

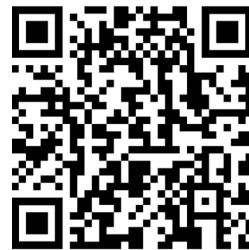
Investigating the impact of post-exam grade-adjustment practices in introductory physics

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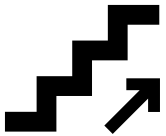
We thank Erin Murray for her assistance in accessing and preparing the data for this project.



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



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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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- Optional exam retakes may exacerbate score disparities between students with different social identities (Supriya et al. 2024)
- What about the weight of *each* exam?

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



Data

- Winter 2017 – Fall 2019
- Grades:
 - Midterm exam 1
 - Midterm exam 2
 - Midterm exam 3
 - Final exam



Data

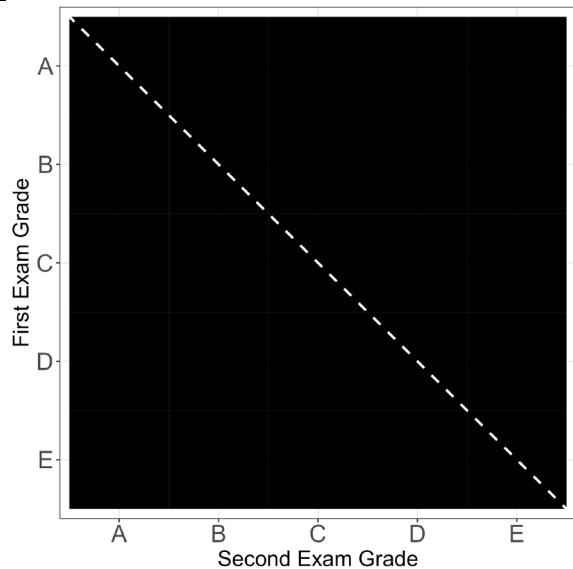
- Winter 2017 – Fall 2019
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- 2290 Students

