School choice increases racial segregation even when parents don't care about race

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This research examines how school choice impacts school segregation. Specifically, this work demonstrates that even if we lived in a world where no one takes race into consideration in their school choice, Black and White differences in preferences for other school attributes can still result in segregation. We theorize that since Black and White parents exist within a racial hierarchy in the US, differences in group status position lead to differences in school preferences that affect social status change. Feeding these revealed preferences into a series of simulations highlights that even if parents do not intentionally seek schools with their own racial group. preference differences lead to 10.7% more segregated schools—the equivalent of over 6 million children in K-12 US schools. We find that under a regime of unmitigated school choice, school preference differences between Black and White parents that have nothing to do with race can still increase racial segregation. However, if these parents had similar preferences, unmitigated school choice would reduce racial segregation. This research may inform public policy concerning school segregation and school choice.

segregation | school choice | status | preferences | heterogeneity |

A fter the U.S. Supreme Court's 1954 ruling on Brown v. Board of Education deemed segregation unconstitutional, school segregation significantly dropped over the next three decades. Before the law was enforced, 99% of students attended schools that were racially segregated (i.e., racial/ethnic group comprises more than 75% of the student body; (1)). By the end of the 1980s, the proportion dropped to 63% for Black and 61% for White students (2–4). However, the Supreme Court's 1990 decision on Board of Education of Oklahoma City v. Dowell weakened regulatory support for school integration efforts. Today, segregation levels have regressed to those seen in the late 1960s: 69% of Black students and 87% of White students attend a school where they are the predominant race (5).

School-choice advocates contend that increasing the availability of school choice (policies, funding, and infrastructure that enable parents to select whichever school that best fits their needs) may reduce racial segregation by allowing parents to freely choose schools for their children (6, 7). A counter position maintains that because of parents' preference for their own racial group, parents choose schools where their child is a member of the predominant race (8, 9). This is supported by research which finds a positive relationship between availability of school choice and racial segregation (10). In this view, policies that reduce school choice mitigate segregation.

If unmitigated school choice enables parents to select whichever school they want for their children, then we propose that school choice creates a market for educational services where the parent is the consumer and schools are service options in a choice set. Schools that differ in attributes will attract different market segments of parents who differ in preferences. We theorize that regardless of preference for one's own racial group, the extent to which Black and White parents differ in school preferences can determine the effect of school choice on segregation. Specifically, we propose that preference differences in Black and White parents occur because of a divergence in motivation to change social status. For this reason, Black and White parents will select different schools, regardless of preference for one's own racial group. In effect, even if parents did not intentionally seek schools where the majority of students are in their own racial group, unmitigated school choice among parents would lead to increased racial segregation. However, if these parent groups had the same preferences, unmitigated school choice would lead to reduced racial segregation.

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Parents view education as a means to influence social status, which is one's relative level of deference, honor, respect, and assumed competence afforded to an individual during their lifetime (11–13). Education sharply influences social status by impacting one's career and income opportunities. As such, when choosing a school is possible, parents use school choice to increase their children's life-long social status. Published work suggests that in their decision process, parents consider a variety of school attributes. These attributes include 1) the school's performance rating, 2) teacher experience, 3) prevalence of poverty among the students, 4) the commute (i.e.,

Significance Statement

Children within the US largely attend segregated schools, a remnant of historic racial inequities. Given that school resources are largely divided along racial lines, segregation impacts the success of children since education is one of the most dominant predictors of life-long social status. Scholars have offered that despite enhanced freedom of school choice, structural barriers and preferences for one's own race maintain segregation. We propose that differences in how Black and White parents prioritize school attributes also contribute to segregation, even if there were no structural barriers nor preferences for one's own race. We theorize that these differences occur due to the de-facto racial hierarchy in the US that assigns higher group social status to White people and lower status to Black people. This discrepancy shifts how Black and White parents make school-related decisions for their children in an effort to affect their children's eventual social status.

