THE UNIVERSITY OF CHICAGO

NOT A CHOICE; HOW TRANSPORTATION INEQUITY UNDERMINES SCHOOL-CHOICE IN CHICAGO

BY

MARDET MULUGETA

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Faculty Advisor: Maria Bautista

Public Policy Studies Preceptor: Alexis Pearson

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Abstract

This study investigates how transportation inequities undermine the effectiveness of school-choice policies in Chicago, particularly for Black and Hispanic students from under-resourced neighborhoods. Using spatial data from the Chicago Metropolitan Agency for Planning's MyDailyTravel survey and qualitative interviews with four CPS students, the research examines how commute times, distance, and transportation modes impact access to education. Quantitative analysis reveals significant disparities: students of color face longer, more complex commutes, often traveling north to access higher-performing schools. Qualitative data adds depth, showing how unreliable transit, unsafe walking routes, and limited school bus access create daily obstacles. These findings suggest that school-choice, while intended to promote educational equity, fails to deliver for students without reliable transportation. The study advocates for targeted transit investments, universal student CTA passes, and a mobility justice framework to guide policy. Without equitable transportation, the promise of school-choice remains out of reach for many Chicago students.

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Introduction

Schools are important social institutions that cultivate successful members of society. They can build a learning culture that prepares students for life after schooling. A student-centered learning approach is key to schools as learning communities, where the student's advancement is the goal of every school (Toikka, 2023). Constant policy changes occur to ensure that every child gets their needs met to foster future success. Most projects completed on education focus on what happens in classrooms (Berliner, 2006; Cuban, 2013; Closa & Sarmiento, 2023). Issues such as careful curriculum implementation and proper instruction assessment are often at the forefront of conversations surrounding education policy. For example, fellows at the Brown Center on Education Policy identify key areas where they seek improvements, ranging from concerns over bipartisan support for funding to concerns about school staffing (Brookings, 2022). However, few projects consider the factors that lead students to show up at school. Without attending classes, students will not benefit from any of the values that schools add to society. Thus, it is important to understand how students get to school regarding the types of transportation they use in their commutes. This information allows for the identification of potential obstacles preventing students from attending school and furthering their educational careers. Because existing research places limited emphasis on students' experiences outside of school, scholars do not fully understand students' experiences before they step into school.

In Chicago, chronic absenteeism affects almost 40% of students (Gowins, 2024). Chronic absenteeism is defined as "missing at least 10 percent of days in a school year for any reason, including excused and unexcused absences" (American Federation of Teachers), meaning over 40% of Chicago Public School (CPS) students miss almost 20 full days of instructional material.

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Therefore, it is essential to understand if there are barriers that prevent students from attending school to combat the issue of chronic absenteeism. Considering the longstanding disparities in public transportation infrastructure in Chicago, this point is even more critical to understand. These disparities are most evident in how a resident's location in the city determines their transportation access; neighborhoods in the North enjoy more frequent service and shorter travel times than neighborhoods in the West and South (Kuzuhara, 2024). Simultaneously, the West and South sides of the city are racially segregated areas that are made up of majority-minority neighborhoods, meaning there is a concentration of Black and Hispanic residents in these areas (U.S. Census Bureau). Conversely, the North side of the city is where most White residents live (U.S. Census Bureau). Putting this information in the context of job access, public transit provides less access to opportunities for Black and Hispanic residents than to White residents despite Black residents relying more on public transit to get to work than White residents (TransitCenter). Furthermore, as cities become more car-centric, it is harder for transit-dependent residents to access the same work opportunities as car owners. When it comes to educational opportunities, it is even harder for residents from poor neighborhoods to access opportunities outside of their neighborhoods.

The issue of unequal education access becomes more apparent when considering the context of school-choice. As mentioned earlier, schools are important institutions that teach students how to succeed in society. To get the most out of their educational journey, students from underfunded neighborhoods can choose to attend schools in more affluent parts of the city. This option is the concept behind school-choice; "policy that allows families to take their children's education dollars to the approved education provider of their choosing – be it traditional public schools, public charter schools, private school, virtual learning, or

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homeschooling" (American Federation for Children). In other words, by giving parents and students the choice to attend a different school, school-choice allows parents to get a say in how to shape their children's educational journey despite unequal access to quality education (Barrow & Sartain, 2017). However, as stated earlier, it is hard for residents to get around the city using public transportation if they come from predominantly Black and Hispanic neighborhoods, which also tend to be the most underfunded parts of the city. Because public transportation is often the most affordable mode of travel for students who experience unequal access to quality education, inadequate transit access hinders these students' ability to benefit from school-choice. Therefore, an important question arises that this paper explores: How effective is school-choice when unequal public transportation access creates barriers for students from underfunded neighborhoods?

Before moving forward, defining a few key terms is essential to ensure proper communication. Common terms discussed in this paper include education equity, transportation equity, and mobility justice. Education equity is an umbrella term that defines several things: equal distributions of outcomes across populations; equal outcomes for every child; "equal resource allocations across students, schools, districts, states, or nations; equal experiences for each child; and equal levels of growth by each child" (Levinson et al., 2022). These meanings can often contradict themselves, but equity amongst all children is the underlying mission of school-choice by spreading resources to account for existing disadvantages for different groups of children. Education equity has the end goal of providing equal learning opportunities to all students. Policymakers developed school-choice through the framework of education equity, where students assigned to neighborhood schools that lack the proper resources can choose to attend schools that have access to those resources. It is clear here that education equity is

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concerned with prioritizing the less advantaged, and that definition best fits the term for this paper.

On the other hand, transportation equity refers to the fairness of transportation funding, such as how federal taxes should be collected and allocated concerning public transportation (Litman, 2025). Many papers on this topic focus on the drivers vs. non-drivers debate, where issues with highways and car-centric infrastructure are raised (Almagro et al., 2024; Mattioli et al., 2020). However, for the concerns of this paper, transportation equity will focus more on access to public transportation and the mobility of less advantaged people while using public transportation. In general, transportation equity can mean that transportation decisions are made with deep and meaningful community input that "leads to transportation networks and land use structures that support health and well-being, environmental sustainability, and equitable access to resources and opportunities." (Stacy et al., 2020). This perspective recognizes that disadvantaged communities often face more significant barriers to reliable and affordable transportation, which can limit access to jobs, education, and essential services. As a result, achieving transportation equity requires policies that prioritize historically underserved populations and work to reduce spatial and economic disparities in transit access.

Lastly, mobility justice connects education and transportation equity under one term. Mobility justice aims to ensure that people can safely and freely move around the city to get to their destinations (Harvard Kennedy School, 2025). This framework emphasizes critical thinking and forces researchers to address the root cause of inequalities (Bierbaum et al., 2020). An equitable transportation plan considers the circumstances impacting a community's mobility and connectivity needs, while an equitable education plan acknowledges the barriers preventing students from succeeding in their educational journey. Combining the two allows for a

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framework that addresses the issues within each term and helps bring education and transportation together in developing effective policy. This approach recognizes that students from underserved communities often face long and unreliable commutes, which can directly impact their academic performance and overall well-being. By integrating mobility justice into education and transportation policy, city planners can create solutions that enhance access to learning opportunities while fostering greater social and economic inclusion.

While previous research has explored how neighborhood factors like violence impact school attendance (Burdick-Will, 2017), this study focuses on the role of student commute patterns and perceptions of transportation access. Rather than examining the effect of specific external conditions on attendance in isolation, this paper looks at the broader landscape of how daily travel distances, transit reliability, and mode of transportation intersect with race and income to shape educational access. It moves beyond causal measurement to emphasize the lived experience of students navigating Chicago's unequal transit infrastructure. By incorporating both spatial analysis and qualitative input, this study provides a more nuanced understanding of students' indirect costs in accessing educational opportunities. In doing so, it highlights how transportation barriers undermine the promise of school-choice and reveals the practical limitations faced by students from under-resourced neighborhoods who must travel farther and longer to reach better schools.

This study aims to provide detailed information about students' commutes to school. To achieve this goal, this study made assumptions concerning the reliability of the data used. A survey conducted by the Chicago Metropolitan Agency for Planning (CMAP), which tracked the daily commute patterns of survey respondents, highlights the commute patterns further analyzed in this paper. The study assumes that the information gathered from this survey accurately

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captures the daily commute patterns of middle and high school students across the city. Additionally, the analysis assumes that commute patterns are one of the predictors of how students decide to attend school. Previous research on chronic absenteeism that links transportation accessibility with attendance rates guides this assumption. Through careful analysis of data, this paper proves that commute patterns differ for students based on their demographics, highlighting the disparities in public transportation infrastructure across the city.

This study used data from a survey conducted by CMAP that asked Chicagoans about the different forms of transportation they use to move around the city. From this survey, 199 observations were filtered out. These observations were made up of 110 high school students and 89 middle school students. Each observation provided information about a respondent's home coordinate, school coordinate, mode of travel to school, race, gender, family size, family income, home tract, distance traveled to school, and travel time to school. These variables will allow for further analysis of how a respondent's race and/or income may affect their distance traveled or travel times to get to school, as well as how different modes of travel affect the distance and time variables. Through QGIS and R, visualizations of the data were created, making information more digestible and apparent. The study then conducted statistical analyses that showed how the distance and time variables differed for racial groups. Regressions helped understand the correlational relationship between distance, travel time, and demographic factors.

The results of the study suggest that transportation inequities play a significant role in shaping students' ability to access educational opportunities, particularly under school-choice policies in Chicago. The data shows that students from under-resourced neighborhoods, predominantly Black and Hispanic students, experience longer travel times and distances when commuting to school—often traveling northward to access higher-quality educational

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institutions. Limited transit options, unreliable service, and a lack of school-provided transportation, particularly for high school students attending charter or selective enrollment schools, further complicate these extended routes. As such, the promise of school-choice is undermined by unequal access to transportation, creating an indirect barrier to attendance and educational success.

While meaningful, these results are limited because the sample size is relatively small (199 students) and may not capture the full diversity of student experiences across all neighborhoods. The data also relies on self-reported survey information, which can introduce recall bias or misclassification of trip purposes. Additionally, the income variable is categorized in broad ranges rather than precise dollar amounts, which limits the precision of income-based analysis. The dataset's absence of exact school names and types makes it difficult to assess how specific institutions (e.g., charter vs. neighborhood schools) factor into commute patterns. Finally, due to time restrictions, only four interviews were conducted, which limits the ability to extrapolate experiences discussed in these interviews to a general audience.

Future research should include larger and more representative samples across multiple academic years and incorporate additional variables, such as school enrollment type, specific education needs, and access to school-specific transportation programs. Further work could expand beyond Chicago to include comparative analyses across cities with similar school-choice policies and segregated transit systems. Finally, longitudinal studies that follow students over time could better assess how transportation burdens influence attendance and academic performance, graduation rates, and post-secondary outcomes.

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Literature Review

This study fills a crucial gap in the existing literature by linking school transportation inequities with the accessibility of in-person learning in the context of Chicago's segregated and inefficient public transportation infrastructure. While previous research has demonstrated the benefits of in-person learning and identified transportation as a significant factor in chronic absenteeism (Harding, 2010; Burdick-Will, 2017), there is a limited examination of how disparities in transit access shape students' ability to attend school-choice high schools. This analysis builds upon frameworks of mobility justice to highlight how students from historically disadvantaged neighborhoods must navigate longer and less reliable commutes, ultimately affecting their educational opportunities and attendance patterns. By interrogating how transportation infrastructure constrains school-choice and exacerbates absenteeism among marginalized students, this paper exposes the indirect costs of school-choice policies and advocates for equitable transit solutions to ensure that all students can fully realize the benefits of in-person learning.

The Benefit of In-Person Learning

To understand why safe and reliable transportation is important for students, it is essential to establish great value in students learning in person, where they can physically interact with their peers and teachers. Since humans learn best through active and engaged learning rather than passive and distracted instruction (Pasek & Golinkoff, 2021), adequate infrastructure must be in place to get them to school each morning. Active learning is socially and physically co-constructed learning with a clear goal (Zosh et al., 2018). Developing students' executive functioning skills is essential to their learning and achievement, and active learning is a means of achieving successful executive functioning (Munakata & Doebel, 2021). Therefore, in-person

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learning is more beneficial for students in all stages of education, rather than remote learning. Moving away from in-person learning in primary and secondary education reduces student achievement.

Since the COVID-19 pandemic, where virtual learning was at its peak, there has been much research on the benefits of in-person learning. One such paper looked at the effects of COVID-19 on the development of cognitive skills and found that remote learning negatively affected students' cognitive and academic performance (Cortes-Albornoz et al., 2023). These findings were worse for students who were fully remote as opposed to a hybrid model. One key cause of the adverse effects of remote learning was the increase in chronic absenteeism that followed COVID-19 lockdowns. One study found that chronic absenteeism increased by 13.5 percentage points during the 2021-2022 academic year compared to the 2018-2019 academic year (Evans et al., 2024). Moreover, absenteeism rates were substantially higher for schools that stayed remote primarily in the 2021-2022 school year as opposed to eventually returning to an in-person learning model, suggesting that remote learning could have a causal effect on the rise of chronic absenteeism.

More specifically, economically disadvantaged students often could not participate in remote learning due to a lack of access to technology and/or the internet at home, further delaying their academic development (Goldhaber et al., 2022). It is important to note that economically disadvantaged students are already entering school with less developed cognitive skills than their peers, resulting in lower test scores and graduation rates (Crosnoe & Cooper, 2010). Thus, students who were the most negatively affected by remote learning were the ones who were already more likely to fall behind in their academic development. This notion

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highlights the importance of providing quality instruction for students regardless of their economic status.

