The Potential for Ride-matching in Disadvantaged Communities

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A Research Report from the Pacific Southwest Region University Transportation Center

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16. Abstract

The mobility constraints for low-income households are well known. Limited or no access to a private vehicle and often poor quality transit access result in shorter trips, slower travel speeds, and overall less travel. New mobility services that fill the gap between vehicle ownership and transit can potentially provide better mobility options for those with no or limited access to private vehicles. Little is known about how these new services may serve travel needs of low income, minority populations. We examine the concept of a community-based, non-profit ride-matching service to provide low-cost mobility services for local travel. Using a community-based, mixed methods approach, we analyze travel patterns, attitudes, and perceptions in Southeast Los Angeles, a predominantly Latino, low-income community. We find that the spatial distribution of travel is focused on a small number of high-frequency destinations creating the potential for a ride-matching service. Community members are generally favorable to the concept, but there are many community needs and designing a suitable service presents many challenges. This research provides the framework for the design and testing of the ride-matching concept.

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Contents

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The Pacific Southwest Region UTC conducts an integrated, multidisciplinary program of research, education and technology transfer aimed at *improving the mobility of people and goods throughout the region.* Our program is organized around four themes: 1) technology to address transportation problems and improve mobility; 2) improving mobility for vulnerable populations; 3) Improving resilience and protecting the environment; and 4) managing mobility in high growth areas.

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Disclosure

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Abstract

The mobility constraints for low-income households are well known. Limited or no access to a private vehicle and often poor-quality transit access result in shorter trips, slower travel speeds, and overall less travel. New mobility services that fill the gap between vehicle ownership and transit can potentially provide better mobility options for those with no or limited access to private vehicles. Little is known about how these new services may serve travel needs of low income, minority populations. We examine the concept of a community-based, non-profit ride-matching service to provide low-cost mobility services for local travel. Using a community-based, mixed methods approach, we analyze travel patterns, attitudes, and perceptions in Southeast Los Angeles, a predominantly Latino, low-income community. We find that the spatial distribution of travel is focused on a small number of high-frequency destinations creating the potential for a ride-matching service. Community members are generally favorable to the concept, but there are many community needs and designing a suitable service presents many challenges. This research provides the framework for the design and testing of the ride-matching concept.

Executive Summary

Low-income communities of color are typically underserved by both public transit and new transportation modes such as ride-hailing. Much of the technological innovation taking place in transportation is aimed at the middle-class, English-speaking, tech-savvy traveler. Low-income, minority travelers have different travel demands and different resources. On-demand services planned for these communities have the potential to provide better mobility options for those with no or limited access to private vehicles.

The purpose of this project is to explore the feasibility of a local ride-matching service in low-income communities of color. The ride-matching service would match an individual seeking a ride to a driver traveling to or from a similar origin or destination. The service would be non-profit, such that riders would only pay for the cost of the ride and drivers would be paid only for the cost of the ride.

Our research approach is first to understand travel patterns within our case study region of Southeast Los Angeles (SELA), a predominantly Latino, low-income community. We use data from the 2012 California Household Travel Survey to study travel patterns, including transportation modes used and destinations frequented by SELA residents. We used recent (2020-21) mobile phone data to examine travel flows and major destinations. We then consider whether a community-based non-profit ride-matching program could improve mobility in the region. We analyze attitudes and perceptions of existing travel and present the ride-matching concept to focus groups and community leaders to determine if this service would fill a mobility gap.

Our travel analysis revealed that, within SELA, people take fewer trips and have longer travel times than average. This aligns with existing research on travel in lower-income communities of color. Private vehicles are the dominant mode of transportation, followed by walking. We find concentrations of trip activity at commercial and medical centers that potentially could serve as hubs for rideshare.

Our focus groups revealed a variety of travel needs and constraints, as well as a strong tradition of sharing rides with others. About 50% of our focus group participants currently drive a personal vehicle, while others relied on a combination of public transportation, getting rides from friends and family, and rideshare. The ride-matching concept was viewed favorably by focus group participants and community leaders, though concerns were expressed, particularly with regard to safety, application technology, vehicles to be used, and forms of payment.

The concept of a community-based rideshare service is promising. There are large clusters of destinations that could serve as hubs for a ride-matching service and there are clearly significant unmet travel needs within the community. Designing a service that both meets these needs and is feasible requires decisions on many factors including eligibility, how the service is accessed, safety and security, driver status, vehicle ownership, and organizational structure. We have recommended three options for further examination and possible development for demonstration:

Ideal concept: Fully community-based, eligibility via membership, volunteer drivers using their own cars, matching with existing rides only.
Option 2: Expand to on-demand service, drivers are paid.
Option 3: Same as Option 2 and move to fleet ownership of vehicles.

Next steps in the research include exploring potential funding sources for a community-based rideshare demonstration and continued engagement with the SELA Collaborative.

Introduction

The relationship between travel behavior and sociodemographics is well known. Low-income, minority individuals are likely to travel shorter distances at slower speeds and take fewer trips than those with higher incomes, due to low rates of vehicle ownership and high rates of public transit usage (Blumenberg & Agrawal, 2014). New mobility services that fill the gap between vehicle ownership and transit can potentially provide better mobility options for those with no or limited access to private vehicles. Little is known about how these new services may serve travel needs of low-income, minority populations. We examine the concept of a community-based, non-profit ride-matching service to provide low-cost mobility services for local travel.

Our focus is low-income communities of color. These communities are typically underserved by both public transit and new modes such as ride-hailing. In addition to income barriers, community members may have limited access to credit cards and smartphones, and may not have sufficient English language proficiency to use automated on-demand services. We use Southeast Los Angeles (SELA) as our case study area. Median household income is well below the county median, and 89% of the population is Hispanic or Latino.

Our research approach is to first understand travel patterns within the SELA area and then consider whether a community-based non-profit ride-matching program could improve mobility for SELA residents. This report will contribute to the growing literature on new mobility services in low-income communities and offer a method to assess a community's potential for such service.

The remainder of this report is organized as follows. We briefly summarize the literature on travel behavior of low-income households and then describe the recent literature on new mobility. We then present our research approach and data. We discuss our results and offer potential options for a community-based ride-matching service.

Literature Review

A large body of research exists on the travel behavior of various demographic groups, including people of color and those with low income. However, many studies are dated; they rely on data and travel surveys that are up to a decade old. This creates a significant gap, given the major technology changes and the emergence of new modes over the past decade. This literature review combines existing travel behavior literature with recent findings on new mobility usage and perceptions in low-income communities to better understand how these services can be effectively implemented in the future.

Travel Behavior

Travel behavior patterns of low-income populations have been well studied. Low-income individuals are likely to travel shorter distances and take fewer daily trips than those with higher incomes (Blumenberg & Agrawal, 2014). Although car ownership in the U.S. is almost universal, disparities in ownership are prevalent by race and income, with low-income, Black, and Hispanic households being more likely to not have a vehicle than high-income and white households (Methipara, 2014; Brown, 2018). While some households choose not to own a private vehicle, Brown (2017) found that 79% of zero-car households cite financial or physical constraints as their primary reason for not owning a vehicle.

Although the poorest households remain carless, vehicle ownership continues to grow, especially among lower-income populations. Vehicle ownership results in low-income households spending a greater proportion of income on transportation expenses, but also results in much higher mobility compared to transit or non-motorized modes. (Giuliano, 2005; Giuliano & Hanson, 2017). Studies of metropolitan areas around the US show large disparities in job access between transit and car. Examples include Boston, where access to jobs is seven times higher by car than by public transit, and San Diego, where job access is up to 30 times greater by car (Shen, 2001; Boarnet et al., 2017). These studies only consider employment opportunities, but access to other activities and services (e.g., education, medical care, food, and recreation) are also important.

Those without access to private vehicles must often rely on public transportation. In Los Angeles, regular transit riders make up a very small percentage of the population and share common characteristics; they are more likely to be lower-income, come from homes with either no vehicle or less than one vehicle per driver, to be younger, immigrants, and African American or Latino (Manville et al., 2018). Even among the transit-dependent, transit is often not a first choice. The majority of low-income populations do not take most trips by transit (Giuliano, 2005). Most regular transit users do not have access to a vehicle, but the reverse does not apply; most people without vehicles do not regularly use transit, at least in part due to lack of access or unavailability of service (Manville et al., 2018).

Transit services are often a poor fit with the travel patterns of low-income households. Lower-income workers are more likely to have irregular working hours or childcare considerations that peak-hour transit services may not accommodate. Those who work part-time jobs and have inconsistent working schedules may not be adjusted to the "9-to-5 public timetable" that most of society, transit service included, is centered around (Roy et al., 2004).

Given the limitations of transit, low-income and minority groups often rely on informal carpooling or ride-sharing services among neighbors and friends. Carpooling rates are higher among people of the same race (Charles & Kline, 2006). Some ethnic groups have institutionalized informal services. One example is camionetas, privately owned and operated immigrant ridesharing by Latinos for Latinos (Valenzuela et al., 2005). They are popular due to low cost, speed, door-to-door service, and having Spanish-speaking drivers. A similar informal service, often used by immigrants for commuting purposes, is the raitero, primarily targeted to manufacturing and agricultural workers (Grabell, 2013). There is limited research on these types of informal services because they are illegal; they operate within tight social networks and avoid visibility.

