UNIVERSITY OF GEORGIA
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Investigating the impact of post-exam grade-adjustment practices in introductory physics

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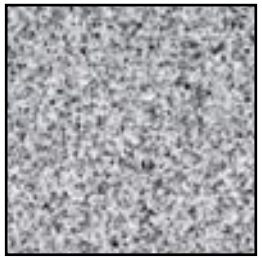

Georgia Physics and Astronomy Education Research
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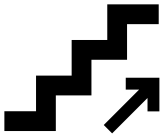
We thank Erin Murray for her assistance in accessing and preparing the data for this project.

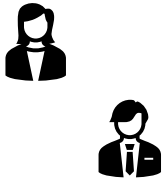
Grades matter

Financial Aid



Majors

Graduation



Careers

Ost 2010; Simmons and Heckler 2020

Grades have patterns of inequities

Matz et al. 2017, Whitcomb, Cwik, and Singh 2021, Castle et al. 2024

Inequities as a result of course structure

"We conclude that there are likely systemic biases, in introductory physics classes, that act against some underrepresented demographic groups. These biases are easily seen by comparing outcomes between different systems of teaching and assessment and these biases ***can likely be removed with appropriate structural changes at the level of a course*** *that—importantly—do not impact the educational standards of the course."* – Webb & Paul

Webb and Paul, 2023

Evidence of structural changes

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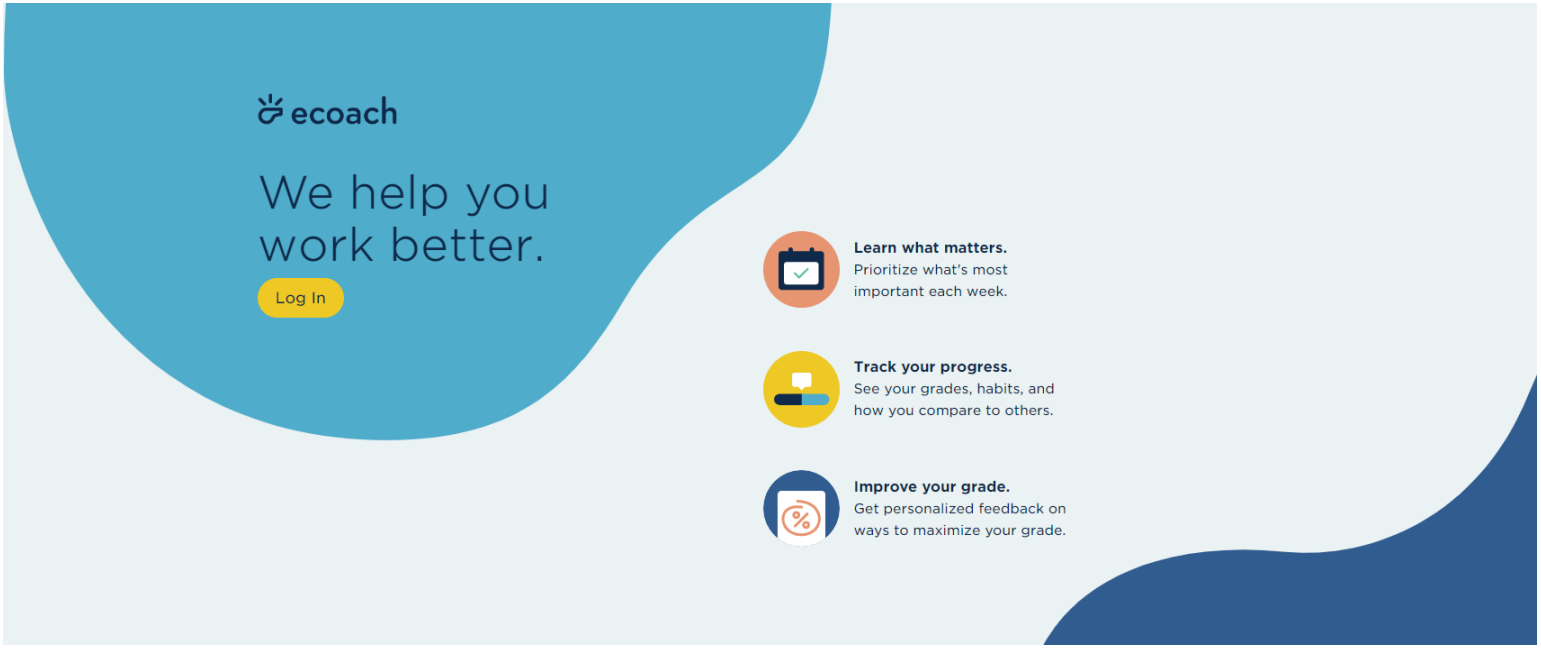
How does changing the weight each exam has in the final grade affect equity gaps?

