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Academic achievement and online learning application use in Pittsburgh Public Schools during remote instruction in the COVID-19 pandemic

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November 19, 2021

How did the pandemic and disruptions to instruction affect achievement?

- National evidence of declines relative to typical performance (Lewis et al., 2021).
- Students learning remotely experienced less instruction, were more likely to be absent, and failed to complete assignments more than those learning in person (Kaufman & Diliberti, 2021).
- Student participation in online learning applications declined relative to pre-pandemic participation in 2020-21; declines were larger for low-income communities (Opportunity Insights, 2021).
- Reports from some districts suggest proportion of students receiving failing grades increased in 2020/21 relative to 2019/20 (Sawchuk, 2020).

How did Pittsburgh students fare academically during remote instruction in the pandemic?

Preview of Findings

- On average, PPS students in most grades experienced test score growth.
- But the growth was less than typical pre-pandemic growth (nationally)
 - Growth lag largest for students in elementary grades.
 - Growth lag in Pittsburgh consistent with evidence of growth lags nationally
- PPS course failure rates increased substantially, especially in grades 6-12.
 - Course failure rates increased more among economically disadvantaged students.
 - Chronic absenteeism strongly predicted course failure
- Data from learning management system show decline in logins and assignment completion as the school year progressed
 - Daily participation data from learning management system strongly related to chronic absenteeism and course failure
 - There is an identifiable group of students who were most negatively affected by the pandemic and remote instruction.

Data

NWEA MAP scores	<ul style="list-style-type: none">• Vertically aligned test offered 3x/year in reading and math.• Focus on grades 2-8 and compare winter 2019/20 to winter 2020/21.• Standardize scores relative to national norms (using pre-pandemic data).
Student demographics and absences	<ul style="list-style-type: none">• Includes race and ethnicity, gender, economically disadvantaged status, absences, and Individualized Education Program (IEP) status.
Student grades	<ul style="list-style-type: none">• Focus on first semesters in 2019-20 and 2020-21.• Use grades to construct number of courses failed.
Schoology	<ul style="list-style-type: none">• Learning management system used by all students in all grades.• Daily records of who logs in and what actions they take, including opening course materials, submitting assignments, submitting assessments, and posting to discussion boards.

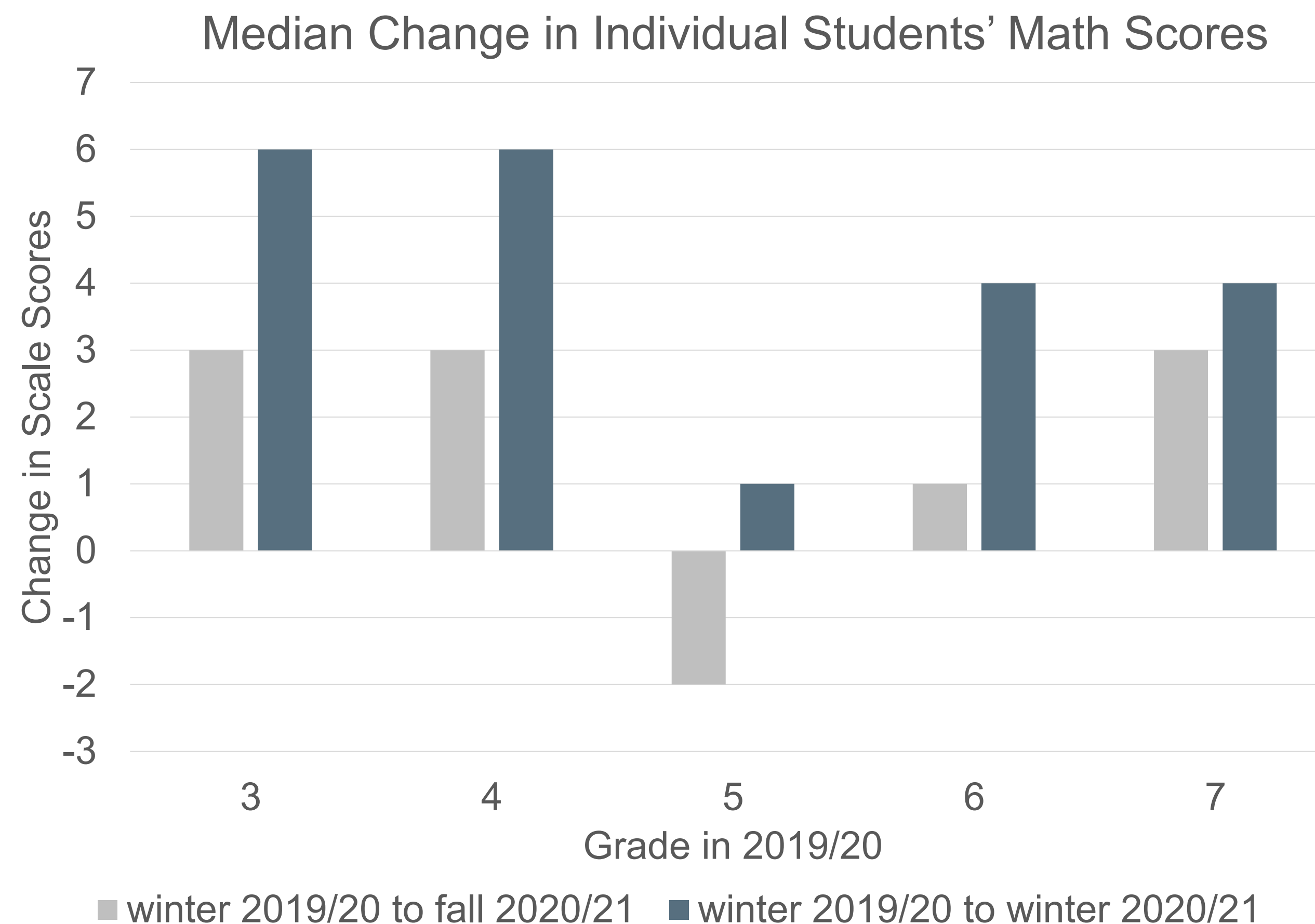
Did PPS students show learning growth while school buildings were closed during the pandemic?

Their average test scores increased from winter 2019/20 to winter 2020/21.



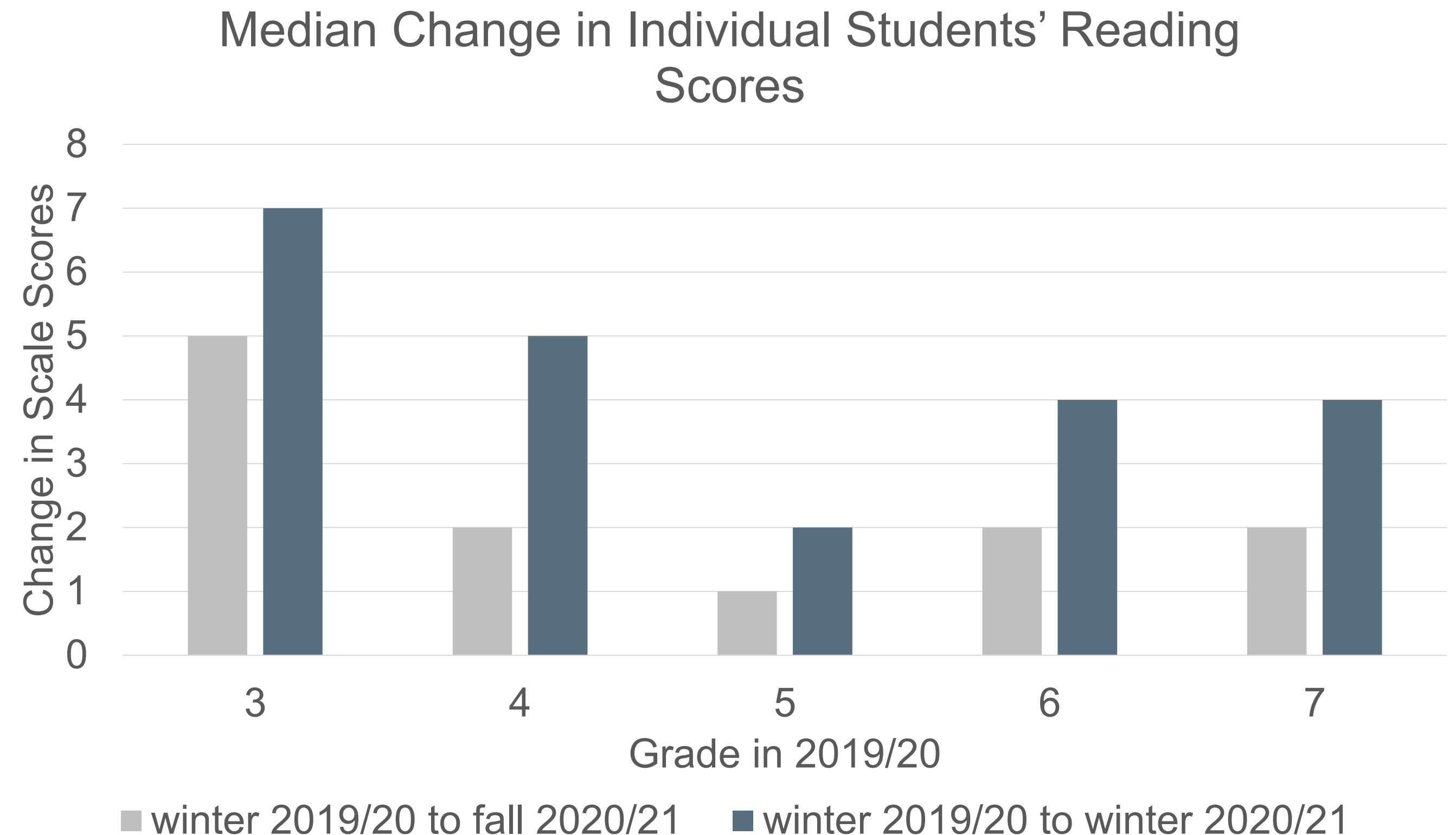
On average, Pittsburgh students showed math score growth

