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Supplementary Information for

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

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      Supplementary text
      Figs. S1 to S2 (not allowed for Brief Reports)
      Tables S1 to S3 (not allowed for Brief Reports)
      Legends for Dataset S1 to S4
      SI References

Other supplementary materials for this manuscript include the following:

      Datasets S1 to S4

Supporting Information Text

19 **SI Dataset S1 (DatasetPilot.csv)**
20   Pilot Study Data

21 **SI Dataset S2 (DatasetStudy1.csv)**
22   Study 1 Data

23 **SI Dataset S3 (CBCChoicesets.csv)**
24   Study 1 Choice Based Conjoint Cards

25 **SI Dataset S4 (DatasetStudy2.csv)**
26   Study 2 Data

27 **Pilot Study 1**

28 This study sought to determine how parents perceived the ability for five school attributes to change social-status of their
29 child. We recruited 163 Parents from Prolific Academic in exchange for $0.61. Of these parents, 150 completed the study and
30 were included in the final analysis. Parents were informed that they would be taking part in a study on school choice decision
31 making. They were asked to "imagine that you have a child that will be beginning school in a year, and you are reviewing
32 different school options for your child to attend." They were then provided information about each of the five school attributes:
33 school performance, income level, teachers & staff experience, commute time, and racial demographics.

34 Parents were then provided the following information about each school attribute, presented one at a time, in a random order:

35

36 **SCHOOL PERFORMANCE**
37 This measure tells you how well the school performs compared to national averages.
38 OVERALL GRADE-
39 A = Highest Performing School (Top 5% of schools in the country)
40 B = High Performing School (Top 20% of schools in the country)
41 C = Average Performing School (Top 50% of schools in the country)
42 High School Graduation Rate: The percentage of students who start and finish at the same school.
43 **National Average = 84%.**
44 SAT Score: Scholastic Aptitude Test. A standard test for college admissions.
45 **National Average = 1000 out of 1600 points.**
46 Percentage of graduates who go to college: The percentage of students who will attend a 4-year college within 12 months of
47 graduation from this school.
48 **National Average = 44%.**

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51 **INCOME LEVEL**
52 This measure tells you the economic make-up of the student body. Some schools have a high proportion of students from
53 high-income households while other schools have a high proportion of students from low-income households. This measure
54 shows the percentage of students from low-income households based on the percentage of students at the school who are eligible
55 for free or reduced-price lunches due to their family's income.
56 **National average of percentage of low-income households = 37%.**

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59 **TEACHERS AND STAFF**
60 This measures the number of teachers who have more than three years of teaching experience. In general schools that have
61 more teachers with more experience provide greater support to their students.
62 **National average of percentage of teachers with more than 3-years of experiences = 90%.**

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65 **PARENT COMMUTE TIME**
66 This measures the time that the parent must take out of their morning to help their child get to the school. The parent's
67 commute time is the total amount of time that the parent is actively involved in getting their child to school. This does not
68 include any time that the child spends getting to school without the parent's assistance (e.g., riding on the bus).
69 For example: If a parent spends 10 minutes driving their child to the school bus stop, then the parent's commute time is 10

minutes. If a parent spends 20 minutes driving their child to the school building each morning, then the parent's commute time is 20 minutes. If a parent has a child who walks to school, then the parent's commute time is 0 minutes.

National Average: 8 minutes

RACIAL DEMOGRAPHICS

This measures the racial and ethnic demographic make-up of a school. We only consider students who self-report their racial or ethnic demographics as White (non-Hispanic), Black (non-Hispanic), Hispanic, and Asian.

National Averages: 49% White, 15% Black, 26% Hispanic, 5% Asian.

Next parents were asked to rank each attribute and were given the following instructions:

Rank each school attribute below in order of how much you believe the average parent sees each attributes below as signaling a school's ability to increase a child's adulthood social status (i.e., the attribute that will lead to greatest change in relative level of respect, honor, assumed competence, and deference afforded to a person). Importantly, remember that these are not about your personal perspective, but what you think the average parent believes.

For example, imagine that the five attributes below were: a school's overall funding, the school's lunch cuisine, class offerings, number of students, and the school's proximity to a nearby college. If you think that most parents see a school's overall funding as the strongest attribute relative to the others in conveying the schools' ability to change one's social status, you would put this attribute as number 1. On the other hand, if you though that most parents see a school's overall funding as the weakest attribute relative to the others in in this aspect, you would rank it last as number 5.

