

## School Transportation Mode and Student Attendance Across Schools of Choice

Sarah Winchell Lenhoff

*Wayne State University*

Jeremy Singer

*Michigan State University*

Ben Pogodzinski

*Wayne State University*

Danica Brown

*Wayne State University*

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### **Abstract**

The availability and reliability of school transportation is essential for regular student attendance at school. Yet, school transportation resources are stretched for both families and school districts in cities with widespread school choice, where students' residences do not determine where they enroll in school. This study provides some of the first evidence on how Detroit students get to school. Going beyond eligibility for the school bus, we use linked survey and administrative data to determine how students get to school, the student and school characteristics associated with riding the school bus, and how mode of transit is associated with attendance. We find that 75% of Detroit students are driven to school in their parent's car daily and just 12% of students ride the school bus daily, with 76% never riding the school bus. Only 53% of students are eligible for any school-provided transportation (school bus or public bus cards), and about half of the students who are eligible to ride the bus never do so. Students who walked or biked to school daily had better attendance rates than students who drove their parent's car, controlling for school and student characteristics. Students who used multiple modes of daily transportation had the lowest family incomes.

### **School Transportation Mode and Student Attendance Across Schools of Choice**

A pre-requisite for educational success in public schools is having a reliable way to get to school each morning and home each afternoon. The expansion of school choice in large urban cities has stretched school transit dollars and created pain points for parents who do not have their own reliable mode of transportation. Inadequate school transportation resources, paired with geographically unequal cities, means that students have inequitable access to schools, particularly in a school choice market that does not require schools to provide transportation (Bell, 2009). Some research has found that school bus ridership and eligibility are associated with better attendance. In a national sample, kindergarteners who rode the school bus missed fewer days of school and were less likely to be chronically absent (Gottfried, 2017; Gottfried et al., 2021). There is some evidence that school bus eligibility increases attendance (Edwards, in press), although eligibility may not be sufficient in contexts with extreme levels of school choice and few students who qualify or who ride the bus (Blagg et al., 2017; Cowen et al., 2018).

Despite the recognition among policymakers and researchers that school transportation is a vital issue with relevance for educational equity (Bierbaum et al., 2021; Sattin-Bajaj, 2018), little research has measured the various ways that students get to school in cities with widespread school choice and how mode of transportation is related to student attendance and patterns of absenteeism. In this study, we combine a representative sample of students from Detroit traditional public schools, Detroit application/exam schools, and Detroit charter schools with district administrative records to explore the variation in school transportation mode and its relationship to student attendance. By analyzing the relationship between multiple modes of transit (e.g., family car, other car, school bus, public bus, walking or biking, and ride share), the frequency of transit mode use, and attendance, this study has important implications for how school districts and states should

invest limited transportation resources, in addition to how they make other policy decisions related to getting to school, such as school siting and school choice enrollment policies (Burdick-Will et al., 2013; Deka & Von Hagen, 2015).

## **Literature Review**

### **How Students Get to School**

Students get to school in many ways including riding the school bus, public transit, car, bike, or walking. The most common forms of transportation are the school bus and car (Rhoulac, 2005), but this has not always been the case. Historically, there has been a shift in how students get to school from walking/biking to their neighborhood school to mainly taking a car or riding the school bus. In fact, the National Center for Safe Routes to School (2011) reported that the percentage of students biking or walking to school decreased drastically from 48% in 1969 to 13% by 2009. Furthermore, the percentage of students taking the bus to school has declined and differs from the percentage of students who are eligible to ride the bus. To illustrate, districts report money spent on school transportation for approximately 51% of bus-eligible students in the 2018-2019 school year (Institute of Education Sciences, 2019). This included students who attend private schools, but use transportation funded by public dollars. Yet, a recent study by Kontou and colleagues (2020) examined data from the National Household Travel Survey (NHTS) and found that in 2017, 50% of students got to school by car, while only 37% rode the school bus and 11% walked or rode a bike to school.

Shifts in the mode of transit to school can be attributed, in part, to many students living further from school due to changes in educational and geographic landscapes—increased school choice in many cities and expansion of suburbs (Frie et al., 2012). Greater distance between home and school is associated with getting to school by car. In addition, concerns about travel safety

have contributed to fewer students walking, biking, or riding a bus to school and instead using car as a primary mode of transportation as parents perceived driving their children to school as safer than taking the school bus (Rhoulac, 2005).