How Transportation Infrastructure Inhibits Benefits of In-Person Learning

As stated earlier, students without safe and reliable transportation cannot reap the benefits of in-person learning because they often do not even attend school. Previous literature exploring the effect of transportation access on educational access does so by looking at absenteeism. Michael Gottfried, a professor at UC Santa Barbara, explains that access to a school bus may be helpful for attendance by providing students with safe, reliable transportation (Gottfried, 2017). His paper focused more specifically on kindergarten students because he identified this grade level as most predictive of future absenteeism. He fears that the increasing challenges to providing transportation to schools will inevitably have negative implications for student outcomes because these students could eventually end up not coming to school. Gottfried also looks at school transportation as a means of establishing routines for students that allow them to stay consistent in their attendance and remain motivated throughout the year, reducing stress for younger students especially. Families with strict work schedules also benefit from having consistent school transportation provided by buses.

Similarly, Danielle Edwards, a professor at Brown University, claims that simply qualifying for transportation increases attendance and lowers the probability of chronic absenteeism (Edwards, 2024). Edwards raises concerns over funding eligibility of schools with high absenteeism, which explains why the issue of absenteeism is important; schools that have low attendance rates will be at risk of cutting funding for the next academic year. Furthermore, she explains that one student's absence affects their peers, as classrooms with a high percentage of chronically absent students are associated with lower test scores. She also points out that

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having access to public transportation allows students to attend better schools than they otherwise would not have access to, bringing in a perspective of the mobility of students. This point relates explicitly well to the study's question about how access to transportation increases students' access to educational opportunities across Chicago. Considering the benefits of in-person education, addressing the current transportation infrastructure's inefficiencies that threaten students' ability to attend school is paramount.

Transportation Infrastructure as a Larger Issue

The issue with Chicago's public transportation infrastructure does not only impact students. Over the past few decades, Chicago has been adapted to serve cars as the primary mode of transportation (Almagro et al., 2024). Highways have been built in many large cities like Chicago, often uprooting residents from their homes and making public transportation more strenuous. In Chicago, car dependency comes at a cost for residents who cannot afford a car. This gap in mobility has a racial disparity, where 35% of Black households had no vehicle compared to 24% of White households (National Equity Atlas 2022). Moreover, the inefficiencies of the Chicago Transportation Authority (CTA) prevent it from being an optimal choice for Chicagoans without cars to get around the city. As mentioned earlier, Chicago is a highly segregated city, and transportation infrastructure is not exempt from this segregation. The North side of the city has a much more connected and efficient transportation system even though the CTA is a city-wide agency (Kuzuhara, 2024). Therefore, carless residents often interact with an unreliable transportation system that limits their mobility.

Additionally, the West and South sides of the city have fewer frequencies of service as well as highly disconnected bus routes that make it difficult to transfer across buses (Kuzuhara, 2024). In the context of school commutes, it is difficult for students to easily get from their

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neighborhoods to a school in a different neighborhood if transfers are difficult. As Chicago is a grid city, transfers are frequent to connect buses traveling horizontally and vertically across the city. Therefore, students traveling using public transit are bound to experience longer travel times than students using other modes of travel. This phenomenon exists because the bus system goes horizontal or vertical, meaning riders must rely on transfers to get from one part of the city to another, increasing the time needed to commute and introducing areas for bus failures (ghost buses, late buses, etc.). These transportation disparities are not just logistical inconveniences; they are deeply tied to structural inequality. As highlighted by Almagro et al. (2024) and the National Equity Atlas (2022), this unequal transit infrastructure reflects broader patterns of spatial mismatch and environmental racism. Residents in majority Black and Hispanic neighborhoods face disproportionate barriers to mobility, making it harder to access educational opportunities outside their immediate areas. Within the framework of mobility justice, these patterns reveal how transit systems can reinforce existing racial and economic segregation, undermining both access and equity in education.

The Problem of Chronic Absenteeism in Chicago

In Chicago, chronic absenteeism is at 40%, meaning that 40% of CPS students miss at least 10% of their school days in a given year (Illinois Report Card 2024). An explanation for this outcome is transportation inequity, caused by concentrated disadvantages of the West and South sides of the city. Redlining, disinvestment, and lack of social assistance cause primarily Black and Hispanic neighborhoods to be disadvantaged (Weiss, 2020). The practice of redlining in the South Side was the cause of the economic decline of these areas. Specifically, the destruction of the Green Line past 63rd Street and Cottage Grove further disconnected the South Side from the rest of the city (Mukanhal, 2017). Julia Burdick-Will, professor at Johns Hopkins

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University, also suggests that exposure to violence that comes with areas of concentrated disadvantage leads to children falling behind in class and having lower test scores as well as graduation rates (Burdick-Will, 2017). Providing students with safe, reliable transportation is critical in these areas to get them to and from school. Furthermore, she explains that students in concentrated disadvantaged areas travel long distances to various schools daily. Thus, this creates a problem for students before entering their classrooms.

Students in high school (grades 9-12) have lower attendance rates than elementary and middle school students. The range of high school students' attendance rates begins at 30%, while it does not get lower than 70% for elementary school students (CPS, 2024). To explore this disparity, Burdick-Will completed a case study on CPS and the effect of neighborhood violence on shaping patterns of high school attendance, inevitably affecting academic achievement. She points out that students who come from violent neighborhoods often have to travel long distances to attend a high school in a safer or more affluent neighborhood. This finding explains why high school attendance is so low; students who do not participate in school-choice to find a better high school are most likely staying at home to avoid being exposed to violence. If these students do not have access to transportation to these schools, their attendance and graduation rates could be affected as their chances of attending school are negatively impacted.

The demographics of CPS is majority Hispanic and Black (46.5 and 35.8%, respectively) (CPS, 2025). In recent years, CPS has seen an expansion of high school-choice with the addition of 19 schools in the past 10 years alone. The school-choice policy allows parents and students to select the high school they want to attend, potentially opening up doors for high schools with specific curriculums better suited for a student's needs. Chicago has four types of schools: neighborhood, open enrollment, charter/contract, and selective enrollment. According to Lisa

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Barrow and Lauren Sartain, economists at the Federal Reserve Bank of Chicago, school-choice led to the growth of students attending charter schools, with an increase from 500 to 6,500 students enrolled in charter schools from 2002 to 2016 (Barrow & Sartain, 2017). Furthermore, students who are most engaged in school-choice live in the poorest neighborhoods. In this pool of students, Black students made up a large percentage, with 35.9 percent of Black students who participated in school-choice attending charter schools. This finding suggests that opening charter schools provided a more attractive educational option for Black students. With this in mind, it is important to consider the fact that students who come from disadvantaged communities and attend schools that they are not assigned to are primarily Black. With many charter and public schools no longer being required to provide transportation for their students (Feurer, 2024), this paper investigates how the burden of securing transportation may contribute to chronic absenteeism, especially for Black students from under-resourced neighborhoods.

Education and Transportation Equity Through the Frameworks of Mobility Justice

To better contextualize the problem, looking at the link between education and transportation equity is helpful by analyzing existing inequities through the framework of mobility justice. Mobility justice argues that inequity is built into systems of exploitation, where certain groups are granted greater value and power while others must make sacrifices to achieve equity (Bierbaum et al.). In the Chicago context, school-choice was introduced to combat school inequity and allow students assigned to under-resourced high schools to attend better high schools (Barrow & Sartain, 2017). However, school-choice does not account for the lack of transportation that many students experience because they live several miles from the nearest better high school. Thus, students who want a better education must sacrifice their time to travel long distances to get that education, and most students who participate in school-choice have

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access to cars for their commutes (Urban Institute, nd.). In other words, school-choice only provides the illusion of choice for students who do not have access to reliable transportation from school to home (Valant & Lincove, 2023). Even with the right intent, school-choice policies often fail marginalized students by not considering the unequal access that these students have to reliable forms of transportation. With school-choice becoming more widespread across many cities, especially Chicago, it has been increasingly important to address the limited services public transportation provides in getting students to school.

Both Gottfried and Edwards claim a causal relationship between attendance and school bus eligibility, meaning that students who have buses assigned to transport them to school have higher attendance rates than students who do not. In order to define transportation access, this paper looks at the available modes of transportation for students in each specific school. CPS does not require all schools to provide yellow bus transportation, but students can apply for a free voucher (for 10 rides a week) to use CTA during the school year if they are assigned a school bus and there are not enough buses to transport students to school (CPS, 2025). However, through the framework of mobility justice, a question is raised: How accessible and reliable is CTA for students traveling long distances to reach their school-choice high school? If students did not have access to other modes of transportation (i.e., cars), would they still choose to participate in school-choice? As school-choice continues to become more prevalent, especially in Chicago, researchers should pay great attention to how exactly students reach these preferred schools. Harding argues that the effects of violence are of sufficient magnitude and that violence should be considered one of the primary mechanisms through which neighborhood disadvantage affects adolescent outcomes (Harding, 2010). If students fear for their safety while trying to make their commutes to school, this inevitably affects their mobility and puts them at risk of

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missing school to remain safe. Providing safe and reliable transportation to schools in other neighborhoods could mediate the role violence plays in preventing students from attending schools and linking them to other educational opportunities across the city. However, when those who stand to benefit most from school-choice lack access to reliable transportation, school-choice policy fundamentally undermines its stated objective of advancing educational equity.

Spatial Data Analysis: Why Location Matters

The analysis conducted in this paper is built on the principles of Spatial Data Analysis (SDA). SDA is the process of examining data with a geographical or locational component, allowing researchers to uncover spatial patterns and relationships often invisible in non-spatial analyses. In urban settings like Chicago, where structural inequities are deeply tied to geography, SDA provides critical insights into how place influences access to opportunities. By mapping students' home and school locations, commute distances, and travel times, SDA enables a clearer picture of how transportation infrastructure intersects with socioeconomic status and race to shape educational access (Goodchild & Janelle, 2010). Spatial analysis also allows for the integration of Geographic Information Systems (GIS), which enhances data visualization and supports more precise measurement of spatial disparities (Wang & Luo, 2005). In this paper, SDA is used to identify student mobility patterns and reveal how geographic isolation, especially in under-resourced neighborhoods, contributes to chronic absenteeism and unequal access to quality schools.

Spatial Data Analysis (SDA) is crucial for this study because it situates the problem of educational inequality within the city's built environment. Chicago's historical legacy of racial segregation and uneven investment in transportation has produced what scholars refer to as

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spatial mismatch-a condition in which low-income, predominantly Black and Hispanic residents live in areas far from quality public services, jobs, and schools while also lacking adequate transportation infrastructure to access them (Jiao & Dillivan, 2013). These transit deserts—neighborhoods where public transit is limited, infrequent, or unreliable-–intensify the structural barriers these communities face. SDA allows us to visualize and analyze how these mismatches manifest in student commute patterns, revealing that students from these underserved neighborhoods often experience longer, more complex commutes to school (Talen, 2012). These extended travel times increase the physical and psychological burden of attending school and contribute to higher absenteeism rates. Moreover, SDA illustrates how these transportation barriers undermine the intended benefits of school-choice policies. While such policies were designed to provide equitable access to better educational opportunities, they fall short when students from transit-poor neighborhoods cannot reach their chosen schools (Valant & Lincove, 2023). In such contexts, school-choice becomes not a vehicle for opportunity but an added burden, especially for those already marginalized by inequitable infrastructure.

Using QGIS to visualize spatial disparities, this study enhances the current understanding of the link between educational and transportation equity. In other words, SDA visualizes disparities and quantifies and analyzes spatial patterns, offering a more rigorous understanding of the relationship between transportation, school-choice, and educational access. This spatial lens goes deeper into the analysis of educational and transportation equity. Furthermore, spatial analysis supports the concept of mobility justice by demonstrating how geographic barriers intersect with social inequities, ultimately reinforcing systemic disadvantages (Sheller, 2018). By leveraging spatial data, this paper brings to light the real locational obstacles that students face, informing policy discussions to make school-choice meaningful and accessible to all students,

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regardless of where they live. The spatial analysis conducted in this study examines disparities in commute time and distance across racial and neighborhood lines, highlighting how students from the South and West Sides (primarily Black and Hispanic neighborhoods) are disproportionately burdened by long, complex commutes to school. The results produced using this analysis provide empirical evidence of mobility injustice by mapping out where students go and, even more importantly, where they do not. By analyzing the commute patterns of different groups of students, this study provides individual-level information about where students are going to school, how they get there, how far they travel, and how long it takes them to reach their final destination. This kind of individual-level information on students' commute patterns is rare in spatial data analysis, partly because it is hard to get information about minors' travel patterns. This fact makes the findings of this study even more meaningful to the larger field of education and transportation equity.

Methodology

Data from CMAP

To understand the commute patterns of students, this study used data from the MyDailyTravel survey. The MyDailyTravel survey was conducted in 2018-2019 by the Chicago Metropolitan Agency for Planning (CMAP) and asked people across Chicago about how they got around the city (CMAP, 2024). The survey aimed to understand how local roads, highways, public transit, bike lanes, and sidewalks are used today and how the city can improve these modes of transport to make travel better. The survey stresses the importance of representation in developing effective transportation plans that meet all residents' needs. To track the necessary data, households invited to participate in the survey tracked their travel for seven days in the smartphone app rMove and spent about 5-10 minutes each day reporting their travel in the

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survey. Households receive a gift card once all members have reported their travel and completed their surveys to incentivize participation. The final dataset did not collect respondents' personal information (like names).