For students who took the math test in both winter 2019/20 and fall 2020/21 (or winter 2020/21), students scored higher in fall or winter 2020/21 than in winter 2019/20 in almost all grades, indicating learning occurred.



On average, Pittsburgh students showed reading score growth

For students who took the reading test in both winter 2019/20 and fall 2020/21 (or winter 2020/21), PPS students scored higher in fall or winter 2020/21 than in winter 2019/20 in all grades, indicating learning occurred.



How did PPS students' scores change over time, relative to prior national norms?



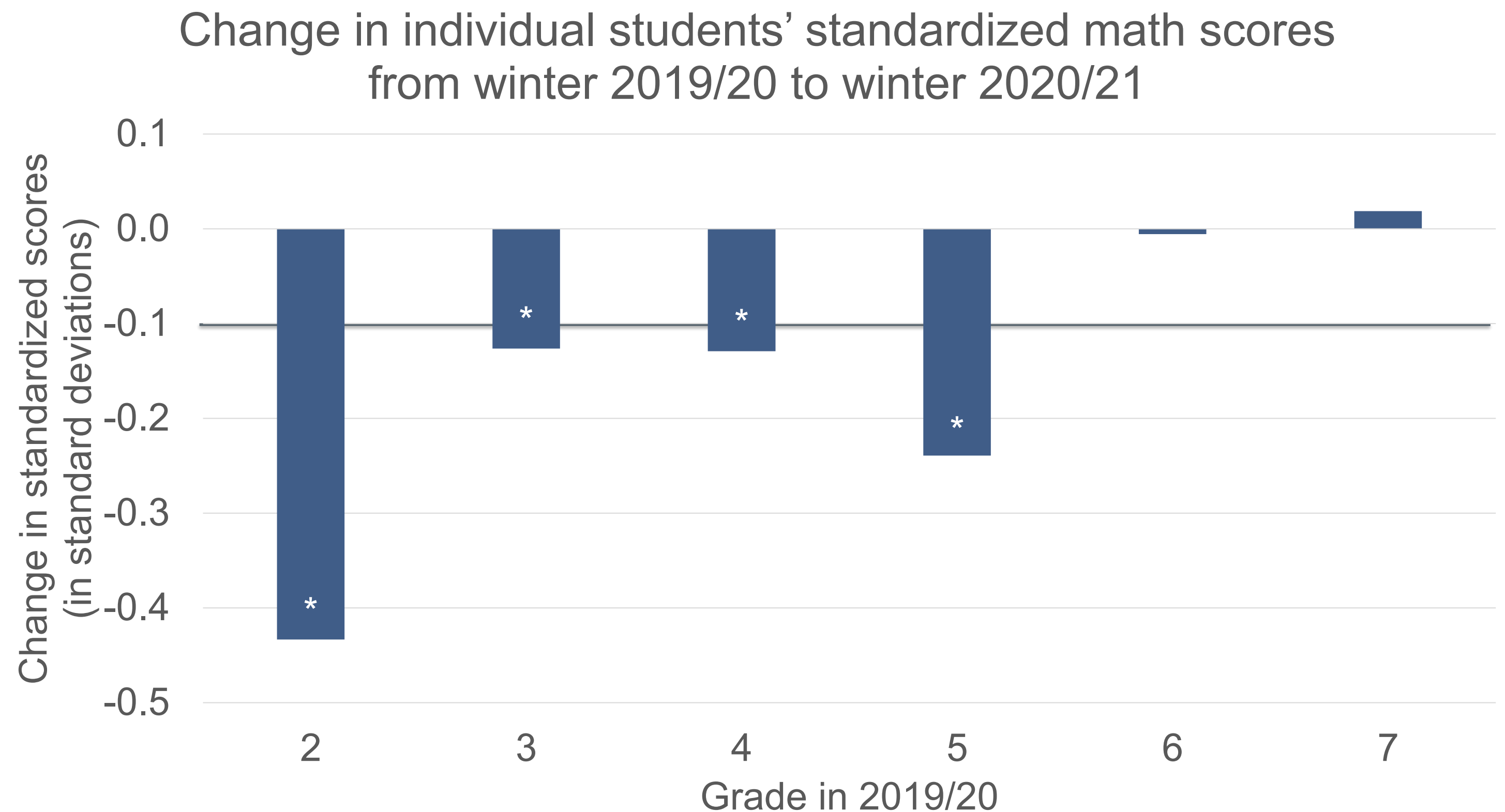
Consistent with national findings, their test score growth in remote instruction was lower than average growth nationally in pre-pandemic years.

Comparing individual students' scores in 2019/20 to 2020/21, largest lags in math scores (relative to pre-pandemic national norms) were in elementary grades

Students in grades 2–7 in 2019/20 had average **lags** from winter 2019/20 to winter 2020/21 of **0.15 standard deviations (SDs) in math**.

Note that large lag for 2nd graders may be related to having unusually *high* scores before the pandemic (2019 2nd graders scores were about 0.4 SDs higher than 1st, 3rd, or 4th graders in fall and winter 2019).

Findings very similar when imputing scores for those missing them.