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amount of time it takes a parent to get their child from home to school), and 5) the racial composition of the student body (14–21). Notably, although parents consider each of these attributes when selecting a school for their children, these attributes vary in how parents think they will impact their children's social status. This research conducted a pilot study on 150 parents who were asked to rank school attributes in terms of effect on social status (see the Supporting Information (SI) Appendix for details). Overall, participants ranked school performance (presented as an A, B or C rating based on test scores, graduation rates, college attendance rates, etc.) as the most effective in changing social status. This was followed in degree by teacher experience, student income demographics, student racial demographics, and commute to school.

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One might expect that parents, regardless of race, would equally prioritize school performance above other school attributes. However, this work shows that Black and White parents differ in preferences for school attributes because they differ in social status motivations. We propose that even if there is no preference for one's own racial group, we can expect that racial groups will still choose different schools if the schools have different attributes. Consequently, even if we lived in a world where no one takes race into consideration in their school choice, Black and White differences in preferences for other school attributes can still result in segregation. However, this work considers that Black and White parents exist with a racial hierarchy in the US, and this difference in group position alters their motivation to use the school system to affect social

In terms of racial hierarchy, the US has historically assigned lower social status to Black people and higher social status to White people. (22, 23). This positional difference differentially impacts how these groups prioritize the aforementioned attributes when selecting schools. Previous research finds that groups assigned lower social status differ from those assigned higher social status in their motivation to increase their status position. Those assigned lower social status seek to reduce hierarchical position differences (24). Thus, we propose that Black and White parents will differ in their motivation to increase the social status of their children. Specifically, we theorize that Black parents are more willing than White parents to forego other attributes if it means that their children can attend the highest performing, top-ranked (e.g., A-ranked) schools. Specifically, Black parents should be more willing than White parents to trade-off schools with more experienced teachers, shorter commute times, higher-income student bodies, and own-race demographics in favor of the highest performing schools for their children.

Notably, this difference in attribute preferences between Black and White parents may be affected by income level. Previous research finds a positive relationship between a Black person's income and pursuit of greater respectability and social status, as measured by the John Henryism scale (25, 26). In contrast, no such relationship was found for White people. Indeed, middle- and upper- class minorities often report dressing in nicer clothes and over-tipping in restaurants as strategies to increase their perceived status (27). Furthermore, Black middle-class informants report consuming higher-status goods as a tool for gaining respectability among the greater American populace (28). Thus, we propose that higher-income Black parents are motivated to increase social status more

than not only higher- and lower-income White parents but also lower-income Black counterparts. Thus, we predict that higher-income Black parents will place the greatest weight on choosing the highest performing schools.

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If Black and White parents differ in school attribute preferences, it follows that they would predictably choose different schools if the schools vary in these attributes. This would occur even if parents do not intentionally seek schools where most of the students are in their own racial group. For example, imagine a version of the US in which the proportion of Black and White students at a school had no effect on a parent's willingness to choose the school. Furthermore, imagine a city opens two schools. The first school is an A-ranked, top performing school but has a long commute for the average household. The second school is a B-ranked but has a short commute for the average household. Now imagine hundreds of Black and White parents are given complete freedom of choice in choosing either of these schools for their children. We predict that the Black parents are more likely to select the A-ranked school with the long commute and that the White parents are more likely to select the B-ranked school with the benefit of the short commute. Even in the absence of a preference for schools where the majority is one's own racial group, the likely outcome is that the two schools would be segregated.

Furthermore, the availability of unmitigated school choice should moderate this effect. If only a few families in our imaginary scenario are able to freely choose between these schools, the difference in preferences between Black and White parents would have a weaker effect on segregation. Thus, we propose that a policy of unmitigated school choice compounds and increases segregation when Black and White parents have different school preferences. In contrast, a policy of unmitigated school choice decreases segregation when Black and White parents have the same school preferences.

In sum, this work predicts that 1) Black parents have a greater preference than White parents for the highest performing schools, 2) Black parents are more likely to trade-off other school attributes to choose A-ranked schools for their children than their White counterparts, 3) the gap in preference for A-ranked schools increases for Black, but not White, parents as their income increases, 4) differences in attribute preference between Black and White parents leads to racial segregation, and 5) as school choice increases in markets where Black and White parents have preference differences, segregation increases. The present research first conducts a choice-based conjoint study to reveal the underlying preferences of Black and White parents. A subsequent simulation analysis with an agent-based model uses these preferences as decision weights to demonstrate how preferences affect segregation in school choice regimes.