CMAP is a state-authorized regional planning agency that aims to address development and transportation challenges in northeastern Illinois through streamlined, consolidated regional planning and integrated land use and transportation plans. The efforts of CMAP are best understood under the frameworks of transportation equity, which makes the data they collect an excellent fit for this study. CMAP's focus on equity ensures that marginalized communities are adequately represented in the survey, strengthening the reliability and relevance of the data for analyzing racial and socioeconomic disparities in school commutes. Equity is one of the five focus areas for CMAP, and the agency's Github provides transparency in data collection and storage that allows anyone to replicate the analysis carried out in this study.

Independent and Dependent Variables

The independent variables in this data set were a student's home coordinate, school coordinate, mode of travel to school, race, family size, family income, and home tract. The dependent variables were distance traveled to school and travel time to school. The chart below helps to visualize this information more clearly:

Dependent Variables	● Distance traveled to school ● Travel time to school
Independent Variables	● Student home and school coordinates ● Mode of travel to school ● Student race ● Student family size ● Student family income ● Student home tract

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Data Transformation

The MyDailyTravel dataset has over 30,000 entries, and this study filtered through all entries to identify 199 eligible observations. Eligibility was determined by first accounting for whether each observation had complete information in all columns; entries with nulls in any independent variables were dropped. The database was then filtered using age and location requirements, including respondents between 12-19 years old and identifying Chicago as their geographical location. Outliers were accounted for by filtering for observations with reasonable distances and time traveled. The distance and time cutoffs were determined by assessing the distribution of distance traveled and keeping only entries that were less than 35 miles, and that took less than 1 hour. Only trips that start or end between 6 am and 10 am were kept to ensure that these observations were recorded accurately. This window was determined to give students leeway if they arrived late to school or left earlier than usual but could reasonably attend school when they recorded their trips. Finally, only students who identified their trip purposes as "school" were kept. These observations include 110 high school students and 89 middle school students. Once the observations were filtered out, the dataset was recoded using CMAP's Github to complete further statistical analysis. The original dataset was coded using numeric values to represent categorical variables, which made it harder to understand before running regressions and creating visualizations. This numerical dataset was recoded to ensure meaningful analysis could take place.

Using R to Understand Interactions Between Variables

To properly identify key relationships among independent variables, the cleaned data was further analyzed using R. R to complete the origin-destination analysis. First, the data was split into two dataframes for middle and high school students. This split was designed to understand

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students' transition in their commute patterns from middle school to high school. Students between 12-14 and enrolled in middle school were determined to qualify for the middle school dataset. This age cutoff was an attempt to capture mostly 8th-grade students to serve as a strict change in status compared to high school students. Students who were enrolled in high school were put into the high school dataset. Descriptive tables were created to summarize distance traveled and travel times for different racial groups for middle and high school students. Following this split, four separate groups of graphs were created. The first group of graphs were histograms that compared the distribution of modes of transport for middle and high school students. Four travel modes were considered: passenger, transit, school bus, and walking. The survey also had the option for respondents to choose biking as a mode of transport. However, there were not enough respondents to capture this choice after cleaning the data and keeping only observations with complete information. The second group of graphs were scatterplots that analyzed the relationship between income, travel time, and distance traveled for middle and high school students. A regression line was added to display the correlation between travel time and distance traveled. Income was shown using a gradient of colors ranging from green to purple, with green being the lowest income and purple being the highest. The third set of graphs were scatterplots that display the relationship between race, income, and distance traveled for middle and high school students. The data was grouped by racial groups to show how income and distance traveled change for different racial groups. A regression line was added to show the correlation between income and distance traveled. The last set of graphs were Wind Rose maps that displayed the direction of travel for both middle and high school students. These two maps were created by finding the difference between Longitudinal and Latitudinal coordinates to determine the direction of a student's travel and inputting that information into the Wind Rose

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map to display the direction most students traveled in. Finally, all created maps were saved in a JPEG format. The steps described above allow for an analysis that acknowledges the interaction between the independent variables and how these variables ultimately affect the dependent variables. By understanding the role of demographic factors on distance traveled and travel time, this study aims to highlight the disparities between different groups of students when it comes to educational access.

Using QGIS to Create Visualizations

To provide information about the commute patterns of middle and high school students, a specific data frame was created that took the coordinates of respondents when they identified the purpose of their trip as home and school. A binary code was created for each respective variable (home vs school) to display when a respondent is going home versus school. The data was then separated into information about respondents going home vs. school. Following that manipulation, six separate data sets were created using R. The data was first divided into two separate datasets for middle and high school students. Each data set was separated into three datasets for White, Black, and Hispanic students. There were not enough observations in the survey for Asian students in either the middle or high school datasets, so a separate dataset was not created for Asian students. Therefore, there were 12 separate datasets: 6 for information about respondents going home that was further broken down into two datasets for high school students and middle school students, which included a final separation according to 3 racial groups, and 6 for information about respondents going to school that was further broken down into two datasets for middle school and high school students, which included a final separation according to 3 racial groups. Each of these datasets was then uploaded to QGIS and used to create three separate maps for each racial group. The points on the map represented a

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respondent's home coordinate and school coordinate. These points were connected using the plugin ConnectPoints on QGIS. The title, legend, and scale were added using Layer Manager in QGIS. Finally, all created maps were saved in a JPEG format. The creation of maps was intended to visualize students' movement from their homes to their schools to pinpoint where students are going to school and where they live. This information helps by highlighting students' potential choices when deciding to go to a school in a particular area. If students travel long distances to get to school, they likely participate in school-choice, meaning the area they are traveling to provides them with better educational opportunities. Visual representations of data for both middle and high school students also allow for a comparison between the commute patterns of students belonging to each group. With the help of these maps, a holistic analysis of the commuting patterns of middle and high school students was made possible.

Interviews to Aid Visualizations

To add further context to the quantitative findings, interviews were conducted with middle and high school students over 9 weeks. Following approval to conduct interviews from the Internal Review Board, students were recruited by participating in one of the University of Chicago's academic and career programs. A flyer was circulated across the mailhosts for the academic and career programs, but the most successful method of recruitment was talking to parents in-person. The primary researcher went to tutoring sessions offered by the University, as well as college preparation events to obtain consent from the parents of the students since the students were minors. After consent forms were signed, students could sign up for 30-minute interviews conducted over Zoom. Students could use pseudonyms and turn off their cameras to maintain anonymity. Each interview was recorded and transcribed using Otterai to identify key quotes and themes discussed. The interviews were able to point out themes relevant to students'

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commutes that were harder to display using just visualizations. The added context from the interviews allowed for a more thorough analysis of how transportation access affects educational access. As much as possible, students were selected to represent a range of grade levels, school types, and neighborhoods to capture variation in commute experiences. Questions in the interview guide focused on daily travel routines, perceived obstacles, transportation preferences, and how students' mobility influenced their ability to participate in school-related activities.

Results

The results developed using R and QGIS display the relationship between the independent variables (home and school coordinates, mode of travel, race, family size, income, and home tract) and the dependent variables (distance traveled and travel time). The independent variables are important because they help explain variations in the dependent variables. The distance and time variables were identified as the most critical variables that describe how a student's commute should be understood. As students travel longer distances, their commute becomes a burden they must overcome to get to school. Similarly, long commutes mean students have to dedicate more time before the start of school to figure out how to get to school (and home from school). These factors can potentially influence students' decision to attend school. Moreover, these factors can create hardship for students and their families as they navigate their educational journeys. In other words, coming to school should not be a hard choice.

There were 89 middle school students and 110 high school students. The tables created from these observations aim to highlight how the independent variables affect the two key dependent variables. The first set of tables explains the average distance traveled and travel times for different racial groups. These tables identify any disparities between racial groups that could signal baseline differences between these groups. The second set of graphs explains the

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distribution of each transport mode to show the most popular modes for each group of students. This visualization allows a better understanding of what most students view as the most reliable form of transportation for their destination. The third set of graphs shows the relationship between income, distance traveled, and travel time to understand if students from higher-income families experience shorter distances or travel times in their commute to schools. This information would help identify a link between income and transportation access. The fourth set of graphs shows the relationship between race, income, and distance traveled. These graphs highlight the connection between race and income and how this relationship could impact transportation access. Lastly, the fifth set of graphs displays Wind Rose maps for middle and high school students to visualize the students' direction of travel. These maps show what direction most students are moving in when heading from home to school, allowing a glimpse into how students and their parents decide where to go to school.

The interviews were used to address themes and topics that were not explored using R or QGIS. These interviews provided context for what students consider essential when attending school. They also allowed students to express the hardships they experienced during their school commutes. Several key themes emerged through these conversations, including the burden of coordinating commutes around parents' work schedules, the inconvenience and unreliability of public transportation, and the lack of school-provided transportation options. Students shared how walking long distances or relying on CTA buses often made them late or forced them to modify their daily routines in stressful ways. Others described how safety concerns influenced their travel choices, particularly when walking on poorly designed or dangerous streets. Students also voiced frustration with how extracurricular involvement was limited by transportation barriers, forcing them to choose between after-school opportunities and a guaranteed way home.

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These firsthand accounts added nuance and emotional weight to the patterns revealed in the data, highlighting the real-life consequences of transportation inequity on student engagement and attendance. See appendix for larger versions of the graphs, charts, and maps created.

Results from R

High school data

race_eth	travtime25	travtime50	travtime_mean	travtime_mean_uw	travtime75	travtime90	distance	n
asian	10	10	13.33153	25.00000	10	13	1.038	6
black	15	30	30.52518	30.76667	45	51	3.656	30
hispanic	30	34	41.16328	37.61111	60	90	2.313	36
other	14	14	28.22273	29.85714	35	75	4.705	7
white	15	29	32.82817	33.68519	45	68	3.380	54

Figure 1. Travel Time and Distance Traveled by Race for High School Students

Figure 1 displays the mean travel time and distance traveled. The data was broken up according to the race/ethnicity of the respondent. White students comprised the most significant percentage of the sample size, with 54 students identifying as White. Hispanic and Black students had similar sample sizes, with 36 and 30 students, respectively. Asian students comprised the smallest percentage of the sample size, with only six students identifying as Asian. For this reason, there is not a standalone map for the traveling patterns of Asian students. The survey allowed respondents to answer “other” as a race, so seven respondents are in this category. Since this information is not helpful for the analysis due to its vagueness, it is excluded from the data visualization portion. As the table displayed, Black students had the highest number of miles traveled compared to other race groups, with an average of 3.6 miles to get to their high school. White students travel 3.3 miles on average to get to their high school, while Hispanic students travel 2.3 miles to get to their high school. Lastly, Asian students traveled about 1 mile to reach their high schools. Hispanic students had the longest travel times, with commutes taking 41 minutes for students to get to their high school. White and Black students

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had similar commuting times, sitting at 33 minutes and 30 minutes, respectively. Asian students had the shortest travel time at 13 minutes. Since the methods of creating the weights were not explicitly stated, the unweighted (travtime_mean_uw) statistics were used in this analysis.

Middle school data

race_eth	travtime25	travtime50	travtime_mean	travtime_mean_uw	travtime75	travtime90	distance	n
asian	10	10	10.00000	10.00000	10	10	1.382	1
black	15	20	29.17457	29.03030	35	45	4.037	33
hispanic	7	9	13.15204	14.05000	15	29	0.963	20
other	5	10	21.52517	29.40000	20	73	0.369	10
white	8	15	17.74591	16.83333	26	35	0.919	42

Figure 2. Travel Time and Distance Traveled by Race for Middle School Students

Figure 2 displays the same information as its High School Students' counterparts, with information on the mean travel time and distance traveled. White students made up the most significant percentage of the sample size for middle school students, with 42 students identifying as White. Black and Hispanic students had similar sample sizes, with 33 and 20 students, respectively. Again, Asian students comprised the smallest percentage of the sample size, with only one student identifying as Asian. For this reason, there is not a standalone map for the traveling patterns of Asian students. The “other” option as a race had 10 respondents in this category. As the table displayed, Black students had the highest number of miles traveled compared to other race groups, with an average of 4 miles to get to their high school. Hispanic and White students travel around 1 mile to reach their middle school. Since there is only one Asian student represented in this table, it is hard to generalize their responses to other Asian students. Black students had the longest travel times, with commutes taking 30 minutes for students to get to their middle school. White and Hispanic students had similar commuting times, sitting at 17 minutes and 13 minutes, respectively. Travel time got faster for White and Hispanic students between middle and high school, which could signal middle schools being closer to

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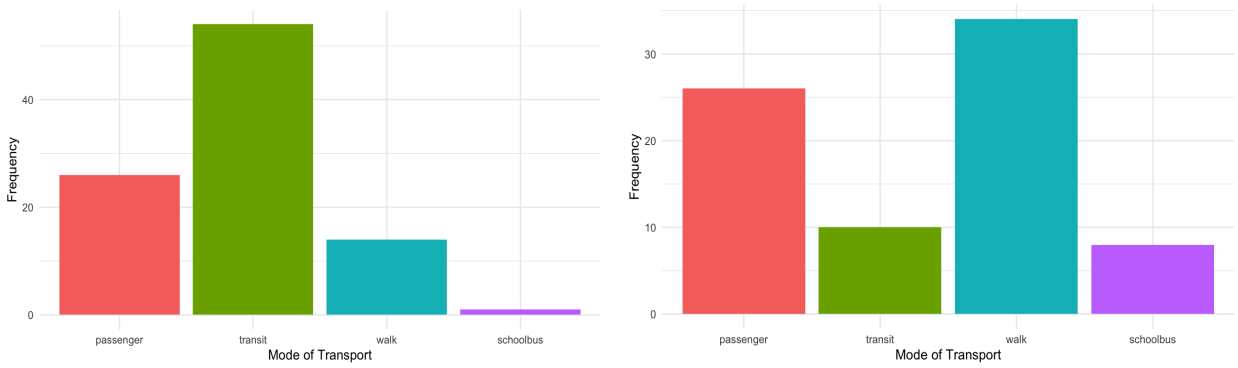
students' homes than their high schools. Black students, on the other hand, travel longer distances in middle school than high school. Again, since the methods of creating the weights were not explicitly stated, the unweighted (travtime_mean_uw) statistics were used in this analysis.

