



Morning, midday, or night: Learning time-of-day affects student experience— but not performance— in an upper division genetics course

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Background

- Research on K-12 students indicates that student performance is sometimes reduced when class is scheduled outside of student's preferred time-of-day for learning¹
- Students asked to attend class outside of conventional work hours may find that their schedule interferes with personal activities like sleeping, eating, and resting²— could this be alleviated through remote learning?
- There are gaps in research for undergraduate students and for late-evening classes^{1,2}, such as the discussion sections for the UC Merced Genetics courses held in Spring semesters
- Course timing is usually chosen for administrative reasons-- and research into potential affects on student performance and experiences are not available, let alone taken into consideration when scheduling courses

Methods

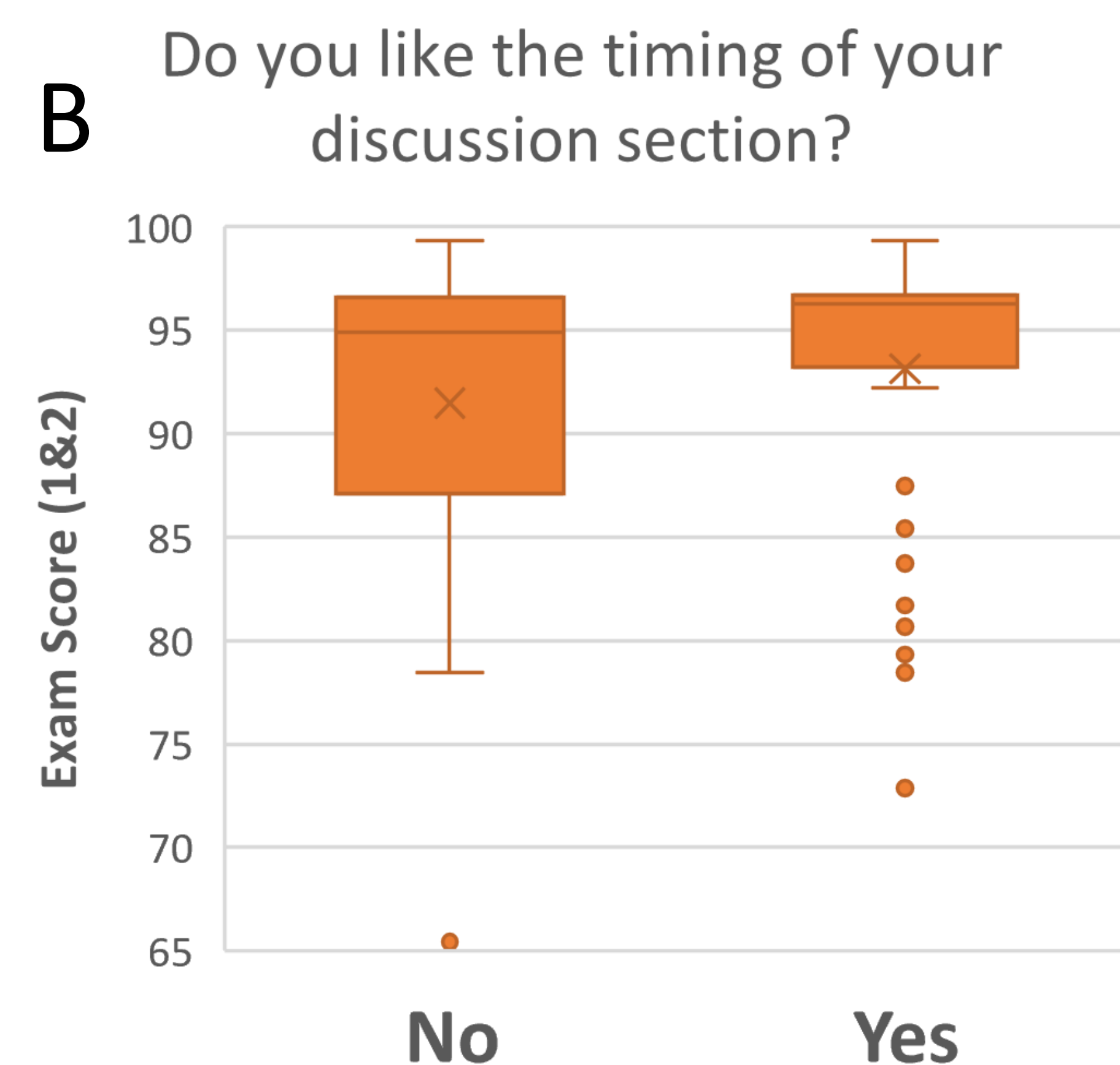
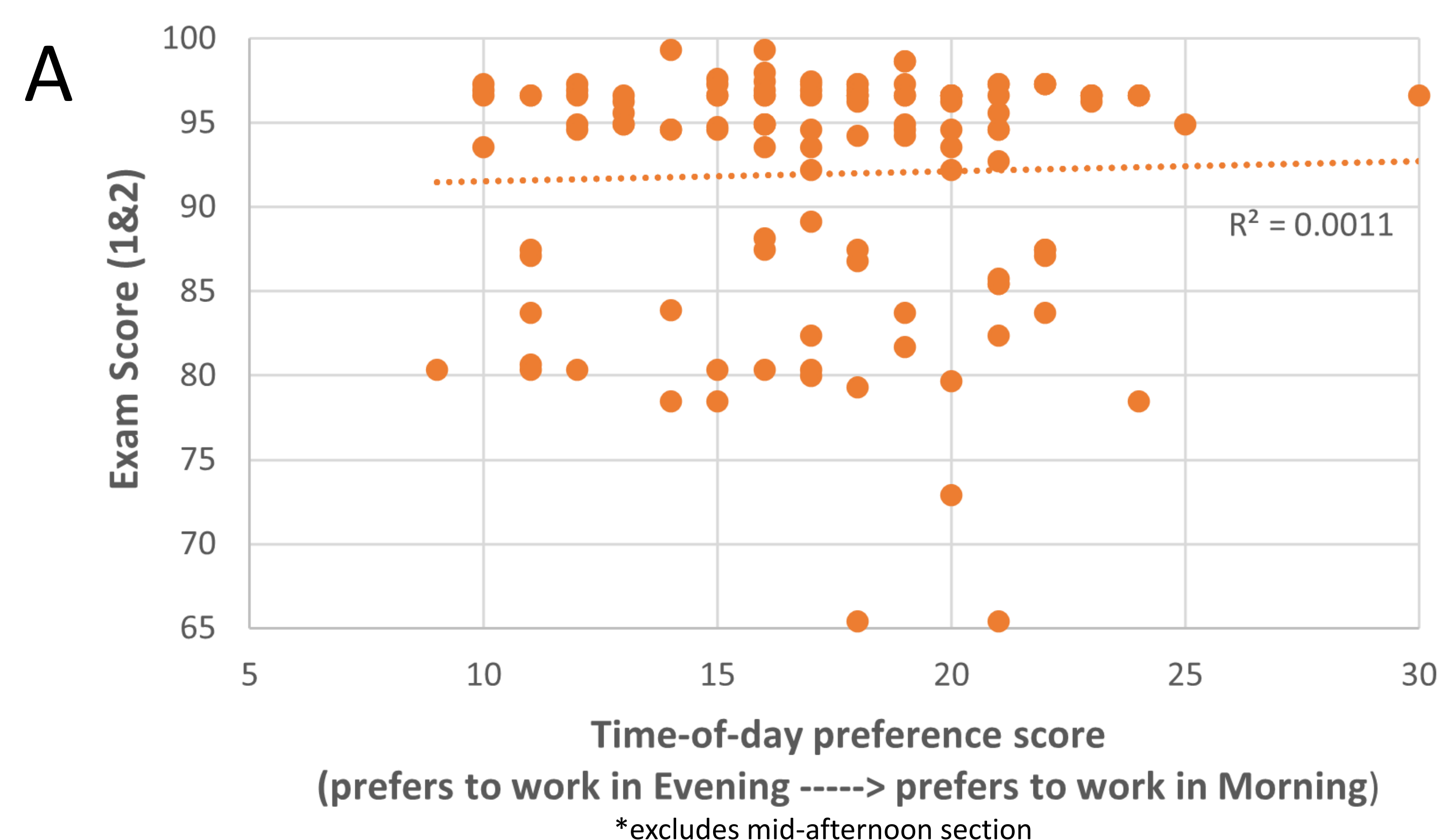
Student Population

- 143 recorded responses from a 167-student upper division genetics course at UC Merced in Spring 2022 with students attending one of seven discussion sections (23-24 students per section)
 - 3 Discussion sections scheduled 5:30-7:20pm (T,W,Th)
 - 3 Discussion sections scheduled 7:30-9:20pm (T,W,Th)
 - 1 Discussion section scheduled 12:30-2:20 pm (F)
 - 2 sections hosted remotely (Tues sections) while remainder held in-person (W, Th, F sections)

Survey Design

- Student learning time-of-day preference established using a modified survey protocol created for undergraduates^{2,3}
- Open ended questions gather information on variation on student opinions and experience in mid-afternoon vs evening discussions, as well as changes in those experiences in remote vs. in-person class formats

Does time-of-day preference impact student performance in an introductory genetics course?