Most research on transportation to school has examined the use of school buses, especially bus eligibility, leaving less understanding of other modes of transit in choice contexts and how they shape student outcomes like attendance. Furthermore, access to school transportation is not equitable as choice-intensive districts have varying policies on providing transportation (Chingos & Blagg, 2017). Guidelines for school bus provision and eligibility are mainly at the discretion of districts with some broad policies provided by states. Policies even vary by school with some schools not providing access to buses at all (Chingos & Blagg, 2017).

### **Who Uses School Transportation**

School-sponsored transportation is vital for many students who face additional barriers in getting to school (Singer et al., 2021), yet 37% of students in grades K-12 get to school by school bus (Kontou et al., 2020). Some research has found inequities in access and use of school buses by race and socioeconomic status (SES) (Weinstein et al., 2022). Evidence suggests that White students have greater access to schools that provide buses and are more likely to ride the school bus than Black and Hispanic students. A study of school bus transit in New York City found that Black students are less likely to attend schools with buses and less likely to ride school buses even when schools are similar distances from home as White students (Weinstein et al., 2022). Some research has also found that Black students are more likely to get to school by car and students from higher SES backgrounds are more likely to ride the bus (Rhoulac, 2005).

Some researchers have utilized a mobility justice framework to elevate and understand access to and use of school transportation, especially in the context of school choice (Bierbaum et

al., 2021; Lenhoff et al., 2022). Eligibility for yellow bus service in some large choice-rich cities like Denver, New York, and D.C., depends on or varies by grade level (Sattin-Bajaj, 2018). Reliable school transportation improves both academic and non-academic outcomes, including school attendance (Gottfried, 2017) and the likelihood of participating in school choice (Trajkovski et al., 2021) to gain access to higher-quality schools.

### **Transportation and Attendance**

Research has demonstrated a positive relationship between reliable, safe transportation and attendance (Burdick-Will et al., 2019; Gottfried et al., 2021; Patel et al., 2021). Specifically, riding a school bus is linked to better attendance. A study by Gottfried (2017) found that kindergarten students who ride the bus are more likely to attend school and less likely to be chronically absent than students who get to school using other modes of transit like riding a car, biking or walking. Similarly, in Michigan, Edwards (in press) found that riding the bus was associated with better attendance (0.5% to 1% increase) and a reduced likelihood of chronic absence (2% to 4% decrease), especially for low-income students. However, bus transportation was examined using eligibility as a proxy for actual bus ridership, and eligibility for the bus does not necessarily translate into taking the bus to school (Pogodzinski et al., 2022).

Commuting time has also been found to have effects on attendance. In DC, students across grade levels with longer commute times were more likely to be absent (Blagg et al., 2018). And in NYC, Black students were more likely to have longer commute times than White and Hispanic students. Longer commute times were associated with decreased attendance and greater chronic absenteeism in district choice schools (Cordes et al., 2022).

### **Transportation in Detroit**

The relationship between transportation and attendance is especially salient in Detroit, a city with high levels of poverty and the highest rate of student chronic absenteeism (i.e., missing 10% or more days) compared to other large US cities (Singer et al., 2021). The expansion of school choice has further exacerbated challenges with students getting to school (Sattin-Bajaj, 2018), where less than one in five Detroit students attend school closest to home (Cowen et al., 2018). Public and school transportation infrastructure in Detroit are not sufficient to meet the needs of students attending schools further away from home, and many elementary and high school students in Detroit live approximately 2.5 and 4 miles away from home, respectively (Lenhoff et al., 2019). As a low-density city (Linn, 2011) that has experienced significant population decline (Sugrue, 2014), public transit has suffered from financial challenges and divestment. Furthermore, school transportation is expensive, costing approximately \$1,000 per student (Institute of Education Sciences, 2019). Bus eligibility varies by grade level with Detroit Public Community Schools District (DPSCD) providing school bus transportation for K-8 students who attend their zoned schools and live 0.75 miles or more away and students with disabilities whose individualized education plans indicated a need for school transportation. High school students in DPSCD receive subsidized passes for public transportation. Detroit charter school policies vary dramatically, with some offering traditional school buses, bus loops, or bus shuttles. The plurality of charter schools in Detroit do not offer any school-sponsored transportation (Singer et al., 2020).

### **Research Questions**

Although research has demonstrated a relationship between transportation and attendance, most studies rely on measures of bus eligibility, commute times, and distance to school. We have less understanding of actual bus ridership and the use of other modes of transportation and the relationship between various modes of transit on student attendance. The current study addresses

this gap in the literature to provide evidence on how students get to school, actual school bus usage beyond eligibility, and the association between modes of school transit on attendance in Detroit.