Distribution of each mode of transportations

High School Students *Middle School Students*



Figures 3 and 4. Mode of Transportation for High School and Middle School Students

Figures 3 and 4 allow for an analysis of which mode is most common for middle and high school students. Most high school students use transit as a mode of transportation to school, including public buses, trains, and Metra. Driving was the second most popular mode of transportation, followed by walking and then a school bus. Comparatively, most middle schools walked to school, with driving also being the second most popular mode of transportation. Transit and school bus transportation were equally popular for middle school students.

The data presented in these graphs allows for a better understanding of the everyday commuting experiences for middle and high school students. Since most middle school students walk, it suggests that they live close to home, as it takes an average of about 20 minutes of traveling to get to school daily. This hypothesis is supported by the data tables analyzed earlier, which show that middle school students traveled shorter distances than their high school

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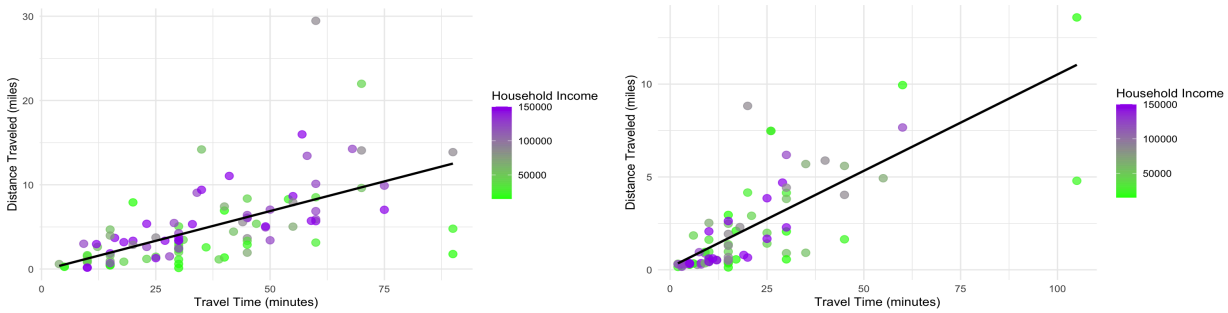
counterparts. On the other hand, high school students live farther distances, supported by the fact that most of them use transit instead of walking to get to school.

Relationship between income, travel time and distance traveled

High School Students *Middle School students*



Figures 5 and 6. Income, Travel Time and Distance Interactions for High School and Middle School Students

Regression using formula: $distance\ traveled\ = \alpha + \beta_1 travel\ time\ + \epsilon_1$

```
Call:
lm(formula = distance_pg ~ travtime_pg_calc, data = qgis_bwh_school)

Residuals:
    Min      1Q  Median      3Q     Max
-9.8567 -1.5791 -0.4095  1.0547 12.9225

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)      0.06097    0.63036   0.097    0.923
travtime_pg_calc 0.12861    0.01529   8.412 3.32e-13 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 3.105 on 98 degrees of freedom
Multiple R-squared:  0.4193,    Adjusted R-squared:  0.4134
F-statistic: 70.77 on 1 and 98 DF,  p-value: 3.318e-13
```

```
Call:
lm(formula = distance_pg ~ travtime_pg_calc, data = qgis_bwh_school_8th)

Residuals:
    Min      1Q  Median      3Q     Max
-5.3459 -0.8256 -0.4224  0.7731  6.6468

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)      0.30608    0.30942   0.989    0.326
travtime_pg_calc 0.09366    0.01222   7.662 3.95e-11 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.795 on 79 degrees of freedom
Multiple R-squared:  0.4263,    Adjusted R-squared:  0.4191
F-statistic: 58.71 on 1 and 79 DF,  p-value: 3.951e-11
```

Figures 7 and 8. Regression Summaries for High School and Middle School Students

Figures 5 and 6 show that higher income high school students still have longer travel times and distances traveled. The scatter plot for high school students shows a spread out distribution of income levels across different travel times, meaning income likely doesn't have a large effect on travel time for this group. For middle school students, the distribution of income levels is concentrated on the lower end of travel times, suggesting that students have short travel

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times regardless of their income levels. The difference between middle and high school students is contingent upon the fact that middle school students have a shorter distance to travel to get to school compared to high school students. Furthermore, the income levels of students were recorded in a manner that doesn't allow for strict interpretation. The income levels were just averages rather than exact numbers, which could be over or underestimating the true income levels of students. Because of this, there should be great caution when interpreting the results of these graphs, and the result should not be extrapolated past this dataset.

Figures 7 and 8 indicate that travel time is a strong and statistically significant predictor of distance. According to the model, approximately 41% of the variation in distance traveled for high school students is explained by travel time ($R^2 = 0.41$), with a p-value well below the 0.05 threshold (p-value = 0.00000749977), affirming statistical significance. For middle school students, 42% of the variation in distance traveled is explained by travel time, with a p-value less than 0.05 (p-value = 0.00006598841) . This result is consistent with expectations: students who spend more time commuting are likely traveling farther distances to reach their schools. Therefore, the point of the graphs was to identify where different income groups are concentrated on this regression line rather than assess the correlation between distance traveled and travel time.

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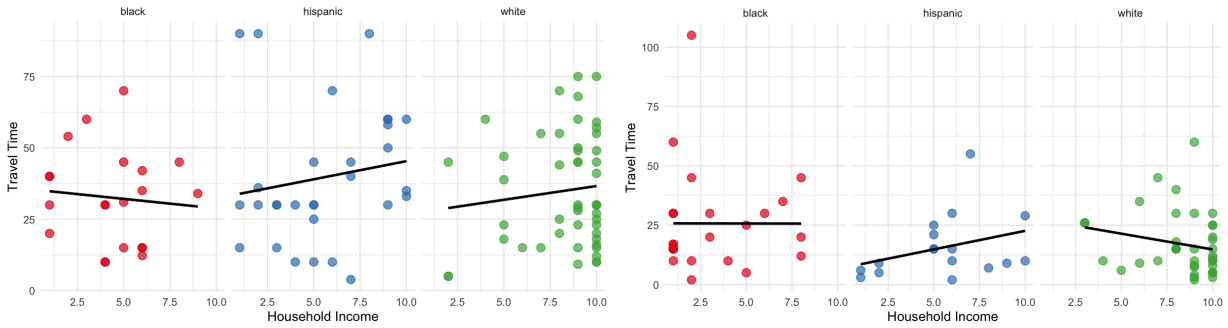
Relationship between race, income and travel time

High School Students *Middle School students*



Figures 9 and 10. Race, Income, and Travel Time Interactions for High School and Middle School Students

Regression using formula: $travel\ time\ =\ \alpha + \beta_1 income + \epsilon_1$

```
Call:
lm(formula = travtime_pg_calc ~ hhinc, data = qgis_bwh_school)

Residuals:
    Min      1Q  Median      3Q     Max
-32.210 -17.169  -3.972  11.917  57.073

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  32.4053     4.9986   6.483 3.65e-09 ***
hhinc         0.5221     0.6848   0.762    0.448
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 20.46 on 98 degrees of freedom
Multiple R-squared:  0.005897,  Adjusted R-squared:  -0.004247
F-statistic: 0.5814 on 1 and 98 DF,  p-value: 0.4476
```

```
Call:
lm(formula = travtime_pg_calc ~ hhinc, data = qgis_bwh_school_8th)

Residuals:
    Min      1Q  Median      3Q     Max
-20.509 -10.483  -5.239   6.734  82.491

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  24.0225     3.8819   6.188 2.54e-08 ***
hhinc        -0.7566     0.5559  -1.361    0.177
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 16.34 on 79 degrees of freedom
Multiple R-squared:  0.02291,   Adjusted R-squared:  0.01055
F-statistic: 1.853 on 1 and 79 DF,  p-value: 0.1773
```

Figures 11 and 12. Regression Summaries for High School and Middle School Students

Concerning the relationship between race, income and travel time, Figures 9 and 10 display how higher income levels allow students to attend schools that are farther from their homes. For high school students, there is a positive correlation between travel time and household income for Hispanic and White high school students, meaning students from higher income families have longer commutes than students from lower income families. There is a slightly negative correlation between travel time and household income for Black students,

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meaning these students most likely stay closer to their homes and go to neighborhood high schools even as their income rises.

Inversely, there is a negative correlation between travel time and household income for White middle school students, suggesting that these students often go to their neighborhood middle school. For Hispanic middle school students, there exists a positive correlation between household income and travel time. This correlation means that Hispanic students are still traveling for longer times to get to their middle schools even as their income rises. There is a slight negative correlation again for Black students, meaning Black students attend middle schools closer to their homes even as their income rises.

Figures 11 and 12 reveal a very weak and statistically insignificant relationship. For high school students, income explains just 0.5% of the variation in travel time ($R^2 = 0.005$), and the associated p-value is 0.44, well above the 0.05 significance threshold. Similarly, for middle school students, income explains 2% of the variation in travel time ($R^2 = 0.02$), and the associated p-value is 0.173, which is less than the p-value for high school students, but is still above the 0.05 threshold for significance. This indicates that income alone does not meaningfully predict how long students spend commuting in this sample. Although the results are not statistically significant, the patterns observed in the data could still have substantive meaning. Further research with a more careful collection of income information is required to assess the effect of income on students' commute patterns.

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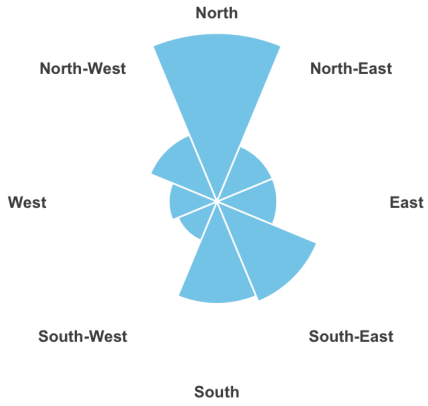
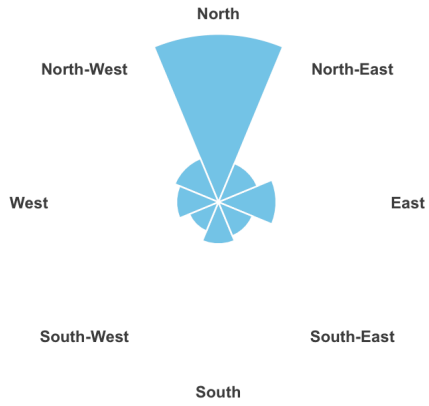
Direction of Travel of Students

High School Students



Middle School students



Figures 13 and 14. Direction of Travel for High School and Middle School Students

Figures 13 and 14 display the direction in which most students travel to school. As shown above, most high school students travel north to reach their destination. The same story is present for middle school students, where most students travel north to get to school. While the Wind Rose maps offer limited detail in isolation, they provide a directional foundation for deeper spatial analysis when combined with QGIS visualizations. With a clear preference for middle and high school students traveling North, this finding helps pinpoint what considerations students and their families make when deciding where to attend school.

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Results from QGIS

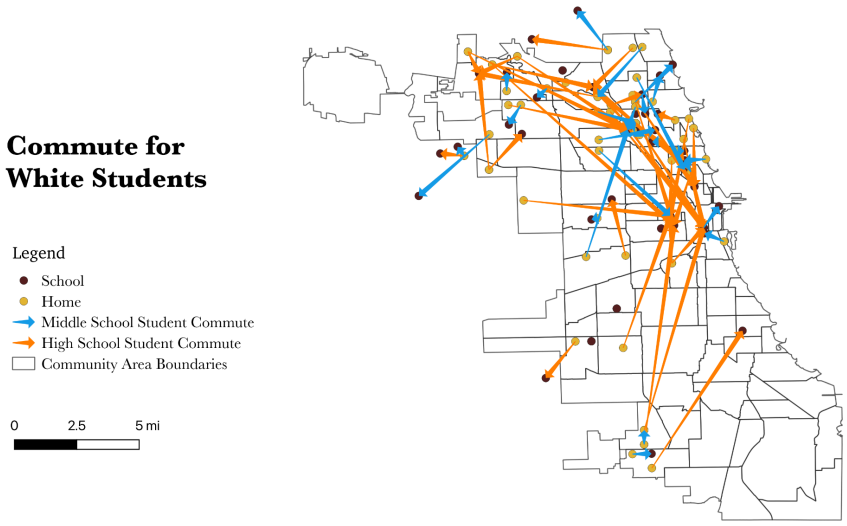

Figure 15. Commute Patterns for White Students

Figure 15 tracks the commute patterns for White middle and high school students. Middle school routes are highlighted using blue arrows, while high school routes are highlighted using orange arrows. The map shows a concentration of White students living in the North part of the city. This finding is supported by census data that shows that White populations are more concentrated on the North side. High school routes are shown to be longer than middle school routes, which is supported by the table summarizing travel time and distance traveled for middle and high school students. A few students attend schools outside of city borders but selected "Chicago" as their location instead of "Suburban Chicago," potentially highlighting some limitations of the survey data. If people can put their location as Chicago despite not being in Chicago, the average travel times and distance traveled could be contaminated. For students living on the city's South side, it is clear that they are traveling north to get to school rather than staying in their neighborhood or going further down south. This finding signals the quality of

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schools on the South Side of the city; students would rather travel longer distances to attend school on the North side than stay in the South in return for shorter commutes.