Time-of-day preference not correlated with changes in student exam score (A, $R^2=0.0011$)

Grade effect from whether students like or dislike the timing of their section is not significant (B, $p = .76$)

Student performance as measured by exam grades is not affected by time-of-instruction or time preference.

Why do students have a time-of-day learning preference?

Why do you like the timing of your discussion section?		
Code	# of Responses	Example Quote
Unstated/Unrelated to time	20	"The timing is fine. I like that it is a little long because it gives groups plenty of time to work out the difficult problems." - Valentin Gutierrez
Afternoon Section-Specific	17	"It is right in the middle of the day and is my only class of the day, so after I wake up later I get lots of free time to work on anything I want to finish." - Kira Blanco
Convenience	14	"It's convenient." - Rose Corazao
Works with schedule	12	"The reason why I like the timing of my discussion is because it is more convenient for my current schedule this semester." - Cynthia Chavez
Prefers late section	12	"[I like] that its not early in the morning." - Daniel Tellec
Remote-Specific	4	"I like that it is online and gives me a break in the day to focus on work, instead of back to back classes. It is especially helpful as a remote class at this time." - Susan Minhas
Actually dislikes	2	"The timing isn't the best, I don't like having a 5:30-7:20 class but it's not the worst!" - Salah Hamid

Why do you dislike the timing of your discussion section?		
Code	# of Responses	Example Quote
Dislikes Lateness Specifically	40	"I wish the discussion section was earlier because I don't like later classes." - Violet Perez
Creates Schedule Gaps	22	"Although it is not one of the latest classes, it still is inconvenient for me because I have a 4 hour gap so I just sit in the library doing work but since I commute, I end up getting home kind of late." - Mary Lopez
Interferes with Eating	10	"The [dining hall] closes at 9, and I get out 20 min after." - Lydia Dubois
Brain Fog/Concentration	10	"It is too late and I just can't focus the same at that time." - Carlos Morales
Interferes with Rest	9	"I have class early in the morning today so I'm up at 7 and I'd prefer to be home resting at this time..." - Isabella Dugin
Other Times Unavailable	9	"...The one discussion that was the most reasonable for my schedule was the Friday one in the afternoon, however it filled up the fastest..." - Sophie Duong
Unstated/Unrelated to time	6	"The length of discussion is what concerns me, I don't think 2 hours is needed for a few problems." - Maria Gonzalez
Transportation/Danger	5	"I have to take the bus home and then walk. So discussion ending at 9:30pm means I have to take a 15-20 min bus ride home then walk in the dark alone. It feels very unsafe as I am a smaller female and there is very little street lights where I live." - Emily Aguilar