Low-income and minority groups are also dependent on taxi services. The 2009 National Household Travel Survey revealed that taxi users have a bimodal income distribution, with a majority of users concentrated at the lowest or highest ends of the income spectrum. Taxis were also found to be much more likely used for medical trips than other modes. Low-income households without vehicle access may have no choice but to utilize taxi services to make it on time to doctor's appointments or to prompt care in medical emergencies (Schaller, 2015). Lack of transport access is a significant part of healthcare access; transportation access has been cited as a reason for missed or canceled medical appointments between 10 and 51 percent of the time among low-income households (Syed et al., 2013). Missing appointments can lead to a negative spiral of worsening health outcomes.

New Mobility

New mobility services include ride-hailing, various forms of local transit services, and vehicle-sharing services for cars, bicycles, and scooters. Most of these services are emerging in the private market. Ride-hailing began in 2007, with Uber launching its first service in San Francisco. Ride-hailing operates as a platform system that matches ride requests with drivers. It functions as a lower-priced taxi service. New mobility transit services include local fixed or flexible route services and shuttle services for major transit stations. Vehicle-sharing systems allow users to rent vehicles on an hourly basis, typically allowing pickups and returns at different locations.

To what extent do such services increase mobility and accessibility for low-income populations? There are several barriers to using these services. First, they may not be available in low-income neighborhoods. Ride-hailing, bike share, and scooter services concentrate in areas of high demand: high density areas where there is sufficient income to spend on such services. Areas with sparse demand have poor or no service. Private companies may also avoid perceived high crime areas (Kodransky & Lewenstein, 2014). Second, these services are volatile. Most services are not profitable and hence are dependent on investors to maintain operations. Scooters may be available for a few months and then disappear. This uncertainty makes it difficult to determine how to best integrate these services into the existing transportation system (Fleisher et al., 2020).

Third, there are barriers to access. Low-income travelers may face operational barriers – lack of internet or smartphone access, or lack of access to bank accounts or credit cards – all needed to use platform-based services. There may also be information barriers. For example, McNeil et al. (2018) looked at bike share perception and usage in primarily low-income neighborhoods in multiple cities (Philadelphia, PA; Chicago, IL; Brooklyn, NY). They found that while lower-income people of color use bike share less than higher-income white people, interest was high. Disparities between interest and usage can be explained by several factors, including but not limited to: misconceptions about bike share (cost, believing helmets are required, believing bikes would lock after allotted time limit), unfamiliarity with the system, and payment concerns (believing credit card is required for use). It is easy to see how similar misunderstandings and hesitations could apply to other new mobility services.

Finally, there may be cultural barriers. Bikesharing may be perceived as inappropriate for women or older people. Using Uber or Lyft unescorted may be considered too risky, given the limited regulation of ride-hail drivers. These issues have yet to be examined. While new mobility may potentially provide added value services, the evidence to date is sparse.

Research Approach

The purpose of our research is to examine the potential of a community-based, non-profit rideshare service for serving local travel needs. The concept seeks to address the shortcomings of ride-hailing and microtransit services. Ride-hailing serves individual point-to-point trips, requiring additional vehicle miles traveled (VMT) as the driver moves from serving one passenger to the next. Microtransit services are costly to operate due to hired drivers and other expenses. Our rideshare concept, ride-matching, is aimed at matching passengers with vehicles that are en route to a given destination. This matching

process reduces extra VMT. By using community volunteer drivers and compensating the driver only for costs incurred, the cost of the service is minimized.

The first step in evaluating the concept is to understand local travel patterns. We use both travel diary and mobile phone trace data to examine travel patterns and identify spatial concentrations of travel activity. A second step is to engage the local community in the concept development process and to better understand perceptions, attitudes, and cultural factors that can inform the design of the service. We select Southeast Los Angeles (SELA) as our case study area, and we partner with the SELA Collaborative to engage the community. The SELA Collaborative is an umbrella organization of nonprofits providing services in the SELA area.

Previous work with the SELA Collaborative sparked the motivation for this research and for using the SELA area for the case study. Giuliano et al. (2017) performed an extensive transportation audit of this region. A key finding was that bus frequency and on-time performance were lower in SELA than the county average. Subsequent research showed that job access is much lower by public transit than by car and that traveling to or from transit stops by bike or car could significantly reduce the disparity (Giuliano et al., 2021). This finding motivated the search for a low-cost local transportation option.

The SELA Area

The SELA area is approximately 62 square miles and has a population of about 750,000. It includes 11 cities and four unincorporated communities. See Figure 1. The SELA area is located in a heavily industrialized part of Los Angeles. To the south is the San Pedro Bay port complex. A major industrial corridor traverses the northern portion of the area. It is also traversed by the I-710, the major link from the ports to railyards in central Los Angeles. The area, therefore, has high employment access, as well as high impact from industrial activity. The area is densely populated, overwhelmingly Hispanic and Latino, and of low median income, relative to Los Angeles County, as shown in Table 1.

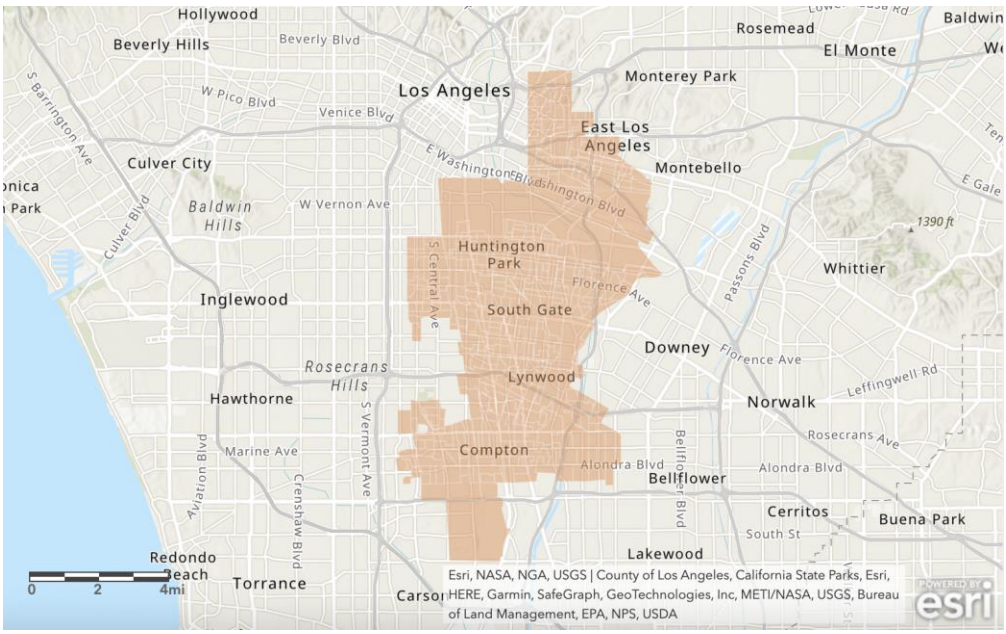

Figure 1. SELA region

Table 1. SELA area demographics.

	SELA area	LA County
Mean population density (people/acre)	27.33	20.91
Share Hispanic or Latino	89%	48%
Median household income	$40,306	$61,213

Source: American Community Survey, 2019.

Travel Data

There is no perfect data source to examine travel behavior at a highly disaggregate level. Travel diary data give detailed data on daily travel patterns of individuals, but due to cost are infrequently conducted. Mobile phone trace data provide detailed information on origins and destinations and are available in near real-time. However, the data do not provide information on individual travelers. We use both types of data to examine both individual behavior and spatial patterns of travel.

The 2017 National Household Travel Survey (NHTS) is the most recent travel diary data available. Unfortunately, the sample size within the boundaries of the SELA area was too small to provide a representative sample (136 persons). We, therefore, used the California Household Travel Survey (CHTS), conducted from 2010 to 2012, which includes 42,000 households within the state. Like NHTS, CHTS includes a survey of usual travel behavior in addition to the travel diary data. The CHTS sample for SELA is 1,071 persons. It contains person, household, vehicle, and locational data for all travel for one day.

Safegraph is a private company that obtains mobile phone trace data and makes it available at various levels of aggregation. We obtained the census block group (CBG) level data. The trace data is collected by place and time stamp. Origins and destinations are identified as “points of interest” at the CBG level. The data, therefore, give flows between CBGs over the course of each day. A comparison of our data sources is given in Table 2.

