Gender Issues in Post-Secondary Mathematics Enrolment and Perseverance

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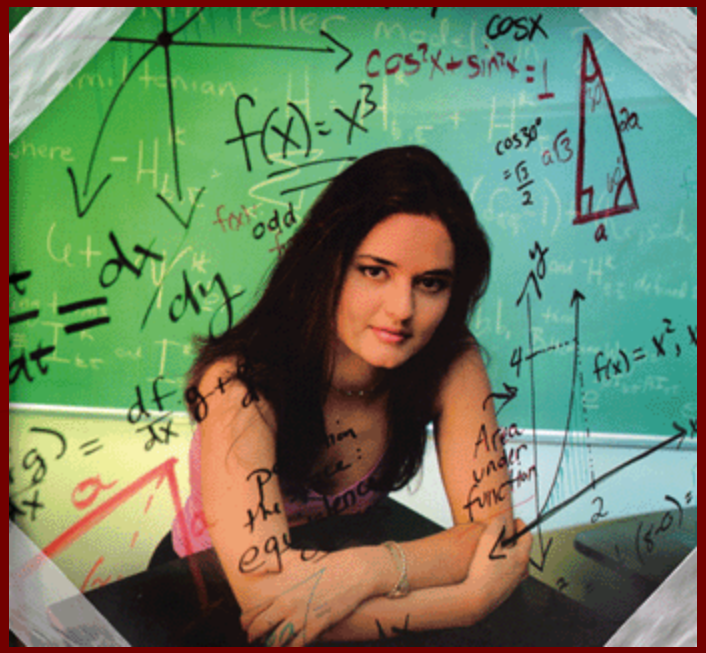


Overview

- The Presenter
- The Situation in Canada
- Explanations for Gender Differences
- Review of the Literature
- Pilot Study
- Thesis Research

The Presenter

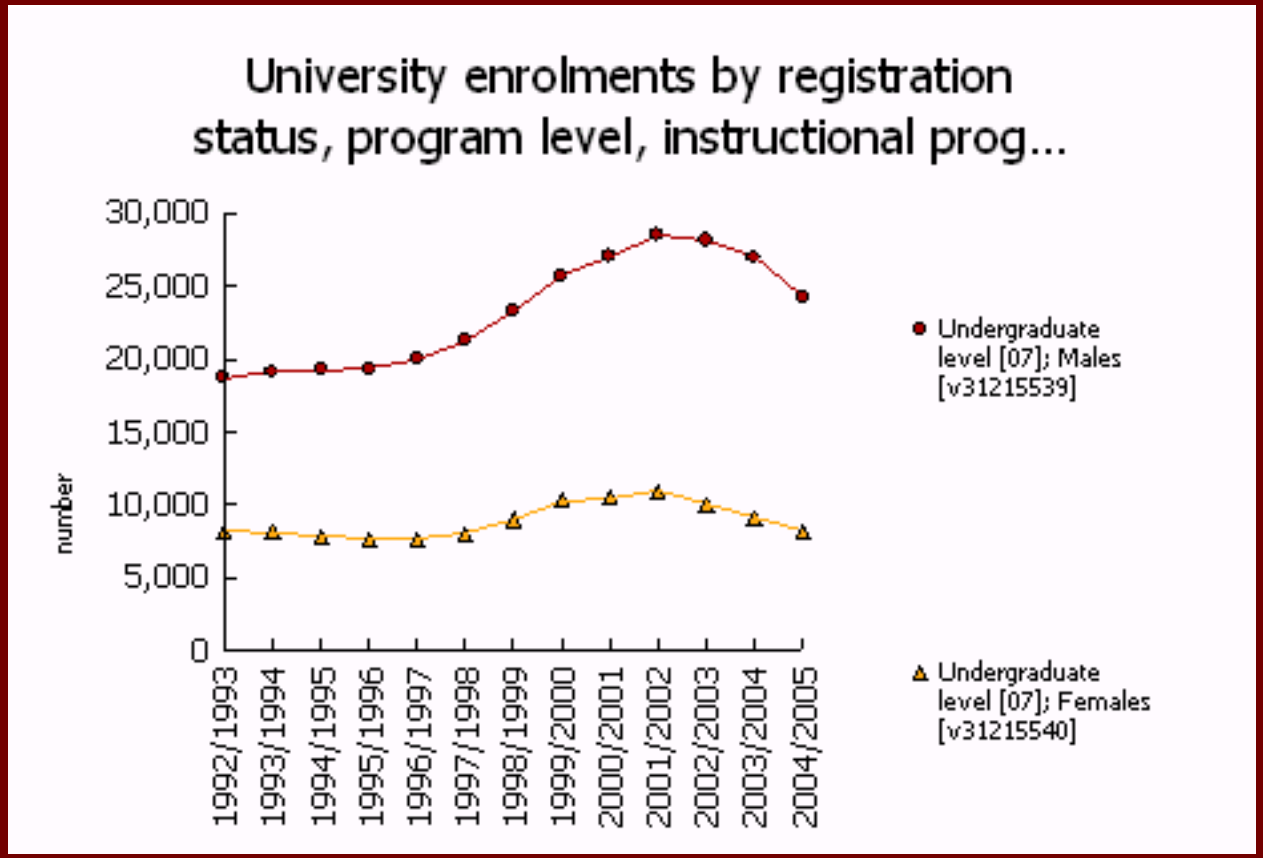
- Master's student
  - University of Ottawa
  - Supervisor: Dr. Christine Suurtamm
  - Thesis topic: Women's high school and university experiences that influence the pursuit of undergraduate mathematics degrees
- Mathematics Microdata Learning Resources Officer
  - Statistics Canada