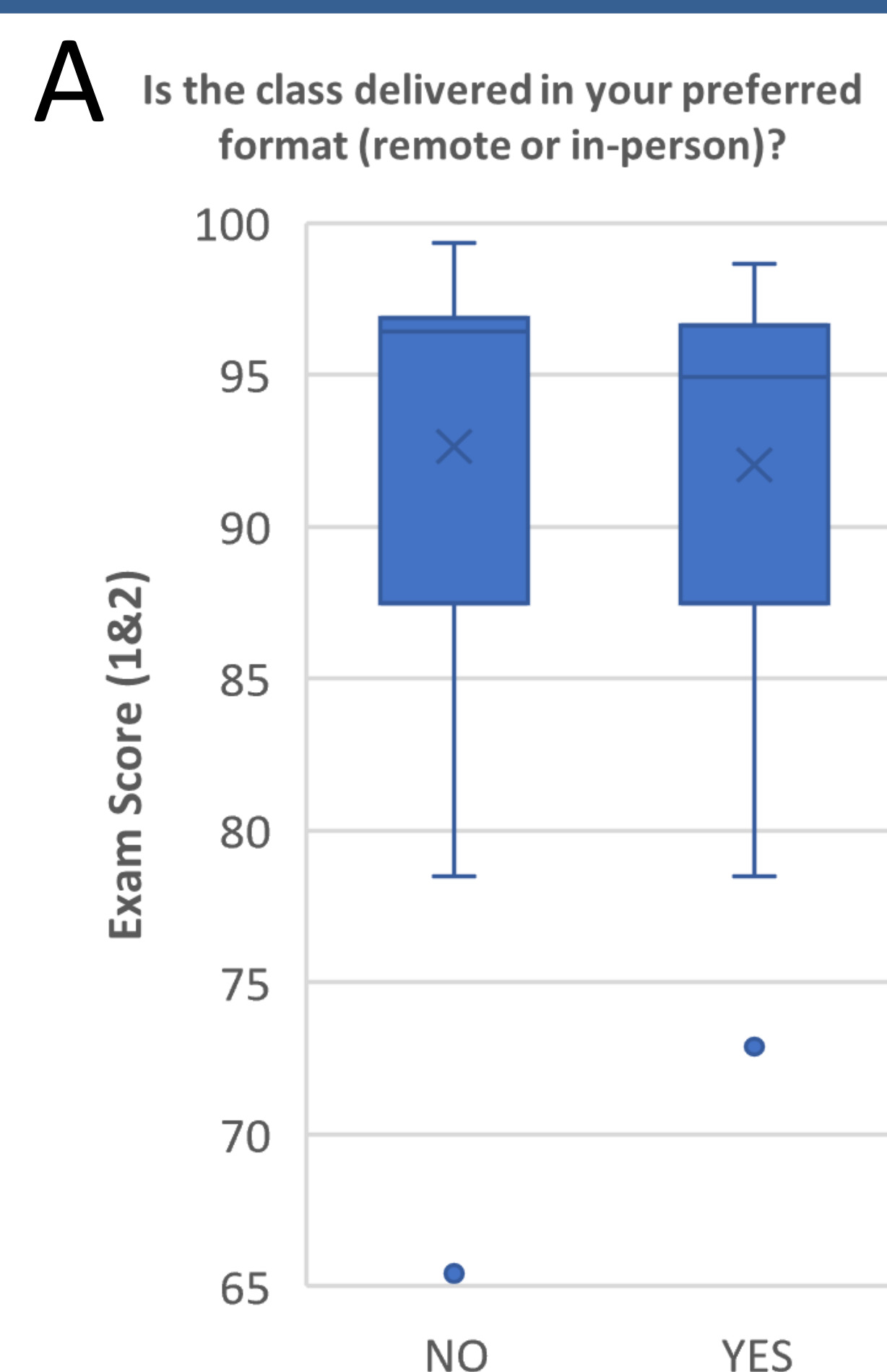
Most students disliked the timing of their discussion section ($n = 66$ "like" vs $n = 77$ "dislike"), an effect magnified when filtering out responses from the Friday afternoon section ($n = 46$ "like" vs. $n = 76$ "dislike"). All students in the Friday section liked the timing of their discussion section or marked dislike for a reason unrelated to time.

*Responses were sometimes coded in multiple categories. Names have been changed for anonymity but preserve demographic information.

Is there a difference between time-of-day preference in remote and in-person learning environments?