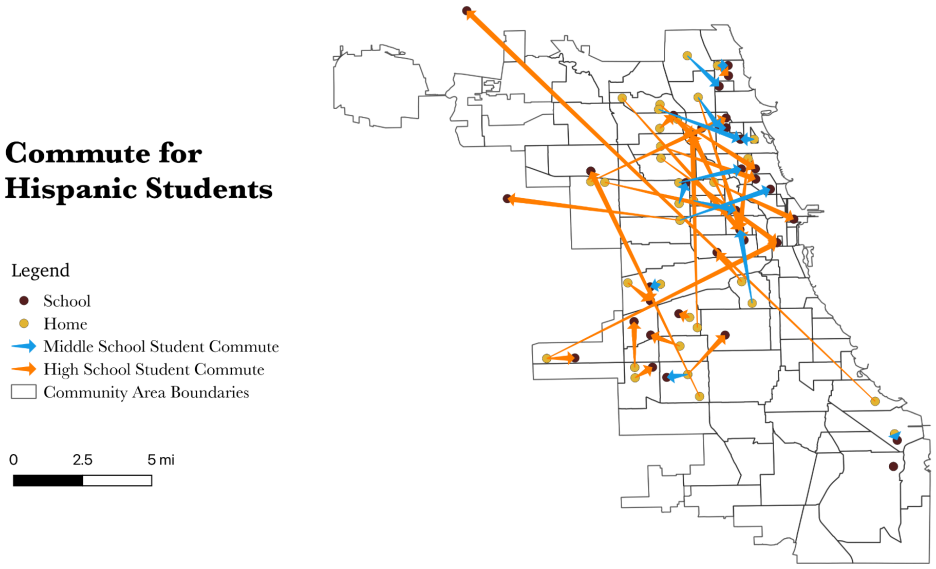

Figure 16. Commute Patterns for Hispanic Students

Figure 16 displays commute patterns for Hispanic students. Similarly to White students, Hispanic students are also concentrated mainly in the North, with a minor concentration on the west side. Middle school routes are much shorter than high school routes for Hispanic students, which is also supported by data from the tables above. Students from the southern parts of the city travel farther north to get to school; there are no students going towards the south side of the city to get to school. Students living in the far north of the city come closer to the downtown area for school. The findings of these maps call for further analysis to identify where selective enrollment schools could be concentrated. Similarly to White students, one student travels outside city borders to get to school. This respondent's data is removed before the computation of average travel times, and distance traveled to create the data tables from earlier.

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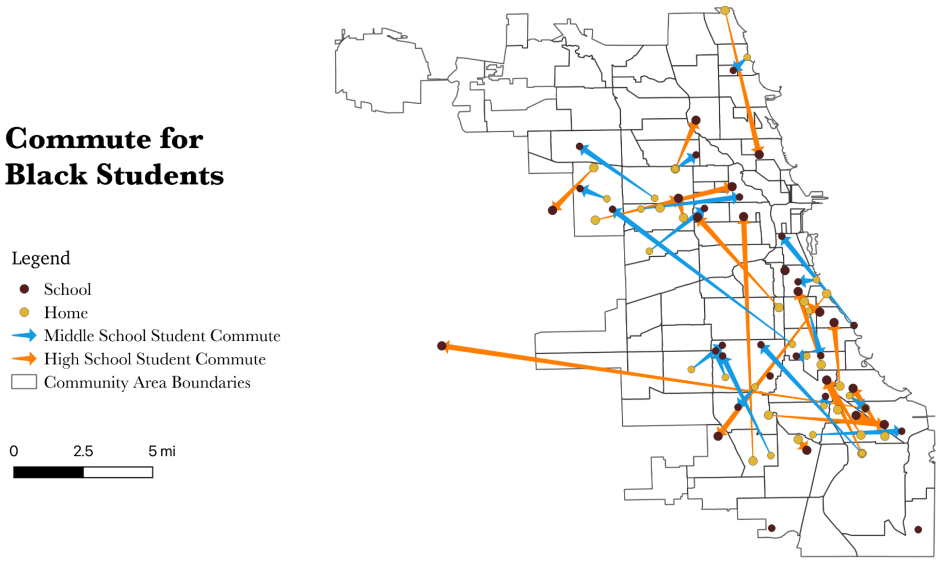

Figure 17. Commute Patterns for Black Students

Similar to the previous maps, Figure 17 tracks the commute patterns of Black middle and high school students. Most Black students appear to be concentrated in the West and South sides of the city, which is also supported by Census data. Middle school commutes appear longer for Black students than White students, displayed by longer blue arrows for Black students over White students. A few points appear disconnected, but these routes are just extremely close to each other and appear touching when scaled up to a city-wide view. One student's route is extremely long, as displayed by the size of the orange arrow. This respondent's data was dropped from the averages table but was kept on the map for a more holistic view of commute patterns. As supported by the Wind Rose maps, many students appear to be traveling north from home to school. This finding further supports the idea that the quality of schools could be stronger on the North side of the city rather than on the South side. Still, fewer Black students are traveling long distances to reach their high schools compared to White and Hispanic students.

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Excerpts from interviews

A total of four students were interviewed: two middle school students and two high school students. For clarification, Student A and Student B get dropped off at school every day by their parents, while Student C and Student D walk to school. Student A and Student C are in middle school, while Student B and Student D are in high school. All students interviewed were Black. Several themes were brought up in the interviews, with a few standing out: multi-step commute, schedule conflicts, other school activities (clubs, field trips), convenience of cars, and unwalkable commutes.

Multi-step commutes

Firstly, Student A discussed completing a multi-step commute to get home from school: "My mom picks me up from my aunt's house. So sometimes I play the piano after school. And so I go to my aunt's house after school, and she picks me up." This student explained that her aunt's house was only a five-minute walk from school, and her school finishes at around 3:30 pm, while her mom finishes work at about 5 pm. To avoid waiting for 2+ hours at school, this student walks to her aunt's home and waits for her mom. When asked if her school provides a yellow bus, she explained, "I don't think so. I don't know," and later confirmed that she has never used it. Students B and C had the same experience, where their school did not provide yellow school bus transportation. Furthermore, Student C explained that her younger "brother has to be up by 7:30 am and out. And then [her] and her other two brothers must be up by 8:00 am and get to school by 8:30 am." The different school start times mean that Student C's mom has to drop her brother at school first before coming back to pick up her and her brothers to get them to school later.

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Conflicts in schedules

On the topic of conflict between parents' job schedules and students' school schedules, Student A explains: "[I'm late] maybe once or twice a week because [my mom] has to work, but my school starts too late…I like going to school early, so I can go to my locker before the class and put my stuff in there." Again, due to her mom's work, this student is often late to school against her wishes or has to wait for her mom at her aunt's house because her school does not provide a consistent form of transportation that takes the burden off her mom to get to school. Student A later explains that her "school opens at seven o'clock before school starts. If [she] arrives early, [she] can sit in a cafeteria until classes start." However, she also expressed that she does not like waking up early and finds it inconvenient to wake up at 7:00 am to avoid being late to class.

Buses and School Activities Outside of School

City-provided yellow school buses serve multiple essential functions, from enabling daily student commutes to facilitating field trips that enrich the learning experience. However, as Student C revealed, even for field trips, schools increasingly rely on public CTA buses: "Once in a while, for my field trips at my school, we take public buses, and we use our [Ventra] cards." This transportation gap extends beyond field trips and into the daily routines of students who wish to engage in extracurricular activities. Student D noted that she must coordinate with her mother to stay after school: "I have to let my mom know that I'm staying after school." This dependency places a disproportionate burden on families, particularly those with rigid work schedules or limited access to a car.

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Convenience of Cars

Students often expressed their opinion that using the public bus permanently would inconvenience them. Student B explains that when he "first started taking the bus, [his mom's] car was in the process of being fixed, and [his] dad wouldn't get out of work till, like, seven or towards eight o'clock. So if [he] wanted to get to school on time, [he] would have to be on the bus." Student B explains the circumstances that led him to use the bus to get to school. His preferred mode of transport is by car, but the bus will get him to school faster than his dad since his dad has work until 8 am. He later expressed that he does not prefer the bus as a permanent mode of transport because he "just wouldn't want to be bothered. [He] feels like it would throw [his] routine off" to budget extra time to use the bus. He further cements this idea that buses come second choice by explaining that he "was only on the bus for a couple of months; [he] would just take it, now and then in eighth grade." This quote reflects how, while technically available, public transit is perceived as disruptive and unreliable for students who must manage tight schedules and competing family responsibilities.

Unwalkable commutes

Students discussed various obstacles that they faced during their commutes to school, with Student C sharing how unsafe the streets she walks on are:

"There are main streets when I go to school that I must be careful of because driving in Chicago is hectic, so some people don't know how to drive too well. I usually practice checking the streets and watching all my surroundings, not walking with headphones because that's unsafe."

Similarly, Student D shares a story about an intersection close to her school that has been prone to a few accidents:

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“This intersection is close to our school, and a few accidents have occurred. I’d probably say it's been like two accidents within a few months. When you're walking and turning, [drivers] don't see you, and they turn it in, and then you don't see the person coming, so the car hits you. That's just how it is.”

The experiences of these students highlight how unsafe their current form of transportation can be, especially if walking is their only means of getting to school. These quotes illustrate that walking to school is not just inconvenient; it can be a daily source of stress and danger.

How the System is Working

Despite widespread issues with transportation access, Student B’s experience shows that, when functioning as intended, the system can offer a degree of support and flexibility. Recalling getting his Ventra card from school, he shared:

“I never really had gotten on the bus before. But my friends who I would take the bus with to school, they were like, 'Oh yeah, the school will give you one, and they'll pay for it, and you can get a new one, like, every week.' And so that's when I started getting them…the [CTA representatives] just told me about it at the student fair, and they will go through the process there with you.”

This anecdote illustrates that when information about transit assistance is shared through peers, school events, or CTA outreach, students can navigate the system to their advantage. In this case, the student fair served as a practical access point where students could learn about and obtain their fare cards with minimal bureaucratic barriers. It also highlights the value of peer networks in making public systems more approachable and transparent.

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Access to Transportation and School-Choice Participation

Finally, on the topic of school-choice, two out of four students expressed that they are currently attending or will be attending schools that they selected as part of the school-choice process. Student A explained that she applied to Kenwood Academy because of its closeness to home:

"I want to go to Kenwood, but I applied to other schools just in case I didn't want to go to Kenwood by the time it was time for me to choose where I wanted to go. But I want to go to Kenwood because it is close."

Similarly, Student B explained that he chose to apply to Simeon Career Academy because of the football team:

"I've been wanting to go there. I know a lot of greats from Chicago who went there, like Derrick Rose, who went to that school, so there's a lot of history behind the school."

Conversely, Student C explained that she did not apply to school-choice because she knew little about it. Similarly, Student D explained that she attends a school close to her neighborhood and "[does not] remember participating in [school-choice] during eighth grade."

Discussion

The results of the interviews added nuance to the overall goals of the project. Across the four interviews, a few recurring themes emerged: multi-step commutes, misalignment between school and family schedules, limited transportation for extracurricular activities, the perceived inconvenience of public transit, and unsafe walking conditions. These conversations confirmed and added depth to the broader patterns identified in the quantitative analysis. Students are not just passively dealing with long commutes but are rather constantly weighing trade-offs between safety, time, and opportunity. On the topic of safety, Student D's experiences display the city's

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failure to ensure safe, walkable routes for students. By taking away school-provided transportation, CPS punishes students for the city's failures to ensure the streets are safe. Student D's casual resignation to repeated accidents by saying "that’s just how it is" speaks to the normalization of danger in certain neighborhoods, revealing how system-wide neglect shapes students' expectations. Similarly, Student C demonstrates how transportation insecurity affects safety and well-being through the emotional and physical vigilance she had to exercise to reach school. These are not isolated incidents but symptoms of broader infrastructural and planning failures that disproportionately burden youth in under-resourced areas.

Regarding reliability, Student B's reluctance to rely on the bus highlights the logistical strain of coordinating commutes around parent work hours and unpredictable service. His comments also suggest that students internalize a hierarchy of transportation, with cars offering autonomy and comfort while buses representing a fallback option. This mindset speaks to broader issues of infrastructure inequality and the devaluation of public transportation, especially among youth who experience its limitations firsthand. Similarly, Student B's nottage of her school's reliance on public transportation during field trips emphasizes the severity of Chicago's ongoing school bus shortage. Using public transportation to take students on educational excursions raises serious concerns about both safety and reliability. Unlike dedicated school buses, CTA buses operate on fluctuating schedules, are often delayed or absent (Ramos, 2022), and lack the level of supervision and security that school-sponsored outings require. Chaperones cannot control public transit environments like on a private school bus, making these trips potentially stressful and unpredictable for students and staff alike. It is unlikely that public transportation is the first choice for schools; rather, it reflects a last-resort measure after unsuccessful attempts to secure yellow bus service.