The Situation in Canada

- Participation and achievement in mathematics now equitable at the elementary and high school level
- Several formerly male-dominated university fields now have equitable participation
- Overall increase in the number of women in mathematics degree programs, but the proportion of women is decreasing

Enrolment

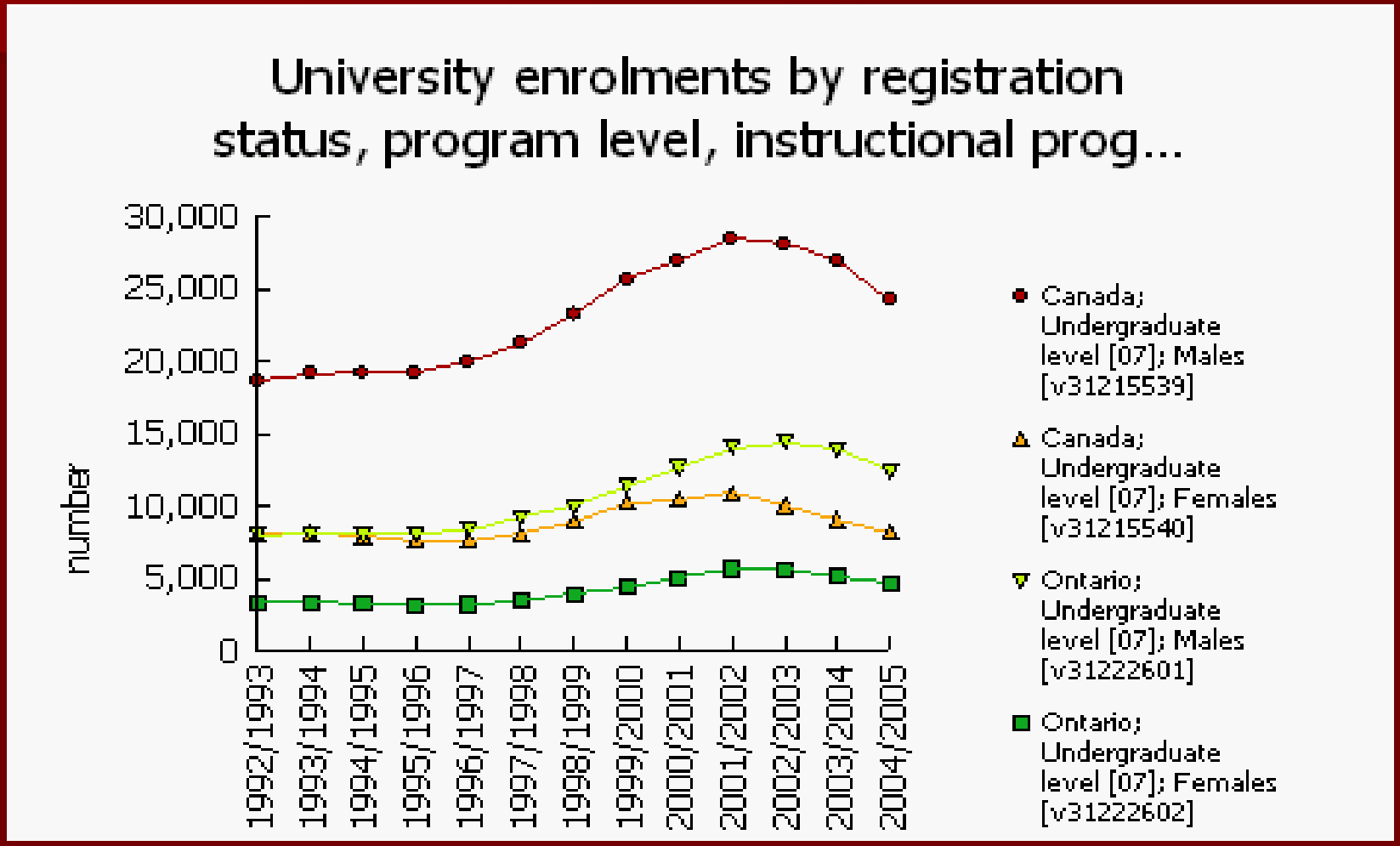
Proportion of Women: 30% in 1992/1993 to 25% in 2004/2005
Mathematics and related fields, Canadian totals