Table 2. Comparison of Travel Data Sources

Data	Feature	Time frame	Sample size of SELA	Pros	Cons
CHTS	Individual's travel log of a sampled day Survey on usual travel behavior	A sampled travel day between 2010 and 2012	345 households, 1,071 persons, 3,219 trips	Detailed disaggregated travel log Includes demographic, household, and travel mode data	Older dataset Small sample size
SafeGraph	Aggregated flow of devices	July 1st, 2021 to March 1st, 2022 (eight months)	149,016 SELA residents monthly	Large sample size Recently updated	Aggregated dataset Captures only mobile device users No data on travelers

Community Engagement

Our research includes two strategies for engaging community members, led by our community partner, the Southeast Los Angeles Collaborative, or SELA Collaborative. The SELA Collaborative is a network of twelve nonprofit organizations and more than 240 SELA Leadership Network members that, collectively, are committed to the mission to strengthen the Southeast Los Angeles communities, build collective power, and encourage innovation to drive regional systemic change.

With the SELA Collaborative, we established a project advisory committee consisting of public agency and community leaders. This committee met to provide guidance on our research. Meetings took place during various stages of the project in April, July, and November 2022. A list of advisory committee organizations and PowerPoint presentations from each meeting are available in Appendices A and B.

Second, we had two focus groups to directly elicit participation from community members. We conducted focus groups in May and October 2022. Participants were recruited by the SELA Collaborative. Compensation in the form of gift cards and a meal was provided. Rides and childcare accommodations were made available to facilitate participation. The groups included 15 and 13 participants, respectively, ranging in age from 16 to 82. The SELA Collaborative team led and facilitated the focus group, which was conducted in both English and Spanish, with simultaneous translation provided via headset.

The focus groups provided invaluable insights about current perceptions of travel access and existing services within the region, as well as willingness to try a non-profit ride-matching service. We use both strategies to verify our findings of travel behavior and to gain perspective about what would and would not be feasible within the SELA area.

Travel Pattern Analysis

In this section we present results from each data source and then draw some conclusions on the potential for a local ride-matching service.

California Household Travel Survey

As noted above, the CHTS is more than a decade old and the number of observations is not large. We compare the CHTS sample demographics with those of the American Community Survey (ACS) to see if the sample generally aligns with SELA's current population characteristics. See Table 3. The CHTS is within 10% of the 2019 ACS on all variables. The biggest differences are share Hispanic or Latino and full-time employment status. The difference in employment status will underestimate work-related travel and possibly underestimate total travel relative to today's population.

Table 3. SELA region demographic variable estimates from CHTS and ACS

Variable	CHTS (2012)	ACS (2019, Five Year Estimates)	Approximate CHTS Difference
Percentage Identifying as Hispanic or Latino	79.0%	89.0%	-10.0%
Less than High School Education	47.53%	45.60%	+1.93%
High School Education	22.60%	25.96%	-3.36%
Some College	11.58%	15.95%	-4.37%
Full-time Employed	48.52%	58.10%	-9.58%

As noted earlier, residents of the SELA area are overwhelmingly Hispanic, have lower education level, lower median income, and lower rates of driver's license holding than the County. These differences in population characteristics are reflected in differences in travel patterns. Table 4 gives selected travel indicators for SELA and LA County populations, respectively. T-test results are given in the last column. Comparisons are as expected. SELA area residents have fewer vehicles per driver, have fewer trips per day, and have a larger average party size. Although the difference is not statistically significant, SELA area residents travel shorter average daily distances. Comparable travel times suggest use of slower

modes – more walking, biking, and transit trips. Party size may be related to generally larger household size, as well as more frequent carpooling.

Table 4. Difference in means test results for CHTS. Comparing SELA to LA County.

Variable	SELA Area	LA County	T-test Result
Vehicles per driver	0.79	0.94	***
Total trips/person	3.01	3.24	***
Average trip distance	7.12	7.64	N/S
Average trip time	21.72	21.19	N/S
Average number of people per trip	2.33	2.01	***

* = P < 0.10, **= P < 0.05. ***= P < 0.01, N/S = not statistically significant

We then compared mode choices among SELA residents and residents of greater LA County. The most commonly used modes have been included in Table 5. SELA residents are less often the drivers of vehicles on a given trip, which again reflects what we would expect given our knowledge of the region. Trips as a passenger were slightly higher for SELA than LA County. Walking trips on the day of the survey were notably higher for SELA than LA County by almost ten percent, which differs from the weekly report above. Although SELA residents have a much higher transit mode share, the use of transit is very low (7.6%) relative to other modes.

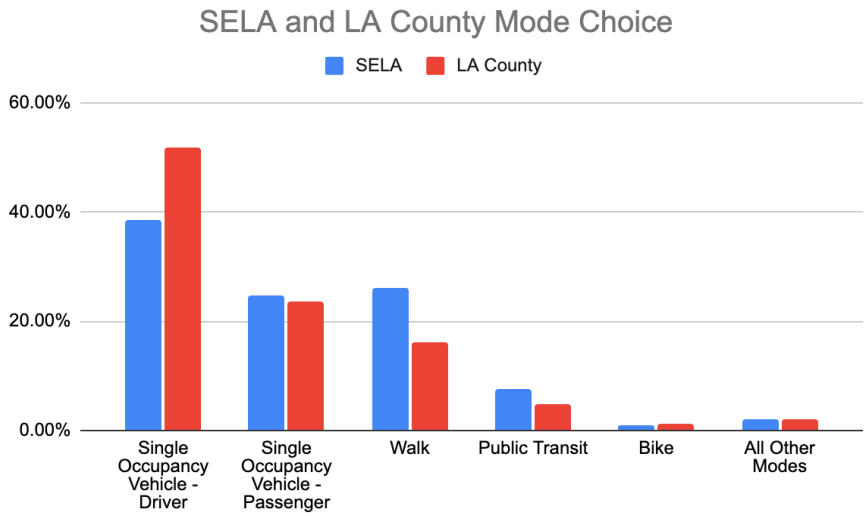

Figure 2. SELA and LA County mode choice distribution. Note: Sample size for trips by SELA residents is 3,219. For all of LA County, the total number of trips is 68,755.

We now examine SELA population travel patterns in more detail. Figure 3 shows kernel density maps of locations of all trips within SELA, by SELA residents from the CHTS data. Kernel density is a point-based pattern analysis method in which the area is divided into cells. The map on the left includes the home locations of SELA residents as destinations, whereas the map on the right excludes home locations. Destination clusters are seen most prominently in Huntington Park and Walnut Park, towards the center of the SELA area. These are well-established commercial areas located along a major boulevard.

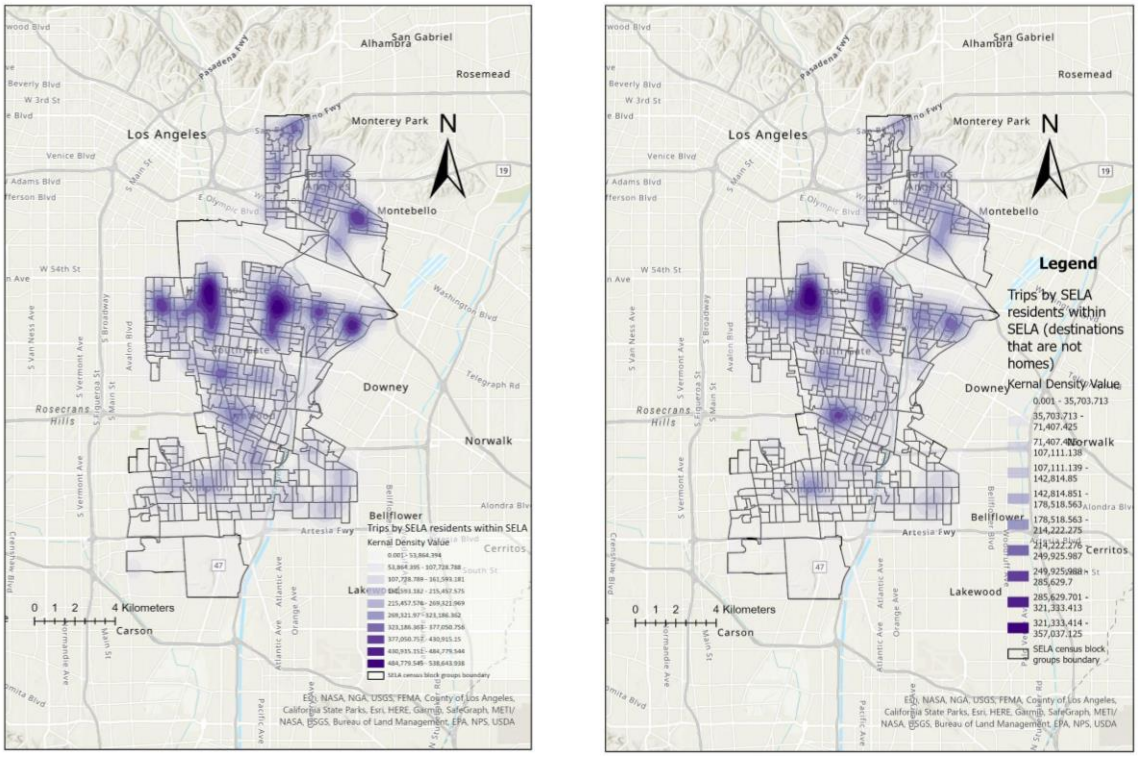

Figure 3a, 3b. 3a (left): density map of all trip stops in SELA, by SELA residents (2,261 trips, including destinations that are homes). 3b (right): density map of all trip stops in SELA, by SELA residents, excluding home locations (1,161 trips).