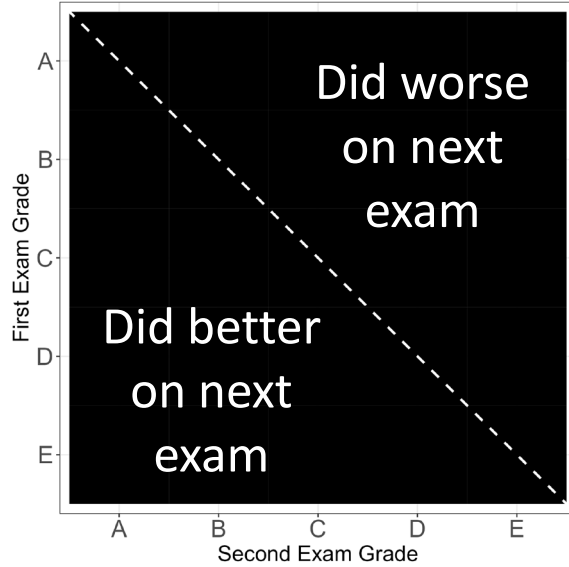


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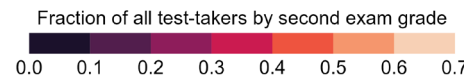
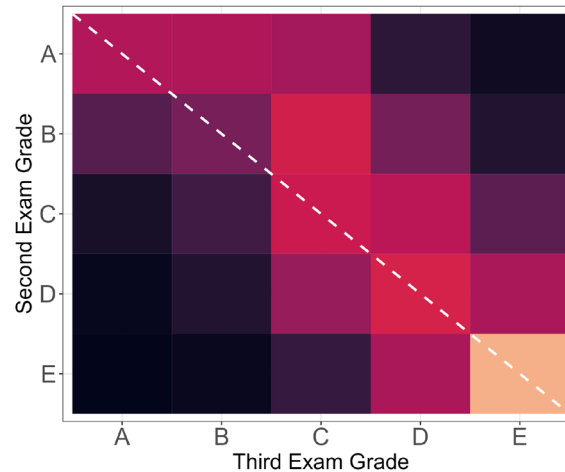
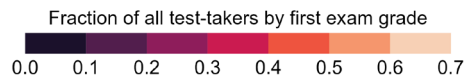
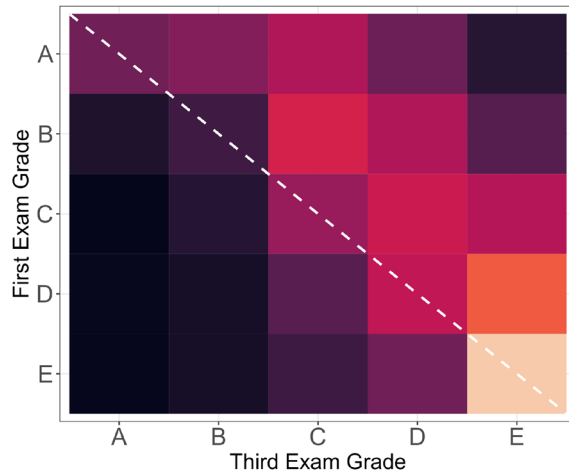
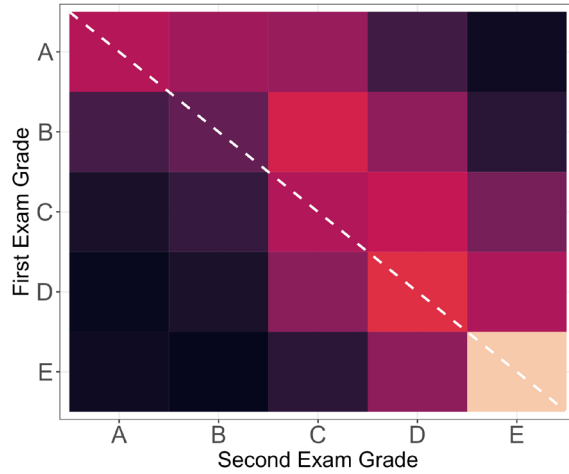
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- Grades:
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 - Midterm exam 2
 - Midterm exam 3
 - Final exam
- 2290 Students
- Exams make up 36% of final grade
- Final exam makes up 16% of final grade







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



How could we determine total exam score?

- Average all three exam scores (default)



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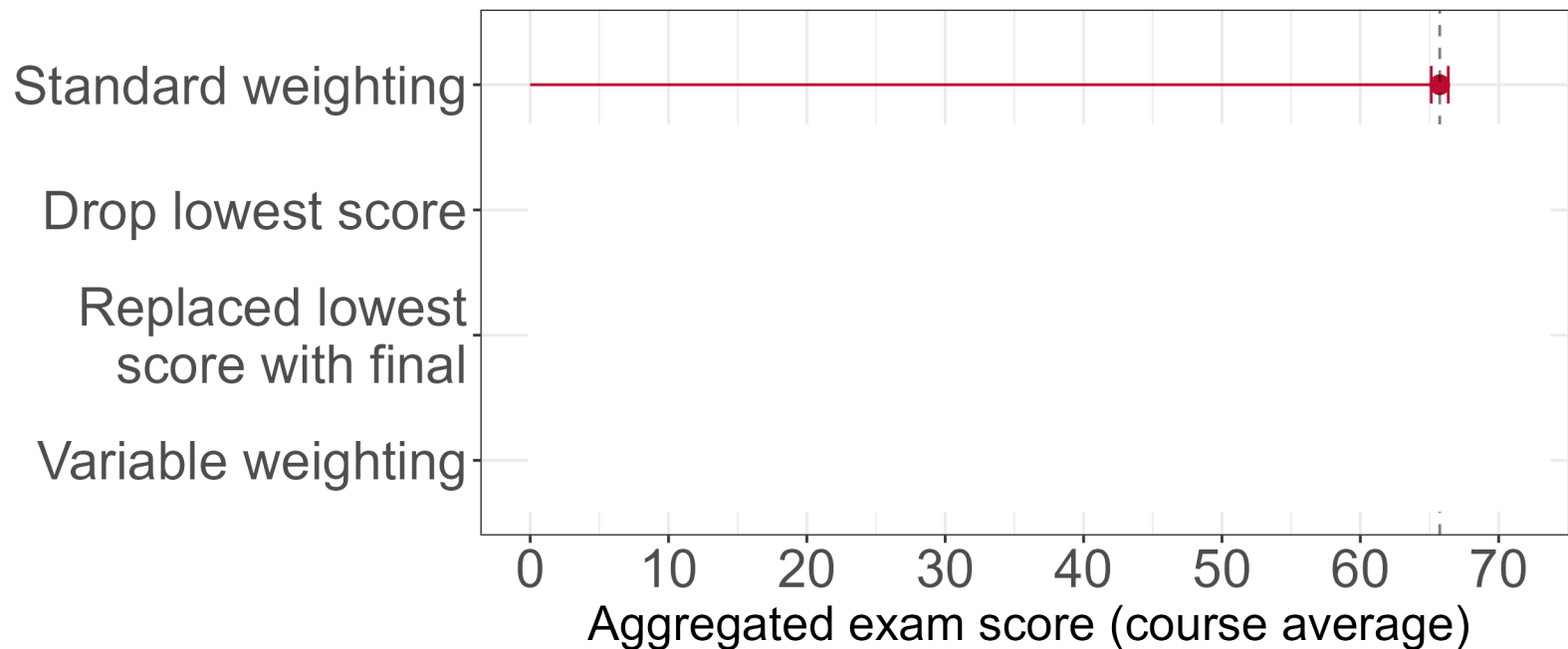
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 - Have the best exam score count for 50% more and have the worst exam score count for 50% less