Study 1. To examine whether Black and White parents currently differ in preferences for school attributes, we conducted a choice-based conjoint (CBC) study. The choice of CBC was deliberate because this method is designed to reveal the true preferences of surveyed populations when faced with challenging trade offs of multiple attributes in a product or service (29). This method is also useful in reducing the likelihood of social desirability bias in responses.

We recruited participants in two waves. Since there were no statistical differences between the results of the two waves, we

present the aggregated results. The combined pool contained 344 parents who self-identified as White and 261 parents who self-identified as Black. We showed each participant 32 choice sets of school options. Each choice set contained three fictional schools and a fourth option of "None". Choice sets displayed information about each school's performance rating, teacher experience, racial composition, income demographics, and average commute time to the school. The SI Appendix shows an example of the school choice sets in Figure S1 and provides details on the attributes in Table S1.

Participants selected one of the four options from each choice set. The three school options varied the values of the five attributes. Given our theory and the pilot study results, we expected Black parents to place greater value on school performance but relatively less value on the other attributes in comparison to White parents.

Next, we estimated parents' value (utility) for each school attribute with a hierarchical Bayesian multinomial logit model (29). We model participant i's utility for school j (or "None") as follows:

$$U_{ij} = \beta_1 \ A.level_j + \beta_2 \ B.level_j + \beta_3 \ C.level_j$$
[1]
+ \beta_4 \ TeachersExperience_j + \beta_5 \ LowIncomeStudents_j
+ \beta_6 \ ShortCommute_j + \beta_7 \ OwnRace_j + \varepsilon_{ij}
\varepsilon_{ij} \simes \mathbf{EV}_1(0,1)

Each variable in Eq. (1) is a dummy variable which represents the value of the attribute of the school selected by the participant. Dummy variables equaled 1 if the selected school had the attribute of the given performance level (A, B, or C), 80% (vs. 20%) of teachers with at least 3 years of experience, 70% (vs. 30%) of the students from low-income households, the commute to school was 8 minutes (vs. 28 minutes), and parent's race matched the majority race of the school. Otherwise the variable was 0.

School Attributes Preference Results. Table 1 displays the results from analysis of the conjoint study. They indicate that all the school attributes play an influential role in the decisions of Black and White parents. Notably, White and Black parents differ in the utility placed on all attributes with the exception of teacher experience.

Table 2 shows the importance weights derived from the utility values in Table 1. Importance weights measure how important to the parent a school attribute is relative to other attributes. School Performance represents the aggregation of school ratings (A/B/C levels) shown in Table 1.

Tables 1 and 2 indicate that the conjoint results are consistent with our predictions. Both Black and White parents value nearby, high performing schools with experienced teachers. Yet the weights that Black and White parents place on these school attributes differ. Choosing the highest-performing A-level school has nearly twice the utility for Black parents as White parents. Although both groups prefer a school with a majority race that matches their own, Black (vs. White) parents are more willing to forego such a school. Black (vs. White) parents are also more willing to accept longer commutes and schools where a greater proportion of students experience poverty in exchange for high performing schools.

Table 1. Parent's Utility for School Attributes

	Black	White	Difference
A-level School	4.091***	2.415***	1.675***
	(0.366)	(0.308)	(0.458)
B-level School	0.798*	-1.385***	2.183***
	(0.332)	(0.290)	(0.424)
C-level School	-4.306***	-6.253***	1.947**
	(0.441)	(0.415)	(0.577)
Teacher Experience	1.569***	1.640***	-0.071
	(0.113)	(0.105)	(0.149)
Low-Income Students	-0.361***	-0.798***	0.437***
	(0.095)	(0.085)	(0.125)
Short Commute	1.730***	2.208***	-0.477*
	(0.162)	(0.149)	(0.214)
Own Race Is Majority	1.014***	1.459***	-0.445*
	(0.155)	(0.138)	(0.205)
Parents	261	344	
Observations	8,352	11,008	

Note:

⁺p<0.1; *p<0.05; **p<0.01; ***p<0.001

Table 2. Importance of School Attributes to Parents

	Black	White	Difference
School Performance	64.2%	58.7%	5.6%
Teacher Experience	12.0%	11.1%	0.9%
Short Commute	13.2%	14.9%	-1.7%
Own Race Is Majority	7.7%	9.9%	-2.2%
Student Income Level	2.8%	5.4%	-2.6%
Total	100.0%	100.0%	0.0%

In contrast, White (vs. Black) parents had a significantly greater preference for schools with a shorter commute whose students come from White, higher-income homes. They were relatively less willing to trade-off these attributes in favor of their children attending the highest performing schools.