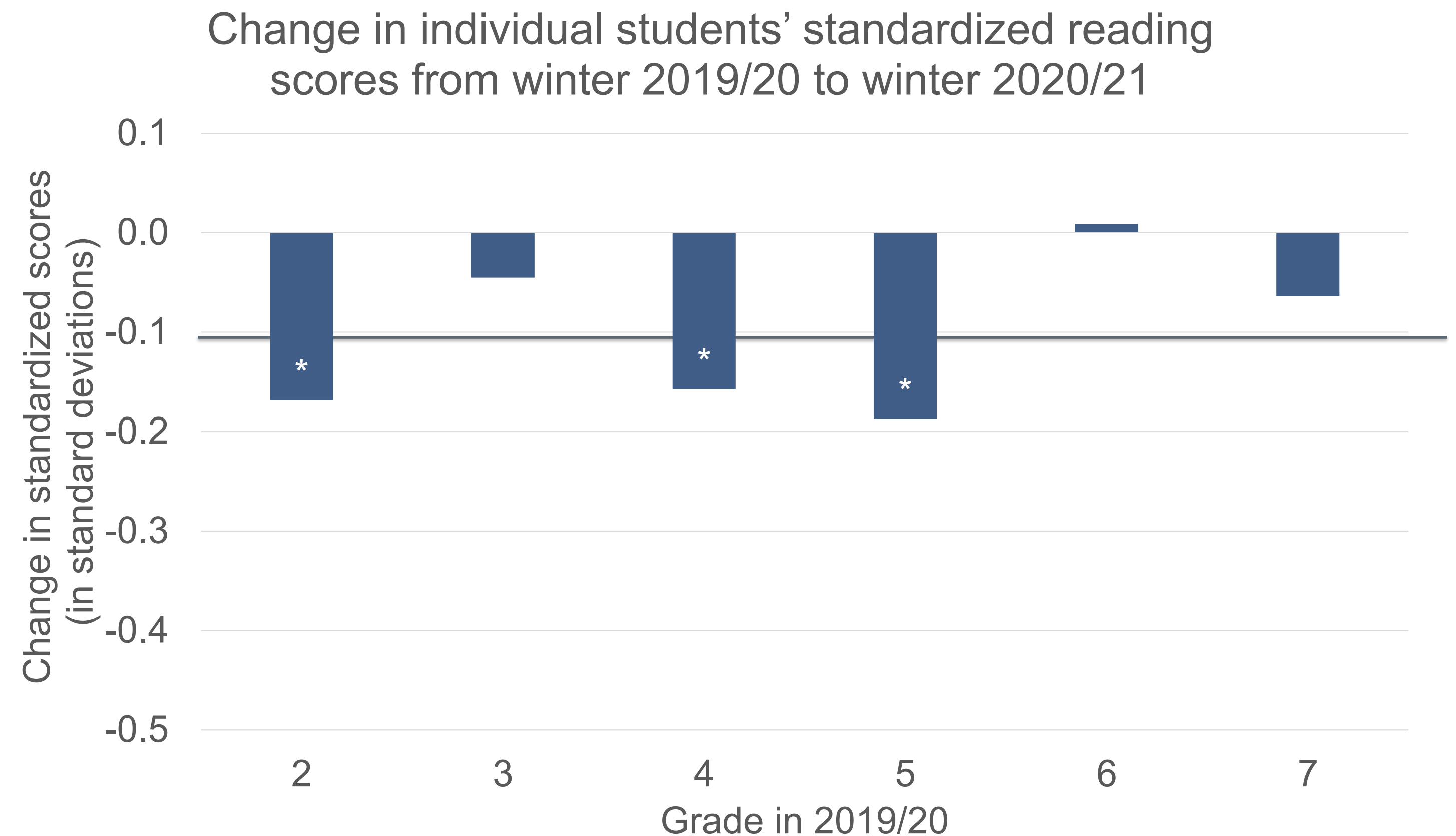


Note: * indicates change was greater or equal to +/- 0.1 standard deviations.

Comparing individual students' scores in 2019/20 to 2020/21, lags in reading scores (relative to pre-pandemic national norms) were in grades 2, 4, and 5

Students in grades 2–7 in 2019/20 had average **lags** from winter 2019/20 to winter 2020/21 of **0.10 standard deviations in reading.**

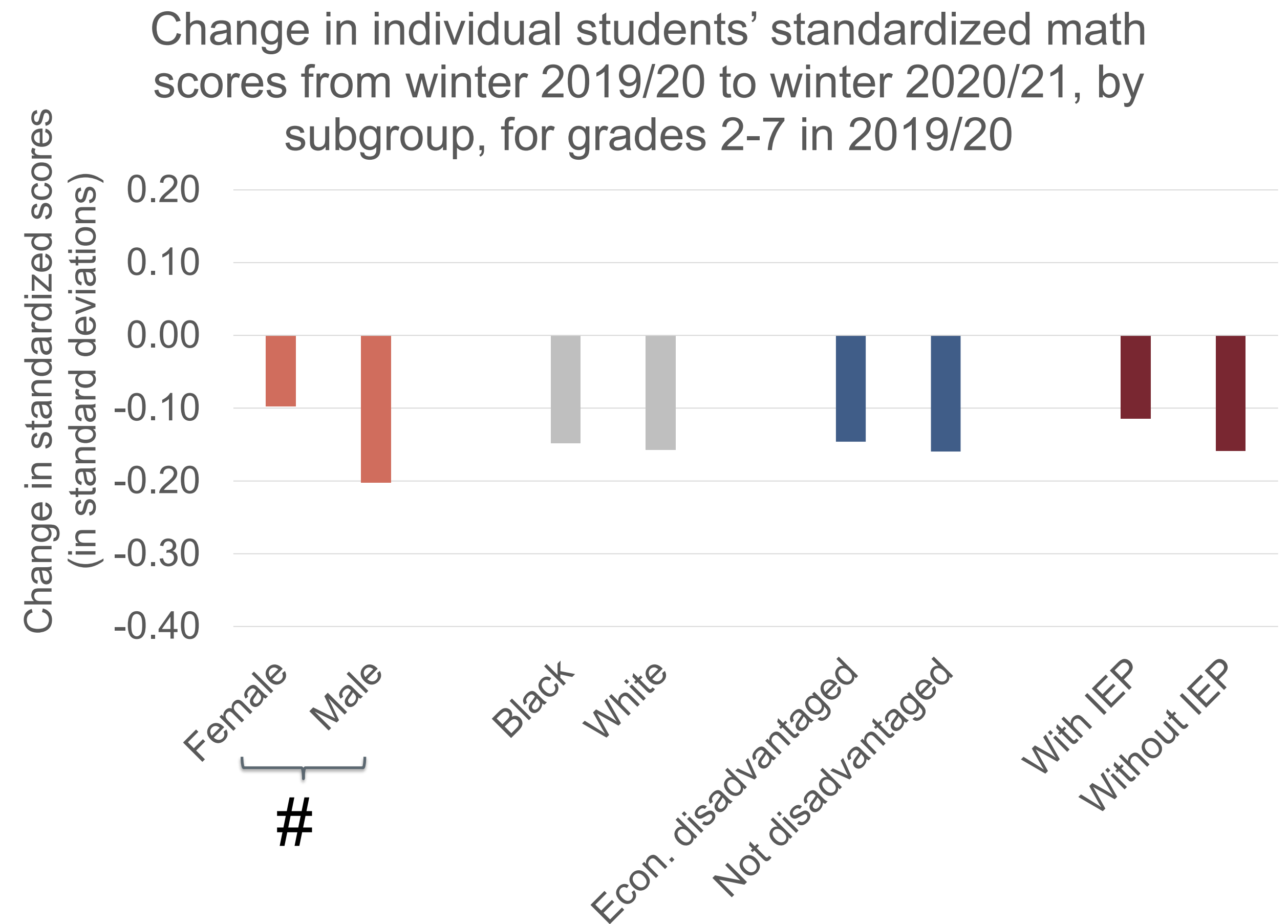
Findings very similar when imputing scores for those missing them.



Note: * indicates change was greater or equal to ± 0.1 standard deviations.

Comparing individual scores in 2019/20 to 2020/21, lags in math (relative to pre-pandemic national norms) are larger for boys

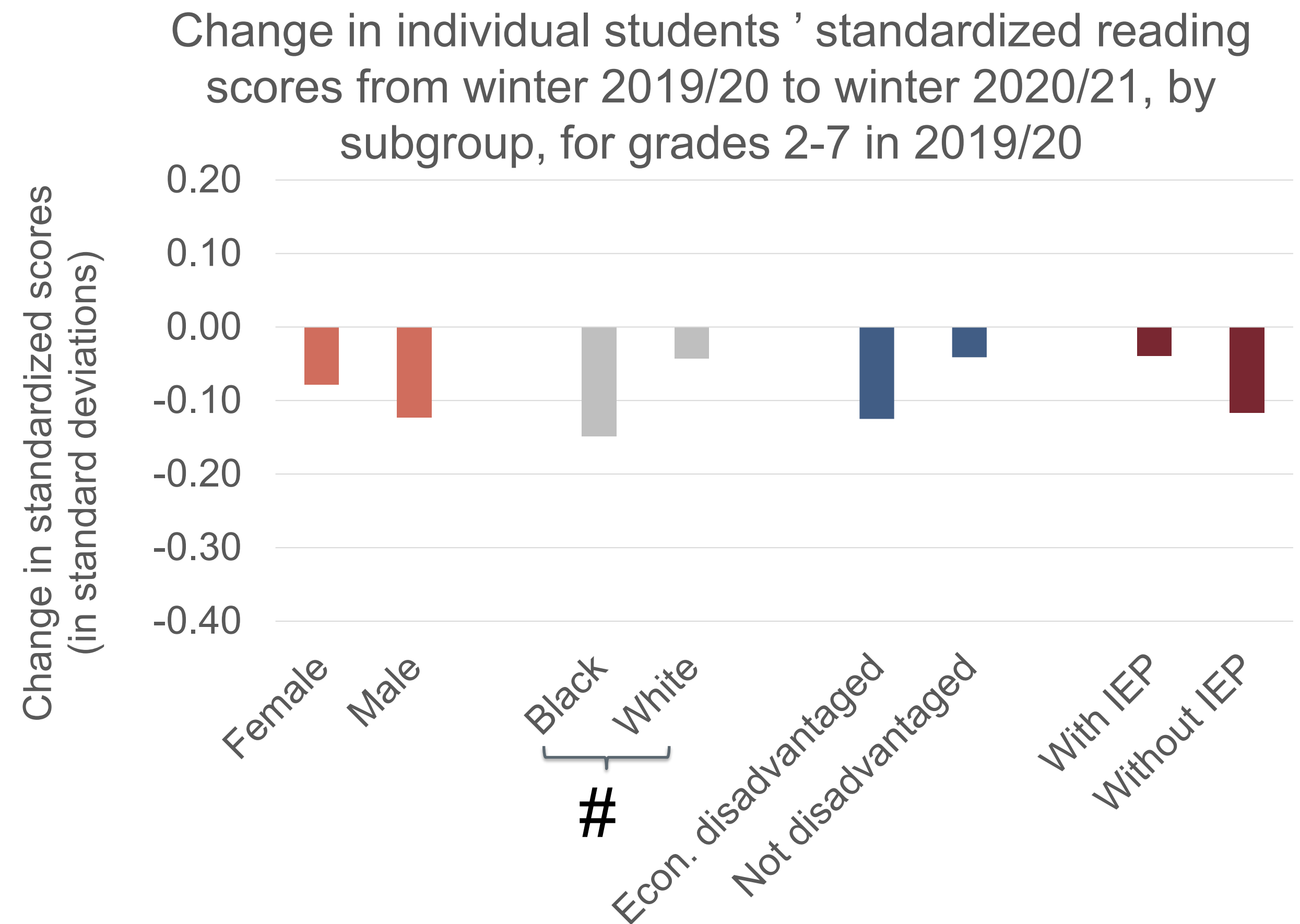
- **Differences in growth were minimal** for Black and White students, economically disadvantaged and non-disadvantaged students, and students with or without an IEP.
- Findings similar when imputing scores for those missing them.