Data: ECoach



https://ecoach.ai.umich.edu

Data: ECoach

- Winter 2017 – Fall 2019
- Grades:
  - Midterm exam 1
  - Midterm exam 2
  - Midterm exam 3
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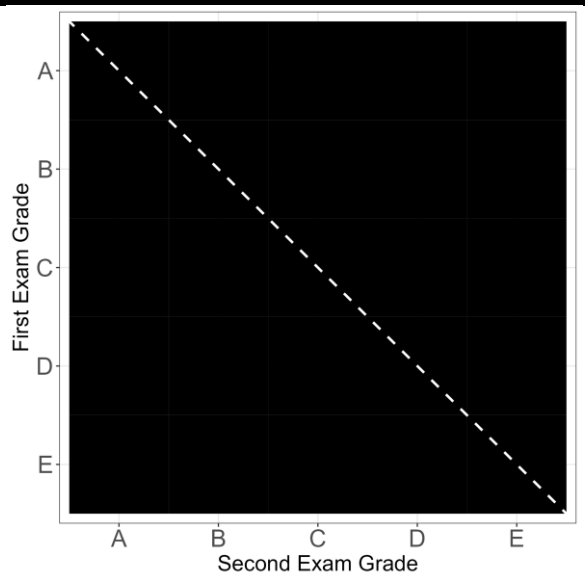
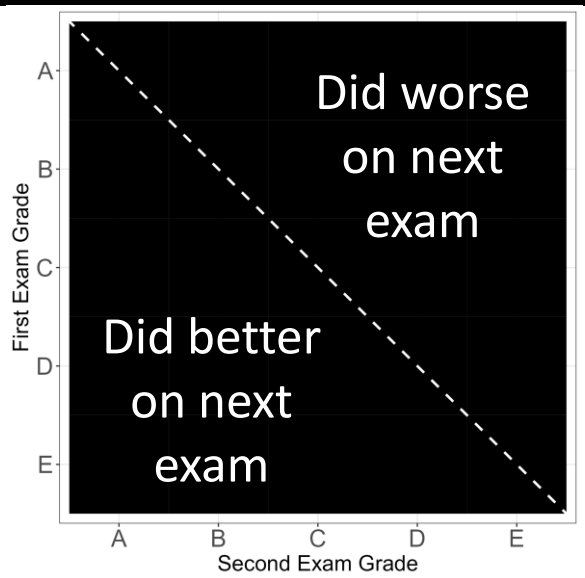
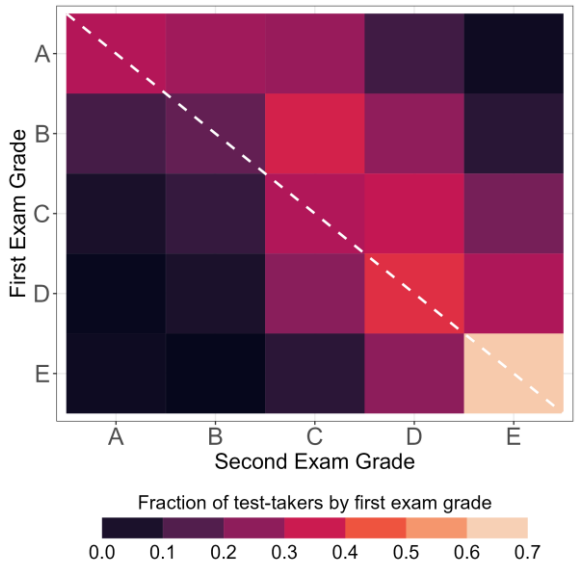
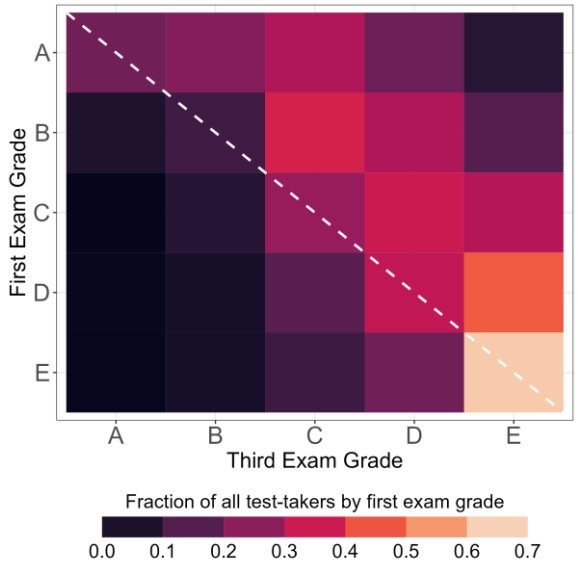
- Exams make up 36% of final grade
- Final exam makes up 16% of final grade