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Providing students with safe and reliable transportation can ensure they can take advantage of the educational opportunities presented to them. At a time when extracurricular involvement is often considered integral to a student's academic and personal development (O'Brien 1995), no student should have to forgo participation due to a lack of transportation. By failing to provide late buses or alternative transit options for students involved in after-school programs, CPS effectively limits access to these opportunities, relegating extracurricular engagement to those with the means to arrange private transportation. Ensuring schools offer safe, consistent transportation for field trips and after-school activities is not a luxury but a matter of educational equity. At the same time, providing adequate transportation reduces the risk of chronic absenteeism. Student A's insights on her tardiness due to her mom's job explain why chronic absenteeism is so high. If students are often late, their chance of missing class altogether is high. All it takes is a consistent pattern of tardiness until a student and/or their parent decides that going to school might not be worthwhile. Students should not rely on their parents' work schedules to attend school on time. They should have access to reliable and fast transportation each morning to school and each afternoon to home. These examples show that transportation is not just a practical issue but also directly affects equity in education. In other words, these interviews humanize the data and illustrate how structural barriers to transportation limit access to educational opportunities for many students in Chicago.

Two out of the four students interviewed did not participate in school-choice, either because they wanted to stay closer to home or did not have the chance to apply. This fact displays the choices students and their families must consider when deciding to change aspects of their education. Student A's recognition of the distance factor in her commute to school gives a glimpse into what is essential for families to decide to attend school-choice schools. The results

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from Figure 9 show that White and Hispanic students from higher-income families have longer commutes than students from lower-income families. Though puzzling at first, this result makes sense when considering the school-choice policy; students with the resources to travel can attend schools in more affluent neighborhoods than their own, even if they commute longer to a school than if they had stayed home. Inversely, there was a slight negative correlation between these three variables for Black students, and the experiences of Student D corroborate this finding. Therefore, there could be other reasons why students do not choose to participate in school-choice regardless of income level, like access to safe and reliable transportation. Thus, the Interaction between different variables, combined with the insights from interviews with students, allows for a more nuanced understanding of the mechanisms of school-choice policy. Moreover, the two students who participated in school-choice had access to cars as a mode of transportation, further highlighting the need for fast and reliable transportation to participate in school-choice. The two students who did not participate in school-choice both walk to school.

The results of this study reveal how transportation inequities in Chicago limit the effectiveness of school-choice policies and disproportionately affect students from marginalized communities. School-choice is often framed as a policy tool to improve educational equity by allowing families, particularly those from under-resourced neighborhoods, to access higher-quality schools outside their immediate surroundings. However, the underlying assumption of school-choice is that students have the mobility to act on these choices. In reality, the study shows that many students, predominantly Black and Hispanic students, face significant barriers to mobility, stemming from unreliable public transit, long travel times, and limited service coverage in the neighborhoods where they live. Moreover, the results from the Wind Rose maps show that the majority of students head North when going to school. This finding

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could mean that students select schools on the North side of the city when participating in school-choice. It could also mean that students living in the North do not travel down south to get to school. This finding highlights the conceptions that students and their families have about the quality of schools in the North vs. South sides of the city. Understanding these conceptions helps make sense of the choices students and their families make regarding their education.

Despite the inefficiencies of student transportation highlighted by this study, some things are working. For example, Student B's experience at the student fair shows how students can access resources to aid with transportation services when needed. Student B learned about CTA fare cards at this event, which allowed him to use public transit when his family's car was unavailable. His peers and CTA representatives made this process accessible and understandable. However, while this moment reflects a responsive and supportive system, it also implies that access is contingent upon being in the right space at the right time with the right people. Other students in the sample, such as Student A and Student C, expressed unfamiliarity with school-provided transit options, including yellow school buses. This reliance on parental availability places a disproportionate burden on families with limited flexibility or vehicle access. Students should not rely on luck or social connections to access transit assistance or school information. Instead, systemic outreach and standardized access across all schools-especially in under-resourced communities-must be the baseline.

The connection between quantitative trends and qualitative insight also strengthens the relevance of the study's findings within the broader literature on educational equity and mobility justice. As Bierbaum et al. (2020) suggest, mobility justice requires critically examining how inequality intersects to constrain people's movement and access to opportunity. The students' narratives in this study reinforce Bierbaum's call to view mobility as a site of structural inequity.

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Moreover, the spatial disparities illuminated through QGIS mapping align with Kuzuhara's (2024) findings on the North-South divide in Chicago's transit infrastructure, with historically disadvantaged residents concentrated in the West and South parts of the city. These findings also build on Julia Burdick-Will's research on school attendance and neighborhood violence. Like her work, this study shows how geography and exposure to disadvantage shape students' capacity to attend and engage with school. Burdick-Will (2017) identifies transportation as a key mediator between neighborhood conditions and school outcomes; a point echoed in this study's exploration of multi-step, high-effort commutes. Similarly, Edwards (2024) emphasizes the importance of consistent and accessible school transportation in reducing absenteeism. The qualitative interviews confirm that lack of reliable transportation can destabilize school routines, contributing to late arrivals and missed days. Furthermore, this study builds on the work of Gottfried (2017), who found that access to school buses improves attendance, especially among younger students. While Gottfried focused primarily on kindergarteners, this study extends his logic to middle and high school students by showing that the absence of formal transportation infrastructure (like school buses or consistent CTA service) leaves students vulnerable to absenteeism.

This study corroborates previous findings and contributes by its integrated application of spatial data, statistical modeling, and student interviews. This mixed-methods approach facilitates a comprehensive knowledge of school commuting. It transcends fundamental cause-and-effect dynamics to display how race, income, and infrastructure affect educational accessibility. The results also prompt several issues for subsequent research. Increasing the sample size of the survey and interviews would facilitate more representative and intersectional analysis. Future research may investigate longitudinal trends in student commuting to evaluate

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the evolution of travel patterns over time or in reaction to policy modifications. Furthermore, adding information on school types and names would facilitate more accurate mapping of school accessibility and demand. This study illustrates that transportation is not merely a logistical matter but a structural issue with significant ramifications for educational equity. School-choice programs will remain ineffective unless the mobility obstacles encountered by low-income and minority students are addressed. This research enhances the expanding literature advocating for cohesive design between education and transportation systems to guarantee that all students, irrespective of their residence, can avail themselves of the advantages of in-person learning.

Limitations

This study offers significant insights into the effects of transportation inequality on student attendance and educational access in Chicago. However, it has limitations. Initially, CMAP's MyDailyTravel survey encompasses a restricted amount of observations pertinent to this study, failing to represent the complete diversity of experiences among all student demographics within Chicago Public Schools. Furthermore, the survey responses are self-reported, which introduces the potential for recollection bias, especially regarding travel durations and distances. The dataset also lacks comprehensive school identities and classifications, hindering assessing how specific school policies influence mobility experiences.

A further constraint is the income variable, which is documented in broad categories instead of as continuous or precise family income figures. This documentation constrains the capacity to conduct detailed statistical analysis on the correlation between income and transportation load. Additionally, this study lacks conclusive evidence regarding why students in the CMAP dataset attend schools outside their neighborhoods. This study links a student's choice to attend a school beyond their area to the pursuit of superior educational possibilities within the

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framework of school-choice policy, particularly in the context of its prevalence in Chicago. This assumption may not be universally applicable. Lastly, although the qualitative interviews offered significant depth, the limited participant pool indicates that their experiences may not represent all CPS students.

Policy Implications

To fulfill the promise of school-choice policy in Chicago, transportation access must be treated as a foundational component rather than an afterthought. This study demonstrates that commute length, travel time, and mode of transportation vary substantially by race, income, and geography—disproportionately affecting students from the South and West Sides. Spatial data analysis and student interviews both reveal that students from under-resourced communities often face longer, more complex, and less reliable commutes in order to attend higher-quality schools. These findings underscore a structural contradiction: while school choice is intended to create more equitable educational opportunities, unequal access to transportation undermines that goal. Thus, the findings of the graphs, tables, and maps created, combined with the opinions and anecdotes of the interviewees, inspired the following policy recommendations:

1. **Expand Access to CTA Student Passes**

CPS currently provides subsidized CTA passes to eligible students, but the criteria for receiving these passes are limited since there are income and distance requirements. The district should consider universalizing access to free CTA transportation for all students, especially those attending schools outside their assigned zones. This policy would reduce the financial burden on families and encourage greater participation in school-choice without penalizing students for their location. This expansion has been implemented in New York City, where students can access the Metropolitan Transit Authority (MTA) for up to four times a day any day of the week

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(MTA, 2025). Students get these passes from their schools and there are no income or distance limits to determine eligibility.

2. **Create Dedicated Student Transit Routes**

CTA and CPS should collaborate to create dedicated express bus or train routes timed around school start and end times. These routes should prioritize areas of the city that existing transit infrastructure underserves, particularly the South and West sides. Express routes that reduce the number of transfers and shorten commute times would help mitigate the logistical barriers students currently face. CTA already has implemented dedicated bus lanes for rapid transit routes, and expanding these lanes to student transit routes should not be impossible.

3. **Require School Transportation Services for Charter and Selective Schools**

Many school-choice institutions do not provide transportation, effectively limiting access to students with the means to arrange their commutes. CPS should mandate that all publicly funded schools, including charter and selective enrollment schools, provide transportation options for students who live beyond walking distance. This policy would align transportation support with the district's equity goals. The removal of school-provided transportation is new and can be reversed to prevent further inequalities.

4. **Use Spatial Analysis to Guide Resource Allocation**

CPS should use Spatial Data Analysis to identify transportation deserts and areas with high unmet demand for school transit. This data-driven approach would ensure that actual student movement patterns inform transportation planning and that areas with the greatest need are allocated the resources they need. Location matters and should be incorporated in the policy-making process.

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5. **Incorporate Transportation Metrics into School-Choice Policy Design**

School-choice policies should explicitly consider commute distance and time traveled when determining school assignment feasibility. Policymakers should also explore weighted funding formulas that account for transportation needs when allocating resources to schools serving students from distant neighborhoods. School commutes are an essential component of the education process and should be treated as such.

6. **Adopt a Mobility Justice Framework in Urban Education Policy**

Education and transportation planners should adopt a mobility justice lens in policymaking. This framework emphasizes the need to dismantle structural barriers that limit mobility for marginalized communities. In the context of school access, this means prioritizing investments that connect under-resourced neighborhoods to high-quality educational institutions and recognizing mobility as a human right.

Conclusion

This study highlights how transportation access critically shapes educational equity in Chicago. While school-choice policies aim to expand opportunities for students in under-resourced neighborhoods, they often ignore the unequal transportation systems that determine whether students can reach the schools they select. This research reveals how long and unreliable commutes disproportionately affect Black and Hispanic students—students who already live more often in neighborhoods with limited public transportation infrastructure—by using spatial data, statistical analysis, and qualitative interviews. This study shows that school-choice does not guarantee school access by analyzing where students live, how they travel, and the barriers they face along the way. Students from disadvantaged communities often must weigh safety, time, and reliability when making basic decisions about how to get to school.

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These patterns do not emerge randomly—they reflect structural inequities in education and transportation systems. Student interviews confirm that navigating this system imposes emotional and logistical strain, particularly on families without cars or flexible work schedules. This study's combination of quantitative and qualitative data provides a fuller understanding of how educational opportunity takes shape long before students enter the classroom. Students do not attend school simply because they choose to or feel motivated; their attendance depends on how they can move through their city. If school-choice aims to expand access to high-quality education, then transportation must be central in designing, funding, and evaluating these policies. Until policymakers address transportation access directly and equitably, school-choice policies will continue to benefit those who already have the means to move freely while leaving others behind. Therefore, school choice policy only promises the illusion of choice for those who can afford its cost.