Source: Statistics Canada (PSIS)

Enrolment

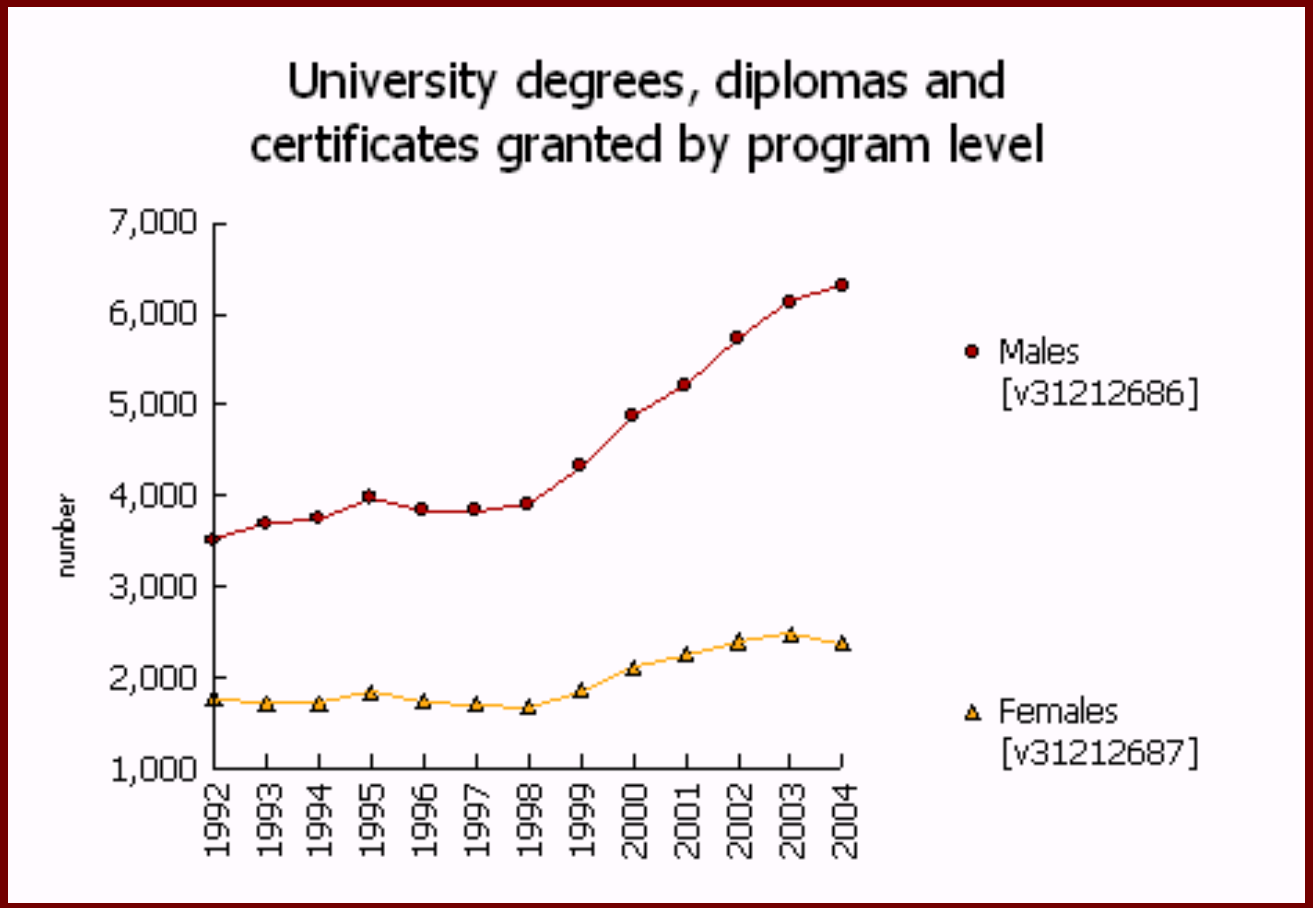
Mathematics and related fields, Canadian and Ontario totals