To do so, we answer the following questions:

1. How do Detroit students get to school?
  - a. How does mode of transit vary by student and school characteristics?
2. Who uses school-based transportation?
3. How is transportation mode associated with attendance?

### **Data Sources**

Data for this study come from three sources: a family survey, student-level administrative records, and a school transportation policy audit to determine student eligibility for the school bus. We fielded the family survey in January 2022 by partnering with Detroit Public Schools Community District and 17 charter districts in Detroit. Using a replicate sampling approach, we randomly sampled students by school type: zoned school, application/exam school, and charter school. We then texted and emailed parents of the sampled students with a link to complete a Qualtrics survey. The survey asked parents about their income, employment, family structure, mode of transportation to school, and car ownership. More details on our survey methodology can be found in the appendix.

Our partner districts then provided us with administrative records for the focal students whose parents completed the survey. We linked these records to survey responses. They included demographic information (e.g., race, special education status, English learner status), school enrollments from 2018-2022, and attendance records, including the number of enrolled school days and the number of days present. For DPSCD students, the administrative records also included an indicator of eligibility for school-sponsored transportation. For charter students, we



conducted an audit of charter school transportation policies to determine which students were eligible to receive school-sponsored transit. We reviewed policies on public websites and, when necessary, contacted schools and districts directly to clarify. Ultimately, we included 1,423 students with linked survey, administrative, and transit eligibility data in our analysis. Table 1 describes our sample, 53% of whom were enrolled in a neighborhood DPSCD school, 25% in a charter school, and 22% in a DPSCD application or exam school. We summarize the means of our sample for our variables of interest, which we use as covariates in our regressions and are theoretically justified as related to student transportation usage and attendance outcomes. The average daily attendance rate of students in our sample was 80%, and 70% of our sampled students were chronically absent in 2021-22 (absent 10% of more of enrolled school days). The racial demographics mirror the Detroit student population, with 79% of our sample identifying as Black, 15% as Hispanic, and 6% as another race. In our sample, 47% of families had one adult in the household, and the average number of children was 2.89. The average income was \$29,269.

### **Methods**

We conducted a descriptive quantitative analysis to determine how students get to school, what characteristics are associated with their use of the school bus, and how their mode of transit was associated with their attendance. We began by describing the variation in availability of school transportation and reported mode of school transportation for Detroit students overall and by sector. Then, we described the characteristics of students whose parents reported daily use of a mode of transit: your car, another person's car that the parent drove, another person, school bus, public bus, or walk/bike. If more than one mode was used daily, we categorized students as using "multiple modes." We excluded daily taxi or rideshare use from this analysis because only three students' parents reported that mode as their only daily mode of transit.

To investigate who takes the school bus in our second research question, we used logistic regressions to estimate the relationship between student characteristics and daily school bus usage or ever school bus usage. We ran these models separately for DPSCD neighborhood school students and charter schools because the bus eligibility criteria are sufficiently different such that we expected the relationships may be different. We modeled school bus usage only for K-8 students, since the vast majority of high school students are ineligible to ride the school bus. Our covariates included variables we theorized would be related to our outcomes of interest. We include an indicator for student gender (female) because parents may have different safety concerns about the school bus based on their child's gender (Lenhoff et al., 2022). We include an indicator for special education status, since many students receive a school bus as part of their individual education plans (IEPs). We include indicators of student race since transportation resources, school siting, and residential locations are shaped by racialized structures and racial inequalities (Barajas, 2021; Burdick-Will et al., 2020; Rothstein, 2017; Turley, 2003). We also include information on family composition: an indicator for whether the household includes a single adult and the number of children in the household, theorizing that fewer adults and more children may make it more challenging to coordinate school transportation. We also include the family's log-transformed income, since families with a greater income may have more resources to support getting to school. We include an indicator whether the student is in high school, since the transportation modes available to high school students may be different (e.g., public bus passes for high school students). Finally, we include the distance the student lives from school, theorizing that this may influence the mode of transportation used.

For our third research question on how mode of transportation is associated with student attendance, we estimated an OLS regression with the outcome of attendance rate. First, we include

as covariates only the daily transit mode described earlier. Then, we add in the same covariates described previously. We implement the same two-step process to estimate the relationship between mode of transit and chronic absenteeism with logistic regressions.