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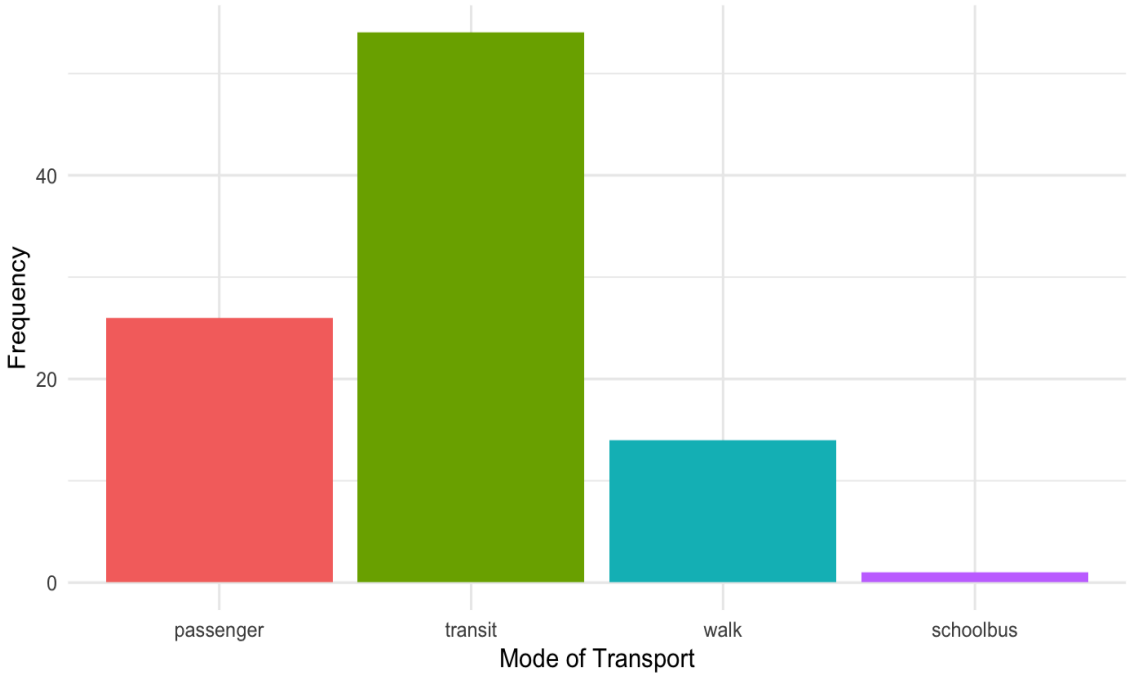
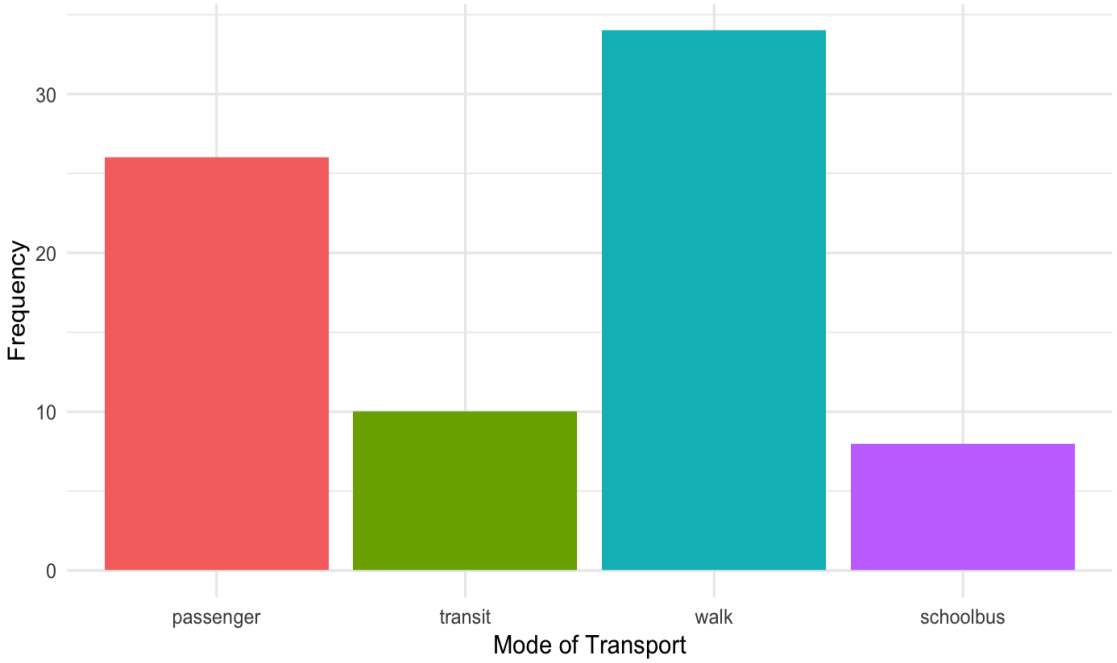
Appendix

Distribution of Travel Modes

High School Students



Middle School Students



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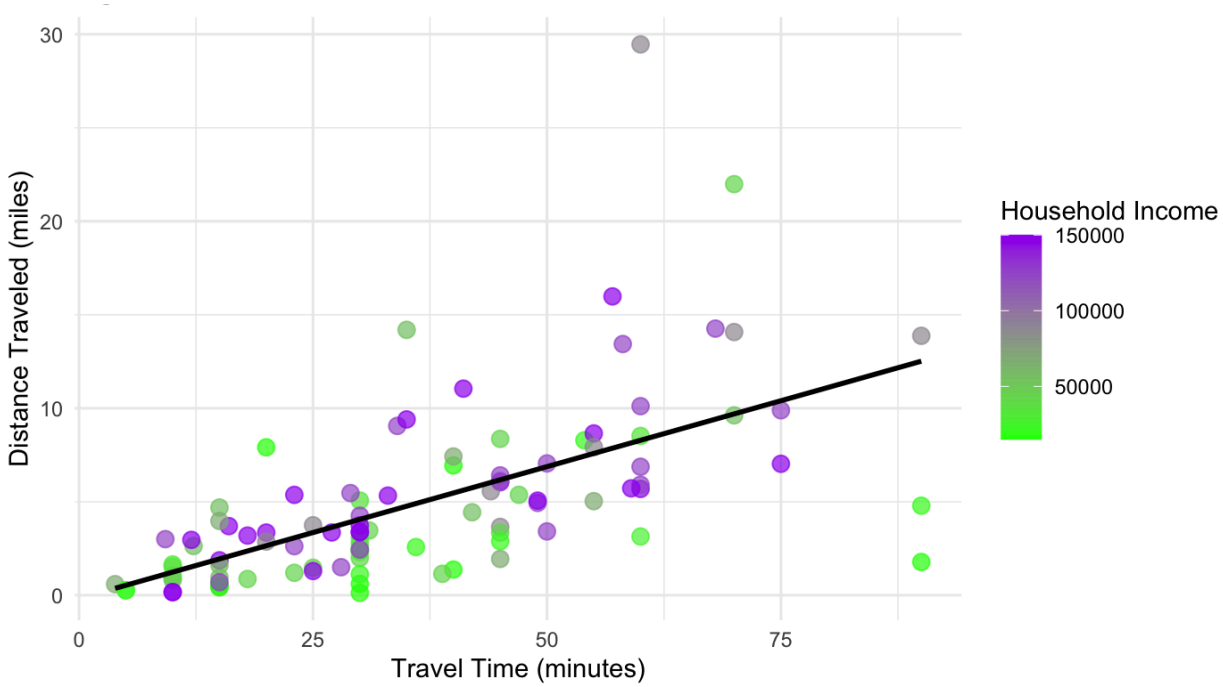
Relationship Between Travel Time, Distance, and Income

High School Students



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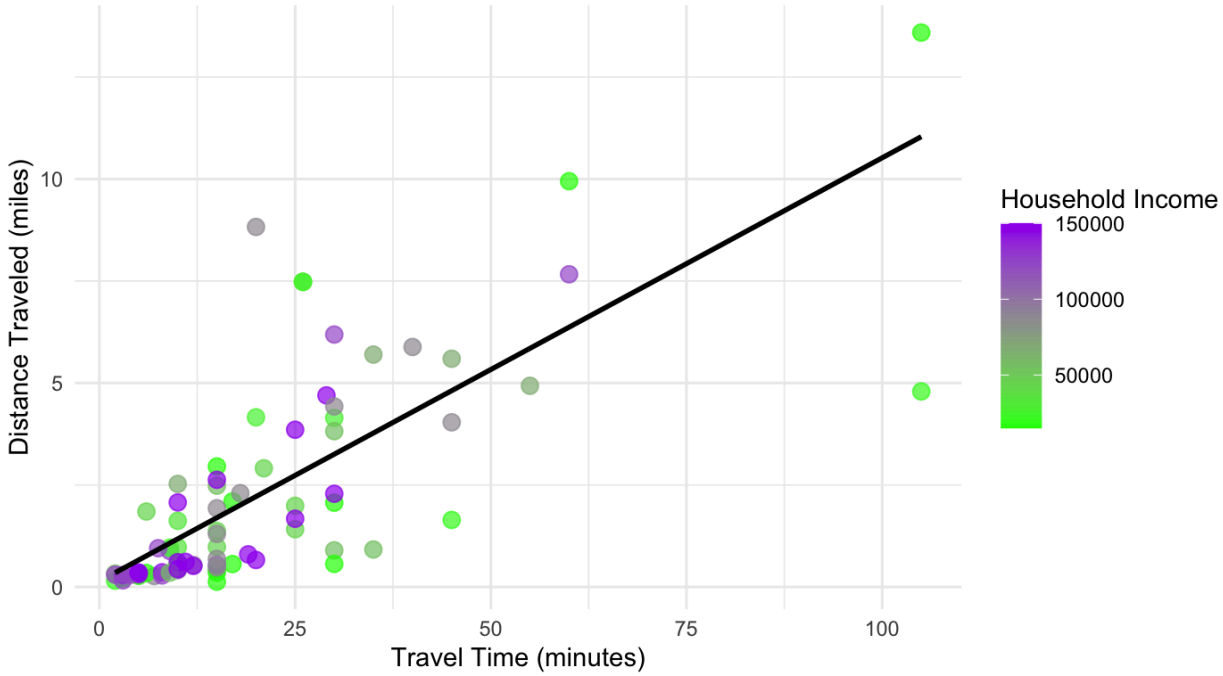
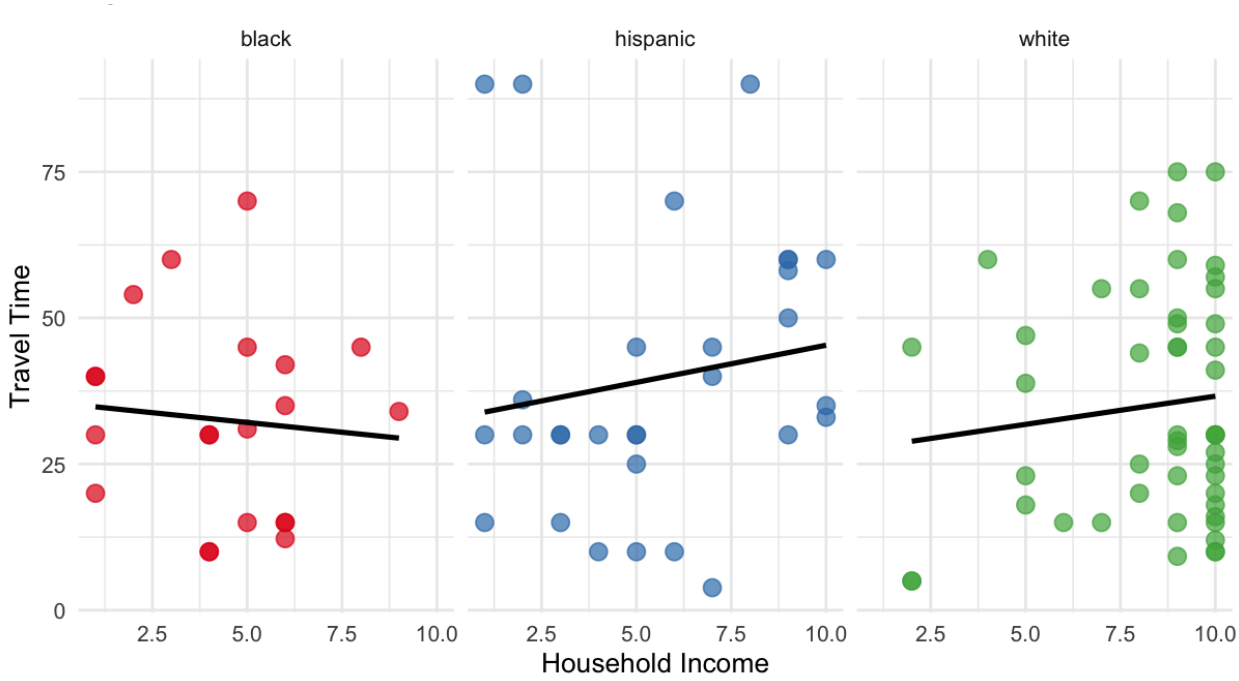