Note: # indicates difference between the two groups listed was greater or equal to +/- 0.1 standard deviations.

Comparing individual students' scores in 2019/20 to 2020/21, lags in reading (relative to pre-pandemic national norms) larger for Black students than White students

- **Black students experienced larger lags** from winter to winter than White students.
- Differences between other groups of students were smaller than between Black and White students.



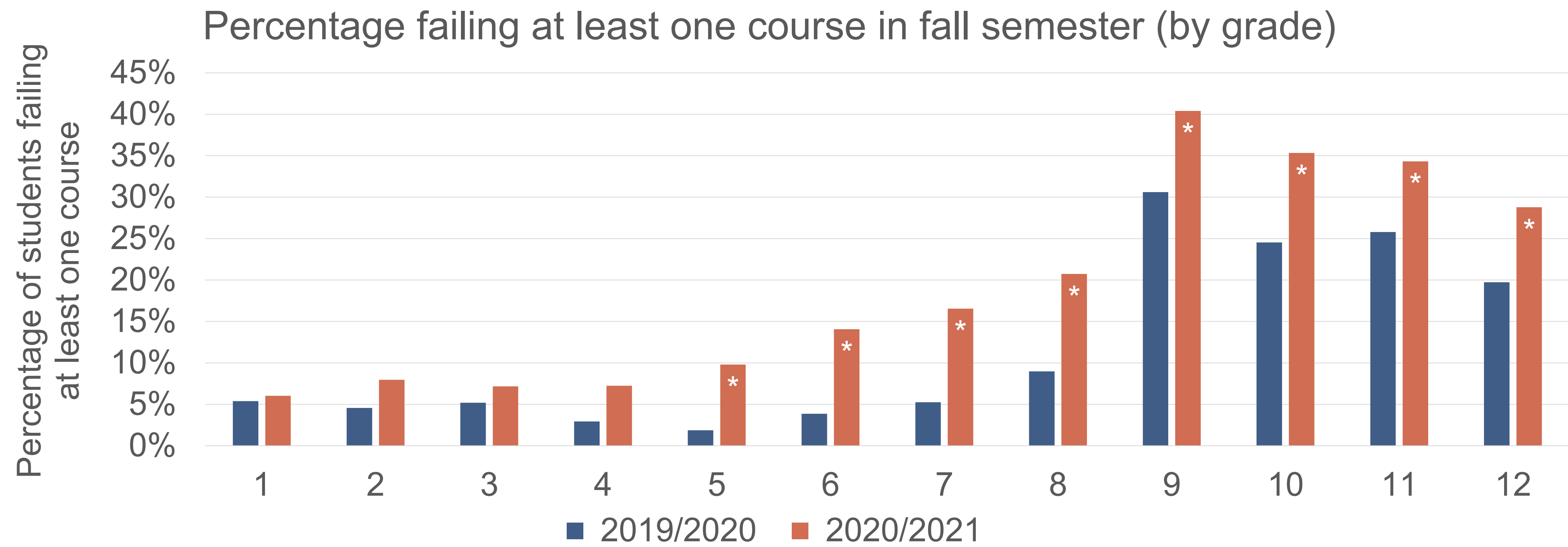
Note: # indicates difference between the two groups listed was greater or equal to +/- 0.1 standard deviations.

How did course failure rates change during remote instruction, overall and for particular student groups?



- 1. Failure rates increased substantially, especially in grades 6-12*
- 2. Course failures increased more for economically disadvantaged students, and especially for chronically absent students*

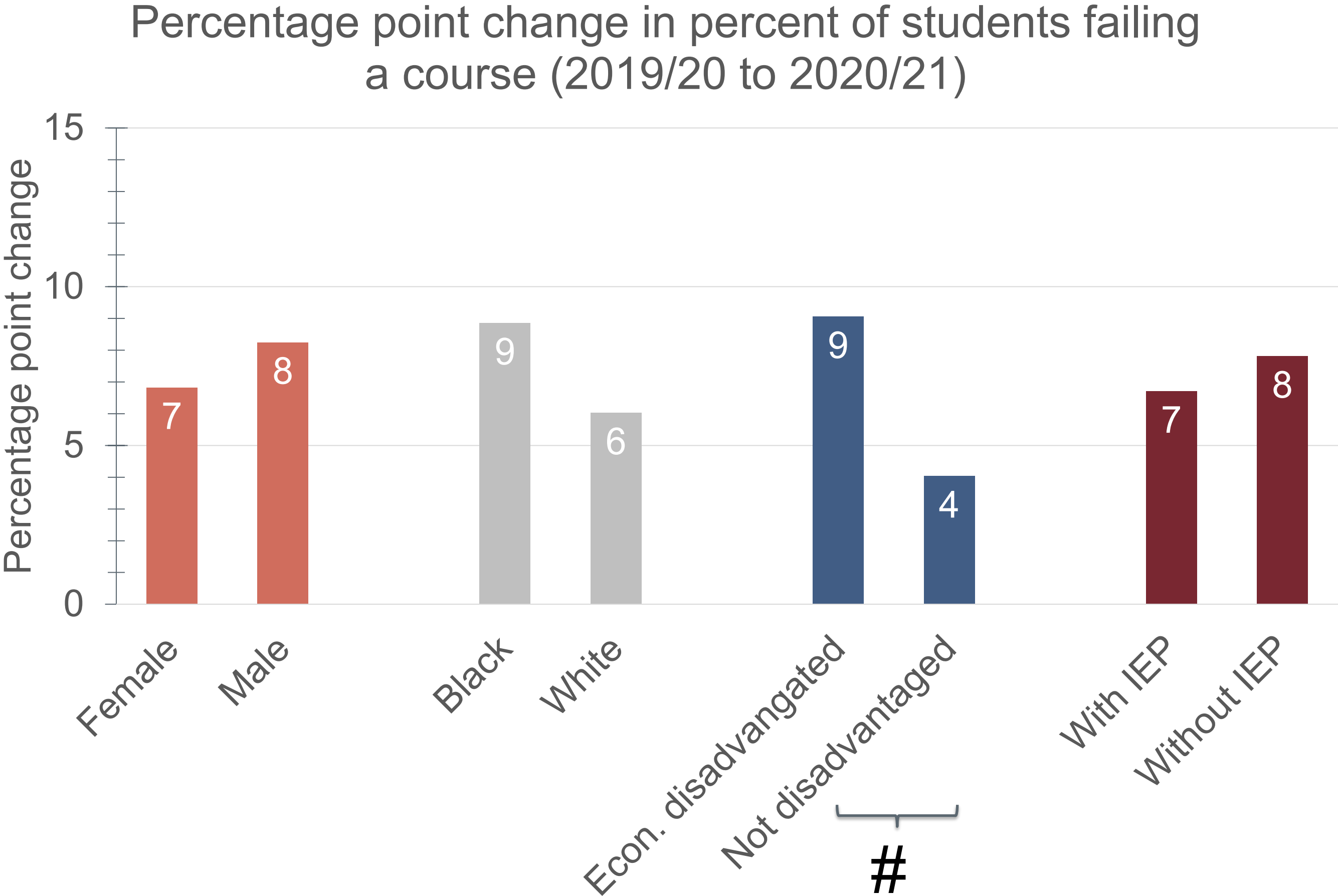
Percentage of students failing courses increased substantially in middle and high school grades



Note: * indicates difference between 2019/20 and 2020/21 was greater or equal to 5 percentage points.