Additionally, parental income level moderates preferences for school attributes (see SI Appendix Table S2). As income increases, the difference between White and Black parents widened for the utility for A-level schools (White: 2.978 vs. Black 4.898, p < 0.01). The gap also widened in preference for schools where the predominant race matches their own (White: 1.439 vs. Black 0.724, p < 0.01). This widened gap in race preferences was driven by higher-income Black parents having an even greater willingness to forego majority Black schools than lower-income Black parents. On the other hand, there was a reduced gap between high-income Black and White parents for all other attributes. The gap narrowed for B-level (White: -1.255 vs. Black 0.731, p < 0.01) and C-level (White: -6.433 vs. Black -4.925, p < 0.1) schools. The gap disappeared for teacher experience (White: 1.690 vs. Black 1.680, n.s.), low-income students (White: -1.053 vs. Black -0.758, n.s.), and short commute (White: 2.259 vs. Black 2.147, n.s.). Overall, these results suggest that high-income Black parents as compared to both high-income White, low-income White, and low-income Black parents, have the highest preference for A-ranked schools.

Study 2. The goal of Study 2 is to understand how differences in school preferences between Black and White parents impact school segregation, especially when parents can freely

choose their child's school under school choice policies. To examine this, we use Study 1 estimates of utility values for school attributes as inputs into a simulation in an agent-based model (ABM). An agent-based model allows us to simulate the behavior and interactions of autonomous individual agents (e.g., parents, schools) and policy decisions (e.g. school choice) to analyze emergent macro phenomena like school segregation rates (30, 31).

Model Design and Assumptions. The ABM simulates the school decisions of parents over 20 time periods. Parents choose among 7 schools in a school district that serves 4,000 households. Each household consists of one or more children. We assume all members of a household are members of the same race. In the ABM, we test whether the proportion of households that exercise school choice impacts school segregation levels. We examine the impact when Black and White parents differ in school preferences and when they do not. We also examine the impact when Black and White parents include race of students as a factor in their decision and when they do not.

In each simulation, a randomly selected proportion of households are allowed to exercise school choice. Households that exercise school choice can select any one of the 7 district schools for their children. We model each househould decision with a multinomial logit regression whose structure is the same as Eq. (1). Each household selects the school that maximizes their utility according to the values for school attributes derived from Study 1. Each household that exercises school choice can change their children's school at each time step. This models instances when parents grow dissatisfied with the attributes of their children's current school and decide to move them to a more preferable school. Remaining households cannot exercise school choice. They send their child to one assigned school and keep them there, which mirrors public school assignment in most U.S. school districts.

We assume that each household within the school district falls into one of the following four income-racial identity groups: high-income Black households, low-income Black households, high-income White households, and low-income White households. Each group has its own set of school attribute preferences from Study 1. SI Appendix Table S3 shows the variables used in the ABM, input assumptions, and the data sources upon which assumptions were based.

We use two common measures of segregation: 1) the dissimilarity index (32) and 2) the entropy index (33). Dissimilarity is the percentage of students from a racial group that would have to move to another school to achieve desegregation in their current school. Entropy measures the comparison between a school's racial composition and that of the school district. If the school and district have the same racial composition, then the school is considered desegregated. Both indices have values between 0 (complete desegregation) and 1 (complete segregation). See SI Appendix for details on the segregation measures.

We simulate parental school preference under three conditions: Different Preferences with Race, Different Preferences without Race, and Same Preferences without Race. In the Different Preferences with Race condition, we model a parent's school choice by using the utility values for all school attributes derived from Study 1. In this condition, parents include racial composition of the student body as a factor in their decision.