Relationship Between Race, Income and Travel Time

High School Students



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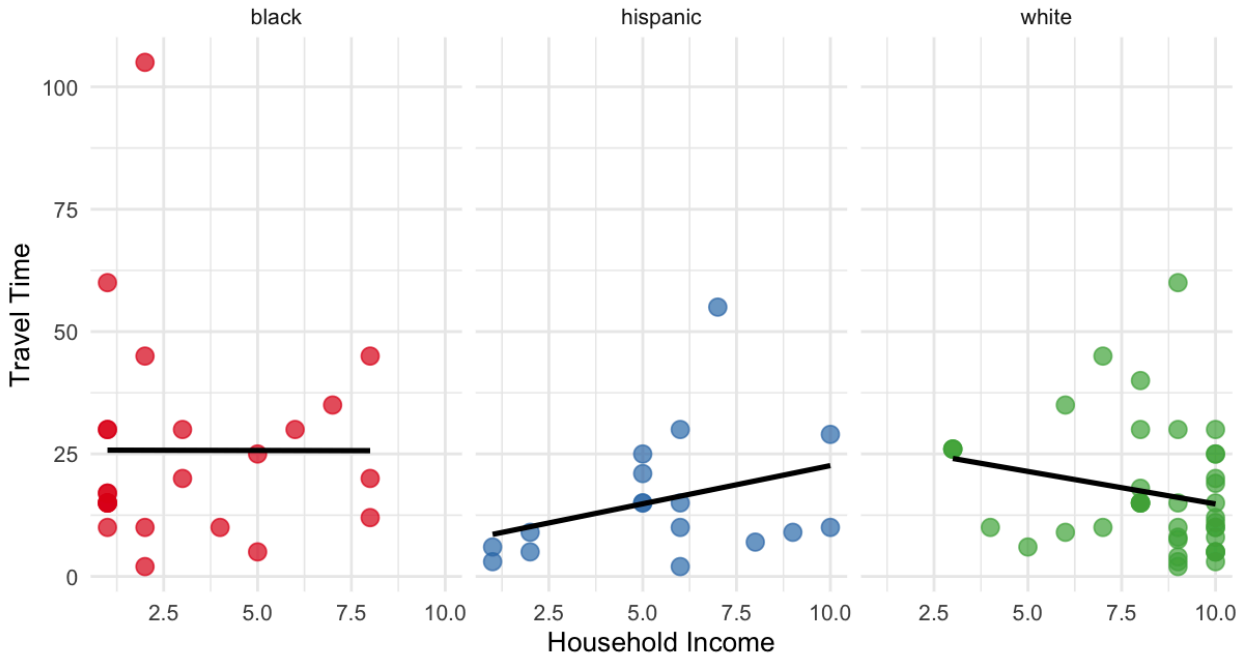
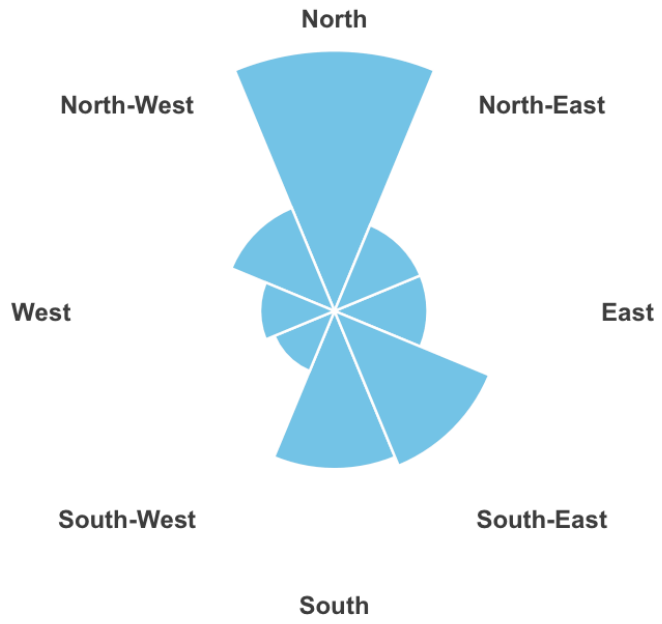
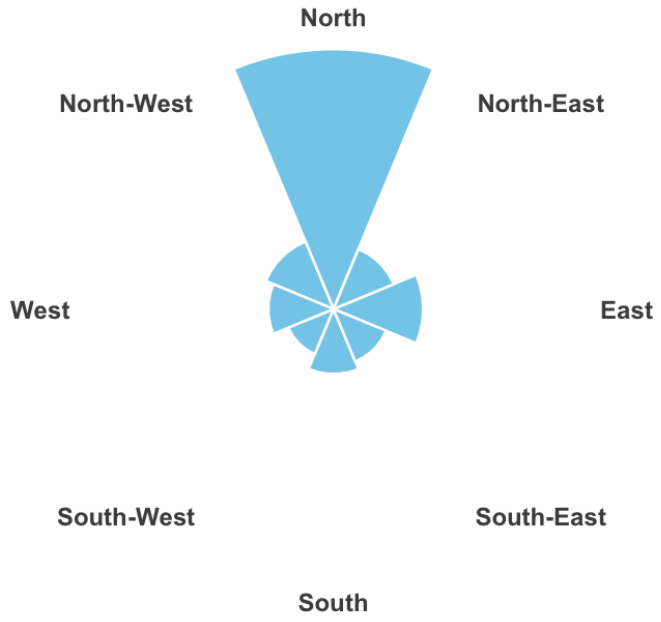


Direction of Travel from Home to School

High School Students



Middle School Students



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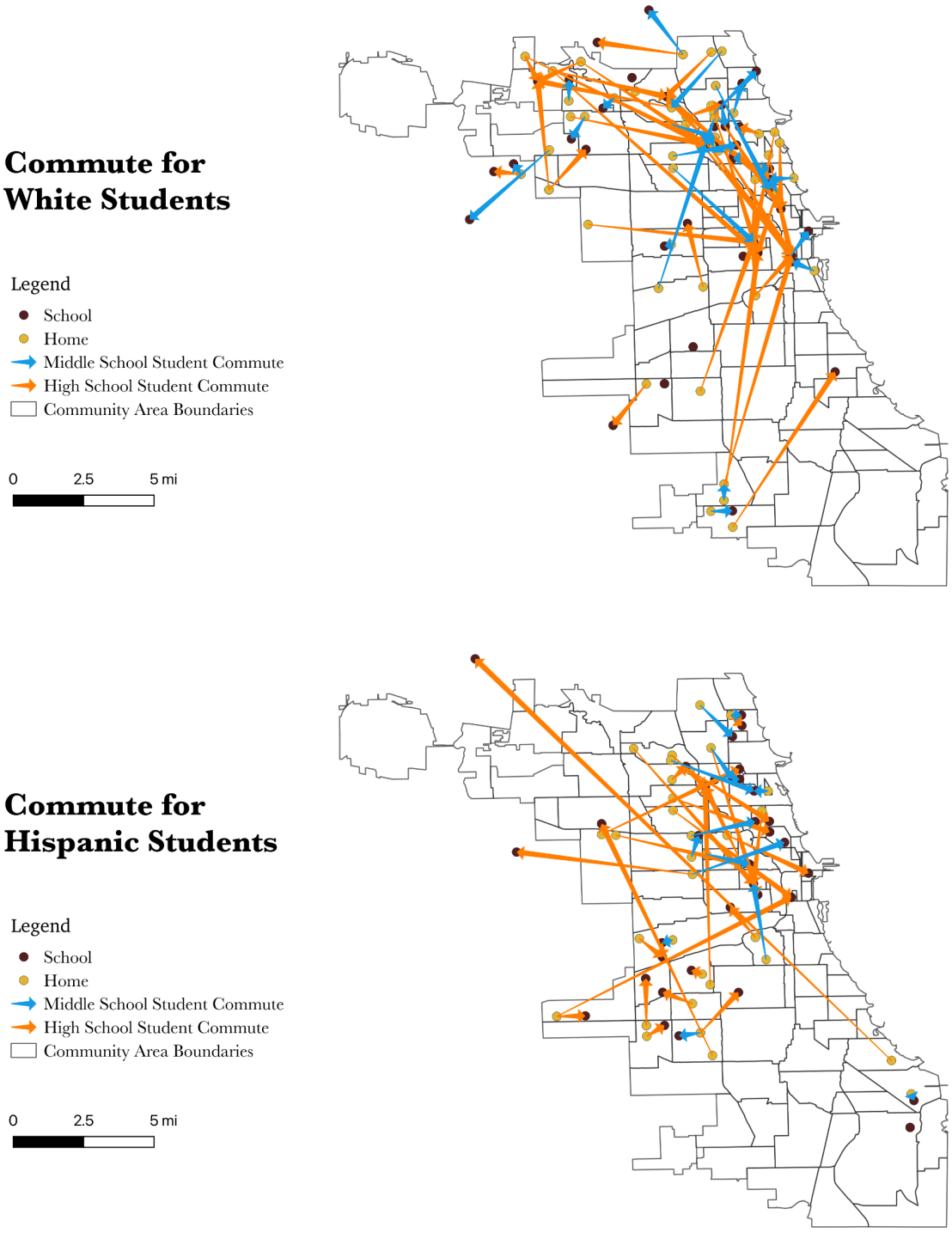
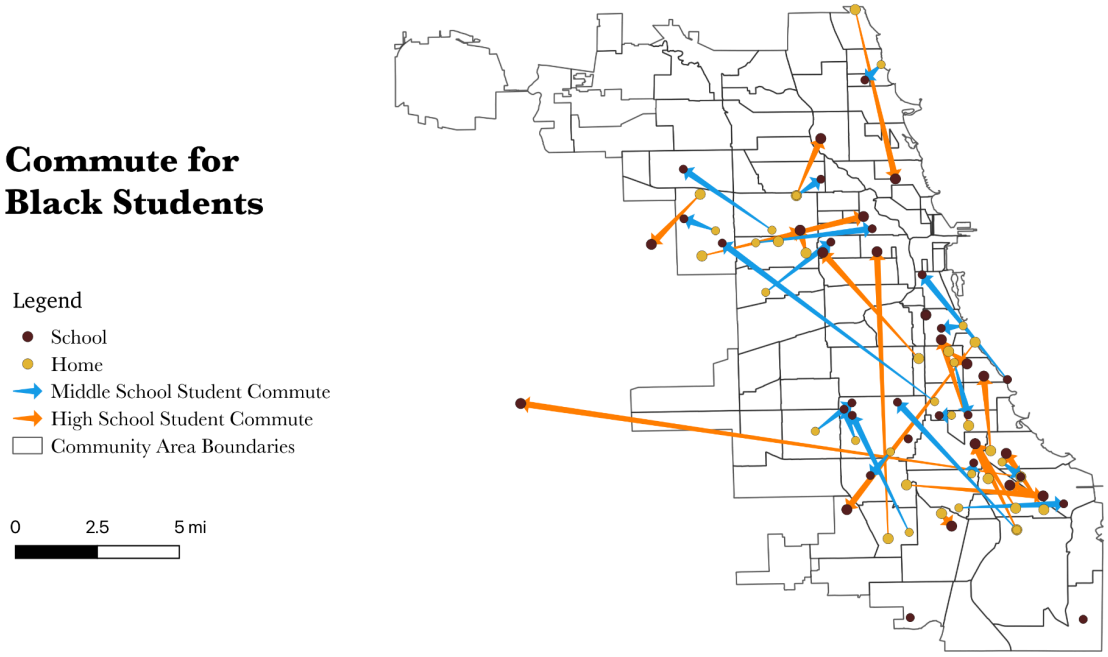
Commute Patterns from Home to School





Interview questions:

- ☐ Tell me your age and grade.
- ☐ What high school do you go to?
- ☐ Do you attend a school in your neighborhood?
    - ☐ If not, did you participate in school-choice?
    - ☐ How did you choose your school?
- ☐ How do you get to school?
- ☐ If you take the bus, what line?
- ☐ If you take the train, what line?
- ☐ Do you take the Metra?
    - ☐ If so, what stop(s)?
- ☐ Do you have a Ventra Card?
    - ☐ If so, what type? Is it the 30-Day CTA/Pace Pass $35 for students?
- ☐ Do you ever Uber/Lyft to school?
- ☐ How long does it take you to get to school?
- ☐ How far do you live from school, in miles?
- ☐ Are there other kids at your school from your neighborhood?
- ☐ What neighborhood do you live in?
- ☐ How would you describe your neighborhood?
- ☐ How many people are in your family, including yourself?
- ☐ Does transportation affect your decision to come to school?
    - ☐ If so, how?
- ☐ Who in your household usually decides how you get to school?
- ☐ Are there any obstacles that could prevent you from getting to school?

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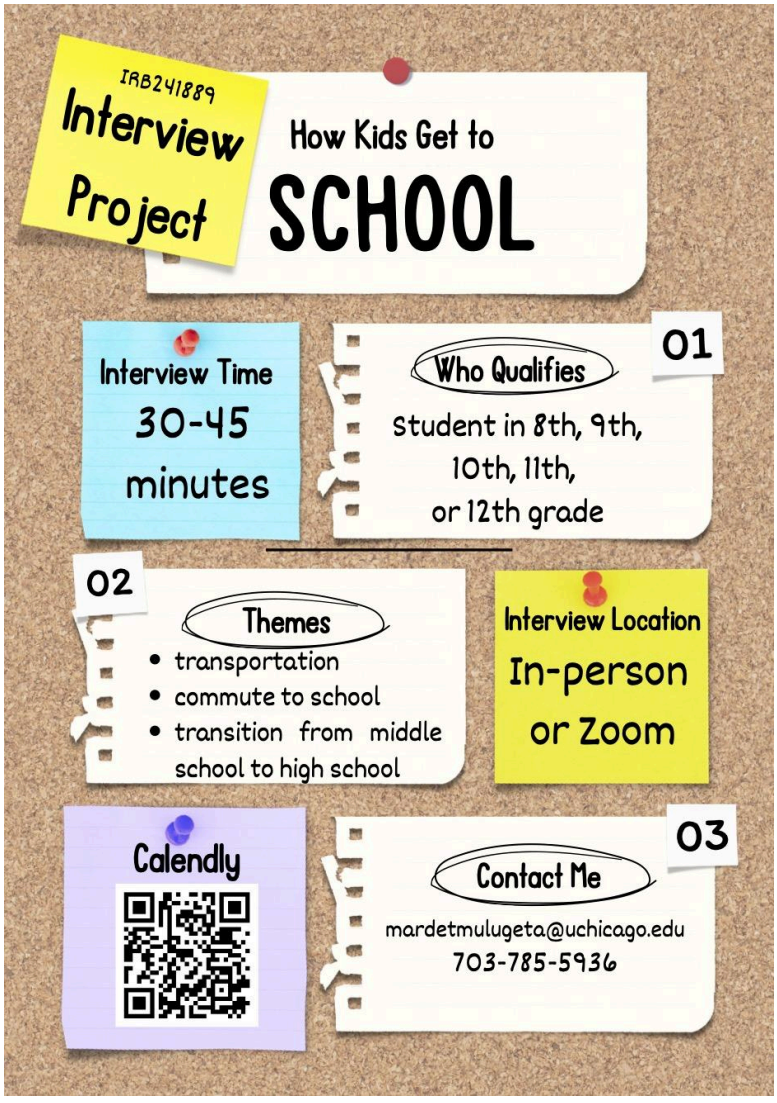
- ☐ If so, what are they?
- ☐ On average, how many days of the week do you go to school?
- ☐ Do you think that you have a safe and reliable form of transportation to school?
- ☐ Do you take the same form of transportation to school each day of the week?
- ☐ How did you get to school in middle school?
- ☐ How was the transition between middle school and high school for you, in terms of transportation?
  - ☐ Which mode did you prefer?
- ☐ If a yellow school bus was provided to you, would you use it?
- ☐ Reflecting on our conversation, do you have anything that you would like to go back to and change/rephrase or erase?
- ☐ If you had a magic wand, what would your ideal transportation routine be?

Recruitment flyer:



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