We then analyze the time aspect of SELA residents' travel. See Figure 4. Travel by SELA residents appear to have more distinct peaks than general travel by LA County residents, peaking at 7 am and 2 pm. Greater LA County has more of an extensive afternoon peak period, from 3 to 6 pm. Understanding the temporal aspect of SELA residents' trips will assist in determining which times are most important to provide the ride-matching service.

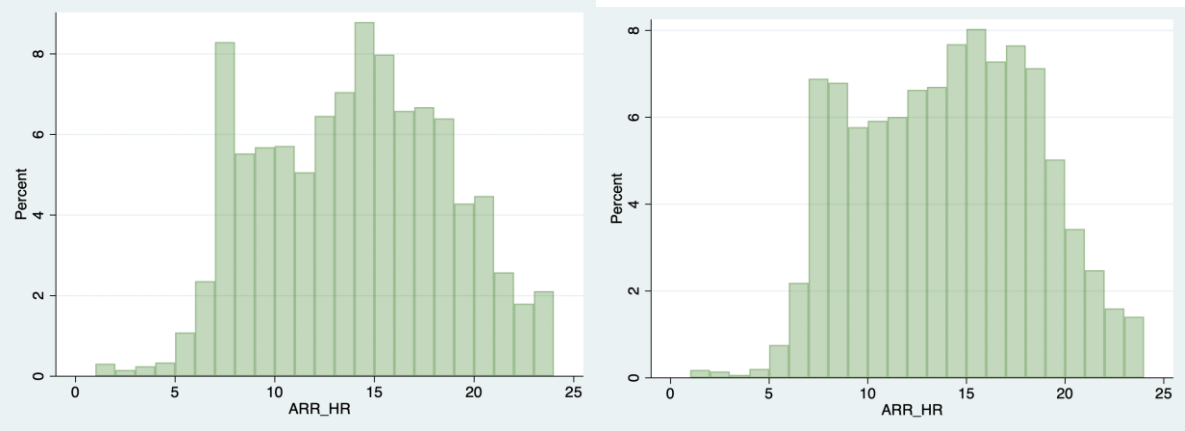

Figure 4. The timing of trips by SELA residents (left) and greater LA County (right).

Trip chaining is one important aspect of daily travel. There is currently no agreed-upon measure for trip chaining. Following McGukin et al. (2005), we use the Federal Highway Administration's (FHWA's) definition: a sequence of trips bounded by stops of 30 minutes or less, between "anchor activities" (such as home, work, or school). We use the 30-minute stop threshold as a starting point but also perform analyses for 60 and 90-minute stops. The start and end anchors must be different; a round trip from home to store to home is not a trip chain. See Figure 5 for an illustration of the process of identifying trip chains. Our process resulted in 686 stops being part of trip chains. Among these, 479, 554, and 590 stops have a duration of less than 30 minutes, 60 minutes, and 90 minutes, respectively.

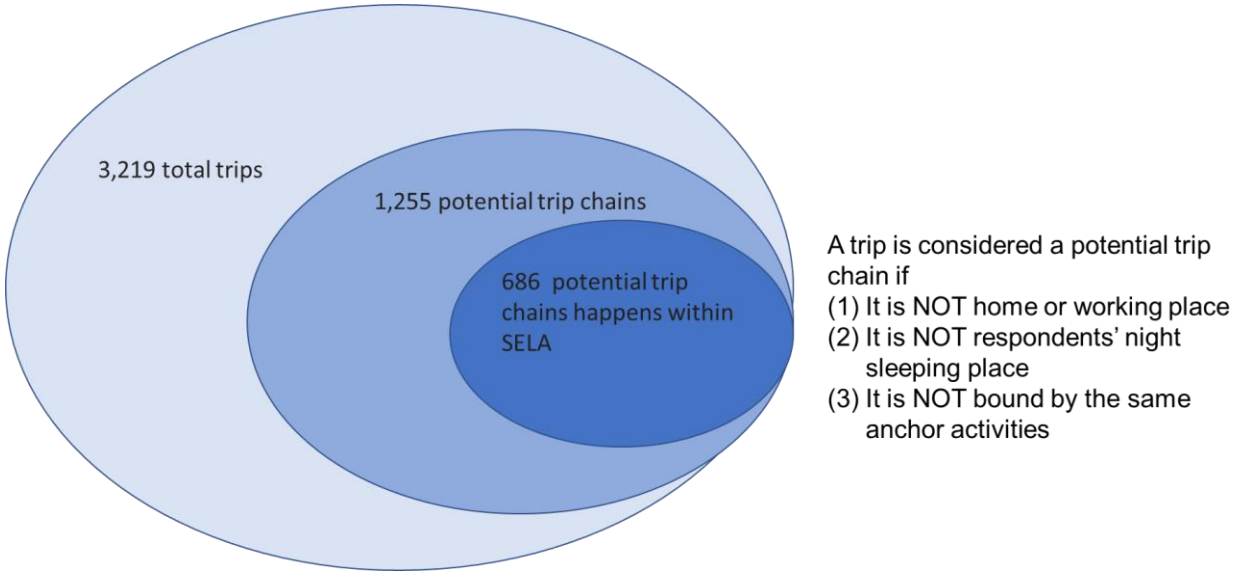

Figure 5. Initial filtering criteria for trip chaining of SELA residents.

Because we are considering a local ride-matching service, it is important to know the locations of trip chain stops. Shares are based on total trips, not chained trips. As expected, the more we relax the dwell time constraint, the greater the share of chained trips. Out of all potential chained trips, 39.6% stopped for less than 30 minutes and occurred in SELA, which we investigated further as follows.

To examine trip chain stops in more detail we use the Kernel Density Analysis tool in ArcGIS Pro to visualize spatial clusters of 30-minute trip chaining locations that are within SELA. We used the default radius computed for the dataset based on the spatial variant of Silverman's Rule of Thumb (Silverman, 1986). We also used the default output cell size (5.35*10-4) and chose to output cell values of trip chaining density.

Figure 6 shows the results. There are clear clusters of activity, similar to the clusters for all trips. The densest cluster, again, is located in Huntington Park and Walnut Park, centered mainly in commercial districts. This aligns with our understanding of likely trip chaining locations, as this area consists of stores, restaurants, clinics, schools, and parks. Similar but less obvious chaining clusters are also seen in Bell, Compton, Lynwood, Commerce, and Bell Gardens neighborhoods.

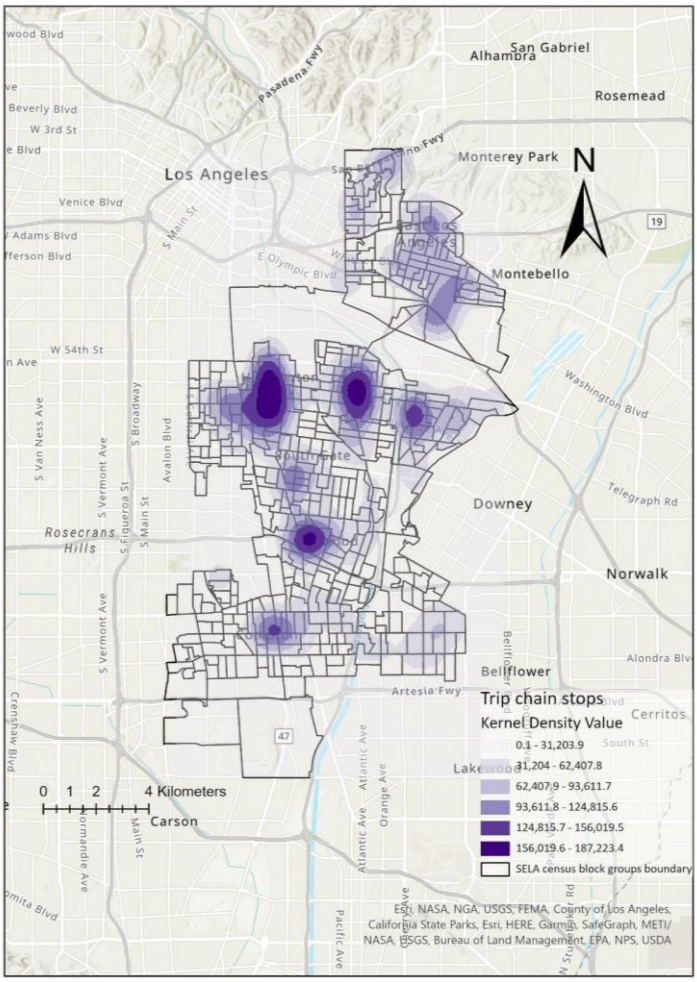

Figure 6. Density map of trip chaining stops in SELA, by SELA residents. 30-minute dwell time threshold.

