DEPARTMENT OF TRANSPORTATION

Centering the Margins: The Transportation Experience of Underserved Communities

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Transportation systems, as integral parts of human settlements, reflect the societal structures and cultural ideologies influenced predominantly by the dominant race or class. In the absence of prioritizing the transportation needs of underserved communities, transportation systems may perpetuate systematic inequities. This study aims to address the inequities present in current transportation systems by conducting a comprehensive examination of the transportation experiences of individuals belonging to ten specific underserved communities. These communities include eight within the Twin Cities metropolitan region (Latinx, African American, Hmong, people with disabilities, immigrants, people living with HIV, single mothers, and single fathers), as well as two communities in the Greater Minnesota area (transitioning home residents in Fergus Falls and tribal members of the White Earth Nation). This research adopts a mixed-method approach, incorporating both qualitative interviews and quantitative smartphone-based travel behavior surveys. The findings reveal that each community faces distinct transportation barriers, alongside shared themes in transportation inequities such as inadequate public transportation, difficulties related to car use, and the impact of transportation on significant life outcomes. Recommendations for future research and practice are provided.

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Executive Summary

Transportation systems are often perceived as infrastructure: paved roads, bus routes, gas stations, and sidewalks. Transportation systems are also social systems made up of the individual choices of car owners, bus riders, walkers, bikers, sidewalk shovelers, and the list goes on. More than pavement or personal decisions, however, transportation systems are a series of decisions made primarily by institutions with power that reflect prevailing societal power structures. For communities that do not reflect dominant identities within a society, their ability to move through a city or town to complete everyday tasks highlights the way transportation decisions have often not been made with them in mind.

Through this study, the research team aimed to center the experiences of marginalized communities to better understand inequities in the current transportation system. The research was guided by Ford and Airhihenbuwa's Centering the Margins approach (2010) to center the perspectives and experiences of socially marginalized groups over those of the dominant race or culture in social and policy discussions. The research was further guided by Vanderweele's Human Flourishing Framework (2017) that sees five domains of everyday life as integral to achieving fulfillment as a human being: work (paid or unpaid), family, health, community, and spirituality. Accessing each of these domains involves an experience of transportation, whether it is sitting in traffic to get to work each morning or finding a Sunday bus route to get to church. Following the framework, this research helps to understand common transportation barriers that have prevented members of marginalized communities from finding personal fulfillment and living a good life.

The communities included in this research represent different populations in Minnesota that have faced exclusion, discrimination, or marginalization, and range from tribal members of the White Earth Nation to low-income single mothers in the Twin Cities. Outreach was primarily conducted through partner organizations that connected the research team with program participants or members. Determined by which organizations were willing to participate, this outreach method led to in-depth research about the transportation experience of members from ten specific underserved communities, including eight communities in the Twin Cities metropolitan region (Latinx, African American, Hmong, people with disabilities, immigrants, people living with HIV, single mothers, and single fathers) and two communities in Greater Minnesota (transitioning home residents in Fergus Falls and tribal members of the White Earth Nation).

The research team employed a mixed-method approach to incorporate both qualitative interviews and quantitative smartphone-based travel behavior surveys into the data collection efforts. On the one hand, the interviews collected open-ended answers regarding the systemic transportation-related barriers faced by underserved communities. The interviews also elicited the coping and survival strategies the participants use to navigate these barriers. On the other hand, the smartphone survey used the app-based diary method to collect quantitative travel behavior data as well as quantitative data on human perceptions, attitudes, and feelings toward transportation in the context of daily

activities and trips. The team collected qualitative and quantitative data from at least eight participants from each of the selected communities.

While each community shared unique transportation challenges, the common themes across communities were profound. In communities across Minnesota, a car was seen as a necessary method of transportation, providing participants with a direct, timely, easy way around. However, cars also posed a significant challenge as purchasing and maintaining a car takes a lot of resources for anyone with a low or fixed income. From Fergus Falls to the Twin Cities, public transportation served an important role and also was inadequate in meeting participants' needs. Inaccessibility, timeliness, and safety came up over and over in different forms as participants expressed frustrations with current systems and desires for service that better meets their needs. Ultimately, participants highlighted the many ways in which inadequate transportation kept them from flourishing, i.e., from good jobs or visits with family, doctor appointments, cultural events, or meaningful spiritual activities. Their experiences formed a call for partnership with underserved communities to explore transformative innovations that address community needs.