### **Findings**

How students get to school in Detroit is largely influenced by what transportation modes they have available to them. Just 68% of students in our sample had a car in their household, echoing findings from the Detroit Metropolitan Community Survey (Gerber et al., 2017), and the average distance students lived from their schools was 2.89 miles. These facts alone suggest that both driving to school and walking or biking to school would be challenging for many families. Based on our audit of Detroit schools' transportation policies, we estimate that 47% of Detroit students are not eligible for any school-provided transportation. As shown in Table 2, 22% of students were eligible for a traditional school bus (34% in DPSCD and 14% in charter schools) with stops near or at their homes, 7% had access to a shuttle-style bus in which students can ride if they can get to any stop on a pre-specified route not tied to students' residences, and 3% had access to a bus loop between campuses within a school system (e.g., a bus that drives between two schools within the same charter school network). In addition, 21% of students (including all DPSCD high school students) had access to a subsidized bus pass to ride DDOT, the City of Detroit's public bus system. Given these public and private transportation resources, the findings below show how students actually get to school, who rides the school bus, and how their mode of transportation relates to their attendance.

#### **How Detroit Students Get to School**

As shown in Table 3, 75% of students are driven to school by their parent with their parent's car daily. While only 68% of parents reported they had a car in the household, the daily use of car

measure is reflective of the precariousness of car ownership in a city with high rates of poverty and costly car insurance and maintenance. In other words, parents may typically have a car available to them for daily transportation for their children, they may have not have had a car in their household at the time of our survey in January 2022. This also reflects a gap between need and transportation availability – many families may have no other choice but to drive their children to school with their own car, so when they have car troubles, their children may miss school. This variability in car availability is also reflected in the fact that just 12% of parents reported never using their own car for morning school transportation.

While driving their own car was the predominant mode of school transportation in Detroit, the results in Table 3 also reflect the variability in transportation to and from school, as well as transit use in times when the primary mode of transportation is not available. There are meaningful differences between transit mode in the morning and at the end of the school day, with just 63% of parents reporting that they pick their child up in their own car daily. Thirty-four percent of parents reported driving someone else’s car at some point for their child’s morning school transportation, and 40% reported that someone other than themselves drove their child to school sometimes. In addition, 16% of parents reported using a taxi or rideshare service for morning school transportation at least once.

Bus usage was very low in Detroit. Just 12% of parents reported that their children rode the school bus daily to get to school, with 13% reporting they use the school bus to get home. Overall, 24% of families reported ever using the school bus, even though 32% of students were eligible to ride a traditional, shuttle, or loop-style bus. Even more striking, while 21% of Detroit students were eligible to receive a DDOT bus pass for school transportation, just 4% of students got to school daily via DDOT, and only 10% ever used DDOT. Reflecting the long distances most

students in Detroit live from their schools, just 7% walk or bike to school daily, with 79% reporting that they never walked or biked.

### ***Variation in Transit Mode by Student and School Characteristics***

We found variation in mode of transit to school by student characteristics and school type. As shown in Table 4, students whose parents drove their own car to get them to school daily (and did not report any other daily mode of transit) in the morning and students who walked or biked to school had higher attendance rates than students who got to school in other ways. These students also were more socioeconomically advantaged, for example with an average family income of \$35,797 and 84% reporting that they currently had a car during our January 2022 survey. They also lived further from school at 3.11 miles away on average, perhaps demonstrating either the need for families who live further from school to drive their own car or their ability to access farther-away schools.

The second most common daily mode to school after your own car was “multiple modes,” when parents indicated more than one daily mode to school. Students who used multiple modes may be uniquely disadvantaged. They had the lowest average family income of all transit modes at \$20,640, and they had among the lowest car ownership at 51%. This suggests that families without cars may be coordinating several different transportation modes for their children as they can find them.

Reflecting the different transportation resources available to families depending on their school type, Table 5 shows the variation in transit mode between DPSCD neighborhood schools, DPSCD application/exam schools, and Detroit charters schools in our sample. Compared to DPSCD neighborhood school students, application/exam school students were significantly more likely to report driving their own car to school either daily or weekly and less likely to report riding

the school bus, or walking/biking. They were more likely to report taking DDOT, reflecting the fact that app/exam school students are disproportionately in high school than those enrolled in neighborhood schools. Charter school students in our sample were significantly less likely to ride a public bus or walk/bike to school than neighborhood school students.