We found that trip chaining happens primarily in the morning, peaking at 7 am, and again in the afternoon between 1-3 pm, similar to trends of all trips by SELA residents. Around 7 am, most of the trip chain stops are schools, transit stops, parks, and restaurants. Around 1-3 pm, the chain stops show a similar pattern to 7 am. On their way back home, people chained their trips at schools, transit stops, grocery stores, pharmacies, and restaurants. The patterns suggest child-related trips and errands linked with work or school trips.

SafeGraph Analysis

We use SafeGraph data to examine aggregate travel patterns. SafeGraph data records the flow of mobile devices and marks their visits to certain POIs or neighborhoods. We have eight months of SafeGraph data. Observations are aggregated by the home census block group (CBG), identified as the location where dwell duration is the longest. The SafeGraph data requires cleaning to eliminate "data sinks", anomalies in the data that transmit locations in error. We eliminated CBGs with more sampled devices than the population to eliminate the data sinks. After removing these CBGs, the number of tracked devices represents a 4.28% sample of the SELA population.

We analyzed monthly pattern data from July 1st, 2021 to March 1st, 2022. We are interested in where SELA residents travel and for what purpose. The POI data allow us to identify trip purpose. The POI categories are based on NAICS two-digit industry codes. The three top visited POI categories in SELA are: Restaurants and Other Eating Places, Religious Organizations, and Grocery Stores. Some POIs (parents) have a broader footprint and encompass smaller POIs (children) within their borders. For example, the parent is the main destination, a shopping center, and the children are the shops within it. We retained both parent POIs and all POIs without parents, which results in 6,699 POIs within 461 CBGs. The total number of trips to these POIs over the eight months by SELA residents is about 1.2 million.

The top fifteen most-visited POIs within the region by SELA residents are shown in Figure 7 and listed in Table 6. It can be seen that they are distributed throughout the SELA area. Of these locations, all but one are shopping malls or commercial centers. Median dwell times at these locations are between 19 and 26 minutes, suggesting that these are primarily quick, non-work trips. One outlier destination was City Terrace Park, where the median dwell time was over three hours. Over half of the above destinations are located in or around hot spots in Figure 2. We cannot expect a high level of consistency given that CHTS data is more than a decade old and a lot of commercial development has occurred over this time period. For example, the Azalea shopping center was constructed in 2014. The SafeGraph data helps us by showing where current trip clusters are located.

Our travel analysis confirms that SELA residents face mobility challenges due to lack of access to private vehicles and limited transit access. The data show a high rate of shared vehicle trips, suggesting a willingness to share rides. The SafeGraph data show potential trip activity clusters that can inform the location of demand for ride-matching.

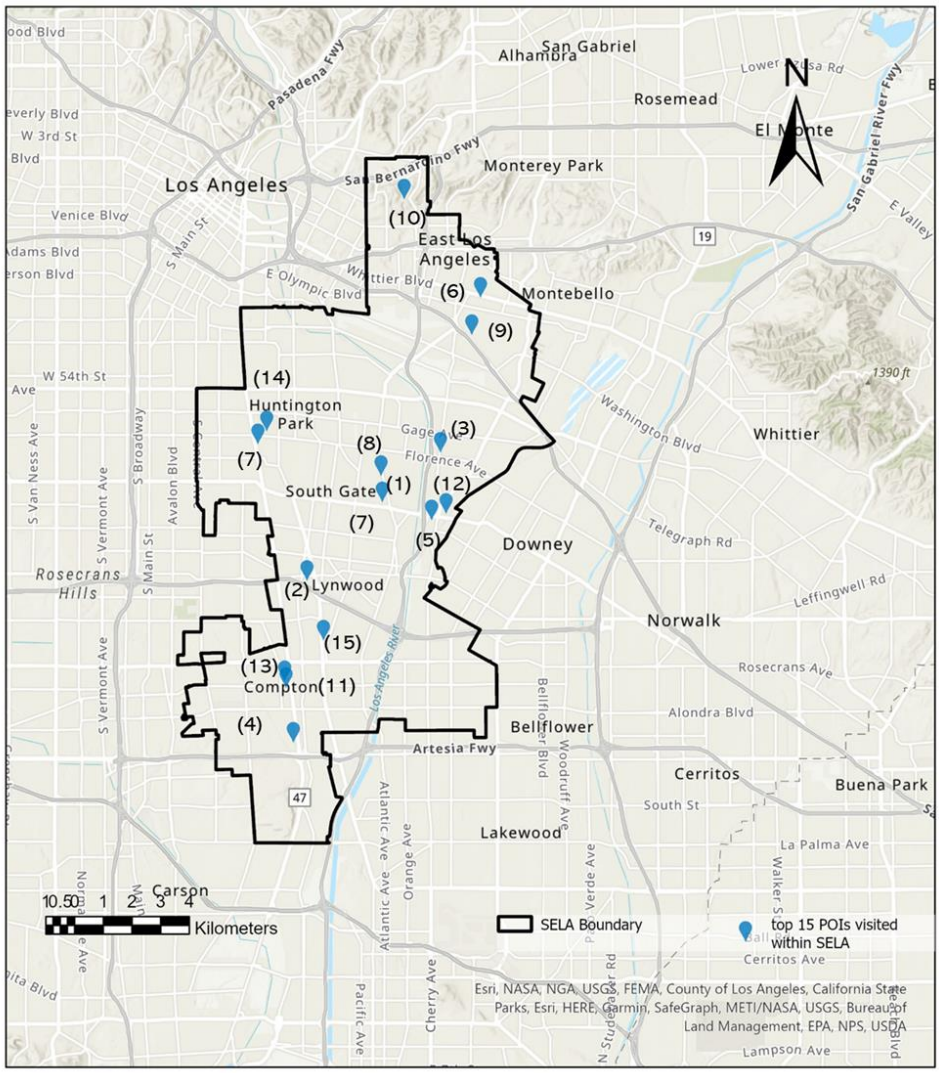

Figure 7: Top 15 most visited POI locations within SELA by SELA residents, from July 2021 to March 2022.

Table 6. Top visited POIs in SELA.

Name (number on map)	**Sampled average visitors from SELA per month**	**Destination category**
Azalea shopping center (1)	2,988	Malls
Plaza Mexico (2)	1,352	Malls
Village Square (3)	1,294	Malls
Gateway Towne Center (4)	1,136	Malls
Target (5)	1,121	Department stores
Commerce Center (6)	951	Malls
La Alameda Shopping Center (7)	854	Malls
Cudahy Plaza (8)	763	Malls
Citadel Outlets (9)	730	Malls
City Terrace Park (10)	685	Park
Compton Town Center (11)	672	Malls
Sam's Club (12)	641	General Merchandise Store
Renaissance Plaza (13)	638	Malls
Margarita Plaza (14)	615	Malls
Walmart Supercenter (15)	605	General Merchandise Store

Travel Behavior - Focus Groups

We asked our focus group participants how and where they traveled to validate our quantitative findings. The locations presented in our hot spot analysis resonated with our groups as destinations they, and others they know, frequent. Similarly, the common peak hours identified within the region were identified as common times of travel.

We then moved to ask more specifically about the existing travel behaviors of our focus group participants, including what their primary mode of travel was and any issues or limitations they have regarding mobility. About 50% of our focus group participants shared that they drive their own vehicle, while others relied on a combination of public transportation, getting rides from friends and family, and rideshare.

Those with Cars

Among those who use their own vehicle to travel, there were some common sentiments. Firstly, those who drive shared that they often give rides to friends and family members, with many doing so multiple times a week. Those with their own vehicles felt a personal responsibility for helping others, both due to knowing what it is like to be without reliable transportation access and in hopes that the favor would be returned in the future. One woman said, *"People always ask me for a ride, and I say yes. I don't like to say no, because sometimes when I need a ride they help me as well. So I like helping other people the way that they help me. I do, I've always done it, and I'll continue to do it"*. Another man shared how he used to carpool with friends to work regularly: "*We call each other and ask, who's going to drive today, who's going to pick up who today. Or who's going to pay for gas today".*

However, some shared that they only feel comfortable giving rides to people they know well due to the responsibility and concerns of getting in a crash. One woman told a story of frequently giving rides but having second thoughts after she was rear-ended with someone else's kids in her car: *".. it's something very sensitive, and it gives me pause. Not because I don't want to give people a ride, because I spent many years riding the bus and I know how difficult and burdensome it is sometimes. But it's a lot of responsibility for someone to take on".*

Of those who drive, participants expressed frustrations with both the difficulty and cost of parking. One woman described wanting to travel from her home in Huntington Park to her brother's in South Gate and only being able to park three blocks away. She expressed safety concerns about walking that far alone. Others shared that they have paid tens to hundreds of dollars in parking fees and fines, particularly at doctors' offices and clinics. Younger participants shared that parking was a burden for those attending local community colleges, as it is often required to purchase a parking permit or pay for a daily pass, which can quickly add up.

Image 1a, 1b: Focus group #1. May 2022.