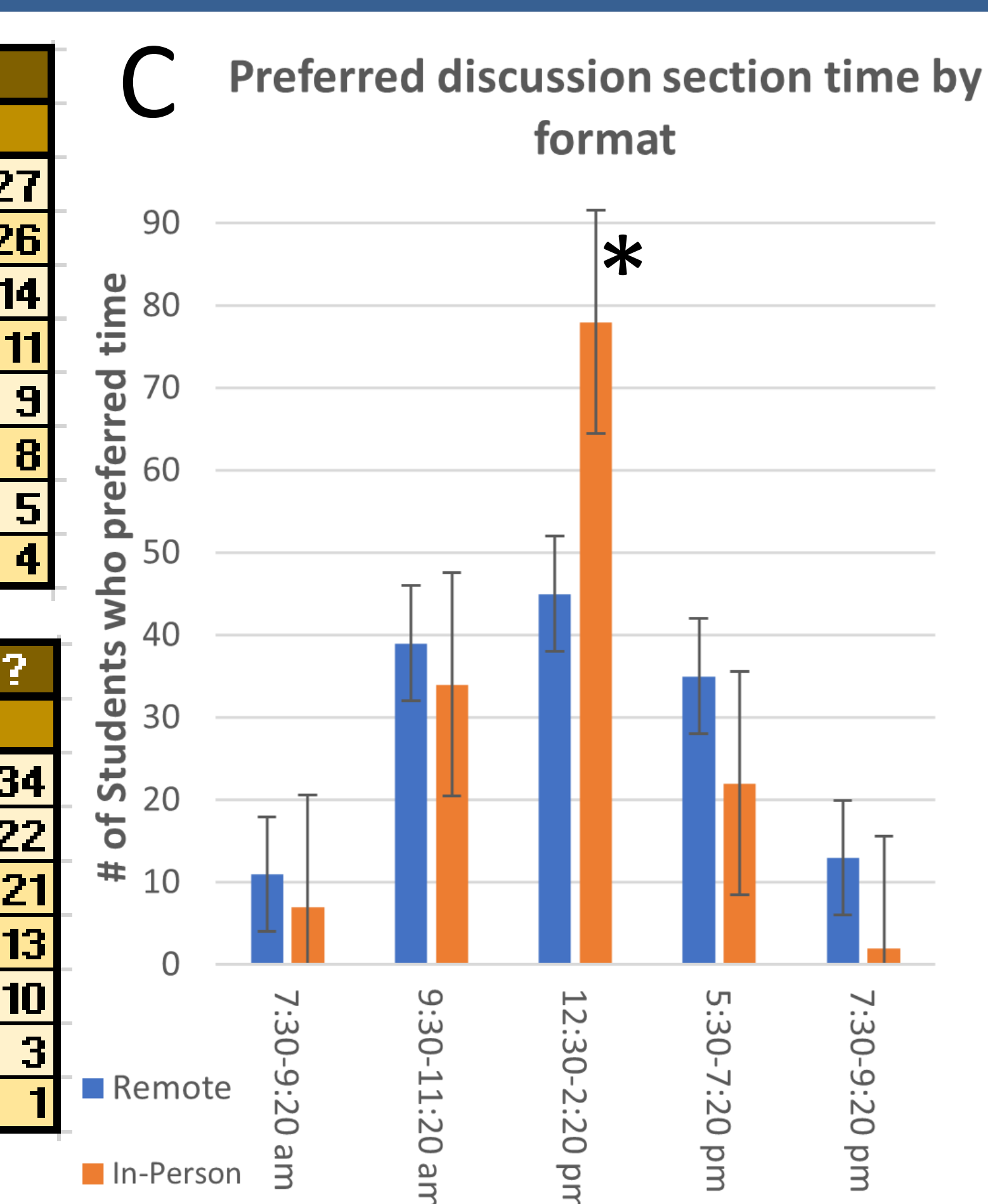
Aligned with other analyses, class format and whether students like the format does not have significant effect on student performance (A).

However, students do share opinions about their preferred course format (B), and students are significantly less likely to prefer a section scheduled in the middle of the day if the course will be delivered remotely (C, $\chi^2(4, N = 143) = 21.1166, p = .0003$).



What do you prefer about remote discussions?	
Code	# of Responses
Convenience	27
Financial/Transport benefit	26
Social/Less Awkward	14
Late timing specific benefit	11
Unstated	9
Accessibility	8
Better Learning	5
Health	4

What do you prefer about in-person discussions?	
Code	# of Responses
Social/Like to make friends	34
Hard to focus remotely	22
Faster Group Work	21
Better/"Forced" learning	13
Unstated	10
Normalcy	3
Convenience	1



Conclusions

- Student performance is often measured by grade scores, which were not affected by learning time-of-day preferences in this analysis.
- However, only considering grade performance ignores affects on student experiences and quality-of-life, obfuscating problems with classes scheduled for the late evening-- including health, safety, and equity concerns.
- Some students strongly prefer either in-person or remote class formats and report that learning in their preferred format offsets some negative aspects of learning at late hours, indicating that it may be worth exploring giving students more options for course modality for early morning or late evening classes.

References

- Wile, A. J. and Shouppe, G. A. (2011). *Does time-of-day instruction impact class achievement?* Perspectives in Learning, 12(1)21-25.
- Hartley, J. and Nicholls, L. (2008). *Time of day, exam performance, and new technology.* British Journal of Educational Teaching, 39(3)555-558.
- Smith, C. S., Folkard, S., Schmieler, R. A., Parra, L. F., Speleten, E., Almira, H. et al (2002). *Investigation of morning-evening orientations in six countries using the preferences scale.* Personality and Individual Differences, 32, 949-968