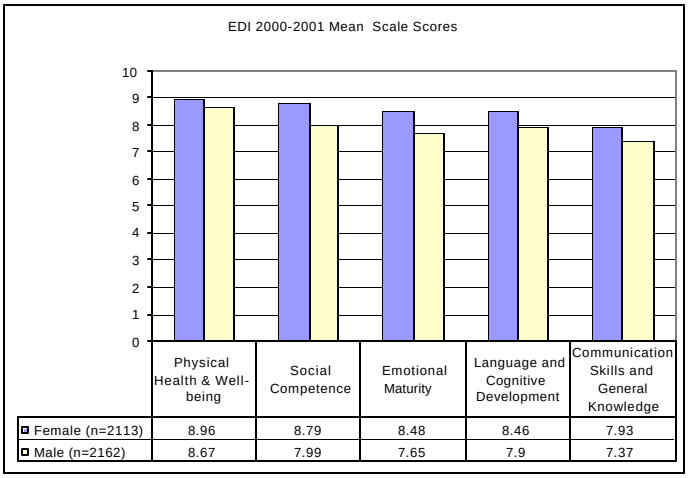
OA Calculus Exam, Jan 2001	M (N=311)	F (N=307)
Percent Passing	80.4%	78.5%
Average Total Mark	67.7%	67.9%

3. Mediating influences

Next I'd like to talk about some mediating variables, some of which Darren alluded to in his paper. I will give a few examples of psycho-social variables, ability, and attitudes.

Psycho-social variables

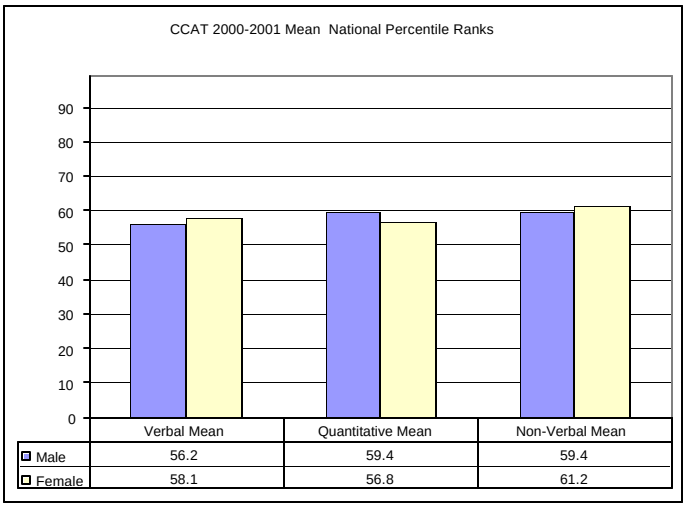
- Girls appear to be "readier to learn" than boys in terms of physical health and well-being, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge.

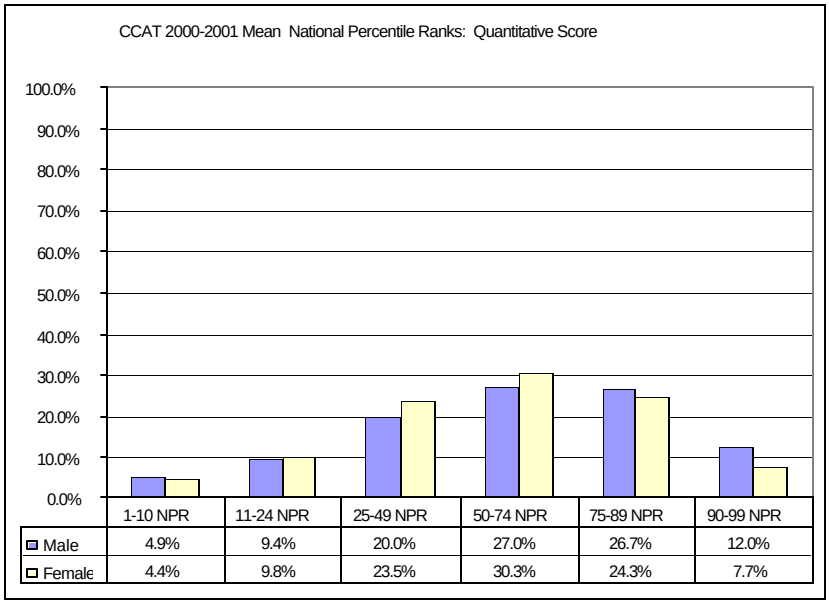


- In Grade 3, those identified as having a behaviour exceptionality are predominately male (close to 80%). By Grade 6, this percentage has risen to 85%. Clearly such behavioural problems will affect academic performance in any subject.

