AN OUTSIDER’S VIEW
& RECOMMENDATIONS FOR FAIR AND VALID
ADMISSIONS TO
AUSTRIA’S MEDICAL SCHOOLS

Diane F. Halpern, Ph. D.
Mc Elwee Family
Professor of Psychology
Claremont McKenna College

BACKGROUND:
A SHORT TIMELINE

- 2002: Change in medical school curriculum
- 2002-2004: “open and unlimited admissions”
  + Problem—more students than could be accommodated
- 2005: EU decree—must treat students from EU countries in a similar manner!!
- 2006-2012: Medical School Admissions Test (EMS) required for admissions; Students are ranked and admissions quotas are established
- 2013: New Test--MedAT
TWO FUNDAMENTAL QUESTIONS TO CONSIDER

- Were there beneficial outcomes from the EMS?
- Were there detrimental outcomes from the EMS?

“Both questions have the same answer: YES

(HANS GEORG KRAFT, CLAUDIA LAMINA, THOMAS KLUCKNER, CHRISTOPH WILD & WOLFGANG M. PRODINGER, 2012)

FIRST, THE GOOD NEWS

According to a study on admissions from Innsbruck Medical University (IMU) and other data

1. Admissions stabilized at 740 (75% Austrians, 20% EU, 5% other)
2. Pass rates for “Summative Tests” at the end of Year 1 and 3 increased for students at IMU in cohorts 2006-2009 (multiple choice content)
3. Better academic performance and fewer drop-outs with EMS
BOTH FEMALES AND MALES HAD HIGHER S1 PASS RATES WITH SELECTED ADMISSIONS

Percentage Passing Summative Test at End of Year 1 in Medical School

NOW, THE BAD NEWS

The EMS also resulted in a significantly lower admittance rate for women—a phenomenon widely known in the literature as “Adverse Impact.”

A troubling outcome for those concerned with gender equity and a troubling outcome for the future of medicine and dentistry in Austria.

(No separate data analysis for dental students, but I’ll get back to that.)
MANY MORE FEMALES TOOK THE EMS; MANY MORE MALES WERE ADMITTED

Selective Admissions 2006-2011
Higher Percentage of Men Admitted

2006 and 2011 show similar trends

Percentage taking test and admitted

<table>
<thead>
<tr>
<th>TEST %</th>
<th>ADMIT %</th>
<th>TEST %</th>
<th>ADMIT %</th>
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<tr>
<td>2006</td>
<td></td>
<td>2011</td>
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</table>

Higher Percentage of Men Admitted

2012 DATA
GENDER NORMING
414 WOMEN AND 326 MEN ADMITTED

2012: Percentage Admitted Matched Percentage of Females and Males Who Took EMS

Percentage taking test and admitted

<table>
<thead>
<tr>
<th>Test participation</th>
<th>Admission</th>
</tr>
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<tbody>
<tr>
<td>Female</td>
<td>Male</td>
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</table>

0.00% 10.00% 20.00% 30.00% 40.00% 50.00% 60.00%
RESULTS IN CONTEXT—OTHER DATA ON ADMISSIONS

College-going rates for women and men in the United States between 1970 and 2006. Note that the rate has increased steadily for both men and women over the 36-year period shown in these data, but it has increased faster for women.

MEDICAL SCHOOL DATA FROM CANADA

In 1990, the number of women enrolled in medical school in Canada was about 10% of the total. Since then, the number of women has increased at a faster rate than men, reaching 30% in 2010/11.
MCAT Scores for Women and Men in US

<table>
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<th>Men</th>
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College GPA for Applicants to Medical School in US

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MEDICAL SCHOOL ENROLLMENTS IN US

Enrollments in US Medical Schools for Women and Men

NEW MCAT FOR 2015

- What will the practice of medicine be like in the future?
- New MCAT will include questions from psychology and biological bases of behavior
- Empathy, dependability, and responsibility—hard to test, but will have new recommendations assessing these traits from letters of recommendation, personal statements, and interviews (all use interviews)
Difference in “percentage of top performers” in reading Education at a Glance 2009: OECD Indicators. Data from Table A4.1b Data from 15-year olds

BOYS SCORE HIGHER ON INTERNATIONAL ASSESSMENTS OF MATH
Girls get higher grades in school, but the difference is only about .25 of a grade.


MALE: FEMALE TAIL RATIOS ARE DECREASING IN MATH AND SCIENCE

Figure 1. Male to female ratio in math ability and science enrollment in the top 0.01% across 30 years.