For each of the ten communities included in this study, the research team provided recommended actions addressing their unique transportation barriers. For the three common threads across communities including inadequate public transportation, car-related challenges, and the impact of transportation on major life outcomes, the research team made the following recommendations to address them:

- Adopt the human flourishing framework to identify transportation-related underserved communities as communities whose transportation barriers have hampered their ability to live a good life, and align transportation funding and investments to the identified underserved communities for transportation equity improvement;
- Reconceptualize public transportation as any mobility service that de-commodifies transportation and helps people to achieve a socially acceptable standard of mobility and accessibility independent of their income;
- Encourage transformative innovations that can significantly broaden the scope of public transportation services and move beyond traditional bus and rail services to include ride-hailing and micro-transit services;
- Collaborate with non-transportation government agencies and frontline community organizations to explore how transportation programs can be paired with non-transportation programs to improve major life outcomes in underserved communities; and
- Promote more diverse public engagement in transportation decision-making processes through active involvement of underserved communities and efforts to study lived experiences of these communities.

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Chapter 1. Introduction

Civil unrest over the killing of George Floyd has invigorated and renewed interest in dismantling systemic racism locally, nationally, and abroad. There is growing consensus that structural inequality has developed over time as government and institutional policies predominantly consider the needs of the dominant group or culture over the socio-economically disadvantaged. In practice, this has led to many communities of color being excluded, displaced, and discriminated against, through policies and programs ranging from restrictive zoning laws to the construction of the interstate highway system. This project aims to confront systemic racism and structural inequality in Minnesota's transportation systems by understanding and centering the transportation experience of underserved communities.

Transportation is a complex social system. Understanding equity in people's transportation experience involves knowing not just where people are going and what type of modes are used, but it also involves understanding how people's personal and household needs, obligations, values, and habits affect their transportation needs and mobility options and how the transportation system supports or fails to meet their everyday needs. In this research, we define transportation broadly as all mobility services that people use to fulfill their daily activity and living needs. It encompasses public transit services; shared mobility services such as Uber, Lyft, and taxi; physical transportation infrastructure such as sidewalks, bicycle lanes, transit stops, and roads/highways as well as teleservices such as telecommuting and online shopping.

To capture the transportation experience in relation to various aspects of human life, we apply the Human Flourishing Framework by Vanderweele (2017) in this research. The Human Flourishing Framework suggests five domains of human life as essential for promoting human flourishing: work (paid or unpaid), family, health, community, and spirituality. Although there are many other frameworks in the literature that promote the growth, development, and holistic well-being of individuals and populations, we choose to apply this framework because it is a simple and easy-to-understand model illustrating main life domains that most people recognize. In this research, we investigate how transportation helps fulfill work, family, health, community, and spirituality-related needs among underserved communities. We recognize that the inclusion of work as a major life domain may create a sense of otherness for people who do not participate in the labor force such as retirees, stay-at-home parents, the unemployed, and people with severe disabilities. In this research, we define the work domain broadly as any activity requiring effort and producing something of value to the functioning of society. In addition to employed work, work can include various forms such as self-employment, freelance work, voluntary work, or unpaid activities like household chores or caregiving. Work may intersect with other life domains of family, health, community, and spirituality.

The focus on underserved communities in this research is grounded in Ford and Airhihenbuwa (2010)'s concept of "Centering in the Margins", i.e., centering the perspectives and experiences of socially marginalized groups over those of the dominant race or culture in social and policy discussions. In this

research, any group facing transportation barriers in their daily life can be defined as underserved communities. We recognize that communities may be defined demographically and/or geographically. For example, underserved communities may include low-income people who reside in rural areas of Minnesota, tribal communities, single mothers, persons of color, people with disabilities, and LGBTQ communities.

Community engagement can be a lengthy process and identifying all underserved communities that face transportation barriers is practically impossible. Given the timeline and budget constraints, the research team identified and selected underserved communities based on the following principles:

- The selected community groups have geographically and demographically diverse representations. The representations should include urban, rural, and tribal communities, as well as communities representing different genders, races, and other sociodemographic characteristics.

- The selected community groups should include communities whose transportation barriers are widely acknowledged in academic and popular literature, e.g., single mothers, persons of color, immigrants, and people with disabilities.

- The selected community groups should recognize distinct ethnic groups that have strong representations in Minnesota, e.g., Hmong and tribal communities.

Following these principles, the research successfully collected data from ten underserved communities. In reaching out to these communities, we received incredible support from our community partners in the Twin Cities metropolitan region as well as Greater Minnesota. Our reliance on community partners for community outreach and participant recruitment was consistent with the need to engage trusted advocates in communities and acquire local wisdom and local knowledge when it comes to community engagement and outreach. With the help of community partners, we successfully recruited 130 study participants from ten different communities who face transportation barriers. Participants in each of the community groups ranged from eight to 20. The ten communities included eight communities in the Twin Cities metropolitan region (Latinx, African American, Hmong, people with disabilities, immigrants, people living with HIV, single mothers, and single fathers) and two communities in Greater Minnesota (transitioning home residents in Fergus Falls and tribal members of the White Earth Nation).