Course-grade distribution shifted downward in middle and high school: fewer As and Bs alongside more Ds and Fs

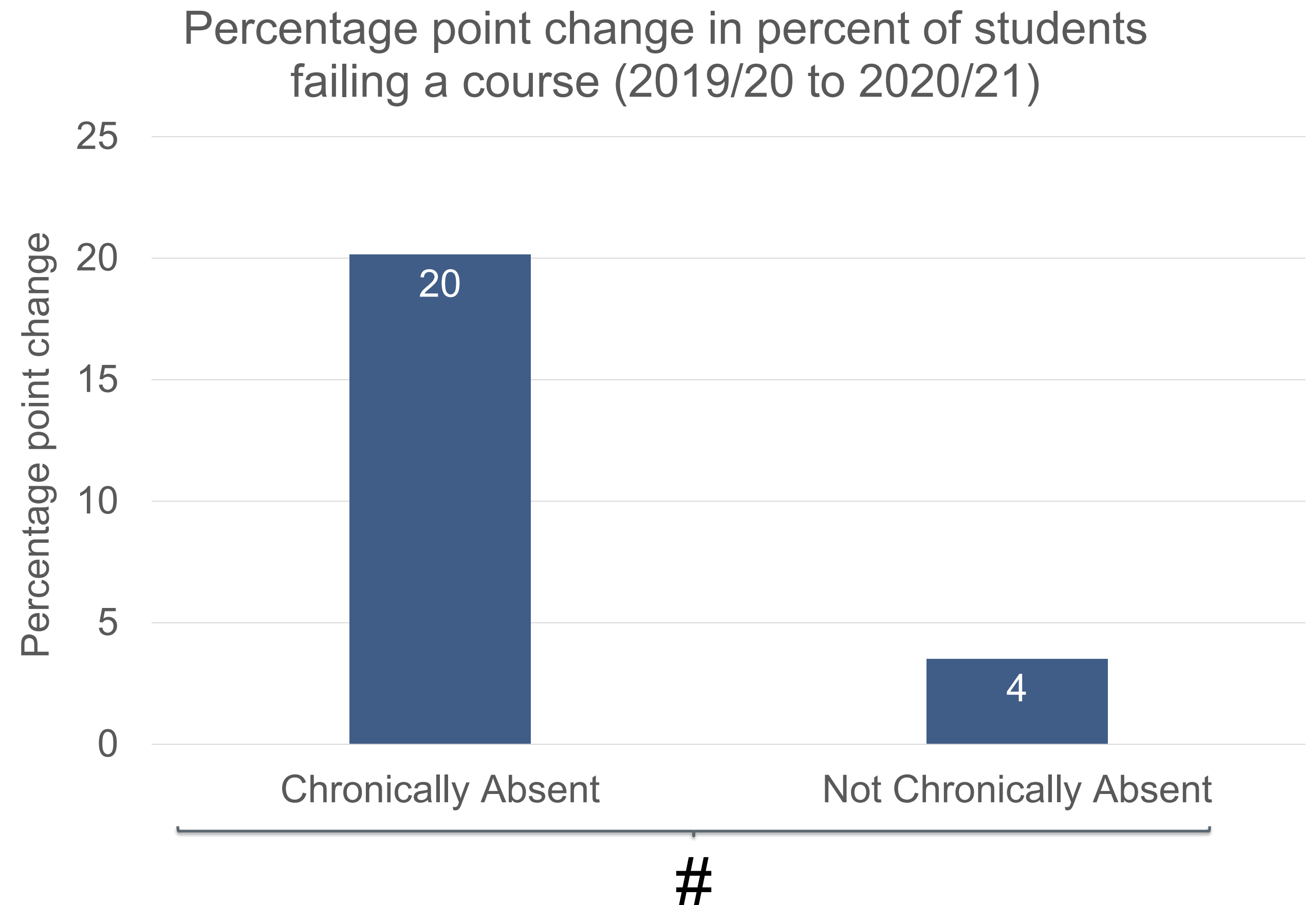
The percentage of students failing at least one course increased more for economically disadvantaged students



Note: Sample includes all students in grades 1-12. # indicates difference between groups is equal to or greater than 5 percentage points.