Image 2a, 2b: Focus group #2. October 2022.

Those without Cars

Participants expressed challenges with navigating the SELA region using public transportation due to the locations of bus stops being far from their homes or target destinations. Participants shared that it takes them, on average, 10 to 15 minutes to walk to a bus stop and wait 10 minutes for the bus to arrive. Additionally, there are safety concerns with waiting at a bus stop and being on the bus. One woman shared, *"I am afraid to be at the metro stop, 111 metro line, because there are individuals who don't seem safe. Waiting for 10 minutes feels like 20."*

In addition to safety and reliability, the cost of public transportation can be a burden, particularly for those with large families. One woman shared that her four-person family pays around $8 per day for the bus.

For older individuals, dial-a-ride services provide necessary access to medical appointments and necessary trips. However, participants expressed frustrations with certain aspects of the service, such as restrictions of eligibility, limitations of where the service could take you, and long wait times.

Focus group members who do not drive or own a vehicle use Uber and Lyft to supplement public transportation services. Ridesharing services are seen as an option to bridge this gap in situations where using transit may be infeasible due to lack of service, inconvenience, or safety concerns. However, focus group participants revealed a new set of challenges when using rideshare services. Our findings related to concerns with rideshare services were categorized into five primary themes: safety, language barriers, technology barriers, payment barriers, and punctuality and reliability.

The first theme we observed was safety concerns when using ridesharing services. Participants shared stories of their experiences using services they did not feel comfortable with. One woman shared a story of seeing a bullet hole in the passenger side door of her Uber. Others generally shared sentiments that the area is not the safest, which is reflected in the quality of the service of drivers.

Safety was a particularly salient issue, especially when combined with technology and language barriers experienced. These issues are the most prevalent for older passengers. The first issue was the technological barrier; navigating an app to coordinate a ride has been a substantial challenge for older folks. The second issue is the language barrier between drivers and passengers, with many drivers not being Spanish-speaking. This further increases the communication barrier for those not comfortable using cell phones, particularly by making it challenging to confirm drop-off and pick-up locations.

Of our fifteen participants, three older women shared that they have their children order Uber or Lyft for them, particularly when their children cannot be there to pick them up themselves. This involves staying on the phone with their child and verifying the car's license plate and color, origin, and destination. Multiple women shared their experiences of how their child ordering them a ride helps them to feel safer using Uber or Lyft:

"For example, sometimes I take the bus. When I'm trying to go back, because I don't want to go alone, my son, who was supposed to pick me up, is out partying. So he says he can't pick me up but that he's sending an Uber. He always sends the information and the person that picks me up is always the one that he sends. I know I'm safe, because the person in the picture he sent is the same one that picks me up. So thankfully that's why I've never had issues. But yes, I get picked up by Uber."

In addition to assisting with language and technology barriers, a common sentiment among older women was, "the kids are the ones with credit cards." Both the cost of ridesharing and the requirement of a credit or debit card can be a barrier to accessing this type of service. As such, this is another incentive to have children order on behalf of their parents. However, it can still make the rider uneasy by being unable to communicate with the driver, as one woman shared:

"My son also orders it for me because he has credit cards. I tell him to make sure he doesn't put in the wrong address, because I get scared easily and especially if they take me to some other place. I tell him to send the driver, the license plate, and the color of the car."

Familial ties and social networks assist in making the service work for those with language and technology barriers; however, it is likely that the most vulnerable populations do not have access to these ties. Technology barriers, language barriers, and lack of payment options all contribute to limitations of existing ridesharing services, which is particularly detrimental to those who have few alternative options.

The last primary concern with using rideshare were issues with reliability and punctuality. Given that many in SELA rely on these services to go to the doctor or to make trips that would otherwise not be accessible by transit, punctuality is essential. This was observed first-hand at the focus groups; rides were provided via Uber or Lyft for those without transportation, and cancellations were frequent. It was apparent that cancellations in this area were the norm, as we had trouble getting reliable service to pick up and drop off passengers.

Participants shared multiple stories of not being able to get a ride when needed and having drivers repeatedly cancel their trips. One woman shared a story of her husband being unable to get a ride home: *"Just the other day, my husband had an issue where they were celebrating somebody's wedding. He could not drive. He ordered a ride from either Lyft or Uber, but they kept canceling, I want to say 3 or 4 times, because he was going a short distance. So they weren't getting that tip, so they kept canceling on him. It took an hour to get home when it was like a 5 minute drive."*

In addition to these concerns, Uber and Lyft services are not cheap, and costs fluctuate widely. When demand is high, trips can become more expensive by orders of magnitude, which likely prevents individuals from taking necessary trips due to exorbitant costs.

Concept

Our travel analysis showed that travel patterns in SELA are consistent with what we know about travel in low-income, minority communities. Trip rates are lower and travel time is higher relative to not low-income communities. Private vehicles are the dominant mode of transportation, followed by walking. There are distinct concentrations of trip activity at the main activity centers (shopping malls, medical centers) that potentially could serve as rideshare hubs. Our focus groups revealed a variety of travel needs and constraints, as well as a rather strong tradition of sharing rides with others. We used these findings to articulate a rideshare concept and present it to a second focus group and the project advisory board.

The basic concept is community-based and non-profit. A ride-matching service would provide low-cost mobility services for local travel. This service would match an individual seeking a ride with a community member traveling to a similar destination. This matching process reduces extra vehicle miles traveled (deadhead miles) that are common with taxis or ridehailing. By using community volunteer drivers and compensating the driver only for costs incurred, the cost of the service is minimized.

The ride-matching concept was introduced to the focus groups with a simple scenario example, as shown in Figure 8 below. Because the ride-matching concept is similar to traditional ridesharing services, it was necessary to highlight the distinguishing features of matching existing rides and compensating drivers based on cost. We presented the concept with the framing that local community members would be both drivers and passengers.

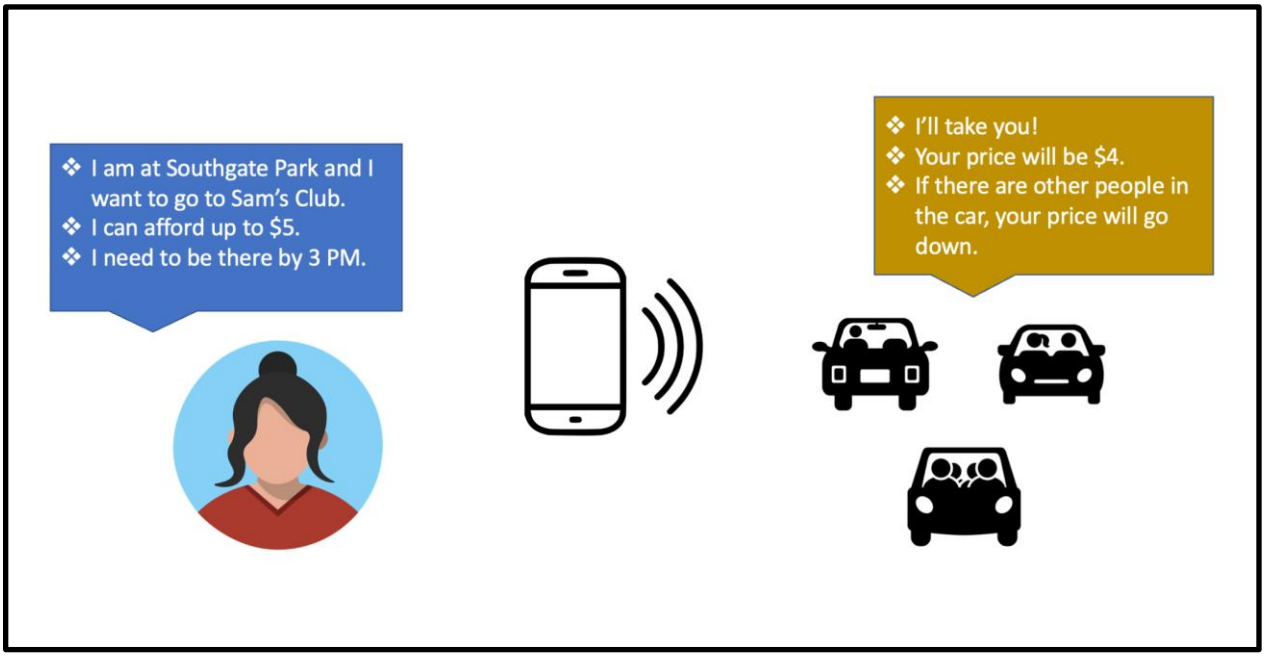

Figure 8: Ride-matching example.

Response to our concept

We asked our two focus groups if they would use this service, if people they know would use this service, and for what kinds of trips.

Who would use it and why?

The ridematching concept was viewed favorably. There was a widespread understanding of the benefits of this kind of service for the environment and the community. When asked if they would use this service and why, one participant said, *"I would use it. It has lots of benefits - less contamination, less street traffic, and that's what we want right now. Gas is also expensive."*

Besides social benefits, there was also an understanding that this service could address existing transportation gaps for those without vehicle access. A few key groups emerged as potential users: older individuals, mothers with children, and teenagers/those in their early 20s.