### **School Bus Usage and Variation**

As shown in Table 5, just 18% of DPSCD neighborhood school students and 17% of charter school students took the bus to school daily or weekly. Based on bus eligibility indicators from the district, just 60% of DPSCD neighborhood students who were eligible to ride the school bus ever rode the bus to school. Likewise, just 53% of charter school students who were eligible to ride the bus ever did so. Table 6 shows the odds ratio estimates modeling daily use and ever use of the school bus for K-8 students in DPSCD neighborhood schools and, separately, for students in charter schools. We found that students who qualified for special education were 3.13 times more likely to ride the school bus daily in DPSCD than students who do not qualify for special education (model 1). In addition, students who have a car in their households are less than half as likely to ride the bus daily as students who do not have a car in neighborhood schools. These associations did not persist in the model estimating ever riding the school bus (model 3).

In charter schools, students who were Black or Hispanic were less likely to ride the bus daily than students of another race, while each additional child in a family's home was associated with a 1.31 times greater probability that they rode the bus daily (model 2). These associations did not persist when modeling ever riding the bus (model 4). However, in estimating both daily and ever riding the bus, charter students were more likely to ride the bus the further they lived from school, with each additional mile away estimated at a 1.14 times greater probability that they would ride the school bus daily.

## Transportation Mode and Attendance

Finally, we estimated whether the mode of transportation to school was associated with student attendance rate and chronic absenteeism, with all other modes compared to parents driving their own car daily. As shown in Table 7, we found that using multiple modes for daily transportation was associated with a significantly lower attendance rate (model 5) when only including modes of transit as covariates. When we added student characteristics and school type as covariates, those associations do not hold, and walking or biking in that mode was associated with significantly higher attendance rate than students whose parents drove their own car (model 6).<sup>1</sup>

In addition, Black students, students in high school, and students with a single adult in their household were associated with significantly lower attendance rates. Students who had a car in their households and higher incomes were associated with higher attendance rates. Controlling for student characteristics, students in app/exam school and charter schools had significantly higher attendance rates than those in neighborhood schools. These student- and school-level associations mirror findings from previous work that suggest that attendance is significantly shaped by racial and socioeconomic inequities in the broader educational ecosystem (Lenhoff et al., 2022; Singer et al., 2019, 2021).

In our estimates for the relationship between mode of transit and chronic absenteeism in Table 8, we found that students who rode the school bus daily are 2.4 times more likely to be chronically absent than students whose parents drove their own car and students who use multiple modes of transit were 1.67 times more likely to be chronically absent (model 7). However, these associations do not hold when controlling for student characteristics and school type (model 8),

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<sup>1</sup> We also modeled your car as an indicator covariate, compared with other modes, and associations did not hold when we included student-level characteristics.

suggesting that the associations in model 7 are reflecting unequal access to school transportation modes by race, class, and school type. Therefore, while transit mode variables were not significant when estimating chronic absenteeism with additional covariates, there were similar associations to student and school characteristics as described above when discussing attendance rate. For instance, students who are Black were 4.14 times more likely to be chronically absent than other race students, and students whose families have a car were about a third less likely to be chronically absent than students whose families did not have a car.

### **Discussion**

Unreliable school transportation is a major problem for many Detroit families, and it plays a role in Detroit's extremely high rates of student absenteeism (Lenhoff et al., 2022; Singer et al., 2021). However, because school-sponsored transportation in Detroit is so limited, there is also limited variation in how families get to school daily, even when families do not have a car. In fact, 16% of the families who reported taking a car daily to school and not reporting any other daily mode of transit also reported that they did not have a car in their household in January 2022. Seventy-eight percent of these students were chronically absent, compared to 62% of those students whose parents drove their own car daily and did have a car in their household in January 2022. In other words, many families have no other transportation resource besides their own car, and they sometimes do not have access to their own car. We believe this largely explains why, overall, students whose parents drove them to school had better attendance but that those associations disappeared when controlling for student characteristics like income and car ownership.

Overall, we found that 30% of families were cobbling together multiple modes of daily school transportation, including borrowing a car from friends or family, asking others to drive their



children to school, or having their children walk or bike sometimes long distances. Of the 21% of students who ever biked or walked, the mean distance from school was 1.75 miles for K-8 students and 2.67 miles for high school students. Students who used multiple modes of daily transportation had lower attendance rates and were more likely to be chronically absent in our models without student and school controls. This is likely because students who used multiple modes have socioeconomic disadvantages (e.g., 49% do not have a car) that are driving their use of multiple modes, and which therefore absorb the variation in attendance when included in the model.