1 = Least Effective at Changing Social Status 5 = Most Effective at Changing Social Status; reverse coded from original data for ease in comprehension

As pre-registered, we then analyzed the data using the Friedman test, which found significant differences across the school attributes' rankings $X^2(4, N = 150) = 172.06, p < .001$).

A Bonferroni correction post-hoc analysis revealed that, in degree from most effective to least effective in changing social status, parents rated the attributes in the following order (significance level represents comparison between each attribute and the attribute prior): School performance (M = 4.04), Teacher and Staff Experience (M = 3.47, p < 0.01), Income (M = 3.21, p = 1.00), Racial Demographics (M = 2.31, p < 0.01), followed by commute (M = 1.97, p = 0.63). See figure S1. Notably, school performance was ranked as the most effective attribute in changing social status relative to the other 4 attributes (ps < 0.01).

Study 1, Choice-Based Conjoint Study

Sample recruitment and exclusions. We posted two advertisement for this study on Prolific Academic in exchange for $1.00. In the first advertisement we recruited 400 White Americans. Of these 344 completed the study and were included in the final analysis. The recruitment was open for two weeks starting on April 27, 2020 The 400 participants completed attempted the study within 9 days. Additionally we collected demographic information including age (M = 41.3, SD = 11.3), gender (57.8% female), income level (M = 4.7, SD = 1.9, 1 = less than $15,000 per year, 8 = $150,000+ per year) and number of children (M = 1.9, SD = 1.1). A second advertisement recruited Black Americans for two weeks starting on April 27, 2020. However, due to large demographic differences on the Prolific Academic service we were unable to collect the total number of Black parents within the time-frame. To account for this discrepancy, we recruited Black parents in a second wave from Amazon's mechanical-Turk and through a list-serve of Black parents with school age children with an open two-week recruitment starting May 26, 2020. We collected demographic information for both studies. There was no significant difference in the demographic variables or the subsequent analysis of revealed importance, and thus the data were combined across data collection waves. Compared to the White parents, the Black parents recruited were of similar age (M = 40.9, SD = 12.25, t(603) = 0.44, P = 0.66), income level (M = 4.4, SD = 1.9, t(603) = 1.32, P = 0.19) and had a similar number of children (2.0, SD = 1.3,t(603) = 0.74, P = 0.34). However, this sample of Black parents had more mothers than fathers than the sample of White parents (65% female, chi-square = 4.05, P = 0.04).

Procedure. All participants read "imagine that you have a child that will be beginning school in a year, and you are reviewing different school options for your child to attend." They were then presented instructions for correctly answering a choice-based conjoint. They then selected 1 choice from 32 cards (see figure S2 for an example). Each card was presented at random. Table 1 includes each attribute and level available, and SI Dataset S4 includes the combination of the attributes for each choice set. After completing the CBC, participants provided their demographic information.

Income-Split Analysis. For analysis, income levels were split into high and low income. To make this distinction we followed guidelines set by the US department of Housing and Urban Development (HUD). To qualify for HUD's mean-tested benefit programs one must meet the income requirements for "low-income." Given the use of Indianapolis, IN as the baseline location within our Agent Based Model simulation, we used the Indiana specific HUD guidelines. The average household in this study was equivalent to 2 children. A a 4-person household qualifies for HUD benefits if they earn $50,150 or less (1). Thus, we set 4 on our 8-point scale($35,001-50,000) as our cutoff point for low-income. All participants who marked 4 or less, were categorized as low income. All above 4 were categorized has high income.

126   We then calculated utility weights for each school attribute by race and income level as seen in Table S2. These utility
127 weights were then used as inputs in our Agent-based model in Study 2.

Study2

129 **Agent Based Model Input Assumptions.** Variable = Inputted variable in the model. Description = Short description of each
130 variable. Value = The starting value inputted into the ABM. Source = Source of starting values. See Table S3.

131 **Measures of segregation.** We used two measures of segregation. See appendix A for equations.

Appendix A: Study 2, Equations for Segregation Measures.

