Determinants of Ethnic Differences in School Modality Choices during the COVID-19 Crisis

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ABSTRACT

A growing body of research and popular reporting shows racial differences in school modality choices during the COVID-19 crisis, with white students more likely to attend school in person in the fall of 2020 and spring of 2021. This in-person learning gap raises serious equity concerns. We use unique panel survey data to explore possible explanations. We find that a combination of factors may explain these differences. School districts' offerings, political partisanship, perceived risk from the pandemic, and local COVID-19 outbreaks are all meaningfully associated with and plausibly explain the in-person learning racial gap. Our results illustrate how both policy decisions, but also political leanings and individuals' beliefs could contribute to inequality in access to learning and illustrate the need for a better understanding of the factors behind observed racial inequalities in education.

Keywords: Learning options, racial gaps, Covid-19

JEL Codes: I24, I28, J15

1. Introduction

In the spring of 2020, the COVID-19 pandemic closed schools throughout the United States. The resulting shift to remote learning created a significant strain on teachers, students, and families. School districts created policies and repurposed technology to facilitate remote learning, often with dramatically different results for different students. One analysis of districts' remote learning policies found that students from high-poverty communities were typically held to less rigorous expectations, such as student work not completed for a grade (Malkus, 2020). Additionally, analyses of internet search data (Bacher-Hicks et al., 2021) and online math instructional software use (Chetty et al., 2020) indicate that families and students in high-poverty communities engaged with remote learning resources at significantly lower rates than their more affluent peers from March 2020 through the 2020-21 school year.

In the fall of 2020, schools began to reopen using in-person, hybrid, and remote learning models. However, lack of centralized decision-making often left these reopening decisions to individual school districts, resulting in a patchwork approach where students in neighboring communities may have different opportunities and experiences. Studies of district reopening plans during this time compared district survey responses with district demographics and determined that Black and Hispanic students returned to school completely remote at a higher rate than white students. An analysis from the Brookings Institution argues that race functions as a proxy for urbanity, and that larger, urban school districts took more extreme measures to limit the spread of COVID-19 (Smith & Reeves, 2020). A separate investigation argues that a combination of politics and parental preferences may be responsible for the under-representation of minority students in in-person learning (Belsha et al., 2020).

Understanding the nature of this racial gap is of significant importance. In early 2021, President Biden stated that the reopening of schools to in-person learning was a national imperative (the United States, Office of the Press Secretary, 2021). In the president's statement and subsequent federal legislation, the focus has been on helping

schools reopen. Some evidence indicates that families became more interested in in-person learning as schools reopened in the spring of 2021 (Kogan, 2021). However, a significant racial gap remained in the spring of 2021 (U.S. Department of Education, Institute of Education Statistics, 2021). If racial gaps in attendance modality are motivated by factors other than the availability of in-person learning, reopening for in-person learning may not be sufficient to ensure a full return to the classroom for all students.

In this paper, we use data from the Understanding Coronavirus in America Tracking Survey (UCA), an internet panel comprising a nationally representative sample of American households, to study potential factors associated with observed racial differences in learning mode during the fall of 2020. We merge this data with election polling from the same respondents to capture political leanings, measures of local COVID-19 outbreaks, and information on available school learning options from a database of school district reopening plans. We find that political partisanship, modality availability, the extent of local outbreaks, and individuals' perceived risk from COVID-19 play sizeable roles in explaining observed differences in families' use of in-person and remote learning options.

2. Connections to Existing Research

The impact of COVID-19 on students and families is an emerging field of research and estimating the pandemic's impact on student achievement has been a particularly active segment of this literature. Initial analyses of student achievement and growth during the pandemic indicate that students of color, economically disadvantaged students, and younger students have been most severely affected (Hamilton & Gross, 2021).While few studies have examined heterogenous effects by mode of instruction, those that did found that remote learning is associated with the largest deficits (Kogan & Lavertu, 2021; Sass & Goldring, 2021). State summative assessments and college entrance exam data show that the COVID-19 pandemic appears to have more substantially affected students' progress in mathematics than language arts but that these trends were not uniform across

students or schools (Betebenner et al., 2021). While creative proposals for addressing the potential consequences of COVID-19, such as high-dosage tutoring (Robinson et al., 2021) or summer learning programs (McCombs & Augustine, 2021), hold some promise, they are largely predicated upon a return to in-person schooling.

Despite the policy objectives of political leaders and districts, a successful return to in-person learning did not occur during the 2020-21 school year for many students in the United States. Data from a federally administered survey of school offerings and attendance indicate that nearly all school districts offered either hybrid or in-person learning by May of 2021, yet nearly a quarter of all students were still learning remotely at that time. While only 34% of white students participated in remote or hybrid learning in May 2021, 59% of Black and 55% of Hispanic students used either of those modalities during that same period (U.S. Department of Education, Institute of Education Statistics, 2021). The racial gap in in-person enrollment is found around the country including in states such as Arkansas, Texas, and Florida where schools were ordered to be open for in-person learning throughout the school year. The persistence of this gap across time and state policies highlights the importance of examining not just learning options availability but also factors that may affect families' uptake of those options.

Parolin & Lee (2020) analyze cellphone geodata and claim that school buildings with high proportions of non-white students and students who qualify for free- or reduced-price lunch were more likely to appear closed during the fall 2020 semester. However, with this data, it is difficult to disentangle district offerings from individual decisions and this distinction may be important. For example, by early October of 2020 almost all New York City public schools had reopened for in-person learning. However, by the end of the month, only 26% of students had attended a single in-person class (Shapiro, 2020).

There is reason to believe that racial and ethnic minorities may be especially hesitant to return to in-person learning. Black and Hispanic individuals have been disproportionately afflicted by the pandemic, with hospitalization rates almost five times

that of whites for both groups (Centers for Disease Control and Prevention, 2020). Shapiro et al. (2021) claim that Black families may be skeptical of in-person learning due to both the disproportionate impact of COVID on their communities and historic abuse by government and medical establishments.

Adding to the complexity, early responses to the pandemic were politicized (Shao & Hao, 2020; Grossman et. al, 2021) with Republicans calling for an immediate reopening of schools and Democrats urging a more cautious reopening in the fall of 2020. Persistent low rates of in-person learning among Black and Hispanic students as compared to white students may be a result of individuals in those communities tending to support Democratic party positions. Not only are individual perceptions of the pandemic influenced by politics, but so are districts' reopening decisions. An analysis using a survey of school districts found that a local conservative political leaning was the strongest predictor of districts' decisions to open in-person (Hartney & Finger, 2020). The interplay of demographic, political, epidemiological, and district offerings on learning modality choice creates a gordian knot that previous research has been unable to untie. We leverage unique data drawn from a nationally representative sample of American households to better document observed racial differences in learning modality during the fall of 2020 and study the role of important factors. To our knowledge, this is the first analysis to use family-level data to explore racial differences in students' learning modes following the COVID-19 school closures.

3. Data & Descriptive Statistics

Starting in March of 2020, the Dornsife Center for Economic and Social Research at the University of Southern California has collected data about the pandemic's impact on American households through the UCA[1]. Participants in the survey were recruited from the nationally representative Understanding America Study (UAS) online panel, resulting in a sample of over 6,000 individual respondents who to date have completed 29 waves.

[1] https://uasdata.usc.edu/index.php

For the first year of the pandemic, the UCA was administered as biweekly survey waves that varied in focus but collected information about labor status, perceived COVID-19 risk, educational experiences for children in the household, psychological distress, and mask usage, among other topics.