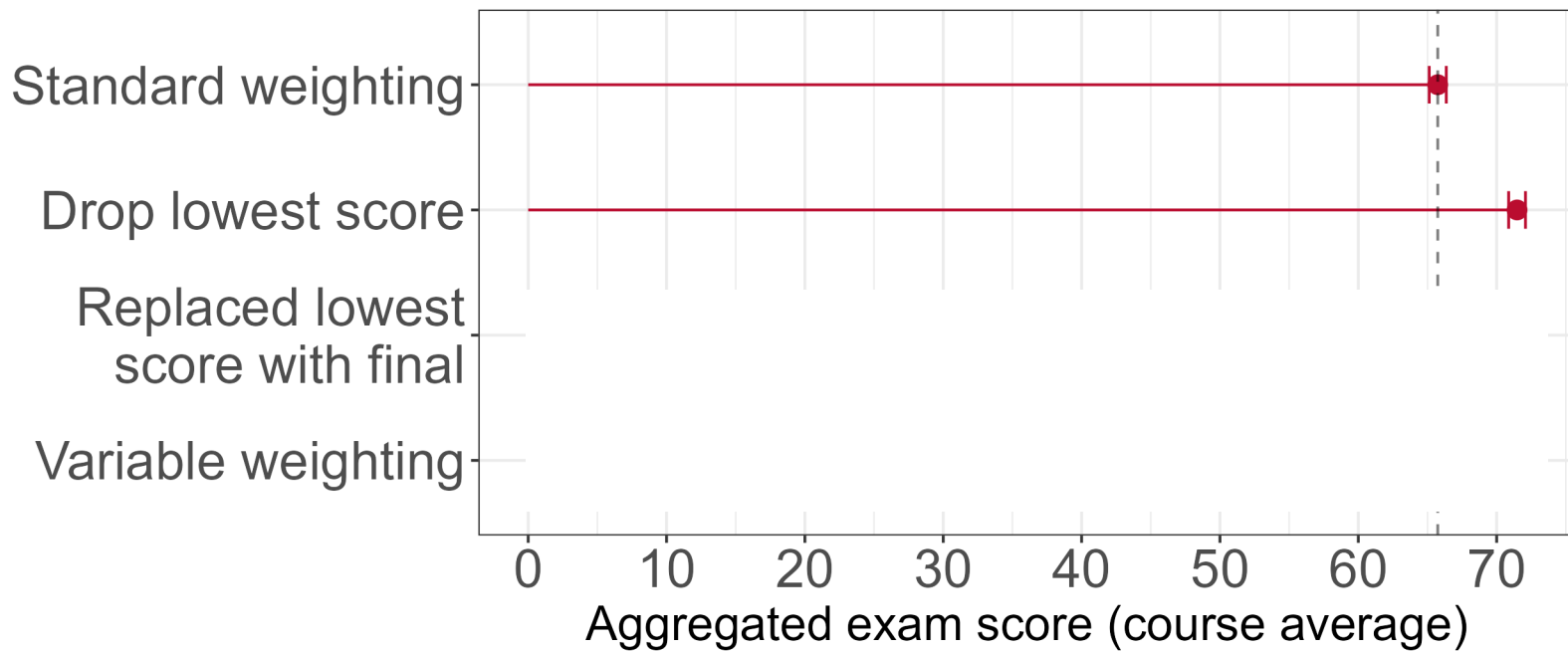
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- Let's apply these to our data!

