# Research and Pedagogy: The Latest Evidence Supporting Gender-Based Learning

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# Back to the Beginning: Evidence from Neuroscience

- The human brain is not sexually dimorphic
  - Greater variation among males than between males and females
- Developmental disorders more prevalent in males – so problems occur early
- Anxiety and mood disorders more prevalent in females – so problems emerge later
- Differences are accentuated during puberty – hormonal effects, or perhaps environment
- Differences in effects of drugs serious enough to require further study

# Academic Achievement

- Differences in academic achievement are probably due to personality rather than any intellectual factors, maybe
- Girls consistently ahead in writing especially in essay and sentence composition
  - Males at greater risk for writing failure
- Male advantage in math primarily due to better problem solving skills
- Lack of sustained attention is major factor in school success
  - This may be sociocultural because differences were greater in countries with less equality (correlational? Lower SES?)

# Mental Toughness

- Paradigm comes from work with athletes in preparation for sport
  - How people deal with challenges, stressors and pressure without regard to current circumstances
- A mindset that can be developed
- The focus is on developing an internal locus of control
  - Achievement is the result of ability and effort, not luck or difficulty of task
- Students with MT were shown to have higher academic attainment, they had better attendance records, fewer behavior problems, and closer peer relationships

# Theory of Mental  Toughness – 4 C's

- Commitment – set goals and strive to achieve despite obstacles
- Challenge – seeking out opportunities for self-development
- Control
  - Life – power to shape own life and future
  - Emotion – manage emotions in difficult situations, appropriate intensity
- Confidence
  - Abilities – attempt new or difficult tasks
  - Interpersonal – social confidence especially in new or unfamiliar environments

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# Developing Mental toughness

- “One size fits all” approach will not work here
- Should **not** be domain specific – good in maths, but not in reading
- Students noted that there was some overlap among the 4 C’s
  - Being confident in a subject led to increased commitment
- Nurturing and supportive environment
  - Relationship between student and teacher is the beginning – positive feedback packaged in a “sandwich”
  - Stress management is key, sleep and quality of life
  - Amount of physical activity did not seem to be a factor

# Gendered Nature of Mental Toughness

- At age 5, higher prosocial behavior, better peer relationships, and lower internalizing & externalizing problems led to better mental toughness and fewer sleep disturbances at age 14.
- Men tend to convey confidence more than women even when minimally prepared and in the face of failure
- Boys attributed failure to bad luck, lack of interest and other external causes; girls to lack of ability, poor preparation and other internal causes
- Boys oriented to proving and girls to improving
- Boys see that teachers create a performance goal structure in class whereas girls think that teachers create a mastery goal structure

# Self-regulation (Not MT Research)

- Internal locus of control as evidenced by self-regulation is key to academic success
- The earlier children learn this skill, the more they do well in school
- Teachers' ratings of inattention may identify poor self-regulation or may be the result of assumptions about causes of inattention
- School achievement was connected to perseverance, self-regulation, prudence, social intelligence, and hope: basically good character
- For boys, academic mastery goal orientations were connected to success

# How Early Do the differences begin?

- One theory about why boys complete less schooling is that it may be due to differences in early self-regulation and prosocial behaviors
  - Early behavior problems predicted lower academic achievement later
- Boys benefited more from early childhood education programs resulting in better grade retention and lower special ed identification later in school
  - Probably due to better executive function skills especially in literacy and mathematics
  - Additionally, developing sequential learning behaviors and increased involvement in learning helped as well

# Movement in the classroom

- Active outside breaks increased on-task behavior and sustained attention
  - 10 minutes, once a day, three days a week
  - Passive breaks resulted in off-task behavior slightly more
- In-class intense activity improved selective attention and fewer errors on a test of attention
  - 4 minutes (total 10 minutes with set-up and return to class), alternated with a 10 minute no-activity break (lecture).
- Standing desks
  - Improvement of activity, reduction of time sitting, and improved class behavior

# Effect of teachers

- Teacher emotional support found to be positively related to GPA
  - In coed class, girls were closer to teachers
- Teachers' assumption that boys have trouble in reading may actually result in poor reading – the reverse for girls was not investigated, but was assumed
  - Teachers may mistake girls' classroom compliance for comprehension, so perhaps they mistake boys' questioning for lack of understanding
  - However, another study found that teacher expectations of how well a child was going to do on reading did not affect boys, but did affect girls

# What all this means

- Start early, boys benefit from early learning programs involving sequencing and developing prosocial skills
- Develop skills in writing especially in essays
- Use problem solving approaches in all courses
- Movement in class results in better attention and better behavior
- Mental Toughness is a characteristic that leads to better academic outcomes
  - Commitment, challenge, control, and confidence
- Self-regulation is THE key to school success