We use responses from wave 15 of the UCA[2] which were gathered between September 30th and October 26th, 2020[3]. In wave 15, respondents with school-age children in the household provided information on a series of education related questions including mode of learning attendance (in-person, hybrid, remote, or homeschool) and type of school (public, charter, private, or homeschool). For respondents with multiple children, questions were exclusively asked about a randomly selected child in the household.

As our focus in this study is the racial gap in student mode of attendance, we restrict our sample to UCA respondents with school-age children in the household who are not homeschooled. The UAS was designed to capture information about American households and for that aim, once a household is selected to be part of the UAS, all adults aged 18 and older in the household are eligible to participate. As a result, some households provide multiple responses about the same child. Because our focus is to study the learning experiences of individual students, we unduplicated households in our sample. To do so, we retained the designated primary respondent's[4] response for those households with multiple respondents and excluded duplicate observations (N=127)

[2] Other survey waves (8, 14, 18-24) asked questions about respondents' educational experiences. However, we selected wave 15 because it occurred close to the 2020 election which allowed us to match respondents' election polling responses with minimal attrition. While wave 14 also occurred near the election (September 16th to October 14th), it did not ask respondents what type of school (public, private, charter) their child was enrolled in which we anticipated to be an important factor. Despite lacking key information, we have performed an analysis using wave 14 data as a robustness check. The overall results of this robustness analysis are similar to those in our main analysis and are available from the authors upon request.

[3] 93% of respondents completed the survey before October 15th, 2020.

[4] For a small number of households with no primary respondent (N=3), we randomly selected which response to keep. Our results are robust to keeping duplicate responses in the sample.

caused by multiple members of the household completing the survey. This results in a sample of 1,191 respondents from unique households.

<<<<***Figure 1 – Learning Modality for Respondents***>>>>

The top bar in Figure 1 represents the overall proportion of respondents choosing each learning option while the four lower bars disaggregate mode of attendance by race. Most American parents (69%) reported either remote or hybrid learning for their school-age children in October 2020. The disproportionality in in-person attendance noted by others is present in our analytic sample. Black and Hispanic students appear less likely to attend school in-person than white students, with 81% of Black and 77% of Hispanic respondents declaring their children attend school through fully remote or hybrid learning options, as compared with 62% of white parents.

The UAS collects important demographic and socio-economic information of participating families that we use in our analysis. Racial information of the respondents in our sample is coded into four categories: white, Black, Hispanic, and other race. Our analysis also includes information about the level of education of the respondent (high school degree or less, some post-secondary education with no degree, and post-secondary degree earned) and reported family income (less than $40,000, $40,000-$100,000 and more than $100,000 per year) to capture the economic circumstances of the family. Similarly, a dummy variable for the respondent being employed at the time of survey helps us capture additional economic circumstances of the family as well as childcare needs. We also use information about the grade level of the randomly selected child in the household (elementary school student, middle school student, or high school student) to allow for different levels of required supervision and educational support for children of different ages.

Families' hesitancy to return to in-person learning for their children may reflect dissatisfaction with their local schools. Wave 15 respondents were also asked to "grade" their child's school using an A-F scale across several dimensions for three time periods (pre-COVID-19, spring 2020, and fall 2020). We use respondents' reverse-coded

assessment of overall education quality, quality of feedback from teachers, student's relationship with their teachers, student's academic engagement, instructional quality in math, English, and science, and ability of the school to keep their child healthy before the pandemic to construct a measure of school quality via principal components factor analysis[5].

The levels of trust in news agencies and government health officials could affect families' perceived risk of COVID and alter their preferences for in-person learning for their children. The UCA included a series of questions in wave 7 (June 10 to July 8, 2020) that allow us to construct measures of media trust[6] and trust in public health organizations. Our media trust measure is calculated via a principal component factor analysis[7] using respondents' ratings of 5 news sources (ABC, CBS, CNN, NBC, and national newspapers). We similarly construct a measure of trust in public health organizations from respondents' ratings of 3 public health information sources (the Centers for Disease Control, U.S. Department of Health and Human Services, and public health officials generally). Together, these variables allow us to estimate the extent to which popular media coverage or guidance from health organizations may predict modality choice.

Political and ideological leanings could also be an important factor predicting school modality choices, given polarization surrounding the response to the COVID-19 crisis. UAS members were asked to participate in a biweekly election tracking poll from August through early November of 2020. We match wave 15 UCA respondents with their

[5] For details of this variable's construction, see the technical appendix B.
[6] 12% of wave 7 respondents with school-aged children did not participate in wave 15. To study the potential bias induced by this attrition in the sample, we regress an indicator for wave 15 response onto demographic characteristics and our media trust measure for all wave 7 respondents. The only significant predictors of attrition in the sample were racial demographics and income levels in the direction of more privileged respondents presenting higher levels of attrition. As we use wave specific sampling weights in our estimates to maintain national representation of the sample in terms of gender, age, race, education, household income, and marital status these should correct for the potential bias induced by this sample attrition.
[7] For details of the media trust variable's construction, see the technical appendix B.

closest in time election polling responses to determine their political leaning. On average, respondents completed the election poll within 4 days of completing wave 15 and 31% of respondents in our analytic sample completed both the poll and survey on the same day. We use a hypothetical question asking respondents who they would vote for if the election was held on that day. We then classified respondents as supporting Biden, Trump, another candidate, or as undecided voters. All participants in the election tracking poll were prompted to respond, including unlikely voters which allows us to have political leaning information of all respondents regardless of voting status.

The local impact of the COVID-19 pandemic along with personal perceived health risks could also be important determinants of parents' choices. To control for the local level of COVID-19 outbreaks, we merge the UCA data with county-level[8] measures constructed using information from the New York Times[9] and U.S. Census Bureau[10]. We construct a measure of COVID-19 incidence rate representing the proportion of a county's population that has tested positive for COVID-19. We also construct a measure of the case-fatality ratio for each county which is defined as the proportion of confirmed deaths among those who have tested positive for COVID-19. To better capture the extent to which respondents' decision-making context may have been shaped by prior outbreaks of COVID-19, we use data from the first day of wave 15 when constructing these measures. In addition, we use factor analysis to construct a measure of respondents' perceived risk from COVID-19 using the self-reported probability of contracting the disease in the next three months and, if infected, their probability of being hospitalized or die. These variables allow us to capture to what extent learning modality decisions may be motivated by parents' health concerns.

Moreover, the UAS election poll data, described above, indicate if a respondent lives in a rural, urban, or mixed locale which helps us better capture population density

[8] For 1.2% of respondents, we were unable to merge any local outbreak information.
[9] https://github.com/nytimes/covid-19-data
[10] https://www.census.gov/programs-surveys/popest.html

along with infrastructure for remote learning such as high-speed internet in respondents' locales. The categorization provided in the UAS data is based upon the share of individuals within a respondent's zip code tabulation area (ZCTA) that also live in a census-designated urbanized area. The respondent is classified as urban or rural if all or no residents in their ZCTA live in one of the country's nearly 500 urbanized areas. If some, but not all, residents of the ZCTA live in an urbanized area they are classified as mixed-urban. Using these variables from the UAS election poll allows us to proxy for factors associated with different levels of urbanicity as they help capture different levels of vulnerability to the pandemic and may play a significant role in the mode of school attendance (Smith & Reeves, 2020).