Many Detroit students who lived close to school did not walk or bike. We found that, among students who lived 0.25 miles away from school or less, 44% never walked or biked to school. Among students who lived 0.5 miles away from school or less, 53% never walked or biked. This suggests that parents or students may feel uncomfortable using active modes of transit, perhaps due to safety concerns related to speed limit enforcement, street lighting, continuous sidewalks, or the presence of other children or adults (Royne et al., 2016). Future research should investigate why more students do not walk to school in Detroit, and policymakers should consider promoting walking and biking to school through programs like Safe Routes to School, walking school buses, and enrollment campaigns for students in the surrounding neighborhoods.

We found that nearly half (47%) of Detroit students did not have any access to school-sponsored transportation and just 22% had access to a traditional school bus. School-sponsored transportation availability was roughly equal between neighborhood, application/exam, and charter schools in the city, with variation in the bus type offered. DPSCD neighborhood schools offered more students access to a traditional school bus, while charters offered shuttle and loop style buses. A major takeaway from this study is that very few Detroit students ride a bus to school.

We found that just 12% reported riding a school bus daily and 76% of students never rode a school bus.

This suggests that only about half of the students who had access to a school bus ever used it. Why is that? While this study cannot answer that question, multiple factors may be at work. First, parents may not know that their children are eligible to ride the school bus or do not know how to access it, such as where the bus stops or shuttle stops are located and when they arrive. Second, parents may not feel that riding the school bus is a safe option for their child, perhaps because of perceptions of safety in the neighborhood where they live or where the bus stop is located. Third, parent work and bus pickup schedules may be in conflict, requiring parents to coordinate with others to arrange for school transportation (Lenhoff et al., 2022). Future research should investigate why bus-eligible students do not ride the bus or what would help them use the bus more frequently.

In our survey, we asked families what school transportation resources would be most helpful to them. As shown in Table 9, 68% of parents reported that it would be “very helpful” and 14% reported it would be “helpful” to receive gift cards to help pay for car gasoline. Seventy-four percent of parents indicated that it would be “very helpful” or “helpful” to have a school bus with a pick up at their house, with 56% reporting that it would be “very helpful” or “helpful” to have a school bus with a pick up stop within 0.25 miles of their house. This suggests that finding ways to expand bus eligibility could be a huge benefit to many Detroit families.

However, given the limited use of the bus by students who are already eligible, our study suggests that simply expanding school bus eligibility alone may not dramatically increase bus usage or student attendance. Rather, policymakers should consider campaigns to inform and engage parents about bus usage so that they understand what is available to them and are given a

chance to contribute ideas to bus policies that would encourage them to use the bus. In addition, policymakers may consider auditing bus routes and stops for safety concerns and usage; it may be that many routes are under-used and could be replaced with routes or stops that reach more students or are in safer areas. Increasing the number of students who ride the bus is likely to be costly, so the state should consider ways to adequately fund school transportation, especially in areas with low car ownership and/or weak public transit infrastructure. A recent report commissioned by the Michigan School Finance Collaborative recommended that Michigan provide greater reimbursement to districts for school transportation, based on the average spending of districts with similar population density (*Cost of Transportation in Michigan, 2022*). Our study suggests that density of transportation need should go beyond population density and consider poverty and car ownership in determining the potential cost and reimbursement rate for districts.

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## Tables

**Table 1***Descriptive Statistics for Student/Family Characteristics*

Variable	Description	Mean	Std Dev	Min	Max
Attendance Rate	Daily student attendance rate	0.80	0.16	0	1
Chronic Absent	Student missed 10% or more days	0.70	-	0	1
Female	Female student	0.50	-	0	1
ELL	Classified as English Language Learner	0.14	-	0	1
SPED	Classified as receiving special education services	0.09	-	0	1
Black	Black student	0.79	-	0	1
Hispanic	Hispanic student	0.15	-	0	1
Other Race	Student race other than Black or Hispanic	0.06	-	0	1
HH Children	Number of children in household	2.89	1.57	1	11
Single Adult HH	Single adult in household	0.47	-	0	1
Car	Family owns car	0.68	-	0	1
Income	Total yearly income in dollars	29,269	29,879	2,500	29,5000

Variable	Description	Mean	Std Dev	Min	Max
Dist2sch	Distance of home from school of attendance	2.89	3.10	0.04	29.60
HS	High school student	0.28	-	0	1
Neighborhood Sch	Student attends a neighborhood traditional public school	0.53	-	0	1
Charter	Student attends a charter school	0.25	-	0	1
AppExam Sch	Student attends a traditional public school that requires an application and/or an exam for admission	0.22	-	0	1

**Table 2***Bus Offering for Students by School Type and Overall*

	Overall	DPSCD Neighborhood	DPSCD App/Exam	Charter
Traditional bus	0.22	0.34	-	0.14
Shuttle-style bus	0.07	-	-	0.28
DDOT	0.21	0.20	0.52	-
Bus loop	0.03	-	-	0.12
None	0.47	0.46	0.48	0.46
Total	1.00	1.00	1.00	1.00

Students at DPSCD neighborhood schools offering “no transportation” are those K-8 students at a non-assigned neighborhood school.