There was potential interest in using this kind of service to go to the grocery store, go to medical appointments, attend community events, get to work, and go to school, among others.

For older individuals, using this service for medical appointments and shopping trips was repeatedly discussed. Focus group members shared that they would benefit from a service that would allow them to cheaply and reliably reach hospitals and clinics they frequent outside of the SELA region, such as in Long Beach or downtown Los Angeles. One participant said they currently take a taxi to their medical appointments, but this service often takes too long to arrive and is expensive. Older individuals with mobility constraints and mothers with young children expressed interest in taking this service to the grocery store. Carrying items home by walking or taking transit can be physically demanding and restrict what one can purchase.

For younger individuals and teenagers, using the service for school and work, and recreational activities were discussed. Parents expressed interest in having their children use the service to safely get to and from school, mainly when they could not pick them up. Those of working age expressed that having a cheap and reliable option to get to work or college would be beneficial, partly to avoid parking costs.

Concerns - Riders

Although there was substantial interest in the program, participants expressed concerns and had logistical questions about such a service. For those who would be potential riders, existing challenges with Uber and Lyft services remained a concern with this service. For example, technological barriers for older users, limitations of feasible payment options, language barriers with drivers, and safety and reliability concerns.

Multiple older residents shared that, while they would be interested in using such a service, using cell phones for downloading and navigating an app would be a barrier to entry. While nearly all reported owning a smartphone, many over the age of 55 shared concerns about not being a smart user. One woman shared the importance of having multiple options to book a trip, like a call center: *"It would be nice to have a phone number to call in addition to an app because those of us 55 years and older might have smartphones but aren't very smart about using them. Many people prefer to call, not use an app… Because this should be to help the community, and sometimes we feel inept with phone apps because we don't know how to use them. You asked if we had smartphones, but, if we don't know how to use them, there's no point."* The importance of having multiple options to request a ride was repeatedly raised, whether that be an app-based service, phone number to call, or website.

Regarding payment, potential riders expressed that the service would work best with many options available. Making a prepaid card an available option appealed to those without credit cards. Others shared that they would like to have the option to use cash, a smartphone wallet (such as Apple Pay), debit, or credit cards.

Ensuring that a future service had, at minimum, the same safety measures as Uber or Lyft was also discussed. Having a background check similar to those services and a rating system for drivers and

passengers would likely incentivize people to use the service. Additional amenities, including having cameras in vehicles, an app-based tracking system to monitor driver and passenger locations, and a distinct logo to identify ridesharing vehicles, were also of interest to some. Finally, it would be expected that the service's drivers would be bilingual to avoid communication barriers that have been salient with ridehailing.

Concerns - Drivers

When asked if they would consider giving rides to others in the community, focus group members had questions and hesitations that generally fell into three categories: personal safety, liability, and personal cost.

Regarding personal safety, participants were generally hesitant about picking up strangers. As explored when discussing existing carpooling in the region, current neighborhood carpooling has taken place primarily among close social networks such as friends and family, with occasional rides also given to coworkers and neighbors. However, most shared that they would be open to the idea if extensive safety measures were in place, such as background checks of passengers, in addition to drivers.

Potential community drivers also expressed repeated concerns about the liability of being in an accident with a rider in their vehicle. There was confusion and discussions about who is and is not covered in an accident if you have passengers in your vehicle. This introduced a potential point of contention when trying to plan the service. After suggesting that the program would cover driver liability with umbrella coverage, there was an overwhelming increase in interest in driving for the service.

Finally, the theme of personal cost arose for many potential drivers. While some expressed a willingness and desire to provide a community service and get paid for something they are already doing, others questioned why they would be interested in providing such a service to people they do not know. This included concerns about time, including how much they would need to deviate from their original trip and how long they would have to potentially wait to pick up a passenger. Others expressed that adding additional miles to their car for someone they do not know simply was not appealing. With the expectations of passengers being high and becoming closer to that of a traditional ridesharing service, only being paid a small fee for the service reflects a misalignment of supply and demand.

Advisory group response

Our advisory committee, made up of local community leaders, was generally supportive of our concept. As many members have had experience planning similar mobility services within their cities, they were able to provide valuable insights and feedback regarding logistical challenges. The group noted that there was no silver bullet solution to the mobility challenges and needs of SELA residents. One service would likely not meet the needs of all users. Therefore managing expectations is a major consideration.

The committee also pointed to potential design changes that could be considered, including using a fleet of electric vehicles rather than vehicles owned by community members, as well as having drivers not be limited to driving for existing trips. These ideas, and additional service recommendations from the committee, are explored in the next section. The committee also suggested the possibility of piloting the service as a community-based co-op. To be a driver or a rider, one would need to register in advance on an online platform and have their address verified to ensure they are within the community of service,

much like NextDoor. This could ensure a level of safety and community accountability that is not currently present with existing ridesharing services. Finally, the advisory committee presented us with potential funding sources for the pilot program, which are discussed in the Next Steps section.

Overall findings

Discussing the logistics of the concept with community members and the advisory group proved to be a fruitful strategy for determining community preference. Focus group and advisory committee members offered both new ideas and challenges that would have to be addressed to implement a pilot program. The following is a discussion of some decision points we considered.

Safety and Security vs. Confidentiality

Focus group members were clear on the need for safety and security. Potential riders want assurance that the driver is qualified and provides no threat to personal safety. Potential drivers want assurance that passengers are vetted and will pay the fee. All agreed that some form of background checking for both drivers and passengers is essential. However many individuals in the SELA region are undocumented. Requiring prospective drivers and riders to perform a background check could hinder those with the greatest needs from using the service. Even if the background check does not report documentation status, performing a background check or being fingerprinted may be perceived as threatening. Additionally, background check services may ask for a social security number, which undocumented individuals do not have. In contrast, not putting background checks in place would likely make many users feel vulnerable and unsafe. Ensuring the safety of those who use the program while maintaining anonymity for those who may be undocumented is one challenge to be addressed with the program design.

Options for assessing the service

Existing formal rideshare services are app-based, but our focus groups revealed that many potential rideshare users were either uncomfortable or unable to use app-based services. Older SELA residents strongly preferred having a call center to book rides, but also liked the security of knowing the driver's route and destination. Younger users and those familiar with app-based services would likely prefer using a more traditional app-based platform. Developing a platform that could accommodate a call center function would serve the various needs, but would add to the complexity of the platform and increase both development and operational costs. It is unlikely that starting with both options for a pilot would be feasible.

Personal vehicles vs. fleet vehicles

Our initial concept is one of using existing vehicles to match riders with drivers who are already making a trip. However, using one's own vehicle means that there must be a way to assure the safety and cleanliness condition of the vehicle and adequate insurance for both driver and vehicle. It also means the vehicle owner is adding miles, something some focus group members saw as a barrier even if these costs were compensated. Another option would be to use a fleet of vehicles dedicated to this service. In this concept, the driver would pick up the vehicle at a hub location, use the vehicle for his/her travel as well as providing rides, and return the vehicle back to the hub. This becomes more of a traditional ridesharing or car-sharing service. The fleet option removes the burden of having a car for the driver. It

also provides the opportunity to use an EV fleet, contributing to local emissions reductions. Given the funding available in California to promote electrification of the vehicle fleet, this concept may be more likely to attract funding.

However, there are also drawbacks to using a fleet. One of our initial goals with the concept was to make the service a more formal version of what people were already familiar with: giving and receiving rides from others within the community. Using one's own vehicle is consistent with this model. Using a fleet vehicle introduces another step for the driver (picking up a fleet vehicle) which could be a deterrent to volunteering to provide the service. Using EVs would require charging infrastructure and impose additional limits on service duration. Using a fleet also means a fixed supply of vehicles, unlike using volunteer vehicles that are more able to respond to demand. Finally, a vehicle fleet would be much more expensive to pilot, from purchasing the vehicles to maintenance to providing insurance.

Volunteers vs. paid drivers

Our initial concept was planned for community volunteers to be drivers, picking up and dropping someone off nearby on an existing trip they already take. However, some community members expressed that they would be interested in regularly driving for the service to make a bit of money. Others saw this as a good opportunity for undocumented folks to get on their feet by providing rides for a few hours a day. This introduces an essential consideration if our drivers are to be considered volunteers or employees and how those dynamics differ based on the selected service.

The club concept

Organizational structure is another consideration. Given the strong support for a community-based service as well as safety and security concerns we are considering the service as a club concept: both drivers and passengers join the "club" by going through an application process that requires basic information (for example, proof of residence in SELA area) and some form of personal background check. Drivers would also provide information on their vehicle. We envision a group of community leaders and representatives developing the rules for entry and service availability. The organization itself would be a non-profit.