Finally, the supply of different learning options is hypothesized to be a key determinant of parents' school modality choices. To study the influence of the supply of learning options, we merge the UCA data with estimates of learning options supply at the census-tract level when possible and county level when we are unable to merge at the tract-level[11]. Data for these supply estimates comes from MCH Strategic Data[12], which has regularly collected information on school district re-opening options since the summer of 2020 and has obtained information on 92% of school districts in the country. This is, to our knowledge, the most comprehensive source of information on school re-openings and the supply of learning options. We use MCH survey data as reported in October 2020, when wave 15 was collected. At this point, MCH had processed reopening plan data for 78% of districts nationwide. Thus, we construct census-tract and county-level estimates of remote learning prevalence as the proportion of students in the tract's school districts that are only offered remote learning. While many districts offered combinations of hybrid and in-person learning for families to choose from, the remote learning measure as defined by MCH represents the absolute unavailability of in-person

[11] 4.8% of respondents were merged at the county level instead of the census-track level. Unfortunately, we were unable to merge any learning options supply information for 0.2% of respondents.
[12] https://www.mchdata.com/covid19/schoolclosings. See also Appendix A for more details on the MCH data.

learning in any form. We match 90% of respondents with a census tract where either no districts are remote only or all districts are remote only. 10% of respondents live in census tracts with multiple modalities offered by different districts. For these respondents, we estimate the probability of their students attending a remote-only district by constructing a weighted average representing the proportion of students in the tracts' districts that are remote-only.

In addition to district-provided information on school offerings described above, wave 15 asks whether respondents' chosen school allowed them to choose their student's learning modality. We also include this variable in our analysis to better model actual attendance as a function of both parental choice and school offerings. It is important to note that being given a choice does not fully determine a given learning modality. For example, 56% of respondents who report having chosen their student's mode of attendance selected remote learning and 18% of respondents who report using an in-person modality indicate that they were not offered a choice of modality. Finally, we also include variables indicating the type of school (public school, private school, or charter school) as different school sectors provided different school modality options for parents (e.g. private schools re-opened for in-person learning at higher rates even when local-school districts decided to keep public schools fully remote). A full description of the variables and their correlations can be found in the technical appendix B.

<<<<Table 1 – Descriptive Statistics of Respondents>>>>

We report descriptive statistics for our analytic sample using sampling weights[13] in Table 1. To test for statistically significant differences by race, we use an adjusted Wald test with the null hypothesis of no differences across racial or ethnic groups ($\mu_{white} = \mu_{black} = \mu_{hispanic} = \mu_{other}$). Trends seen in our descriptive statistics largely

[13] Note that weights aligned to the characteristics of U.S households with K-12 or higher education students are not provided in the UAS. Provided sample weights bring the sample in line with the U.S. adult population.

align with our prior expectations. While 48% of our analytic sample reports their children attending remotely there are large differences by race. Only 38% of white respondents report using remote learning while 60-64% of Black and Hispanic respondents report the same. Overall, there appears to be an even proportion of Biden and Trump voters in our sample. Among white respondents, Donald Trump appears to be the preferred candidate while Joe Biden is the preferred candidate among non-white voters. Interestingly, remote learning appears to be prevalent in 35% of respondents' census tracts but reported as the modality for 48% of respondents. This may indicate the importance of studying family decisions as opposed to just districts' offerings.

4. Analytic Strategy

We study the determinants of the probability of respondent i selecting attendance modality j (i.e., fully in person-learning, fully remote, or hybrid) for their school-age child, conditional upon a set of covariates x_i, using a multinomial logit model:

$$P(Y_i = j|x_i) = \frac{\exp(\beta_j{}' x_i)}{\sum_{l=1}^{3} \exp(\beta_l{}' x_i)} \qquad j = \begin{cases} 1 \text{ for InPers.} \\ 2 \text{ for Remote} \\ 3 \text{ for Hybrid} \end{cases}$$

To explore the role of different factors in explaining observed racial differences in learning options, we define the following four sets of covariates and include them sequentially in our models:

$$x_i' = \{\text{race}_\text{i}\} \tag{A}$$

$$x_i' = \{\text{race}_\text{i}, \text{income}_\text{i}, \text{education}_\text{i}, \text{employed}_\text{i}, \text{gradeLevel}_\text{i}, \text{state}_\text{i}\} \tag{B}$$

$$x_i' = \left\{ \begin{array}{c} \text{race}_\text{i}, \text{income}_\text{i}, \text{education}_\text{i}, \text{employed}_\text{i}, \text{gradeLevel}_\text{i}, \text{SchoolQuality}_\text{i} \\ \text{mediaTrust}_\text{i}, \text{publicHealthTrust}_\text{i}, \text{politics}_\text{i}, \text{percievedCovidRisk}_\text{i} \\ \text{incidenceRate}_\text{i}, \text{caseFatality}_\text{i}, \text{urban}_\text{i}, \text{state}_\text{i} \end{array} \right\} \tag{C}$$

$$x_i' = \left\{ \begin{array}{c} \text{race}_\text{i},\ \text{income}_\text{i},\ \text{education}_\text{i},\ \text{employed}_\text{i}\ , \text{gradeLevel}_\text{i},\ \text{SchoolQuality}_\text{i} \\ \text{mediaTrust}_\text{i}, \text{publicHealthTrust}_\text{i}, \text{politics}_\text{i}, \text{percievedCovidRisk}_\text{i} \\ \text{incidenceRate}_\text{i}, \text{caseFatality}_\text{i}, \text{urban}_\text{i}, \\ \text{schoolType}_\text{i}, \text{choice}_\text{i},\ \text{remote}_\text{i},\ \textit{state}_i \end{array} \right\} \qquad (D)$$

In specification *A*, we include respondent race as the sole explanatory factor to assess initial racial and ethnic differences in learning options. Next, in specification *B* we add controls for respondents' socio-demographic and family context information including the level of income, education, employment status, and grade level of the randomly selected child. We also include state fixed effects to capture state-level remaining unobserved characteristics. Specification *C* builds upon this with the inclusion of our trust and school quality variables, a categorical variable indicating political leaning, a measure of perceived risk from COVID, variables measuring the local extent of COVID-19 outbreaks, and the level of urbanicity of the respondent's residence. Finally, in specification *D*, our most complete specification, we add controls for the supply of options provided to parents including information on the type of school the child is attending (public, private, or charter), whether respondents were offered a choice of attendance modality by their school[14], and prevalence of remote learning as described in the previous section. To maintain national representativeness, our estimates are weighted using UCA sampling weights.

5. Results

To aid interpretation, we present our estimates as average marginal effects (AME) for each covariate x_k by modality j. Tables 2-4 describe our estimates for specifications A-D, which sequentially introduce additional covariates as explained in section 4 above, for in-

[14] While our main analysis models the probability of observing respondents' school-age children in each learning option which results from a combination of parents' preferences and district's offerings, we also conduct a sensitivity analysis restricting our sample to those who declare being given a choice of learning mode by their schools. We find very similar results. Results available from the authors upon request.

person, remote, and hybrid learning modalities, respectively. While we do not report average marginal effects for income and education, they are largely insignificant.[15]

<<<< ***Table 2 – AME for In-Person Learning***>>>>

Looking at the results in Table 2, specification A, without controls, non-white respondents are 15-19 percentage points less likely to attend school in-person than white students. These estimates are significant at the 95 and 99% confidence levels. With the inclusion of socio-demographic controls and state fixed effects in specification B, we no longer observe statistically significant differences between Hispanic and white respondents in the probability of choosing fully in-person learning. However, holding socio-demographic and grade level information constant, being Black is associated with a 17-percentage point decrease in the probability of attending in-person learning as compared to white respondents. Student grade level also appears important. Holding socio-demographic information constant, being in middle school or high school is associated with a 12 to 13 percentage-point decrease in the likelihood of attending in-person as compared to being in kindergarten or elementary school. This result could be due to the lower needs of supervision and school support in higher school grades.