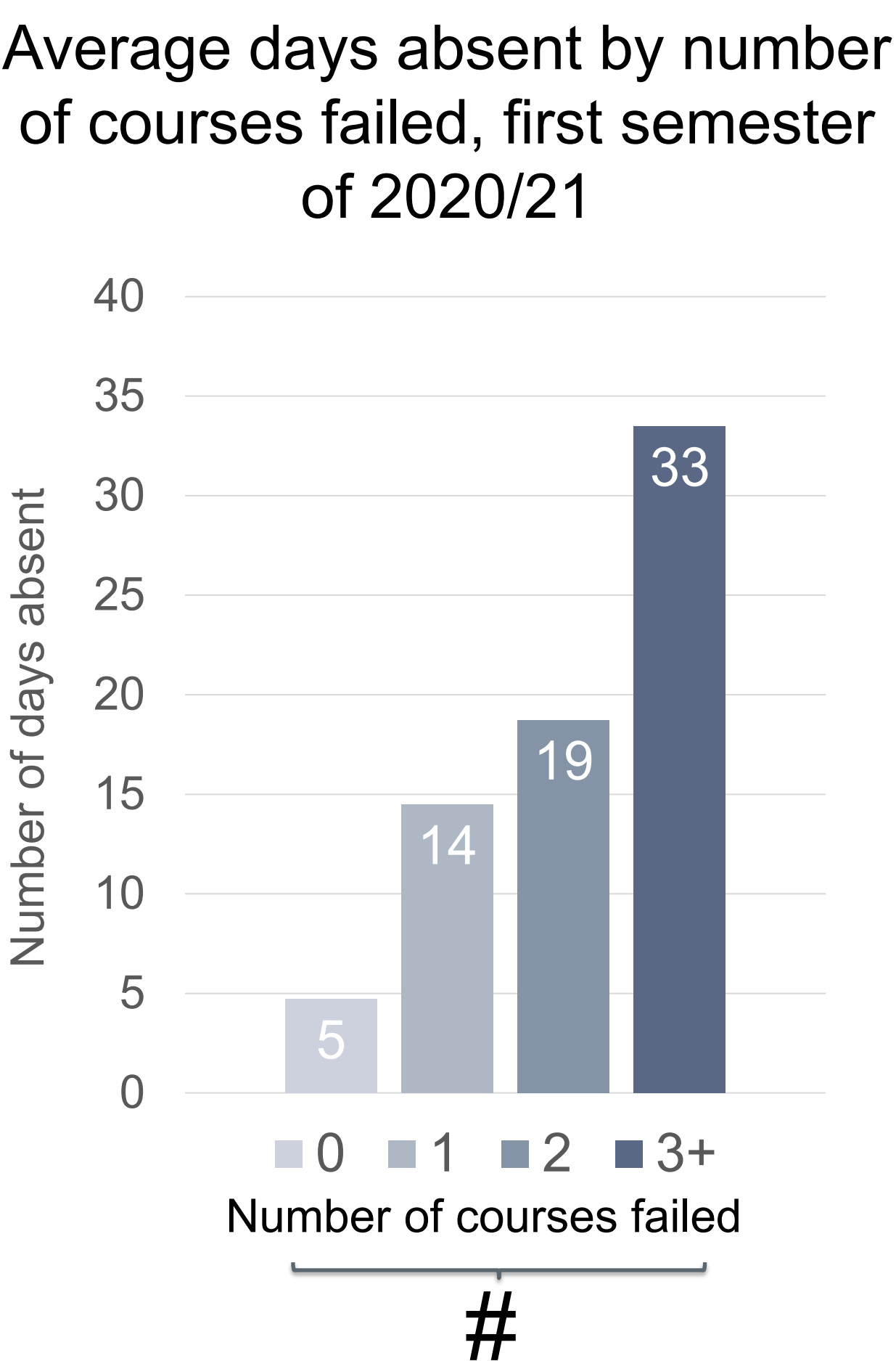
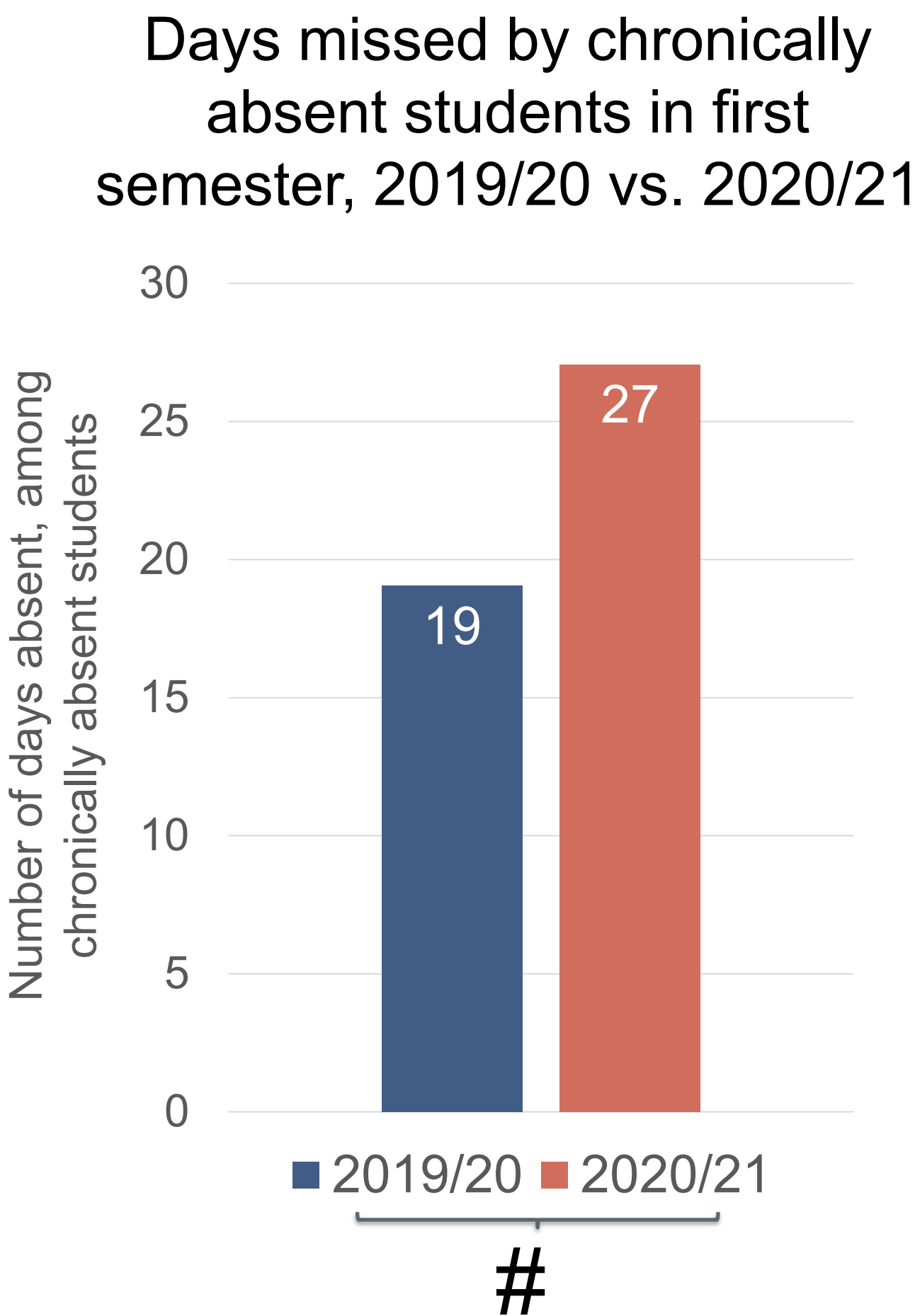
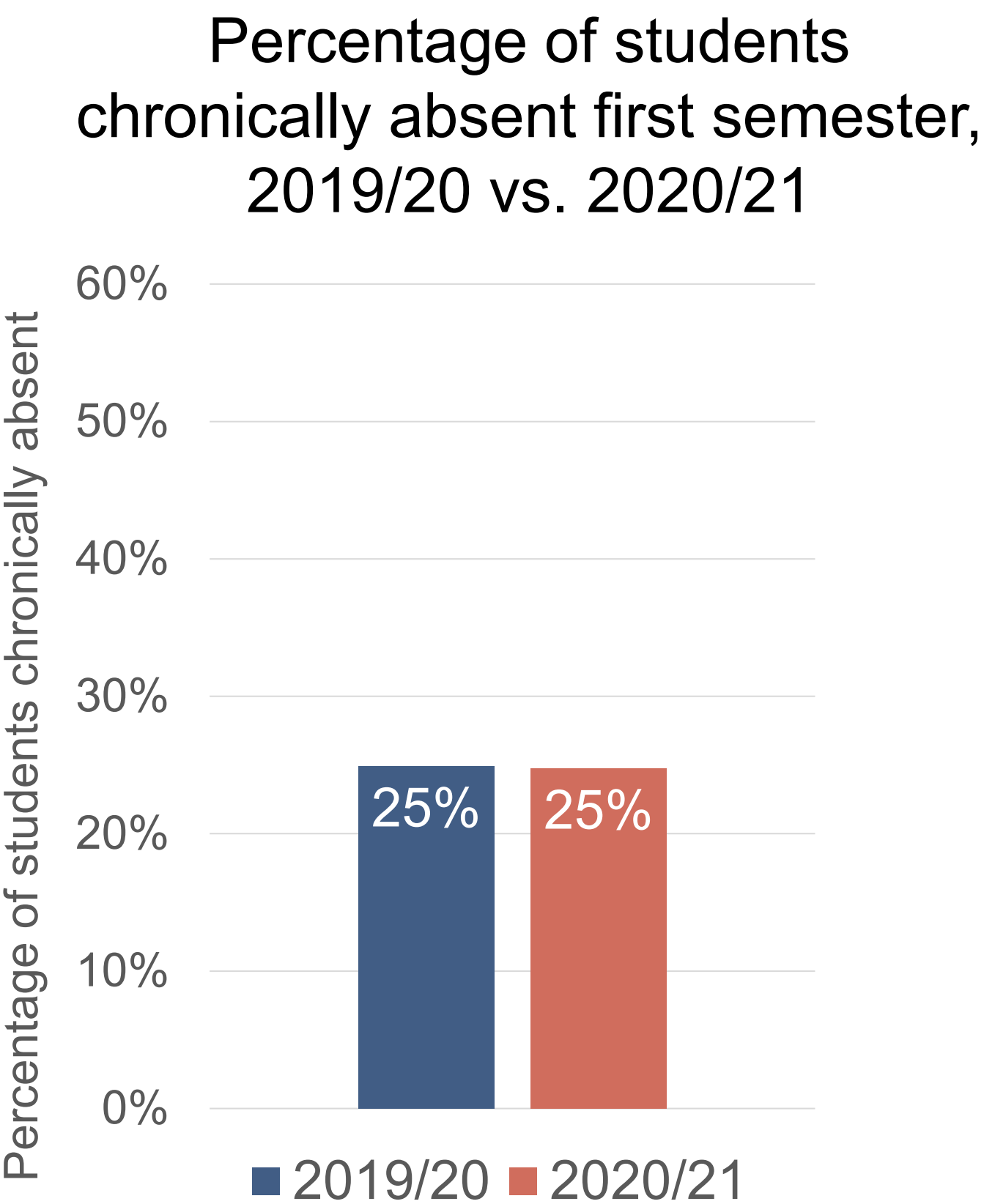
The percentage of students failing at least one course increased dramatically for students who were chronically absent

The percentage of students who failed a course **increased by 20 percentage points** for those who were **chronically absent in first semester 2020/21**, compared to those who were **chronically absent in first semester 2019/20**.



Note: Sample includes all students in grades 1-12. # indicates difference between groups is equal to or greater than 5 percentage points. Chronically absent is having missed more than 10% of instructional days.

Chronically absent students missed 8 more days on average than in prior year. Clear relationship between absences and course failure.