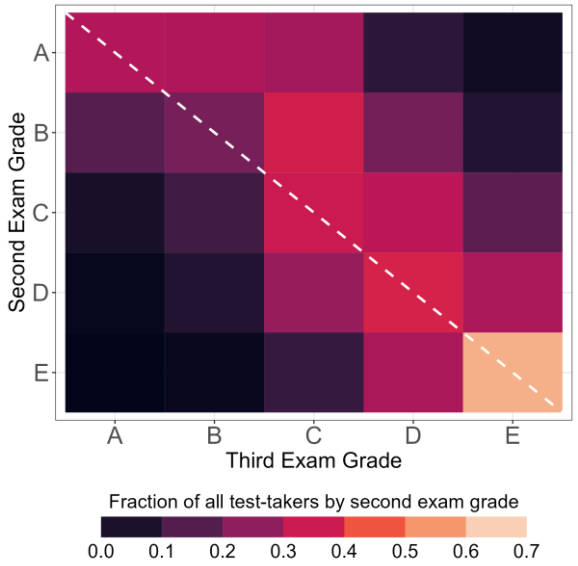

A
B
C
D
E
First Exam Grade
A
B
C
D
E
Second Exam Grade


Did worse on next exam
Did better on next exam
First Exam Grade
A
B
C
D
E
Second Exam Grade



Most students earn similar grades across exams (or do worse)