In contrast, parents do not include racial composition of the student body as a factor in their decision in the Different Preferences without Race condition. To operationalize this, we set the utility value for one's own-race to 0 . This allows us to simulate a scenario where the racial composition of a school has no effect on a parent's school selection. Thus, we control for preferences for one's own race as a contributing factor to segregation. In the Same Preferences without Race condition, all four household income-race groups have the same preferences which do not include racial composition as a factor. We use the average utility part-worths across all the racial-income groups in Study 1 to drive parent decisions in the Same Preferences without Race condition.

To assess the results of the ABM, we first compare Different Preferences with Race to Same Preferences without Race conditions. We assess this to determine the degree to which different preferences for school attributes, including school racial composition, contribute to segregation under a regime of unmitigated school choice. Next, we consider a scenario in which racial composition of a school has no effect on a parent's school preference. Thus, we compare segregation levels between Different Preferences without Race and Same Preferences without Race conditions. Finally, we compared Different Preferences without Race and Different Preferences with Race to quantify the degree that own-race preference in isolation contributes to school segregation.

We estimated a fractional logistic regression model with the following function:

Segreg.
$$\sim \alpha_0 + \alpha_1$$
 PreferencesDiffer [2]
 $+ \alpha_2$ PreferOwnRace $+ \alpha_3$ SchoolChoice
 $+ \alpha_4$ NeighborhoodHomophily
 $+ \alpha_5$ PreferencesDiffer * SchoolChoice
 $+ \alpha_6$ PreferOwnRace * SchoolChoice

In Eq. (2), PreferencesDiffer and PreferOwnRace are dummy variables which represent preference conditions tested in the agent-based model. PreferencesDiffer equaled 1 if all four income-race groups differed in preferences for school attributes (whether racial preferences were included or not). PreferOwnRace equals 1 if a parent's decision factored in the student racial composition of the school. Otherwise the variables were 0. SchoolChoice equals the proportion of households which exercise school choice. These households choose the school which provides them the greatest utility at any time during the simulation. Finally, to account for differences in the racial segregation which currently exists across US neighborhoods (34), we include the measure NeighborhoodHomophily. This variable equals the probability that a household's neighbor is of the same race. The greater the probability, the greater the neighborhood segregation. This model input allows us to control for residential segregation's contribution to school segregation.

School Segregation Results. Table 3 displays results from the fractional logit regression estimates of data generated from the agent-based model simulations. The two regression models use the dissimilarity and entropy segregation measures as dependent variables. Results support our hypothesis that differences in preferences between Black and White parents contribute to school segregation.

Table 3. School Segregation Driven By Preference

	Segregation Dependent Variable:		
	Dissimilarity	Entropy	
	(1)	(2)	
Intercept	-2.942***	-5.552***	
	(0.019)	(0.038)	
Preferences Differ	0.315***	0.804***	
	(0.022)	(0.043)	
Prefer Own Race	0.349***	0.578***	
	(0.019)	(0.029)	
School Choice	-0.296***	-0.570***	
	(0.031)	(0.069)	
Neighborhood Homophily	$-0.013^{'}$	0.008	
	(0.015)	(0.024)	
Pref. Differ:School Choice	0.147***	0.301***	
	(0.040)	(0.081)	
Pref. Own Race:School Choice	-0.0003	0.033	
	(0.034)	(0.053)	
Observations	9,000	9,000	

Note:

+ p<0.1; * p<0.05; ** p<0.01; *** p<0.001

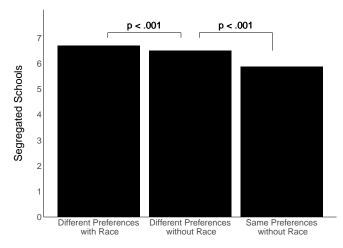
The results show that the positive and statistically significant coefficients on PreferencesDiffer in both regressions indicate that preference differences between Black and White parents in the ABM increases segregation levels. This is the case even when parents have no preference for primarily Black or White schools and even after controlling for the degree of residential segregation.

The results also show that the coefficient on the interaction of PreferencesDiffer with SchoolChoice is positive and significant. This suggests that when Black and White parents differ in school preferences, increases in school choice (households choosing any school) increases segregation.