Equation A1: Dissimilarity Index

$$D = \frac{1}{2}\sum_{i=1}^{n}\left|\frac{r_i}{R} - \frac{g_i}{G}\right|, \text{ where} \tag{1}$$

n = number of schools in school district

R = number of red students in the school district

r_i = number of red students in school i

G = number of green students in the school district

g_i = number of red students in school i

Equation A2: Segregation Entropy Index

$$h_i = -\sum_{J=1}^{k} p_{ij} \ln p_{ij} \tag{2}$$

h_i = entropy index for school i

k = number of ethnicities in school i

p_{ij} = proportion of school i population that is ethnicity j

$H = \left(\hat{H} - \bar{H}\right)$, where $\tag{3}$

$\hat{H}$ = school district segregation entropy index
     (calculated using Equation 2 with ethnicity
     proportions for entire school district)

$\bar{H}$ = weighted mean of all school entropy indices h_i;
     weighted by proportion of total school district population

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Table S1. Study 1. Choice-Based Conjoint Attributes and Levels

Attribute	Level
School performance rating	3 Levels:
	Depicted an A, B, or C letter grade, corresponding to graduation rate, test scores, etc.
Teacher Experience	2 Levels:
	Depicted 80% or 20% of teachers having at least 3 years experience teaching.
Low-income	2 Levels:
	Depicted 70% or 30% of the student body was comprised of low-income students.
Commute	2 Levels:
	Depicted 8 or 28 minute commute time for parents.
Racial Demographics	2 Levels:
	Depicted bar graphs with indicated that the school was 75% Black or 75% White.

**Table S2. High vs. Low Income Parent's Utility for School Attributes**

	High Income	
	White	Black
A-level School	2.978***	4.898***
B-level School	-1.255**	0.731
C-level School	-6.433***	-4.925***
Experienced Teachers	1.690***	1.680***
Low Income Students	-1.053***	-0.758***
Short Commute	2.259***	2.147***
Own Race Is Majority	1.439***	0.724**

	Low Income	
	White	Black
A-level School	1.828***	3.320***
B-level School	-1.468***	0.865*
C-level School	-5.832***	-3.604***
Experienced Teachers	1.571***	1.459***
Low Income Students	-0.478***	0.026
Short Commute	2.172***	1.369***
Own Race Is Majority	1.442***	1.313***

Notes: $^{+}$p<0.1; *p<0.05; **p<0.01; ***p<0.001

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Table S3. Study 2, Agent Based Model Assumptions