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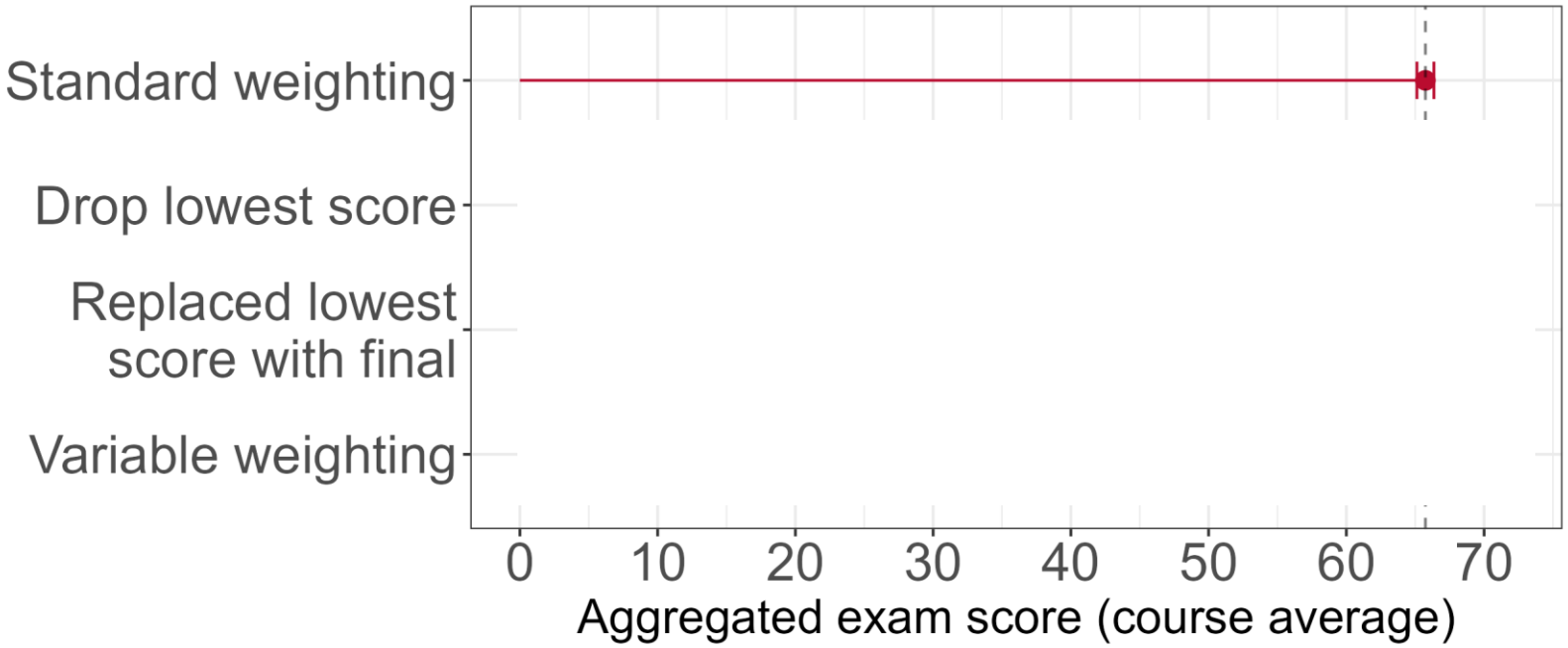
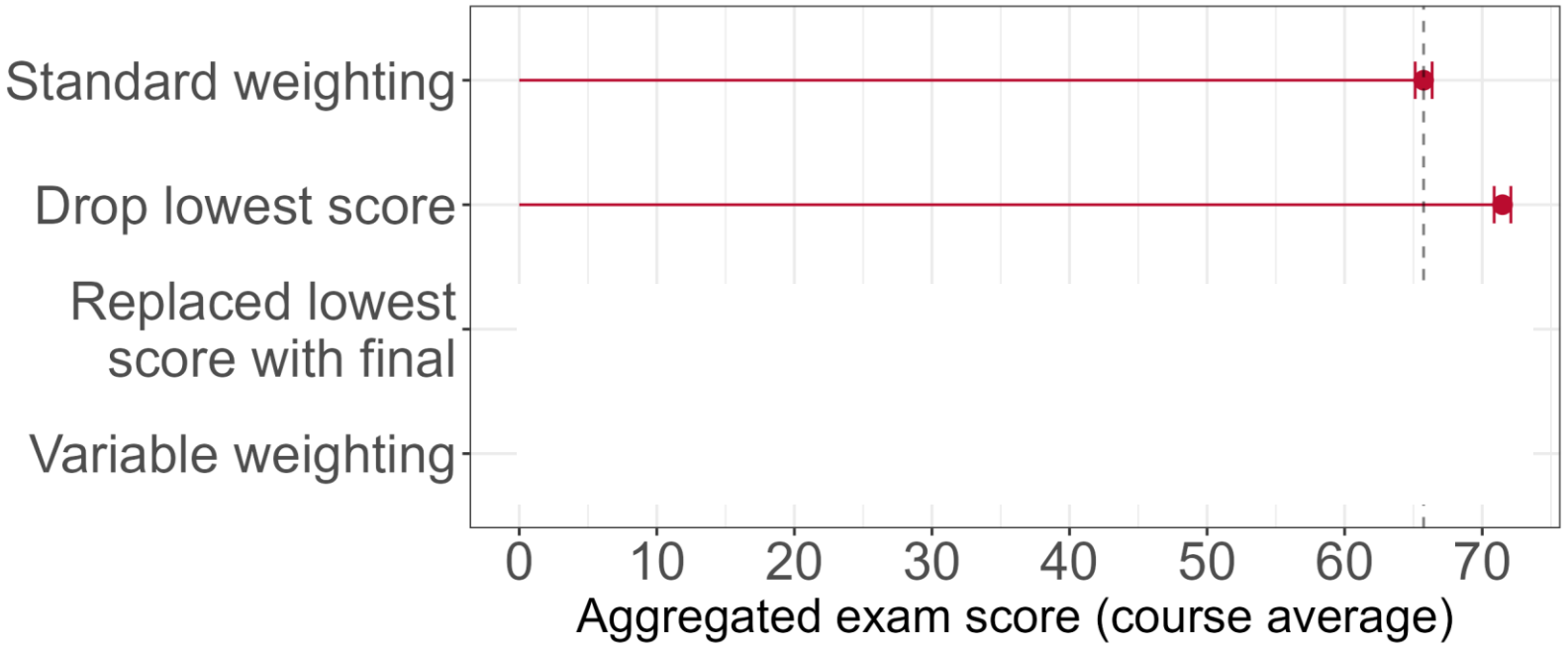
- Let's apply these to our data!