Ability

- There seem to be gender differences in ability in Grade 3 (age 8). Girls have mean scores and are more likely to score in the highest percentiles on the Verbal scale of the Canadian Cognitive Abilities Test. Boys have higher mean scores and are more likely to score in the highest percentiles on the Quantitative scale of the CCAT.





Attitudes

- According to the EQAO Grade 3 assessment, boys are more likely than girls to say they like and are good at math – though the girls do better on the assessment.

- In 2000, a higher percentages of Grade 3 boys (68%) than of girls (59%) said that they like math. This is consistent with results in 1999. (In 1998 this question was not asked.) The difference in attitudes is larger for math than for either reading or writing.

Percent Saying "Yes" to "I like to do mathematics"

	OCDSB	
	1999	2000
Girls	60%	59%
Boys	67%	68%

The results for "I am good at math" are similar:

Percent Saying "Yes" to "I am good at math"

	OCDSB	
	1999	2000
Girls	47%	48%
Boys	62%	64%

- Only in math were gender gaps in liking and feeling oneself good at the subject correlated with each other.
- Only in math were gender gaps in thinking oneself good at the subject and gaps in performance correlated with each other.
- Gender differences in attitudes were correlated with each other (r= .55).
- Gender differences in attitudes were *not* correlated with:
    - the percentage of girls in the grade
    - the number of students in the grade
    - the percentage of ESL or Special Education students in the grade

	G-B	*GLike-Blike*	*Ggood-Bgood*	*% Girls*	*# Students*	*% ESL*	*% Spec Ed*
G-B	1.00						
GLike-Blike	0.20	1.00					
Ggood-Bgood	**0.32**	**0.55**	1.00				
% Girls	-0.05	0.02	-0.02	1.00			
# Students	0.04	0.00	0.01	-0.08	1.00		
% ESL	-0.10	-0.06	-0.10	-0.18	-0.16	1.00	
% Spec Ed	-0.11	-0.19	-0.23	0.02	-0.21	0.09	1.00

Course Selection

- How well they did in courses the previous year was very important in selecting courses for about 40% of the females in Grades 10/11 vs. 30% of the males.

Graduate Careers

- A recent survey of graduates (2000, now in second year of university) indicated that a higher percentage of the females than males were studying in the Sciences, whereas a much higher percentage of the males than females were in engineering/ technical studies.

Males (N=93)	**Females (N=199)**	**Total (N=292)**	
20%	38%	32%	Liberal Arts
17%	**23%**	**21%**	**Sciences**
18%	12%	14%	Business/Management
24%	**5%**	**11%**	**Engineering/Technical Studies**
5%	5%	5%	Fine Arts
4%	5%	5%	Media Studies
1%	5%	4%	Professional Health Sciences
5%	1%	2%	Computer Systems

4. Some thoughts for future research

- Cohort analyses. As indicated in Darren's paper, it would be instructive for us to have more longitudinal/ cohort analyses rather than the cross-sectional data we have now. Our data on the EDI, CCAT, EQAO, and our district-wide testing program – will, over the years, enable us to do that.

- School Differences. If there are schools which consistently show large gender differences in results, what can be done to help them? What can they learn from schools which consistently show no/little differences in achievement based on gender? Are there differences in teaching practices, classroom resources, staff characteristics?

I would like to end with some comments about school improvement planning.

One of the questions we ask schools to consider is whether or not there is a consistent gender gap in achievement. We provide a data from a variety of assessments, support from our Quality Assurance staff, resources/research with suggestions for effective strategies for instruction and assessment, and TIME to consider these. We provide a full day for School Improvement Teams – consisting of principal, teachers, parents, and sometimes students – to look at the data and talk about what the issues are and how they might be addressed.

Marjorie Clegg is Coordinator of Quality Assurance for the Ottawa-Carleton District School Board where she is involved in school improvement planning and school reviews, program evaluation, school profiles, indicators of achievement, testing, surveys, and the index for identifying high needs schools. She also serves as Past-President of the Association of Educational Research Officers of Ontario.

Her background includes research in health issues (Royal Ottawa Hospital), giftedness (Child Study Centre, University of Ottawa), education (Inner London Education Authority, England), and race relations (Institute of Race Relations, England).