**Table 3***Transportation Mode Frequency, Parent Survey 2022*

<u>Transportation type</u> <i>AM</i>	Daily	Weekly	Several times per month	Less often	Never
You drove your car	0.75	0.05	0.02	0.05	0.12
You drove someone else's car	0.16	0.04	0.04	0.11	0.66
Someone else drove	0.11	0.07	0.05	0.17	0.60
School bus	0.12	0.03	0.02	0.06	0.76
Public bus (DDOT)	0.04	0.01	0.01	0.05	0.90
Walk or bike	0.07	0.02	0.03	0.09	0.79
Taxi or rideshare	0.01	0.02	0.03	0.10	0.84
<i>PM</i>					
You drove your car	0.63	0.08	0.03	0.06	0.19
You drove someone else's car	0.11	0.05	0.03	0.11	0.70
Someone else drove	0.09	0.09	0.05	0.16	0.60
School bus	0.13	0.03	0.01	0.05	0.77
Public bus (DDOT)	0.02	0.01	0.01	0.04	0.91
Walk or bike	0.06	0.04	0.02	0.09	0.79
Taxi or rideshare	0.01	0.02	0.02	0.09	0.87

**Table 4***Average Student/Family Characteristics by Daily Mode of Transit to School*

Variable	Your Car (N=815)	Other Car (N=22)	Other Person (N=29)	School Bus (N=73)	Public Bus (N=16)	Walk/ Bike (N=49)	Multiple Modes (N=416)
Attendance Rate	0.81	0.75	0.76	0.79	0.75	0.81	0.77
Chronic Absent	0.65	0.86	0.67	0.82	0.85	0.72	0.76
Female	0.52	0.32	0.38	0.47	0.18	0.31	0.52
ELL	0.13	0.24	0.26	0.13	0.00	0.08	0.15
SPED	0.08	0.13	0.00	0.18	0.18	0.06	0.09
Black	0.78	0.61	0.73	0.77	0.94	0.80	0.80
Hispanic	0.16	0.24	0.06	0.10	0.00	0.17	0.15
Other Race	0.06	0.15	0.21	0.12	0.06	0.02	0.06
HH Children	2.72	3.56	2.11	3.52	3.15	3.31	3.04
Single Adult HH	0.44	0.39	0.37	0.46	0.61	0.42	0.55
Car	0.84	0.53	0.58	0.52	0.30	0.33	0.51
Income	35,797	22,077	27,956	21,406	21,365	22,883	20,640
Dist2sch	3.11	2.56	3.75	2.42	3.76	1.40	2.69
HS	0.29	0.23	0.41	0.15	0.91	0.15	0.26

**Table 5***Transportation Mode (daily or weekly) by School Type*

Transportation type (AM)	DPSCD Neighborhood	DPSCD App/Exam	Charter
You drove your car	0.77	0.88***	0.80
You drove someone else's car	0.21	0.16	0.20
Someone else drove	0.18	0.17	0.16
School bus	0.18	0.10**	0.17
Public bus (DDOT)	0.04	0.09*	0.02*
Walk or bike	0.12	0.06**	0.06*
Taxi or rideshare	0.03	0.04	0.03

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  statistically significantly different compared to DPSCD Neighborhood Schools. Columns do not add up to 1.00 because response categories are not mutually exclusive.

**Table 6***Odds Ratio Estimates for Relationship between Student Characteristics and Use of School Bus**(K-8)*

Variable	Daily Rides School Bus		Ever Rides School Bus	
	DPSCD	Charter	DPSCD	Charter
	Neighborhood (1)	(2)	Neighborhood (3)	(4)
Female	1.24	1.35	0.94	1.03
SPED	3.13*	1.20	1.36	0.84
Black	1.40	0.27*	1.94	0.40
Hispanic	0.94	0.16*	1.59	0.48
HH Children	1.13	1.31*	1.10	1.15
Single Adult				
HH	0.85	0.72	1.13	0.71
Car	0.47*	2.03	0.78	1.22
Log Income	0.73	0.89	0.91	0.89
Dist2sch	0.94	1.14**	1.02	1.11*
R-Sq	0.06	0.08	0.02	0.04

\*  $p < 0.05$ , \*\*  $p < 0.01$ .