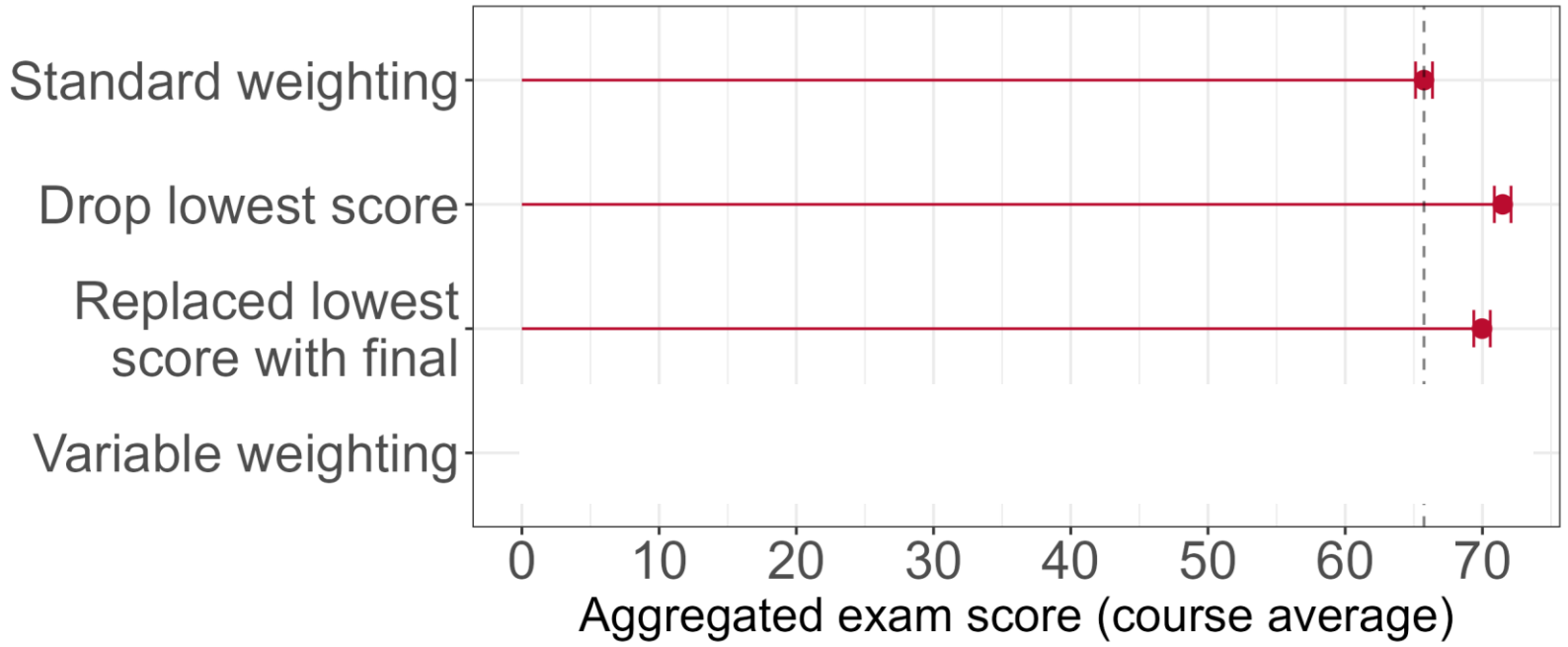
Average total exam score with no modifications