Racial differences are no longer significant at conventional confidence levels in specification C with the inclusion of controls for media trust, trust in public health officials, perceived school quality, political leanings, and measures of pandemic vulnerability (i.e. perceived COVID risk, urbanity, and measures of local COVID-19 outbreaks). Political leaning, perceived risk due to COVID-19, and the prevalence of COVID cases in a respondent's county all appear to be significantly associated with the probability of attending school in person. All else equal, intending to vote for Trump in the November 2020 election is associated with a 12-percentage point increase in the probability of attending school in-person as compared to being a Biden voter. A one-standard-deviation increase in perceived risk from COVID-19 is associated with a 4.4-

[15] Full set of results available from the authors upon request.

percentage point decrease in the probability of attending school in-person, *ceteris paribus.* Holding all else equal, a 1-percentage point increase in county-level COVID-19 incidence rate is associated with a 5.4-percentage point decrease in the probability of attending school in-person. These estimates are significant at the 95% confidence level.

<<Table 3 – AME for Remote Learning>>

As reported in Table 3, specification A, without controls, non-white respondents are between 22 and 32-percentage points more likely to attend school remotely as compared to white students. Like our results for in-person attendance, we find no statistically significant differences between Hispanic and white respondents once we control for socio-demographic and family context information and state fixed effects in column B. In this specification, the estimated average marginal effect of being Black on the probability of attending remotely is, however, large in magnitude and remains statistically significant. Holding all else equal, being Black is associated with a 22-percentage point increase in the probability of reporting remote learning as compared with being white. In line with the results shown in table 2, older students appear more likely to participate in remote learning. Holding all else equal, middle and high school students are between 9 and 12-percentage points more likely to learn remotely as compared to elementary and kindergarten students. These estimates are significant at the 95 and 99% confidence levels, respectively.

Adding in controls for media trust, trust in public health officials, perceived school quality, political leanings, perceived COVID risk, urbanity, and measures of local COVID-19 outbreaks, in column C, results in the racial gap between white and Black respondents becoming statistically insignificant at conventional confidence levels. Political leanings, the extent of local outbreaks, and urbanity are meaningfully associated with participation in remote learning. Intending to vote for candidate Trump in the November 2020 election is associated with a 14-percentage point decrease in the probability of selecting remote learning as compared to being a Biden voter. This estimate is significant at the 99% confidence level. Holding all else constant, rural

respondents are 15-percentage points less likely to participate in remote learning as compared to mixed urbanity respondents, significant at the 99% confidence level. The lower population density in rural areas could reduce perceived pandemic vulnerability and increase families' willingness to use in-person education. Additionally, a one-percentage-point increase in respondents' county-level COVID-19 incidence rate is associated with an 8.6 percentage point increase in the probability of participating in remote learning. This estimate is significant at the 99% confidence level.

Results of our preferred specifications for the probability of choosing fully in-person and fully remote learning, including controls for the local supply of school mode options, are presented in columns D of Tables 2 and 3, respectively. In these full specifications, racial differences are no longer statistically significant. Holding all else equal, attending a private school is associated with a 39-percentage point increase in the probability of attending school fully in-person and a 29-percentage point decrease in the probability of attending fully remotely, as compared to enrollment in a public. This result could be explained by the fact that private schools were free to decide to remain open for in-person learning independently of what local public school districts decided. Conversely, charter school students are estimated to be 18-percentage points less likely to engage in in-person learning and 19-percentage points more likely to engage in remote learning as compared to public school students, all else equal. These estimates are significant at the 99 and 95% confidence levels, respectively.

Respondents whose schools gave them a choice of their children's learning modality were 12-percentage points more likely to select in-person learning and 17-percentage points less likely to report remote learning as compared to those who report not being able to make a choice, *ceteris paribus*. These estimates are significant at the 99% confidence level. The offerings of local public school districts also appear important. All else equal, if respondents live in areas where most districts offer only remote learning they are 17-percentage points less likely to report in-person learning and 15-percentage points more likely to report remote learning as compared with areas where more options are available.

Other factors remain significant predictors of the probability of respondents reporting their children attending fully in-person or fully remotely schooling in specification D. Consistent with our results from specifications C, we find statistically significant effects for political indicators. Holding all else constant, intending to vote for candidate Trump is associated with a 15-percentage point increased probability of attending school fully in-person and a 14-percentage point decreased probability of attending fully remotely. These estimates are significant at the 99% confidence level. Additionally, with our full set of controls we find that perceived COVID-19 risk is meaningfully associated with learning modality. Holding all else equal, a one standard deviation increase in perceived COVID-19 risk is associated with a 4.5-percentage point decrease in the probability of reporting in-person learning and 4-percentage point increase in the probability of reporting remote learning. These estimates are significant at the 95% confidence level.

For in-person learning, we find that our estimated effects of local COVID-19 incidence rates and case-fatality ratios are imprecisely estimated and statistically insignificant at conventional confidence levels. However, the COVID-19 incidence rate appears to be meaningfully associated with remote learning. Holding all else equal, a one-percentage-point increase in the local COVID-19 incidence rate is associated with a 6.5-percentage point increase in the probability of reporting remote learning. Additionally, older students appear more likely to be participating remotely and less likely to attend in person. Holding all else constant, middle school students are 19-percentage points less likely to attend in-person and 14-percentage points more likely to attend remotely as compared to kindergarten and elementary students. These estimates are significant at the 99% confidence level. Similarly, high school students are 18-percentage points less likely to attend in-person and 12-percentage points more likely to attend remotely as compared to kindergarten and elementary students, significant at the 99% confidence level. Finally, the estimated effect of living in a rural location on in-person schooling is positive and marginally significant at the 90% confidence level,

living in a rural location is associated with a 16-percentage point decreased probability of reporting remote learning. This estimate is significant at the 99% confidence level.

<<Table 4 – AME for Hybrid Learning>>

Table 4 reports our findings for the probability of respondents reporting a hybrid modality for their school-age children. We find fewer statistically significant predictors of hybrid modality. In our most controlled specification, we find no statistically significant differences by race. Holding all else constant, private school students are 10-percentage points less likely to attend via a hybrid model as compared to public school students. This estimate is significant at the 95% confidence level. Interestingly, while the COVID incidence rate is not statistically significant the local case-fatality rate is. Holding all else constant, a one-percentage-point increase in the COVID-19 case fatality rate is associated with a 3-percentage point increase in the probability of reporting hybrid learning. This estimate is significant at the 99% confidence level. Like our results for in-person learning, we find that the effect of living in a rural location is positive and marginally significant at the 90% confidence level. Other factors, such as intention to vote for Donald Trump, enrollment in a charter school, trust in media and public health organizations are imprecisely estimated and statistically insignificant in this case.

6. Conclusion

The current COVID-19 crisis has put a strain on teachers, students, and families. Although many schools re-opened for in-person to a limited amount during the 2020-21 school year, participation in in-person learning varied considerably. As a result, not all students had the same learning experiences. We observe important racial differences in the learning modality of students during the fall of 2020 with Black and Hispanic students returning to school remotely more frequently than white students. Although most parents (69%) in the U.S. used fully remote or hybrid learning for their students during this period, Black and Hispanic respondents reported doing so at higher rates. 81% of Black and 77% of Hispanic families report fully remote or hybrid education for their children as compared with 62% of white parents. These observed racial differences along

with recent reports of bigger learning losses for students attending school remotely during the pandemic (Hamilton & Gross, 2021; Kogan, 2021; Sass & Goldring, 2021) raise serious equity concerns.