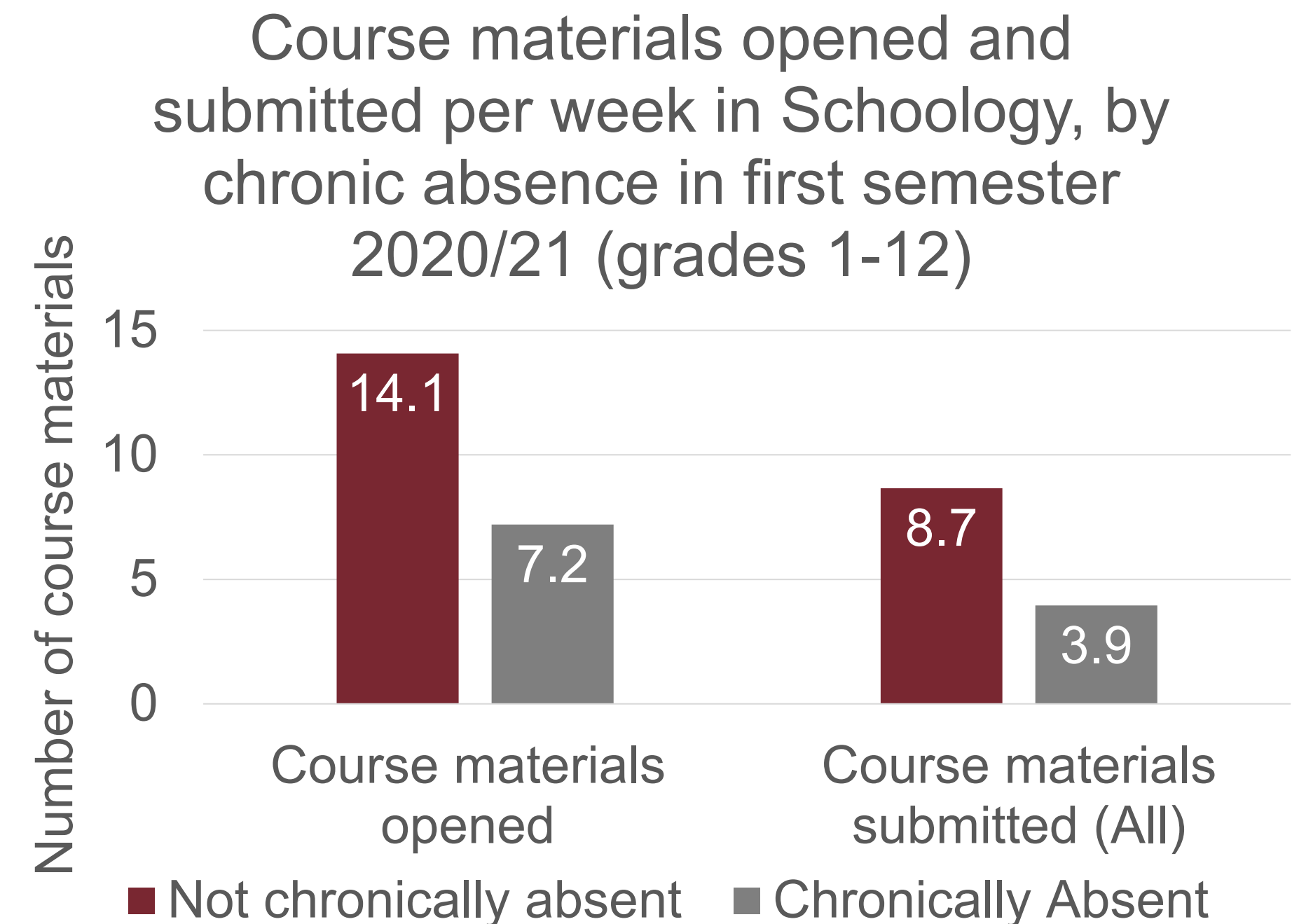
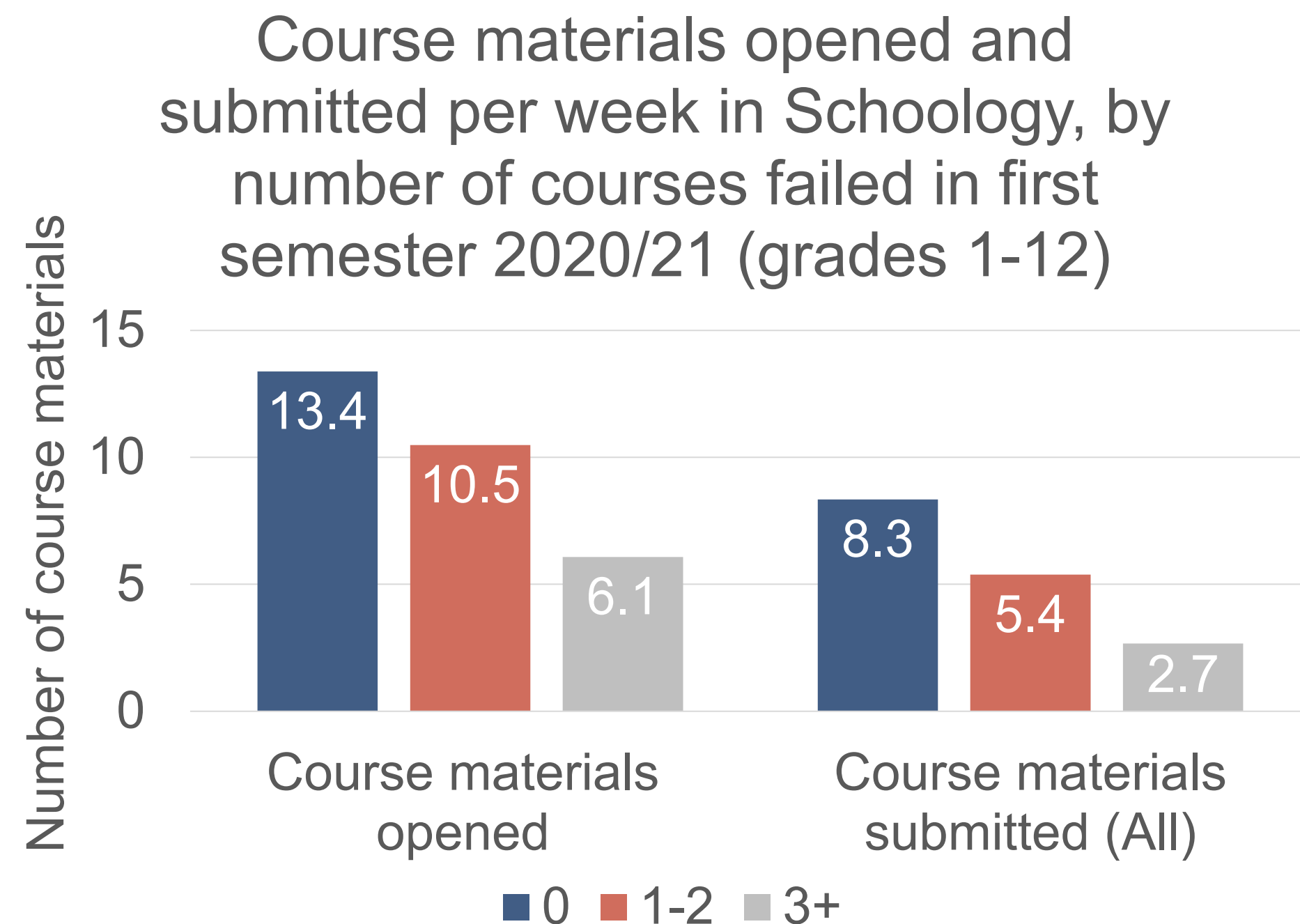
Note: Sample includes all students in grades 1-12. # indicates difference between groups is equal to or greater than 5 percentage points. Chronically absent is having missed more than 10% of instructional days.

How much and in what ways did students access and use the learning management system while learning remotely?



Students who were chronically absent or failing more courses logged in on fewer instructional days and opened and submitted fewer course materials on average per week.

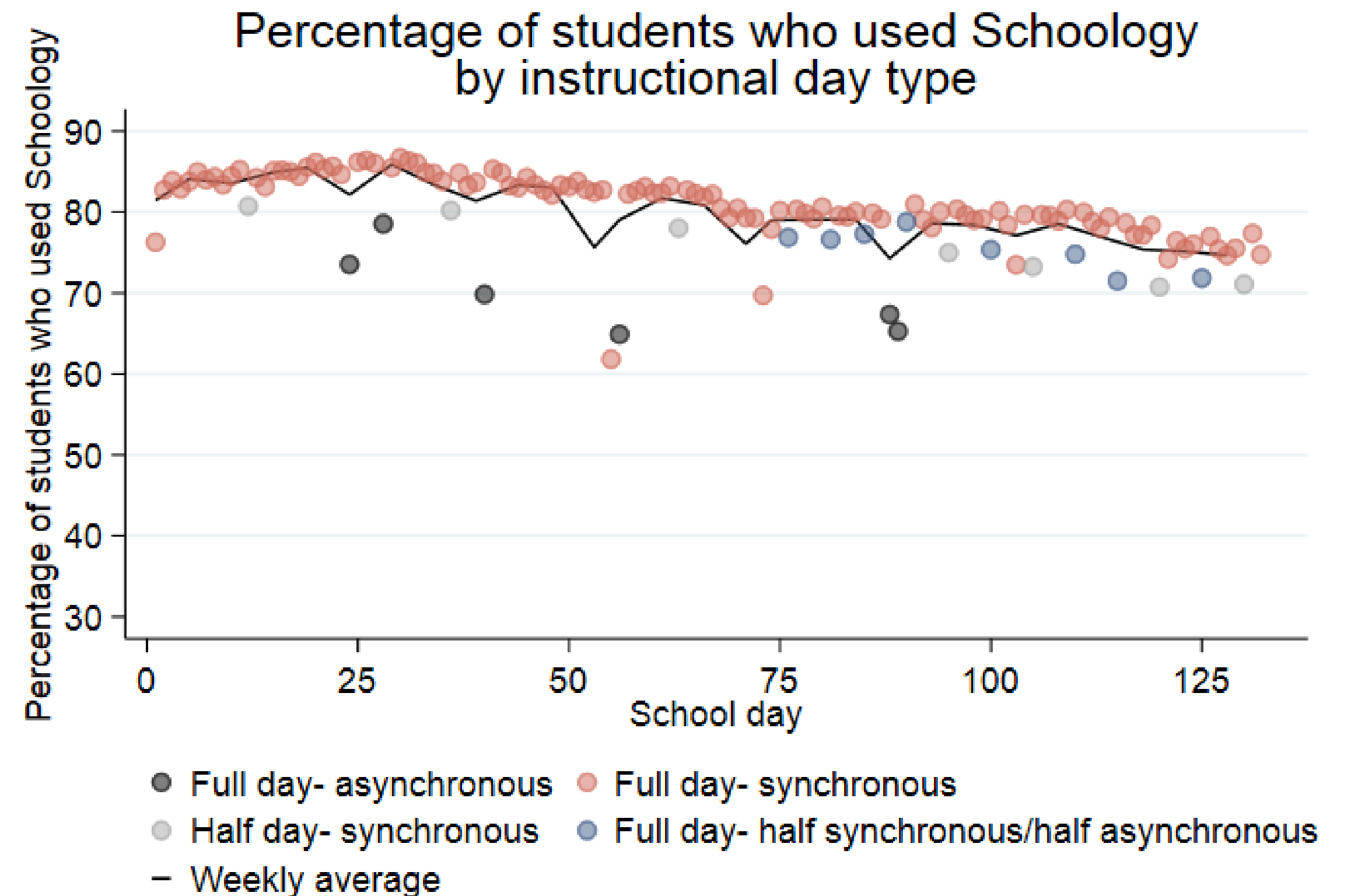
Students who failed 3 or more courses in the first semester of 2020/21 or were chronically absent opened and submitted far fewer course materials through April 2021 than those who did not fail a course or were not chronically absent.