Service parameters

A further consideration is the parameters of service: who would be eligible, what would be the service area, and what would be the hours of service. Regarding eligibility, the concept of a community-based service was strongly endorsed. Residence within the SELA area would be the main eligibility criterion. There were questions about minors being able to use the service. While younger focus group members welcomed the service as a way to get to school or work, it was recognized that opening the service to minors could increase liability costs. The service area could be within the SELA area, or extend to major trip attractions (e.g. major medical centers) that are frequently used by SELA residents. From the perspective of an initial demo, there was support for starting with a major hub within the community such as the Azalea shopping center in Southgate. For service hours, focus group members agreed that weekdays would be the highest demand periods, followed by weekends and evenings. There are of course clear trade-offs between the spatial and temporal extent of service and service costs. The

rideshare model works only when there is enough demand to make rides available. Even if the service is extended beyond using existing trips only, the challenge for most rideshare services is sufficiently dense demand. Thus hours limited to the highest expected demand periods and locations are likely prudent for a demonstration.

Alternative models

To generate alternative models for demonstration we consider the "ideal" concept as originally conceived as one end of a continuum, and a traditional microtransit concept as the other end. See Figure 9a. There are six main attributes that characterize the services and there are multiple options for each attribute. Moving from left to right of the figure, service costs generally increase and community engagement decreases. Using this figure we generate three possible service models: Option 1, the "ideal" concept, Option 2, which allows for on-demand ride requests and paid drivers, and Option 3, which adds vehicle fleet ownership to Option 2. Figures 9b - 9d show the selected attributes for each option. We propose that these options be considered as the basis for design and development as a demonstration.

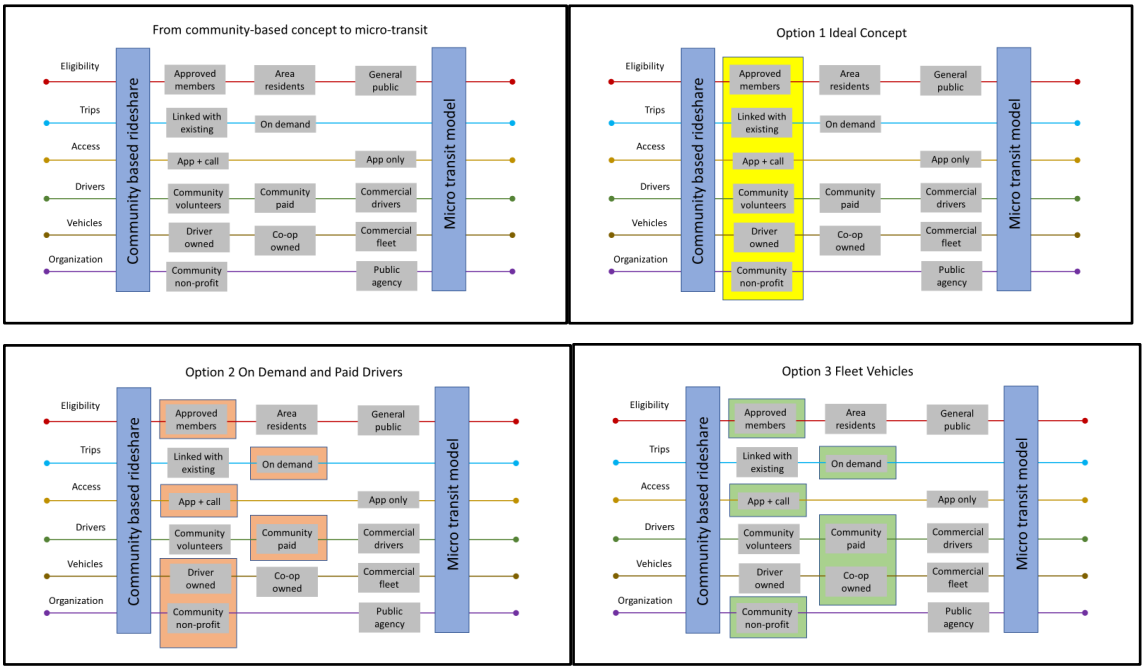

Figure 9 a, b, c, d. Potential concepts and service details.

These models remain high level. There are many details yet to be determined. What security measures would work best for riders while protecting driver anonymity regarding citizenship status remains to be determined. Insurance will also be a major consideration moving forward. Insurance coverage will look different depending on whether drivers use their own vehicles, a fleet, or a combination. If we choose to move forward with community drivers, driver recruitment will be imperative to ensure that our supply meets demand.

Next Steps

Moving forward, we will return to our focus group participants and present our findings and revised concept. In addition to informing community members of the results of our research, the meeting will be an opportunity to manage the expectations of focus group participants. We must ensure that participants recognize that this is a pilot concept program and not something that will be available overnight.

We must also seek out sources of funding. At the time of writing this report, we have three potential leads for funding sources. The first funding source is the Mobile Source Air Pollution Reduction Review Committee (MSRC) Clean Transportation Funding. The MSRC solicits requests for proposals for pilots focused on clean transportation and mobility options. This program receives one-third of the funds from AB 2766, which collects vehicle registration fees and allocates them towards projects that reduce vehicle emissions. Proposing a pilot closer to our Model 2 with an electric vehicle fleet is likely the most applicable for this program.

The second potential option is also through AB 2766, but the funding for the program would go directly to cities by formula allocation. Modeling our pilot program as city-specific to our top hotspot locations would allow this to be a feasible option. However, it has been discussed in our focus groups that traveling outside specific cities is often necessary, particularly for medical appointments. To span multiple cities, we would need the support of the Gateway Cities Council of Governments or a similar organization.

The last potential funding source is AB 617, which identifies communities at risk of disproportionately high air pollution. The SELA region is part of two existing AB 617 communities, and the remainder of the area is expected to be declared soon. Projects are selected via a public process, so having a community member champion this project in front of the committee would be ideal for receiving these funds.

Conclusion

The quantitative findings from our analysis suggest that there are clusters of destinations for a potential non-profit ride-matching service to be a feasible and beneficial option for SELA residents. The length and frequency of non-work trips suggest a market for ride-matching. The focus group grounded these findings in lived experiences of SELA residents, who shared shortcomings of the current state of transportation in the region and validated that they, and others in the region, would use this type of service.

Our community-based, mixed methods approach proved to be fruitful. The travel data provided basic information on travel patterns while engagement of community representatives allowed us to ground truth our results and better understand both the benefits and challenges of a ride-matching service. Some important findings that support testing a ride-matching service include the already established culture of informal ride-sharing, limited access to private vehicles, especially for those who are elderly and do not drive, limited role of public transit services, scarce parking and high parking fees, and common destinations within the SELA area. Our results also point to challenges. Giving rides to

strangers is perceived very differently from giving rides to friends and neighbors. Language and technology barriers are significant; it seems clear that the traditional smartphone-based platform model would not work for many SELA residents. Strategies to assure personal safety may conflict with concerns about sharing personal information. These challenges must be resolved in order to design an effective and successful service.

Much of the technological innovation taking place in transportation is aimed at the middle-class, English-speaking, tech-savvy traveler. Low-income, minority travelers have different travel demands and different resources. It is therefore not surprising that many innovative services such as ride-hailing or carsharing do not serve their needs or are inaccessible because of language or banking barriers. Our approach is to tailor an innovative service to the needs of the community.

Our work demonstrates the benefits of community-engaged research. Motivation for the research was driven by community needs, specifically the effort of the SELA Collaborative to identify local transportation problems and promote solutions. Working with the SELA Collaborative allowed the research team to focus on how the community perceived their problems and what solutions might work best for them.

Finally, our case study has broader implications. The SELA area is not unique. There are many low-income, predominantly Hispanic communities throughout California with similar mobility needs. The lessons learned here can help to inform development of new transportation options that address these needs.

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Data Management Plan

Products of Research

The research uses two primary external data sources: the California Household Travel Survey (CHTS) and SafeGraph. The CHTS aggregated dataset is publicly available. SafeGraph data are proprietary and only available from SafeGraph. Focus group data collected by the research team has been provided.

Data Format and Content

Focus group documentation has been included in PDF format. Focus group one includes a full transcript in Spanish and English. Focus group two includes a high-level report with quotes from participants.

Data Access and Sharing

Individuals will be able to access the data through Dataverse and should contact the principal investigator (Dr. Genevieve Giuliano) prior to accessing the data. The data should not be hosted in other locations and should only use the Dataverse repository. Users of the data should reference the system providers, and the data repository in Dataverse.

Reuse and Redistribution

Dr. Genevieve Giuliano and the other co-authors of the work hold the intellectual property rights to the data collected in this research. Data will not be able to be transferred to other data archives besides the ones approved by the PI.

https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/YP6DUG

Appendix A

Organization
LA Metro
Healthy Active Streets
Communities for a Better Environment
Los Angeles Cleantech Incubator
Gateway Council of Governments
TreePeople
Office of County Supervisor Janice Hahn
City of Huntington Park
City of South Gate
South Coast AQMD
Latino Equality Alliance
City of South Gate
SELA Collaborative
METRANS Transportation Consortium
The Trust for Public Land
East Yard Communities for Environmental Justice
Urban Movement Labs
City of Bell Gardens