In this paper, we study which factors could help explain the observed racial differences in school modality choice. Our results first demonstrate the important role of the political choice of re-opening schools for in-person learning. Giving parents the option to choose the mode of learning increased the probability of participating in in-person learning by 12 percentage points while living in an area where local public schools remained remote increased the probability of attending school fully remote by 15 percentage points. In addition, the type of school attended had a significant influence. Attending a private school, a school sector that largely remained opened for in-person learning, increased the probability of attending in-person by 39 percentage points.

However, other individual factors were also significant predictors of in-person learning participation. Political leanings were also an important and significant predictor of attending in-person or fully remote. Intending to vote for President Trump was associated with a 15-percentage point increase in the probability of attending school in person. Our results go in line with those of Grossmann et al. (2021) who also found that those leaning Republican were more favorable toward in-person learning than those leaning Democrat. Similarly, perceived COVID19 risk was also a significant factor. A one-standard deviation increase in perceived COVID-19 risk is associated with an increase in the probability of attending school remotely of 4 percentage points.

Given the presence of other important individual factors determining families' decisions for learning mode, the re-opening of schools for in-person learning might not be enough to fully eliminate observed racial differences in student's mode of instruction. Families that lean more Democratic or have higher perceived COVID-19 risk might decide to keep their children in remote learning. To the extent that Black and Hispanic families tend to favor more Democratic candidates and policies and have been hit harder by this pandemic, which could increase their perceived COVID-19 risk, we might

continue to observe racial disparities in learning modality during this pandemic. According to reports by the Institute of Education Sciences[16], by February 2021, 79 percent of all school districts offered the option to attend school either in-person or with hybrid instruction, and more than half of non-white respondents indicated that their children were still learning remotely. By May 2021, 66% of white students participated in school in-person as compared with 41% of Black students and 45% of Hispanics. According to the most recent data collected by the UCA between June 9th and July 21st, 2021, while 90% of white families intend to have their K-12 children attend in-person school during the 2021-2022 academic year, only 75% of Black families and 74% of Hispanic families did so.

Significant efforts to provide reassuring information to families may be necessary for students to fully participate in in-person learning opportunities. In this sense, as political messaging changes and school adapt mitigation measures to control the spread of the virus, it is possible that the influence of political leanings and COVID-19 perceived risk fades out over time. However, as the pandemic continues, investments in quality remote teaching and remediation efforts would be needed to help students who fall behind and to avoid increasing learning gaps.

Despite the rich data we were able to leverage, we acknowledge several limitations of our work. We were only able to match respondents with school offerings at the census or county level and did not have information of their exact school district's offerings and circumstances. Although in most of the cases a census track contained only one school district or the multiple school districts offered the same option, the lack of matches at the local school district level may induce measurement error in our local school supply options variables that could downward bias our estimates.

In any case, overall, our results illustrate how both policy decisions, but also political leanings and individuals' beliefs could contribute to inequality in access to

[16] https://ies.ed.gov/schoolsurvey/

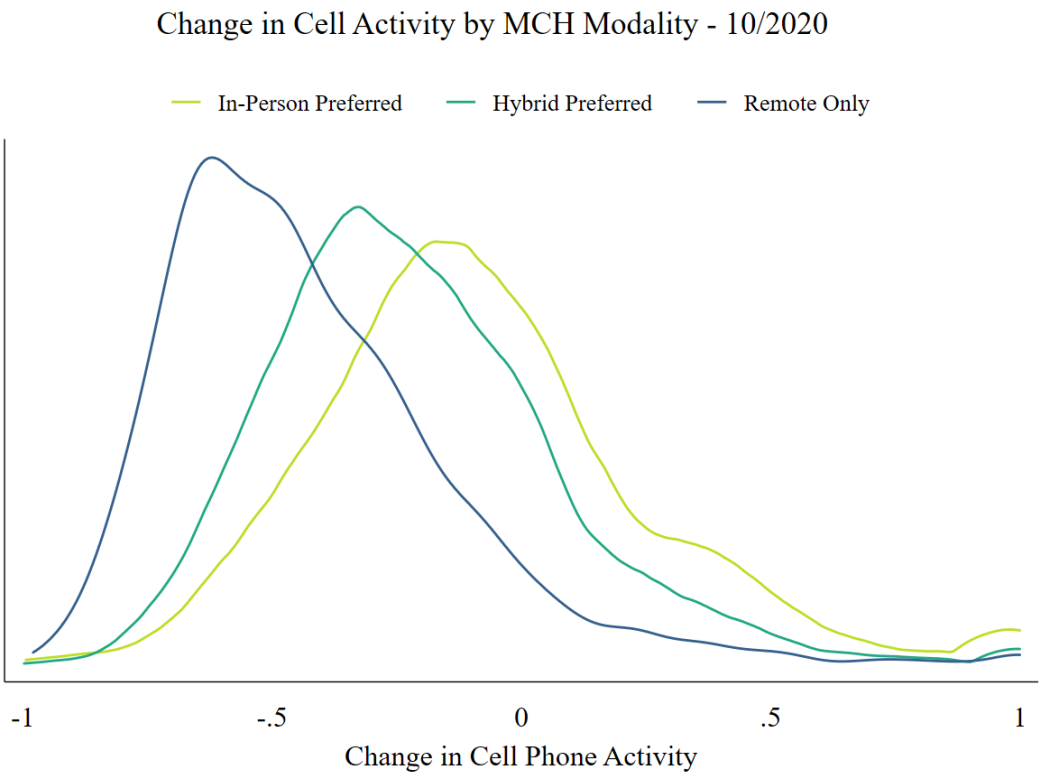
learning and illustrate the need for a better understanding of the factors behind observed racial inequalities in education.

Appendix A: Validation of Learning Options Exposure Estimates

A crucial component of our analysis is the ability to model the availability of in-person learning options to respondents. As shown in our results section, our supply measures of remote learning was significantly related to reported mode of attendance. Data used to create this variable comes from a private company's phone survey of districts. We chose this survey over others because it is, to our knowledge, the most comprehensive source of district reopening decisions. However, as with any survey, there is the risk of measurement error occurring during the data collection process. The survey used to construct this variable does produce slightly different topline numbers (i.e., percent of districts using a remote/hybrid/in-person plan) than surveys collected elsewhere like Burbio's K-12 School Opening Tracker (https://cai.burbio.com/school-opening-tracker/). We believe this may be due to a combination of factors such as differences in coding and sample size.

To validate that our survey data accurately captures the instructional models being used in districts, we utilize innovative cellphone geolocation data based on measures of in-person visits to school buildings developed by Parolin & Lee (2020). In their paper, the authors construct a measure of changes in visits to school buildings relative to a pre-pandemic baseline using anonymized cellphone geolocation information. Importantly, the authors conduct a series of five validation checks to ensure that the data accurately reflects changes in visits to schools. If the survey we use to construct remote learning exposure is accurate, we would expect both the cellphone and survey data to exhibit the same relationship. We show this association in Figure A.1 using overlapping density plots of the relative change in cellphone activity for each district. This visualization shows that the greatest decreases in cellphone activity are among districts classified as remote only by our survey data of school districts, with the least decrease among districts classified as in-person. The similarity of these two separate sources of school re-opening information indicates that our constructed remote only supply measure is likely valid.