**Table 7***Parameter Estimates for Relationship between Mode of Transit and Attendance Rate*

Variable	(5)	(6)
Intercept	0.81**	0.58**
	(0.01)	(0.06)
Other Car	-0.07	-0.05
	(0.04)	(0.04)
Other Person	-0.05	-0.03
	(0.05)	(0.05)
School Bus	-0.02	0.02
	(0.02)	(0.02)
Public Bus	-0.06	0.05
	(0.04)	(0.05)
Walk/Bike	0.00	0.05**
	(0.02)	(0.02)
Multiple Modes	-0.05**	0.00
	(0.01)	(0.01)
Female		0.00
		(0.01)
SPED		-0.01
		(0.02)
Black		-0.06**
		(0.02)

Variable	(5)	(6)
Hispanic		-0.02 (0.02)
High School		-0.06** (0.01)
HH Children		-0.01* (0.00)
Single Adult HH		-0.04** (0.01)
Car		0.05** (0.02)
Log Income		0.03** (0.00)
Dist2sch		0.00* (0.00)
Charter		0.05** (0.01)
AppExam Sch		0.07** (0.01)
R-Sq	0.02	0.21

\*  $p < 0.05$ , \*\*  $p < 0.01$ .

**Table 8***Odds Ratio Estimates for Relationship between Mode of Transit and Chronic Absence*

Variable	(7)	(8)
Other Car	3.25	3.44
Other Person	1.08	0.98
School Bus	2.40**	1.71
Public Bus	2.99	1.42
Walk/Bike	1.38	0.68
Multiple Modes	1.67**	1.02
Female		0.94
SPED		1.00
Black		4.14**
Hispanic		1.84
High School		1.56*
HH Children		1.18**
Single Adult HH		1.32*
Car		0.64*
Log Income		0.64**
Dist2sch		1.03
Charter		0.51**
AppExam Sch		0.42**
R-Sq	0.02	0.24

\*  $p < 0.05$ , \*\*  $p < 0.01$ .

**Table 9***Helpfulness of Transportation Resources Reported by Detroit Parents, 2022*

Transportation type	“Very Helpful”	“Helpful”	“Somewhat Helpful”	“Not Helpful”
School bus with pick up at your house.	0.60	0.14	0.09	0.18
School bus with pick up stop within 0.25 miles of your house.	0.39	0.17	0.15	0.29
Coordinated carpool with other parents.	0.14	0.12	0.17	0.58
Safe walking route from home to school.	0.17	0.09	0.11	0.64
Gift cards to pay for car gasoline.	0.68	0.14	0.06	0.12
Gift card to pay for taxi, Uber, or Lyft.	0.42	0.11	0.07	0.40
DDOT bus cards.	0.21	0.09	0.09	0.61

### **Appendix: Survey Methodology**

We conducted a representative survey of students in the Detroit Public Schools Community District (DPSCD) and Detroit charter schools in January 2022. We conducted a stratified random sample of students from three groups of schools: DPSCD neighborhood schools, DPSCD selective schools (i.e., application- or exam-based schools), and charter schools. Our survey population was all K-12 students enrolled in DPSCD neighborhood and application/exam schools and about 40% of Detroit charter schools. (The remaining charter schools declined to participate in the study.) We offered participants a \$15 gift card for completing the survey.

DPSCD and charter districts provided rosters from which we sampled students. We received both complete and partial responses, and for this study we considered responses as complete if they were not missing data on transportation from the survey and on attendance from the district. In total we had 1,423 responses. This translates to a response rate of approximately 15%, which is consistent with other survey research in Detroit conducted at the time (Gerber & Morenoff, 2021).

For our analysis, we constructed analytic survey weights through “raking” (Cohen, 2008). Raking is an algorithmic technique that adjusts survey weights to align a sample with population totals across multiple observed characteristics. This approach is useful for weighting with stratified random samples since the pool of respondents will disproportionately overrepresent some groups by design. We used raking to construct analytic weights that would align the data with the survey population totals. We used the “ipfraking” command in Stata (Kolenikov, 2017), and as parameters for the algorithm we used survey population statistics for student gender, race or ethnicity, grade level, district enrollment, and school type.