Source: Statistics Canada (PSIS)

Graduation

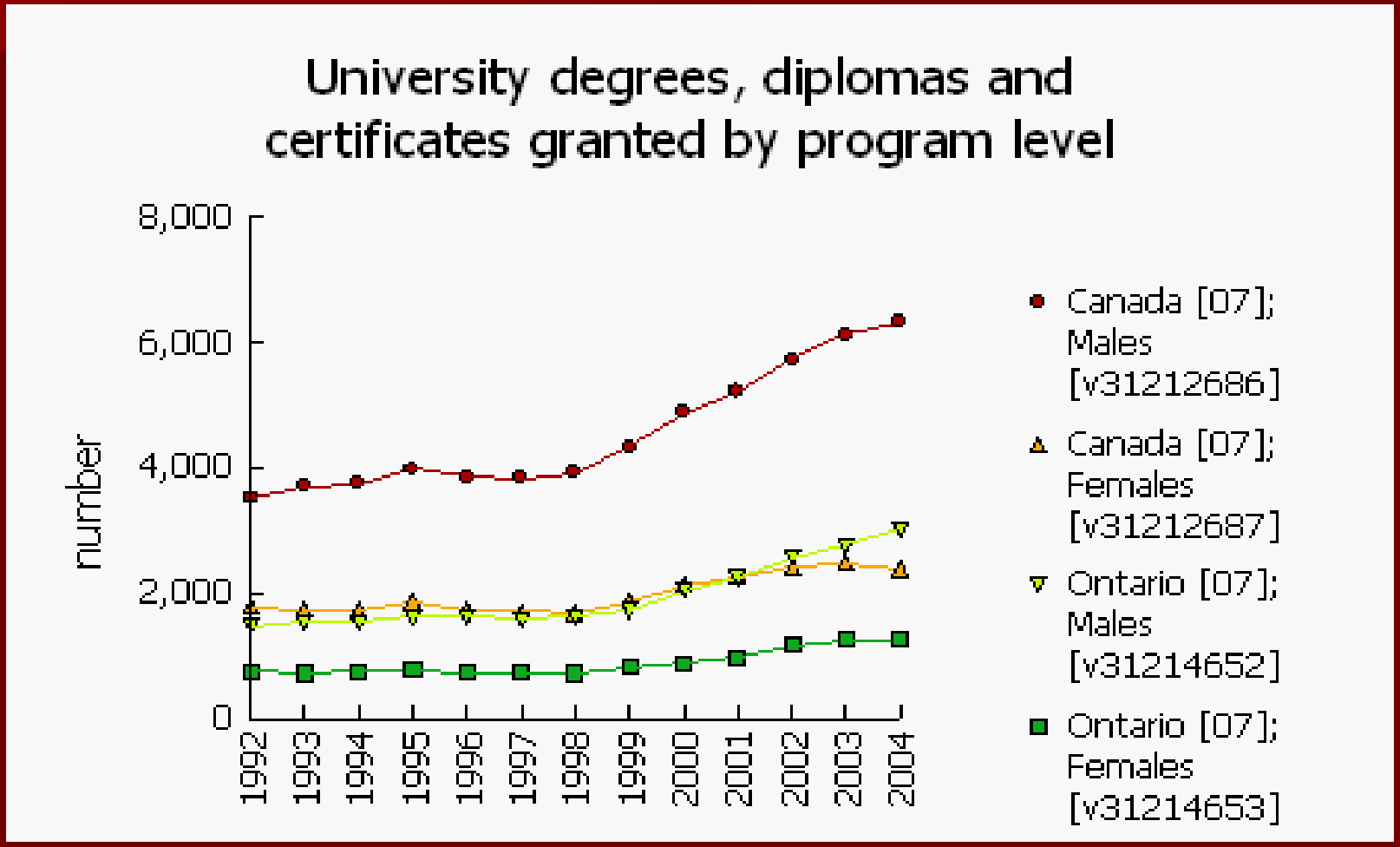
Proportion of Women: 33% in 1992 to 27% in 2004
Mathematics and related fields, Canadian totals