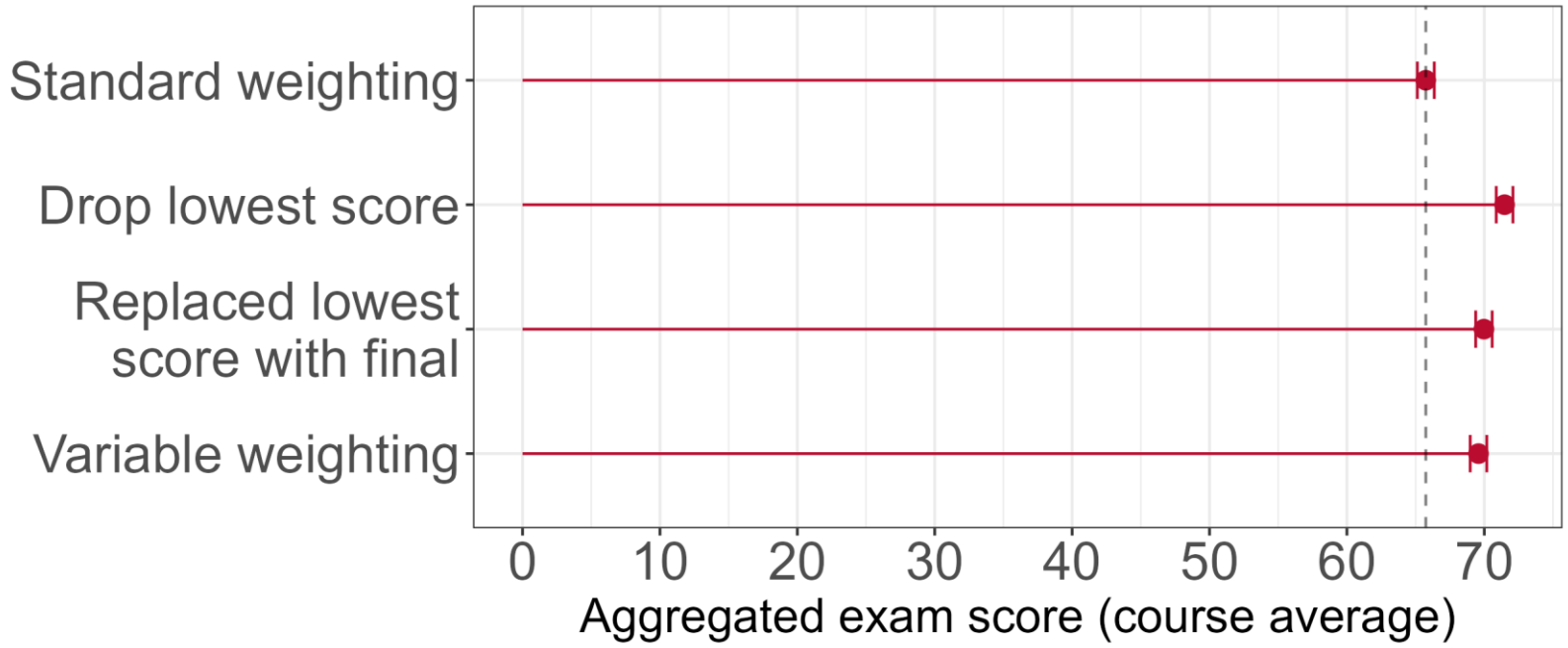
Increase in exam scores



Also increase, but not as much



Also increase, but again, not as much



Dropping the lowest exam score increased the total exam score the most.

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Replacing the lowest exam score with the final exam score and weighing each exam differently in the total exam score also increased the total exam score, but not as much.

What about equity though?

Salehi et al (2019)