Figure A.1 – Changes in Cell Activity by MCH Modality (October 2020)



Appendix B: Technical Appendix

This technical appendix explains in detail the source and construction of variables used in our analysis and provides additional summary statistics representing the correlations between variables. Below are detailed accounts of how each variable was constructed as well as where data used to construct that variable came from. Where appropriate, results of principal-component factor analyses are presented and discussed. Unless otherwise noted, all proportions are in reference to the analytic sample defined in section 3 of the main paper. Tables B.1 and B.2, located at the end of this appendix, provide correlations among respondents' traits and school characteristics.

Race

Our race/ethnicity variable is constructed from a set of binary indicators for race (white, Black, Native America, Asian, Native Hawaiian or Pacific Islander) and ethnicity (whether the respondent identifies as being Hispanic or Latino) included in the UCA wave 15 data. The data for these variables is elicited quarterly as part of the UAS with respondents' most recent data being incorporated at the time of the wave 15 survey. We define a categorical variable to identify respondents as non-Hispanic white, non-Hispanic Black, Hispanic/Latino (of any race), or another race.

Education & Income

Like the race variable described above, respondents' income and level of education are captured quarterly and automatically incorporated into the wave 15 data file at time of survey administration. These factors are captured in two 16-level categorial variables. We collapse this information into two, three-level categorical variables. The resulting education variable categorizes respondents as having a high-school degree or less (36%), some post-secondary education with no degree earned (17%), and some post-secondary degree earned (46%). The resulting income variable categorizes respondents as having a household income less than $40,000 (33%), between $40,000 and $100,000 (41%), and over $100,000 (26%).

Employed

This variable indicates if respondents are currently employed or on leave (sick leave, FMLA leave, etc.) from their employment at the time of the wave 15 survey. Any respondents who indicate a labor status other than employed or on leave are categorized as unemployed including individuals that are retired or disabled.

Grade Level

In wave 15, respondents are asked to identify which grade the randomly selected child they are asked about is in. The options range from kindergarten to 12^{th} grade. We construct a categorical variable with three levels. Children in fourth grade and lower are categorized as attending an elementary school. Middle school children are defined as being in 5^{th} – 8^{th} grades. High school children are defined as being in 9^{th} – 12^{th} grades.

School Quality

We construct our school quality measure using respondents' ratings of their child's school across seven dimensions. These questions are retrospective and ask respondents to assess their child's school prior to the pandemic. Using a 5-point scale, respondents indicate the overall quality of education the school provided as well as the quality of feedback offered to students, quality of instruction in core subjects (science, math, ELA), quality of teacher-student relationships, quality of student engagement, and ability of the school to keep their child healthy. We first reverse code these responses so that a higher value indicates higher quality, and then verify that they capture a unique dimension of school quality using principal components factor analysis. The results of this analysis are shown below. These results show that all school quality questions load onto a latent variable and can be combined. We construct this latent variable using an orthogonal rotation of the factor analysis results.

Factor Analysis for School Quality Measure

	Factor	Uniqueness
Quality of Education	0.8205	0.3267
Quality of Teacher Feedback	0.7768	0.3966
Quality of Science Instruction	0.8175	0.3318
Quality of Mathematics Instruction	0.8432	0.2891
Quality of ELA Instruction	0.8474	0.2820
Students' Relationships with Teachers	0.7771	0.3961
Keeping Students Engaged	0.8136	0.3380
Keeping Students Healthy	0.7020	0.5073

Media & Public Health Trust

To capture media and public health trust, we use data from wave 7[17] of the UCA which asked respondents to rank the trustworthiness of various sources. When selecting news organizations that might contribute to a media trust measure, we excluded two that are viewed as heavily politically aligned to either the Republican or Democratic party as we believed that our election polling data would better capture the influence of such political polarization. We thus devise a media trust variable consisting of respondents' assessment of the trustworthiness of ABC, CBS, CNN, NBC, and national newspapers and a public health trust variable using respondents' assessment of the trustworthiness of the U.S. Department of Health and Human Services (HHS), the Centers for Disease Control and Prevention (CDC), and public health officials generally. We verify that these can be combined using principal-component factor analysis and report these results below.

[17] Wave 7 was conducted between June 10th and July 8th, 2020.

Factor Analysis for Media Trust			Factor Analysis - Trust in Health Orgs.		
	Factor1	Uniqueness		Factor1	Uniqueness
ABC	0.9389	0.1185	HHS	0.8846	0.2176
CBS	0.9384	0.1195	CDC	0.8859	0.2152
CNN	0.8992	0.1914	Officials	0.8570	0.2655
NBC	0.9447	0.1075			
Newspapers	0.8944	0.2000			

Politics

To categorize respondents as likely Trump voters, likely Biden voters, third-party voters, or undecided voters we rely upon UAS's 2020 presidential election tracking poll[18]. We use responses to a question asking, "If the election were held today, who would you vote for?" We recode this variable so that an intention to vote for third-party candidates or candidates that were not running in the 2020 presidential election are supporters of "other candidates." The election tracking poll was administered to respondents approximately every two weeks from August of 2020 until election day in November of 2020. While choice of candidate remained stable among respondents during that time, we select the election poll response that was submitted closest in time to each wave 15 response. Nearly one-third of respondents completed the election poll and wave 15 survey on the same day and over 91% of respondents in the analytic sample completed both within one week of each other.

Perceived COVID-19 Risk

Our measure of perceived COVID-19 risk is constructed from three questions in wave 15 asking respondents to report their perceived probability of contracting COVID-19 in the next three months, being hospitalized because of, and dying from it. We confirm that these three values may be combined into one variable using principal components factor analysis and report the results of this analysis below. While the reported risk of being

[18] https://uasdata.usc.edu/index.php

infected with COVID-19 does appear to be slightly more unique than hospitalization and death, all variables load onto the same latent factor. Following this factor analysis, we use an orthogonal rotation of the results matrix to predict values for the perceived risk index.

Factor Analysis for Perceived Risks.

	Factor	Uniqueness
Risk Infection	0.7984	0.3625
Risk Hospitalization	0.9291	0.1369
Risk Death	0.9156	0.1617

Incidence Rate & Case-Fatality Ratio

We incorporate measures of COVID-19 prevalence and lethality into our analysis using county-level data from the New York Times and U.S. Census Bureau. We use the county-level COVID-19 case and death counts as of the first day of the wave 15 survey (September 30th, 2020) and the estimated population of each U.S. county prior to the pandemic to construct these measures. We define incidence rate as the proportion of a county's pre-pandemic population which has tested positive for COVID-19 and the case-fatality ratio as the proportion of individuals who have tested positive and are confirmed to have died from COVID in that county. To preserve respondent anonymity, we round both values to the nearest tenth prior to merging with UCA respondents.

Urbanity

The three-level urbanity variable we use in our analysis is provided in the UAS election polling data file. The levels – rural, mixed urban, and urban, are defined based upon the proportion of census-designated urbanized areas in a respondents' census-designated zip code tabulation area (ZCTA). If there are no urbanized areas, the respondent is identified as living in a rural location. If there are only urbanized areas in a respondents' ZCTA, they are classified as living in an urban location. Respondents with a mix of urbanized and non-urbanized areas are classified as being "mixed urban."

School Type

In wave 15, respondents indicated if their randomly selected child attended a neighborhood public school, magnet public school, charter school, private/religious school, were homeschooled, or attended another type of school. We recode magnet public schools to be included with neighborhood public schools. Additionally, we remove any respondents who indicate homeschooling on this or other questions. Our resulting analytic sample is composed only of students attending public (86%), charter (6%), and private (8%) schools.