Source: Statistics Canada (PSIS)

Graduation

Mathematics and related fields, Canadian and Ontario totals



Source: Statistics Canada (PSIS)

Historical Overview of Explanations for Gender Differences

- Biology
  - Early studies tended to focus on biological differences as explanations for differences in mathematics achievement
  - Studies focused on spatial skills and ‘general mathematical ability’ (Benbow & Stanley, 1980; Fruchter, 1954; Stafford, 1972)

Historical Overview

- Fennema/Sherman study (1977)
  - Seminal study in gender issues in mathematics – shifted research from biological focus to socio-cultural focus
  - Found no gender differences in spatial skills when prior experience was controlled
  - Investigated the impact of beliefs and attitudes

Historical Overview

- Society and Culture
  - Change in terminology from ‘sex differences’ to ‘gender differences’
  - Examination of how society views mathematics and women
  - Stereotypes of mathematics as a male domain
  - Gender-role beliefs influenced by society (Forgasz & Leder, 1996; Lupart, Cannon, & Telfer, 2004)

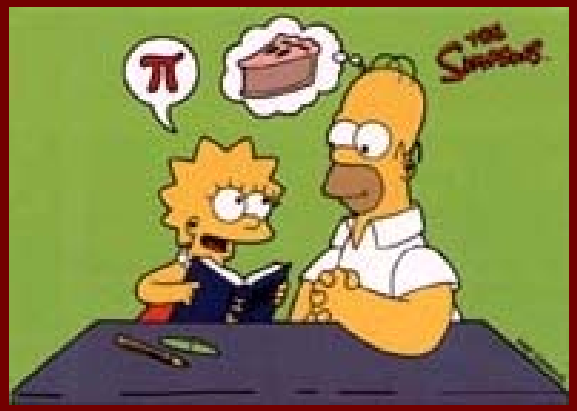
Current Views

- Shift in focus from ‘fix the girls’ to ‘fix the system’/’fix mathematics’
- A variety of methods attempted to improve the learning environment for girls specifically and for all students
- Suggestion to shift from traditionalist environments to problem-based co-operative learning (Boaler, 1997; Morrow & Morrow, 1995)

Research on Enrolment

Promoting enrolment:

- Gill's (2000) study of females who selected science and mathematics degrees
  - Passion about and skill in subject
  - Supportive relationships
  - Special educational programs



Research on Enrolment

Impeding enrolment:

- Attitudes related to achievement and course selection (Freeman, 2004; Morgan, Isaac, & Sansone, 2001; Weinburgh, 1995)
  - Large-scale questionnaires that accompany standardized tests show similar results (EQAO – Gr. 9; NAEP – Gr. 4, 8, & 12)

- Lack of confidence; math anxiety (Bowd & Brady, 2003; Damarin, 1993; Tobias, 1993)

Research on Perseverance

Promoting perseverance:

- Supportive relationships with faculty and quality teaching (Gavin, 1996; Seymour, 1995)
- Personal qualities (Rodd & Bartholomew, 2006; Zhao, Carini, & Kuh, 2005)
- Support of parents and peers (Gavin, 1996; Blair, 1991)

Research on Perseverance

Impeding perseverance:

- Poor relationships with faculty and poor teaching (Herzig, 2004; Sax, 1994)

- Not fitting in
  - 'Old white guys' club' (Herzig, 2004)
  - 'Doubly marked' (Damarin, 2000)

Pilot Study

- Conducted for Qualitative Research course
- Interviewed three women with science or mathematics degrees about perseverance in their fields
- Findings:
  - Great passion for and skill in subject area
  - Informal peer support
  - ‘Supportive’ personality traits

Thesis Research

- High school and university experiences of women who selected and persevered with undergraduate mathematics degree programs
  - Provide qualitative insight into a topic that is often viewed in a quantitative manner
  - Provide a uniquely Canadian perspective

Purpose of Research

To learn how Canadian women who are nearing completion of undergraduate mathematics degrees feel they have been supported and challenged in their high school and university studies

Research Design

- Participants
  - Six women enrolled in 3rd/4th year of an undergraduate mathematics degree program
  - Educated in Canada at all levels
- Data Collection
  - One-on-one, face-to-face interviews
  - Duration: between 40 minutes and 2 hours

Research Design

- Interview Protocol
  - Eight main questions with follow-up questions
  - Four dimensions: formal education system, family, peers, and personal characteristics
- Data Analysis
  - Currently in progress

Thank you!