Logins show similarly strong relationship with course failures and chronic absenteeism

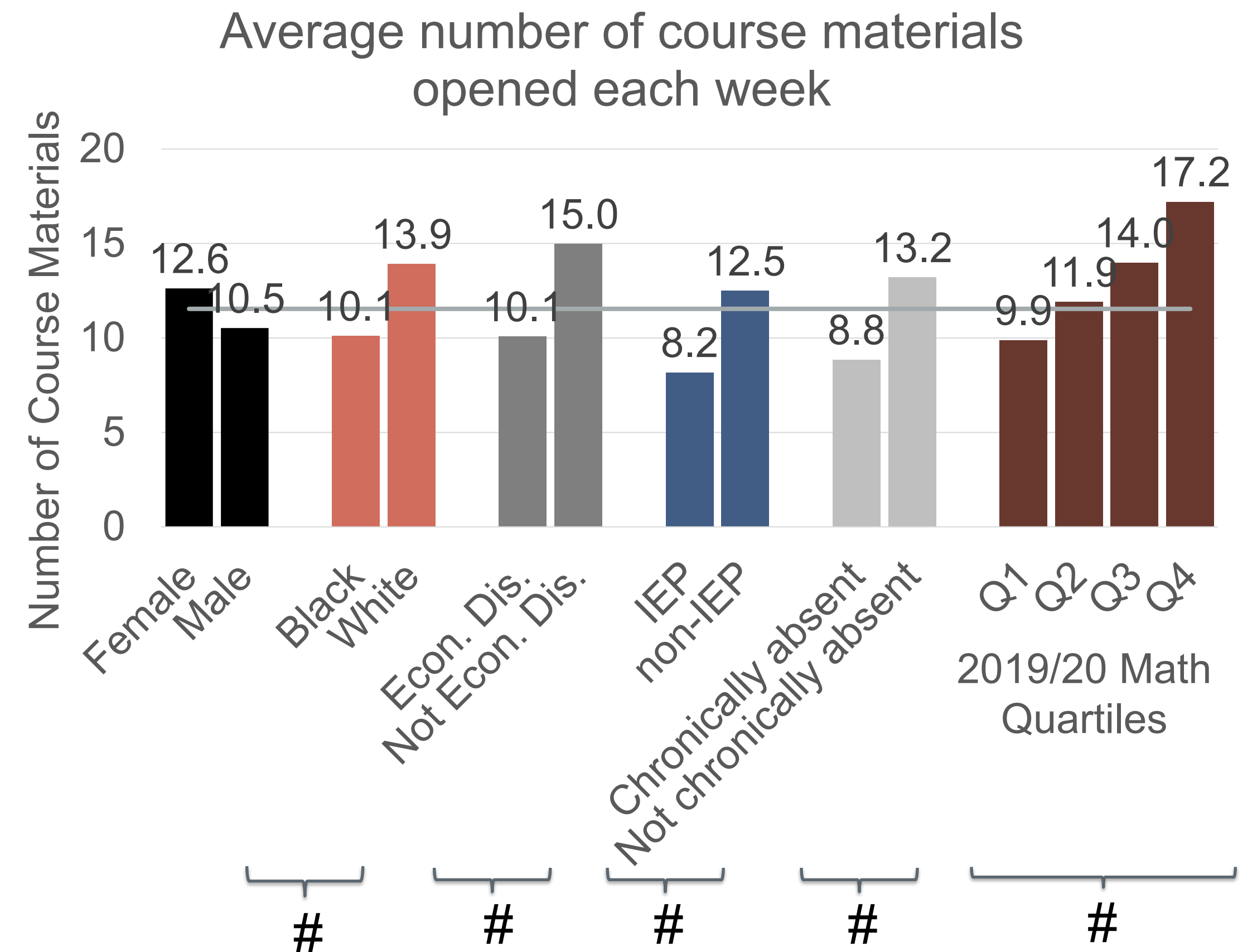
Under remote instruction, percentage of students logging in to Schoology on a given day declined through the year

- Declining participation over the course of the school year also evident in submission of assignments
- This pattern, if true across the country, might explain NWEA's finding of slower learning in second half of pandemic year



Students who are Black, economically disadvantaged, have an IEP, are chronically absent in 2019/20, or have lower test scores opened and submitted fewer course materials

- Similar patterns exist in the average number of course materials submitted each week and for the percentage of days logged in to Schoology.



Note: # denotes a difference of at least three course materials per week.
Chronically absent is having missed more than 10% of instructional days.

Implications



Implications

- Evidence that older and younger students struggled: **Elementary students had the largest lags in test scores, while middle and high school students experienced substantial increases in course failures.**
- Increase in **course failure rates was concentrated among chronically absent students**, who logged in less frequently and opened and submitted fewer materials. An identifiable group of students disengaged and could use **support** reengaging and catching up.
- **Size of test score lags suggests they can be addressed**, but only with additional, evidence-based programs to help students catch up. “Business as usual” will not be enough.



Implications

- Modest **declines in use of learning management system** over the year suggests **engagement may have declined** over time under remote instruction.
- Fewer students log in on asynchronous days, suggesting **synchronous instruction may be better** for engaging students with course work.



Pittsburgh Public Schools' Perspective



Discussion

How has the work been received in Pittsburgh Public Schools?

What steps is the district taking to address learning lags and reengage students?

What challenges are there in addressing learning lags and reengaging students?



Questions



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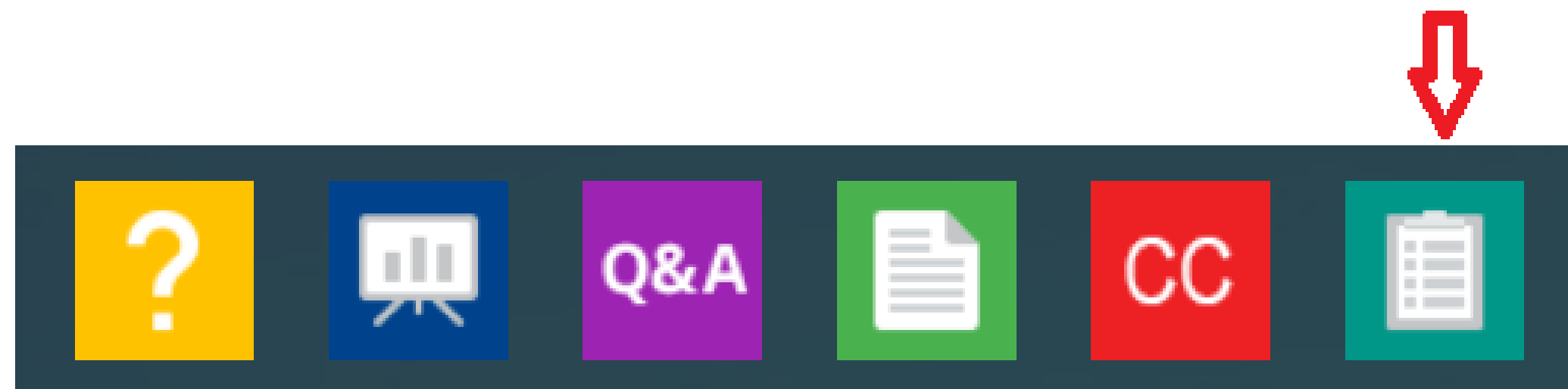
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Appendix



References

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This work was funded by the U.S. Department of Education's Institute of Education Sciences (IES) under contract ED-IES-17-C-0006, with REL Mid-Atlantic, administered by Mathematica. The content of the presentation does not necessarily reflect the views or policies of IES or the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. government.



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