Wai, Cecchin, Putallaz, & Makel, 2011
BIGGEST DIFFERENCE: WHAT ARE VISUOSPATIAL SKILLS?

When we use the term “visuospatial,” we are referring to information that is visual in nature (initiated by stimulation of the retina by light) and has spatial properties (the representation of space including relationships between objects), and this information can either be sensed directly or generated from memory.

Important in many disciplines such as dentistry, chemistry, and design.

COGNITIVE TASKS THAT USUALLY SHOW SEX DIFFERENCES

- Visuospatial tasks--
- Effect sizes depend on the task.
- Mental rotation tasks that require maintaining a three-dimensional figure in working memory while simultaneously transforming it show very large sex differences, somewhere between .9 to 1.0 standard deviations.
BUT, WHEN IT COMES TO SEX DIFFERENCES IN SPATIAL SKILLS, IT IS HARD TO BE A MINIMIZER

- Sex differences are found cross-culturally and throughout the life span.
- When sex differences in spatial skills are found in nonhuman mammals (e.g., rats in a water maze or radial arm maze) males are superior.
- But, everyone can improve with training—in all of the areas where cognitive sex differences are found.

Fig. 2. An example of a mental rotation task. The task is to determine if the two figures labeled A and the two figures labeled B could be made identical by rotating them in space. These are called mental rotation tasks because the rotation must be done in working memory.
MEN OUTPERFORM WOMEN IN 53 COUNTRIES

WHAT YOU SEE DEPENDS ON WHERE YOU LOOK

- The corollary to this statement is: People look for what they want to see.
- Some tests favor females; some favor males; some show no differences. Differences in male and female test scores depend on what is on the test.
- Females tend to excel on tests that are closely related to what is taught in school; boys tend to excel in tests that are unrelated to the curriculum.
- Differences are largest at the tails of distributions.
POSSIBLE EXPLANATIONS FOR GENDERED OUTCOMES IN EMS

EMS has 9 subscales:
- Pattern recognition; Comprehension of medical Science; Visuospatial (perspectives of cables);
- Concentrated and accurate work; Memorizing facts;
- Reading comprehension; Graphs and tables;
- Quantitative; Memorizing Figures

Single Score—need subscores by gender to test for bias
No bias review for items (dif analysis—differential item functioning)
High stakes testing requires high level of analysis

POSSIBLE EXPLANATIONS FOR GENDERED OUTCOMES IN EMS

- Stereotype threat research has become a cottage industry.
  Members of stigmatized groups (e.g., women are poor at math) underperform on “high stakes” exams, especially when their group membership is “primed.” For example, by marking whether they are male or female before taking an exam.
  Two meta-analyses showed the stereotype threat is responsible for a portion (not all) of cognitive sex differences.
- We learned that stereotypes are (mostly) accurate.
LARGE DIFFERENCES IN INTERESTS

Recommendations for fair and valid admissions

New test for 2013 MedAT

- Content from Delphi method of agreement
- Science and math questions and reading comprehension
- Cognitive ability testing—visuospatial, learning and memory, reasoning, algebraic problem solving
- Social-emotional competencies—possibly “mini” interviews (concern about the work involved with too many interviews—advanced students or admissions staff could do the interviews; only interview some %)
RECOMMENDATIONS FOR FAIR AND VALID ADMISSIONS

New test for 2013 and beyond:

- Combine test scores with grades (perhaps last 2 years of high school—academic subjects only)
- Include a written section that taps ethics or commitment or interpersonal skills, or compassion that would only be graded for students ranked 500th to 900th—or some other range—use rapid grading prompts or computerized grading to reduce work load (e.g., pose an ethical dilemma or present a scenario to respond to)
- Mini-interview stations

RECOMMENDATIONS FOR FAIR AND VALID ADMISSIONS

- New test for 2013 and beyond:
- Similar and separate analyses for dental school
- Especially for visuospatial skills—including spatial skills training in curriculum and encourage its use in secondary schools.
- The goal is an admissions program that is fair, unbiased, valid, and transparent. I am confident that it can be achieved.
CONTACT INFORMATION

Dr. Diane F. Halpern
McElwee Family Professor of Psychology
Claremont McKenna College
850 Columbia Ave.
Claremont, CA 91711
(909) 607-9647
www.DianeHalpern.com
Diane.Halpern@cmc.edu