A negative coefficient on *SchoolChoice* indicates that when Black and White parents have the same preferences (the baseline condition in the model), unmitigated school choice *reduces* segregation. This reduction occurs because Black and White parents in this scenario are choosing the same schools.

Next, we examined the average number of segregated schools (out of 7 total schools) in the three different worlds we simulated. Figure 1 displays a bar chart of our findings. Importantly, we find that even if parents do not intentionally consider racial composition of schools, school segregation is 10.7% greater in a world where Black and White parents differ in preferences for other school attributes compared to a world where parents have the same preferences (6.502 vs 5.873, p <0.001). We find that school segregation is 13.5% greater in a world where Black and White parents have different preferences that include racial composition compared to a world where parents have the same preferences and do not consider racial composition (6.683 vs 5.873, p <0.001). This means that including preference for one's own race in the decision increases segregation by an additional 2.7 percentage points.

Discussion. This work theorizes that the historical subjugation of Black people to a lower status in society leads Black (vs. White) parents to place more value on the school attribute that can improve their children's social status the most - sending their children to top performing schools. A choice-based



Note: Agent-based model simulates 7 schools in a school district

Fig. 1. Average Segregated Schools Under Black/White Preference Scenarios

conjoint study revealed that Black parents are more willing than White parents to forego short commutes, experienced teachers, schools with predominantly high-income students, and schools where their own race is the majority in favor of A-ranked schools. Moreover, household income impacted this preference. Black parents with higher incomes placed even greater value on the highest-rated schools for their children. In contrast, changes in income for White parents did not have as strong an effect on preference for A-rated schools.

Preference differences were simulated in an agent-based model to examine the impact at scale when parents are free to choose any school for their child. The simulation demonstrates that even if parents do not intentionally seek schools where their own racial group is the majority, Black vs. White preference differences regarding other school attributes could still increase school segregation by 10.7%. This translates to an additional 6 million US school children attending segregated schools. In sum, when there are differences in school attributes between Black and White parents, unmitigated school choice increases racial segregation.

In 2018, there were over 103,000 K-12 schools educating 56.4 million children in the US (35). Our research suggests that if there is unmitigated school choice, differences between Black and White preferences for other school attributes could still lead to an additional 14,000 racially segregated K-12 schools. This is the case even if all parents no longer considered school racial composition in their choice of schools.

These additional six million students would likely not get the benefits of racial desegregation. Racial desegregation in schools is linked to a positive effect on educational and health attainment for students and their descendants, increased earnings, improved health in children, and reduced crime (36–39). Thus, it is of the utmost importance to understand the underlying mechanisms of school segregation, which may inform policies aimed at desegregating schools.

The policy implications of this work are twofold. First, preference differences caused by social status inequality are an under-considered origin of school racial segregation. Expanding school choice without first addressing preference differences between Black and White parents may lead to more segregated schools. For policymakers who want to reduce school segrega-

tion, this research suggests that it would be short-sighted to rely purely on individual parental choices without considering the implications of these choices at scale. Indeed, even after controlling for parent's own-race preferences in schools, Black parents will continue to chase better schools due to differences in prioritization of short commutes, student household income level, teacher experience, and school performance. In contrast, White parents will be less motivated to move their children. The second implication is for school choice policy and programs. Our work suggests that unrestricted school choice programs could have detrimental impact on efforts to reduce school segregation. For this reason, policymakers may have to weigh the societal benefits of unmitigated school choice against the societal benefits of improved educational outcomes for all children.

Finally, we acknowledge a research limitation of the ABM model. It does not take into account the wealth gap in the US between Black and White parents. Black households have 10% of the wealth of White households (40). Although most public school systems receive their funds from shared property taxes, a majority of school districts allow individual schools to keep all of the funds raised by their neighborhoods (41). If school performance is linked to local neighborhood funding, an increase in Black parents with a corresponding decrease in White parents will likely mean a reduction in funds necessary to maintain high performance. Although our model suggests that unmitigated school choice would likely result in Black students moving to higher performing schools, it is possible that without sufficient funding, these schools will slip in ratings. As a result, Black parents will continue to pursue high performing schools to secure increased social status for their children.

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