Given a Choice of Modality

Wave 15 respondents who do not report homeschooling their child are asked "Is your child's mode of attendance right now based on a choice your school gave you?" We recode answers to this question to form a binary variable and exclude respondents (N=59) who indicate they are unsure if their school gave them a choice of learning modality from our analysis. Including these respondents and coding them as not being given a choice of modality doesn't change the results significantly.

Share of Schools Only Offering Remote

Using a large database of district reopening plans provided by MCH strategic data[19], we identify learning modalities offered in 78% of public school districts nationwide at the time of the wave 15 survey. For details about how we validated these data, see Appendix A. We then match school districts to census tracts using a crosswalk from NCES[20] and construct a continuous variable representing the prevalence of remote-only learning weighted by district enrollment in each tract. For census tracts with one modality or one district, this becomes a binary variable. While we can identify if districts offer hybrid or in-person learning, we select the remote-only measure as it is less prone to measurement

[19] https://www.mchdata.com/covid19/schoolclosings
[20] https://nces.ed.gov/programs/edge/Geographic/RelationshipFiles

error and more accurately reflects the supply of learning options available to students in that district.

State

Respondents indicate their state of residence on their quarterly update survey. We use this information to include state fixed effects in specifications B-D of our analysis.

Correlations Between Variables

Tables B.1 and B.2 show correlation tables across respondents' traits and school characteristics, respectively. Overall, we observe considerable independent variation that allow identification of our models. The highest correlations among respondents' traits are observed between the media trust and public health trust indexes as well as with the political leanings. Across school characteristics we observe strong correlations between the prevalence of remote learning in local public schools and our outcome variable of mode of learning but no other strong correlations across explanatory variables. Overall, these correlations mitigate any concerns of multicollinearity issues in our models.

Table B.1

Correlations Among Respondents' Traits

Rural	1.00											
Mixed-Urban	-0.47	1.00										
Urban	-0.33	-0.68	1.00									
HS or Less	0.17	-0.14	0.01	1.00								
Ed: Some College	-0.04	-0.02	0.05	-0.25	1.00							
Ed: College Grad	-0.10	0.13	-0.05	-0.61	-0.61	1.00						
Employed	0.04	0.01	-0.05	-0.21	-0.09	0.25	1.00					
Biden Voter	-0.23	-0.04	0.23	-0.09	0.01	0.07	-0.02	1.00				
Trump Voter	0.23	0.07	-0.27	0.04	-0.01	-0.03	0.04	-0.76	1.00			
Media Trust	-0.14	-0.04	0.15	-0.10	0.06	0.03	-0.07	0.46	-0.43	1.00		
Public Health Trust	-0.16	-0.01	0.14	-0.12	0.03	0.08	-0.01	0.36	-0.33	0.52	1.00	
Incidence Rate	-0.15	-0.14	0.27	0.05	0.08	-0.11	-0.04	0.16	-0.19	0.07	0.06	1.00

Table B.2

Correlations Among School Characteristics

In-Person	1.00							
Remote	-0.70	1.00						
Hybrid	-0.29	-0.49	1.00	0.01				
School Quality	0.06	-0.07	0.01	1.00				
Public School	-0.05	-0.03	0.10	-0.05	1.00			
Charter School	-0.12	0.16	-0.07	-0.02	-0.64	1.00		
Private School	0.18	-0.11	-0.07	0.08	-0.72	-0.08	1.00	
Given Choice of Modality	0.19	-0.29	0.15	-0.04	0.10	-0.12	-0.02	1.00
Remote Learning Prevalence	-0.38	0.48	-0.18	-0.02	-0.10	0.13	0.02	-0.24	1.00

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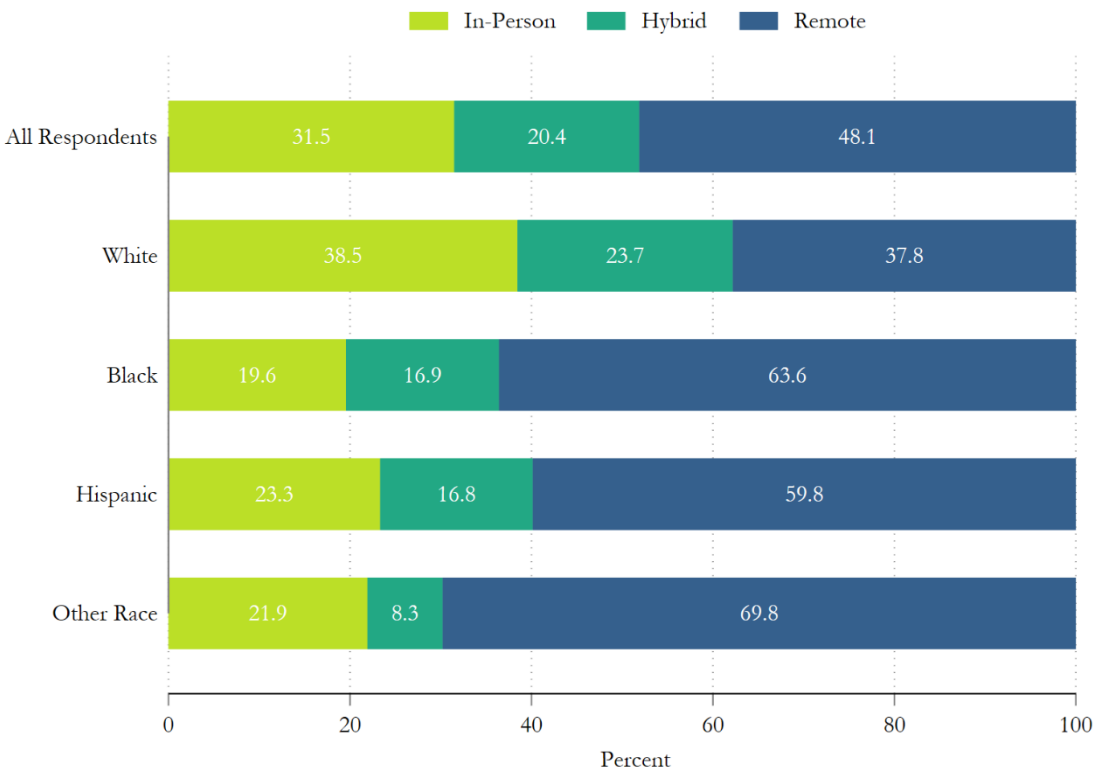
Figure 1 – Learning Modality by Race (UCA Wave 15)



Note: Results weighted using population weights to the CPS benchmarks.