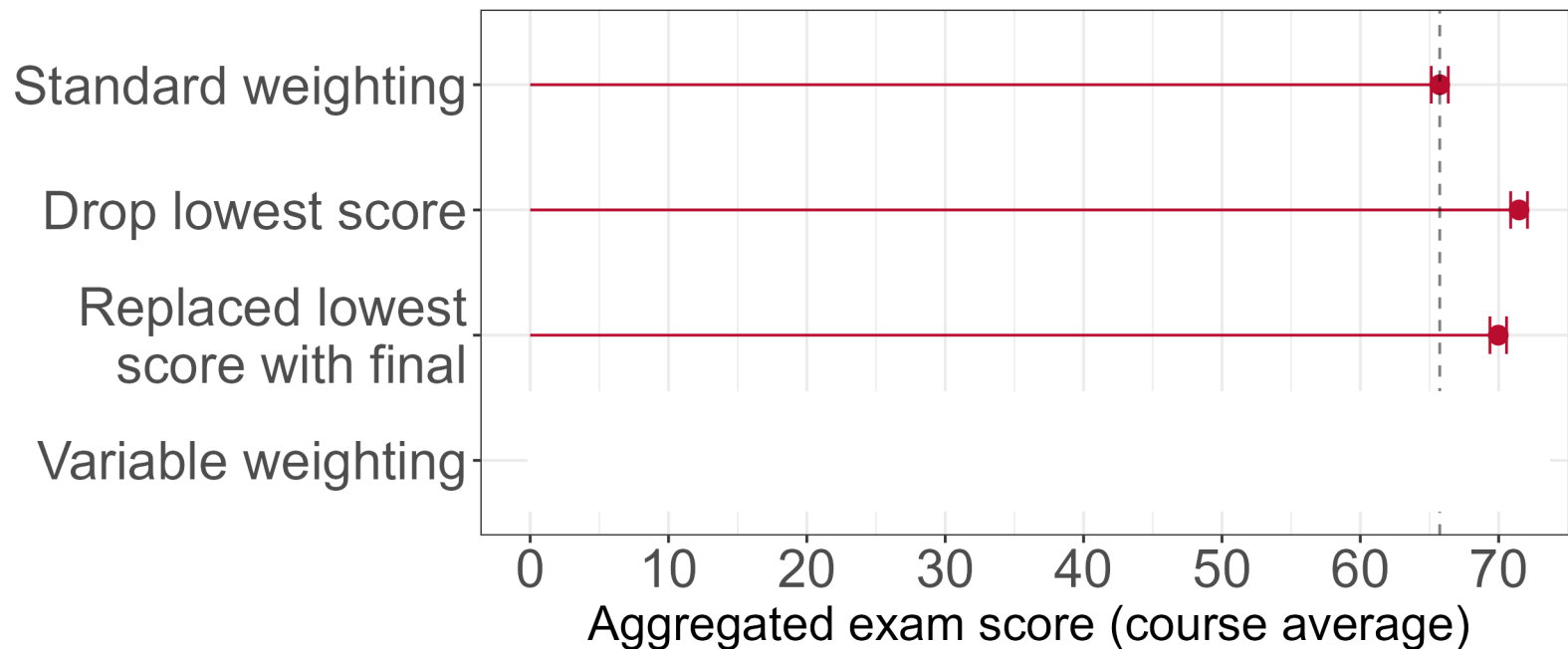
Average total exam score with no modifications