Variable	Description	Value	Source
Households	Number of households in simulated school district	4000	N/A
Proportion of White households	Percentage of households that are White, Non-Hispanic. In the model, these are denoted by "red" dots (vs. green dots). Note that in this model all households are assumed to be uni-racial, that is each parent and student are the same race. There are no-mixed race households.	21.6%	(2)
Proportion of low-income households	Percentage of households that are low-income	65.4%	(2)
Proportion of White households that are low income	Percentage of "red" dot households that are also low income	46.1%	(2)
Schools	Number of elementary schools in the district.	7	(2–4)
Academic Years	Years that students are in elementary school.	6	(3, 4)
Minimum School Age	Minimum age for child to enter kindergarten.	5	(3, 4)
A-rated schools	Percentage of schools in the school district that are A-rated.	14%	(2, 5)
B-rated schools	Percentage of schools in the school district that are B-rated.	15%	(2, 5)
C-rated schools	Percentage of schools in the school district that are C-rated.	71%	(2, 5)
Teacher Experience	Percentage of teachers in school district with 3+ years experience.	89%	(5)
School Choice	Percentage of household in a district that utilize school choice, and thus select the school with the highest utility. The remaining households cannot exercise school choice, and are assigned to the school closest to their home.	Uniform Distribution [0, 1]	N/A
Neighborhood Homophily	Probability that a given household has neighbors that are member of the same racial group.	Uniform Distribution [0, 1]	N/A
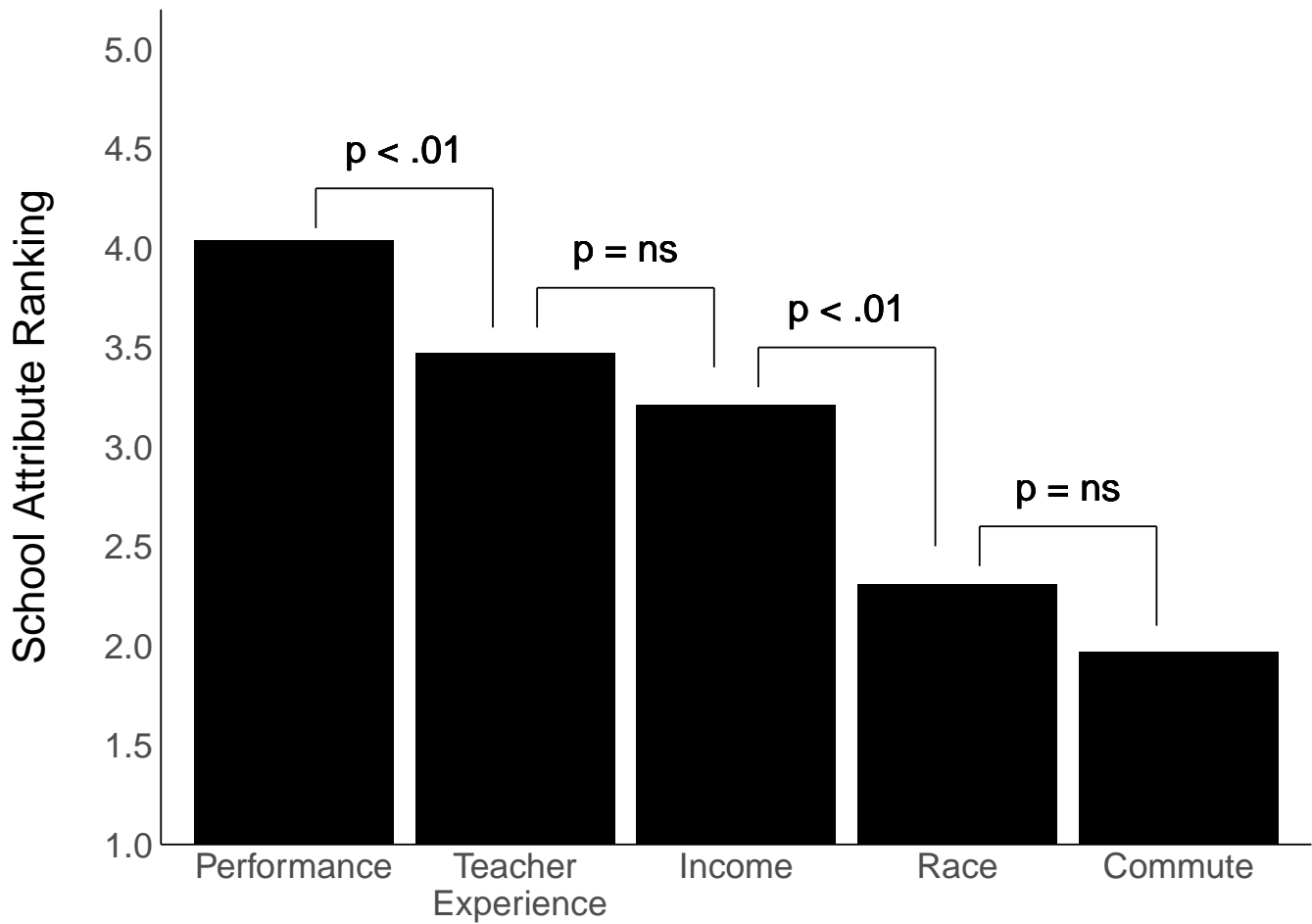
Note: 5 = most effective; 1 = least effective in changing social status

Fig. S1. Pretest Results: Perceived Effect of School Attribute on its Ability to Affect Social-Status Change.
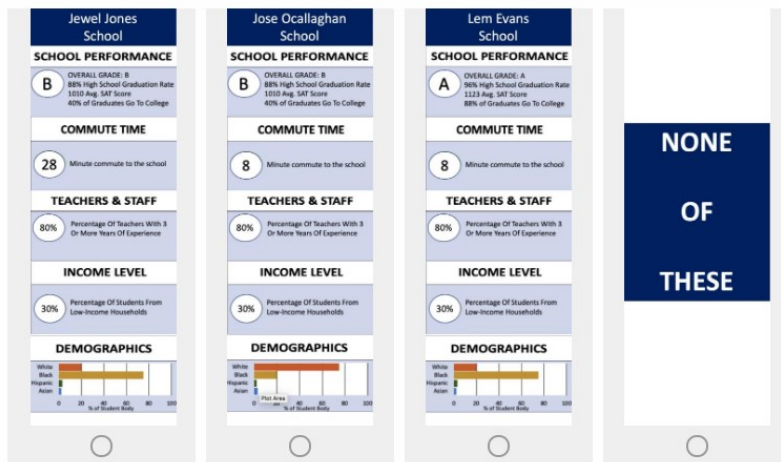
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Fig. S2. School Choice Stimuli in Choice-Based Conjoint Study

References

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