Table 1

Wave 15 Respondent Characteristics

	Overall *(N=1191)*	**White** *(N=756)*	**Black** *(N=116)*	**Hispanic** *(N=243)*	**Other Race** *(N=76)*	**P-Value**
Mode of Attendance						
In-Person	0.315	0.385	0.196	0.233	0.219	0.000
Hybrid	0.204	0.237	0.169	0.168	0.083	0.005
Remote Learning Only	0.481	0.378	0.636	0.598	0.698	0.000
Income						
Less than $40,000	0.334	0.264	0.598	0.335	0.381	0.000
$40,000-$100,000	0.410	0.421	0.339	0.470	0.219	0.007
$100,000+	0.256	0.315	0.064	0.195	0.399	0.000
Education						
H.S. Degree or Less	0.364	0.372	0.395	0.354	0.230	0.215
Some Postsecondary	0.174	0.137	0.214	0.249	0.144	0.045
Degree Earned	0.462	0.491	0.391	0.397	0.626	0.029
Grade Level						
Kindergarten/Elementary	0.392	0.385	0.386	0.410	0.405	0.968
Middle School	0.308	0.311	0.271	0.357	0.158	0.027
High School	0.300	0.304	0.342	0.232	0.436	0.110
Voter Intentions						
Biden Voter	0.414	0.276	0.823	0.493	0.602	0.000
Trump Voter	0.415	0.579	0.061	0.231	0.233	0.000
Undecided Voter	0.076	0.059	0.068	0.134	0.032	0.110
Other	0.096	0.086	0.049	0.142	0.133	0.227
School Type						
Public School	0.883	0.891	0.921	0.837	0.901	0.350
Charter School	0.055	0.034	0.067	0.101	0.059	0.126
Private School	0.062	0.076	0.013	0.062	0.040	0.000
Employed	0.696	0.697	0.670	0.707	0.714	0.944
Media Trust	0.259	0.080	0.500	0.484	0.650	0.000
Public Health Trust	-0.093	-0.173	-0.180	0.064	0.388	0.000
School Quality	0.035	0.061	-0.233	0.085	0.248	0.040
COVID Perceived Risk	-0.130	-0.181	0.002	-0.061	-0.223	0.199
Incidence Rate	0.020	0.018	0.027	0.023	0.021	0.000
Case-Fatality Rate	0.026	0.026	0.029	0.025	0.025	0.629
Given Choice of Modality Remote Learning Prevalence	0.712	0.730	0.719	0.661	0.705	0.647
	0.354	0.263	0.414	0.504	0.555	0.000

Note: Sample restricted to respondents with school-aged children enrolled in a public, private, or charter school and attending via remote, hybrid, or in-person learning. Sampling weights used. P-values are the result of an adjusted Wald test of statistical significance.

Table 2

Average Marginal Effects - In-Person Modality

	A (N=1,191)		**B** (N=1,190)		**C** (N=936)		**D** (N=876)	
	AME	**SE**	**AME**	**SE**	**AME**	**SE**	**AME**	**SE**
Race: Black	-0.189***	0.050	-0.173***	0.049	-0.111	0.079	-0.048	0.077
Race: Hispanic	-0.151***	0.051	-0.045	0.059	-0.004	0.069	0.053	0.062
Race: Other	-0.165**	0.076	-0.044	0.092	-0.009	0.112	0.094	0.098
Employed			0.033	0.040	0.083*	0.043	0.053	0.044
Middle School Student			-0.121***	0.041	-0.172***	0.042	-0.191***	0.044
High School Student			-0.129***	0.040	-0.178***	0.043	-0.177***	0.045
Media Trust Factor					-0.027	0.021	-0.019	0.022
Public Health Trust Factor					0.000	0.022	0.007	0.021
School Quality Factor					0.019	0.018	0.001	0.018
Trump Voter					0.120**	0.047	0.147***	0.049
Undecided Voter					0.011	0.064	0.027	0.074
Other Candidate					-0.035	0.064	-0.020	0.067
COVID Perceived Risk					-0.044*	0.023	-0.045**	0.022
Rural					0.077	0.048	0.079*	0.044
Urban					-0.028	0.048	0.013	0.055
Incidence Rate					-5.435**	2.428	-3.328	2.351
Case Fatality Ratio					-1.079	1.016	-1.331	1.027
Charter School Student							-0.179***	0.057
Private School Student							0.389***	0.061
Given Choice of Modality							0.119***	0.044
Schools Only Offer Remote							-0.167***	0.047
Demographic Controls	N		Y		Y		Y	
State Fixed Effects	N		Y		Y		Y	
McFadden's Pseudo R^2	0.031		0.236		0.316		0.381	

Sampling weights used. Demographic controls also include income and education

**** p≤.01, ** p≤.05, * p≤.1*

Table 3

Average Marginal Effects - Remote Modality

	A (N=1,191)		**B** (N=1,190)		**C** (N=936)		**D** (N=876)	
	AME	**SE**	**AME**	**SE**	**AME**	**SE**	**AME**	**SE**
Race: Black	0.258***	0.058	0.220***	0.060	0.100	0.076	0.019	0.064
Race: Hispanic	0.221***	0.056	0.059	0.055	0.007	0.062	-0.034	0.053
Race: Other	0.320***	0.080	0.103	0.095	0.028	0.102	-0.056	0.082
Employed			-0.054	0.039	-0.051	0.044	-0.030	0.047
Middle School Student			0.087**	0.041	0.126***	0.040	0.137***	0.042
High School Student			0.118***	0.042	0.140***	0.044	0.117***	0.045
Media Trust Factor					0.042*	0.022	0.041*	0.024
Public Health Trust Factor					-0.021	0.022	-0.022	0.022
School Quality Factor					-0.012	0.017	0.007	0.017
Trump Voter					-0.136***	0.049	-0.138***	0.051
Undecided Voter					-0.008	0.070	-0.045	0.071
Other Candidate					0.016	0.073	0.049	0.077
COVID Perceived Risk					0.039*	0.022	0.040**	0.020
Rural					-0.146***	0.047	-0.155***	0.044
Urban					0.037	0.050	-0.003	0.052
Incidence Rate					8.607***	2.414	6.472***	2.298
Case Fatality Ratio					-1.970*	1.053	-1.568	1.002
Charter School Student							0.188**	0.081
Private School Student							-0.292***	0.054
Given Choice of Modality							-0.166***	0.042
Schools Only Offer Remote							0.153***	0.041
Demographic Controls	N		Y		Y		Y	
State Fixed Effects	N		Y		Y		Y	
McFadden's Pseudo R^2	0.031		0.236		0.316		0.381	

Sampling weights used. Demographic controls also include income and education

**** p≤.01, ** p≤.05, * p≤.1*

Table 4

Average Marginal Effects -Hybrid Modality

	A (N=1,191)		**B** (N=1,190)		**C** (N=936)		**D** (N=876)	
	AME	**SE**	**AME**	**SE**	**AME**	**SE**	**AME**	**SE**
Race: Black	-0.069	0.048	-0.048	0.050	0.011	0.067	0.029	0.066
Race: Hispanic	-0.069	0.045	-0.014	0.054	-0.003	0.058	-0.019	0.052
Race: Other	-0.154***	0.045	-0.059	0.066	-0.019	0.074	-0.038	0.064
Employed			0.021	0.035	-0.032	0.037	-0.023	0.037
Middle School Student			0.035	0.037	0.046	0.037	0.054	0.040
High School Student			0.011	0.037	0.038	0.037	0.060	0.037
Media Trust Factor					-0.015	0.019	-0.022	0.020
Public Health Trust Factor					0.020	0.020	0.016	0.019
School Quality Factor					-0.007	0.015	-0.008	0.015
Trump Voter					0.016	0.043	-0.009	0.043
Undecided Voter					-0.003	0.064	0.018	0.071
Other Candidate					0.019	0.062	-0.029	0.063
COVID Perceived Risk					0.005	0.022	0.005	0.021
Rural					0.069	0.045	0.076*	0.045
Urban					-0.009	0.036	-0.010	0.037
Incidence Rate					-3.172	2.034	-3.144	1.960
Case Fatality Ratio					3.049***	0.932	2.898***	0.881
Charter School Student							-0.009	0.083
Private School Student							-0.098**	0.044
Given Choice of Modality							0.047	0.044
Schools Only Offer Remote							0.014	0.041
Demographic Controls	N		Y		Y		Y	
State Fixed Effects	N		Y		Y		Y	
McFadden's Pseudo R^2	0.031		0.236		0.316		0.381	

Sampling weights used. Demographic controls also include income and education

*** $p \leq .01$, ** $p \leq .05$, * $p \leq .1$