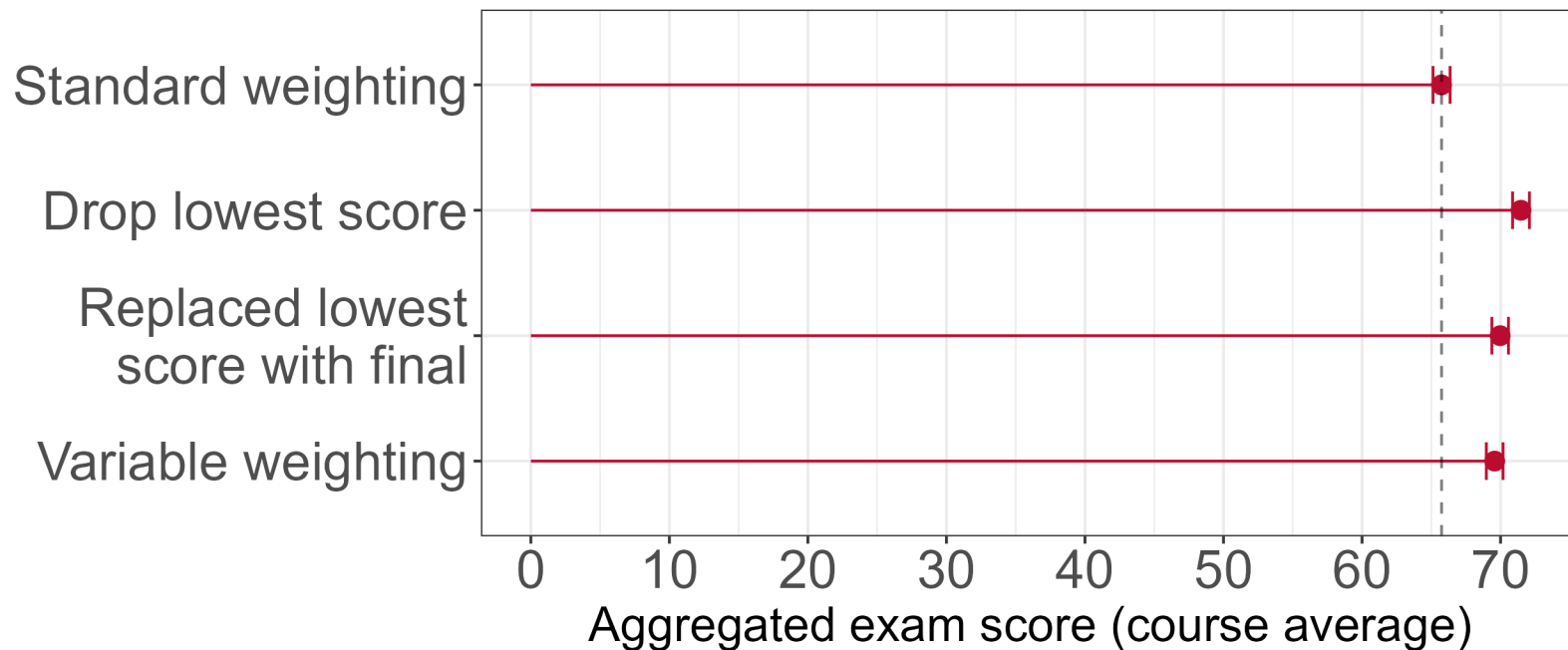
Increase in exam scores



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.