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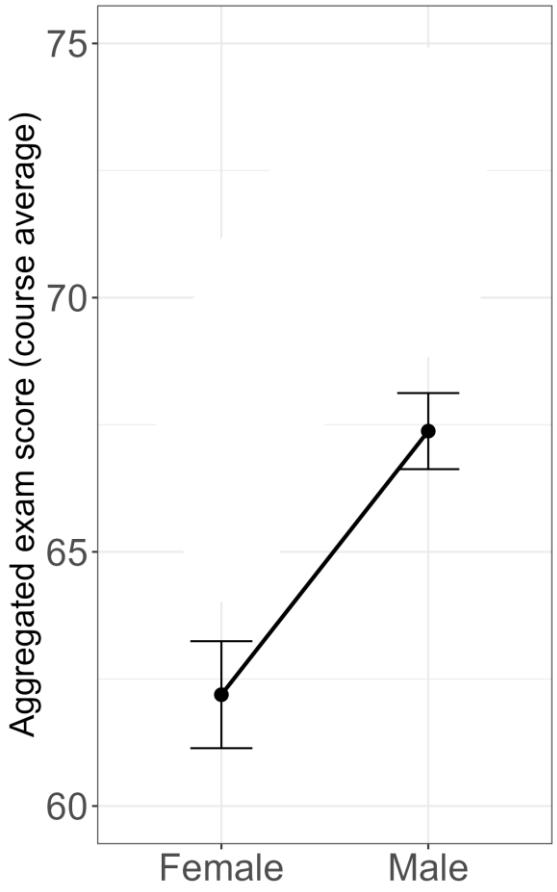

Standard weighting

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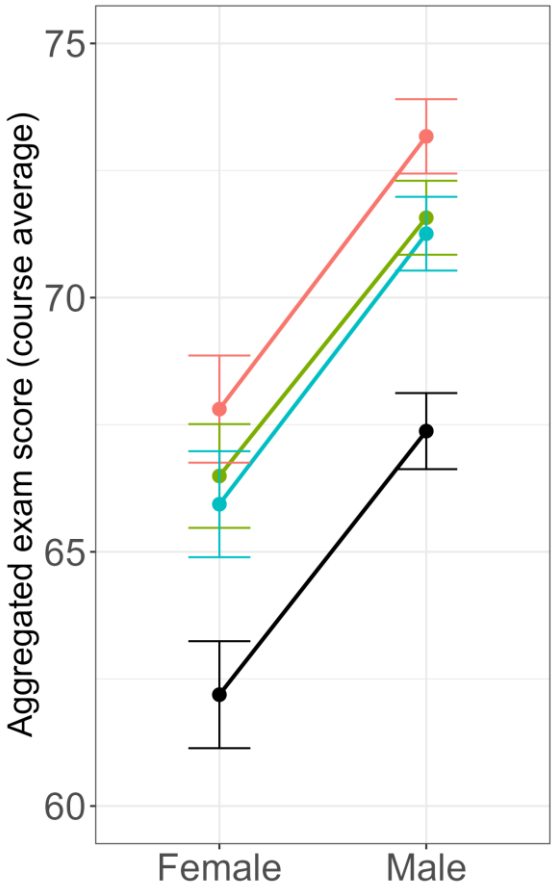
None of the modifications seem to close the equity gaps.



Drop lowest score

Replace lowest score with final

Variable weighting

Standard weighting

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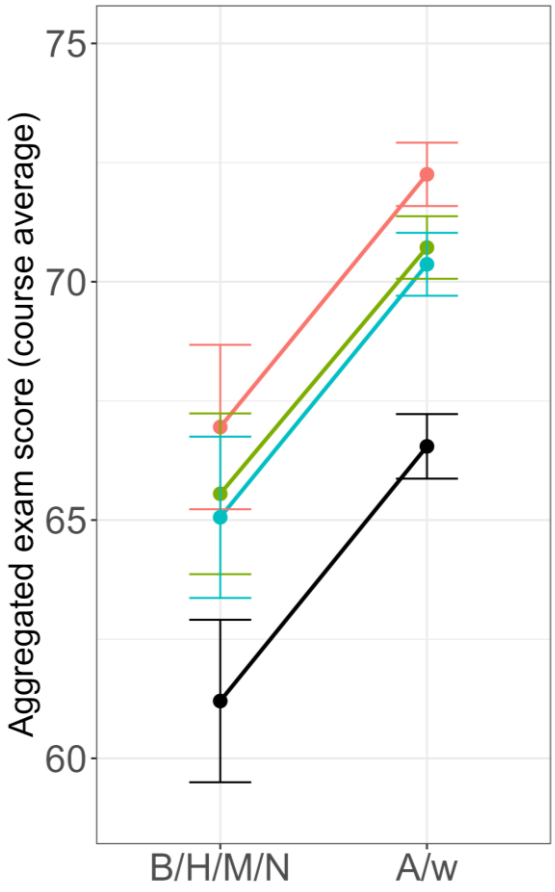
None of the modifications seem to close the equity gaps here either.



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- slides: bit.ly/