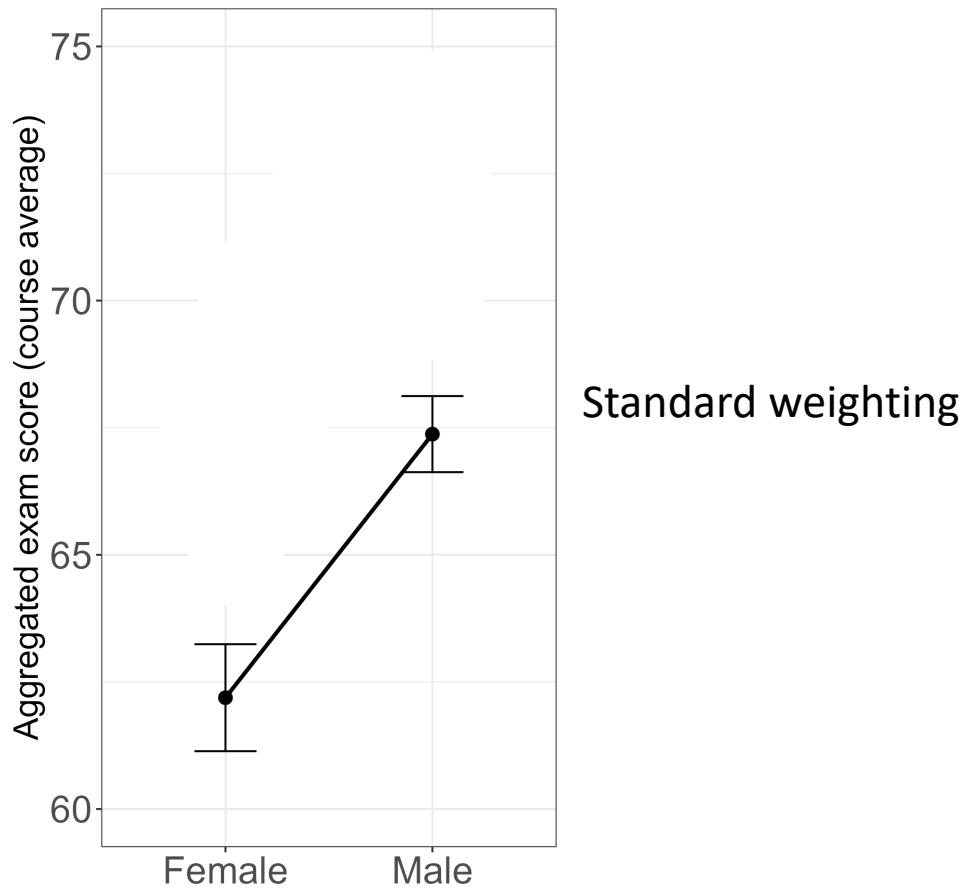


What about equity though?

Salehi et al (2019)



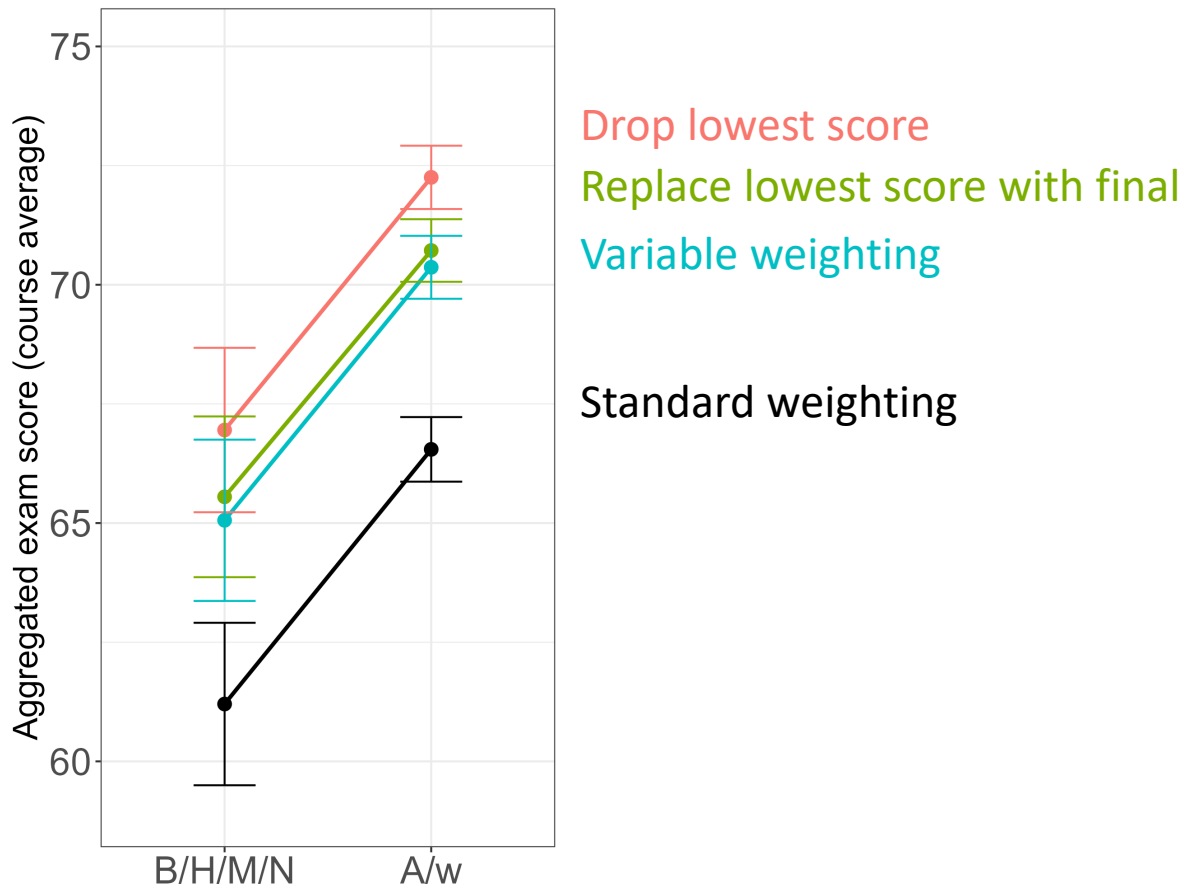
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- slides: bit.ly/YoungSM2024