To ensure a comprehensive understanding of the transportation experience of these ten communities, we employed a mixed-method approach to incorporate both qualitative interviews and quantitative smartphone-based travel behavior surveys into the data collection efforts. On one hand, the interviews collected open-ended answers regarding the systemic transportation-related barriers faced by underserved communities. The interviews also elicited the coping and survival strategies the participants use to navigate these barriers. On the other hand, the smartphone survey used the app-based diary method to collect quantitative travel behavior data as well as quantitative data on human perceptions, attitudes, and feelings toward transportation in the context of daily activities and trips.

Data from the ten selected communities showcase the lived experience of real people, reveal inequities and injustice in our current transportation system, and illustrate how transportation affects all domains of people's lives, including work, family, health, community, and spirituality. Further, findings from the ten community groups show that underserved communities have distinctive patterns of travel behaviors. Although some of their experiences are similar (e.g., inadequate and unsatisfactory public transportation services in the region and state), different communities face different types of transportation barriers and are disadvantaged in different ways. It is the project team's hope that this project will make a small but critical step toward transportation equity by representing and amplifying the voices of the underserved communities.

Chapter 2. Literature Review

There is consensus in transportation literature that underserved communities often face unique transportation barriers and have different transportation experiences when compared to those of socioeconomically advantaged dominant community groups. A Los Angeles Department of Transportation (2021) study finds that women and girls use different transit modes and face different barriers compared to men, based on research in three minority neighborhoods in Los Angeles. Additionally, Fan (2017) finds that there are different travel patterns among gender roles, particularly for households with two parents and children. Shay et al. (2016) demonstrates that transportation barriers in underserved rural communities include poor information access and minimal connections and lead residents to lean on social and community networks for transportation. Guthrie et al. (2019) detail the range of concerns BIPOC communities have about public transit ranging from the comfort of shelters to low transit frequency to safety. Park et al. (2020) look specifically at transportation barriers for people with disabilities and how priorities for people with disabilities differ from the priorities transportation practitioners perceive for the community. Finally, Jocoy and Del Casino (2010) demonstrate that homogenous characterizations informing urban homelessness policies fall short of the variable realities of mobility experienced by homeless individuals, leading to failed policy action.

Previous research on transportation barriers and inequities not only provides the contextual grounding for this study but also provides methodological examples of how to analyze the topic. Many studies rely on qualitative methods including interviews and focus groups like Jocoy and Del Casino (2010). There are also a significant number of studies that rely on quantitative data to analyze specific community groups like Park et al. (2020)'s survey method and Fan (2017)'s use of American Community Survey data. Increasingly, studies combine multiple data collection methods, mixing qualitative with quantitative data sources, such as Shay et al (2016) and Guthrie et al. (2019).

Further, research on underserved communities has emphasized the need to acquire in-depth conversational qualitative data. Goetz et al. (2019) suggested that a qualitative approach is necessary to elicit the "dynamic and negotiated set of realities giving individuals the chance to share how they feel or live a reality," illustrating a deeper understanding of the systems that impact them. A purely quantitative approach seeks to establish averages and best-fit assumptions that ultimately fall short of the complex reality.

The role of government agencies and funding in perpetuating or addressing existing disparities has also been increasing studied in transportation literature. Lubitow, Rainer, and Bassett (2017) illustrate how a transit agency can perpetuate vulnerabilities and inequalities by neglecting the unique experiences of different transit riders. Pasha (2018) finds that municipalities in Massachusetts with higher numbers of people of color received less funding; though found to be unintentional, it systemically reduced opportunities for people of color. Williams et al. (2019) find that certain factors help metropolitan planning organizations integrate equity into project prioritization including systematically engaging underserved populations, explicitly including equity in vision and goal statements, and emphasizing

transparency of decision processes. Williams et al. (2020 and 2021) have developed a transportation equity scorecard and needs assessment tool targeted for metropolitan planning organizations and local governments to better assess and address needs of underserved populations.

Boisjoly and Yengoh (2017) detail the failure of broad public participation in transportation planning to sufficiently incorporate the perspectives of marginalized communities. They suggest that community engagement efforts should begin with clear equity goals and provide target groups with the resources needed to meaningfully participate. Compared to group-based engagement activities, one-on-one interviews and interactions can better integrate diverse perspectives lacking from present discourse. Aimen & Morris (2012) offer a number of steps for transportation planners to engage community member including providing more complete and accessible information about projects, gathering feedback from a broad range of sources, building lasting community relationships, and training community leaders.

Chapter 3. Research Design and Method

This research employs a mixed method research design to combine qualitative and quantitative data for greater policy insights. The research design is composed of three aspects detailed below: recruitment, data collection, and data analysis.

3.1 Recruitment

The recruitment was conducted through targeted recruitment channels that are specific to each community. These included emails, newsletters, flyers, or posters. Channels with a potential to expand the outreach of this study to ineligible participants, such as social media posts, were not used. Recruitment materials included the study details, time commitment, and compensation information. The sample flyer we used in this research can be found in Appendix A. Sample Recruitment Flyer.

Recruiting underserved communities was a challenging task. Earlier efforts to build connection with community organizations were not successful and many organizations turned down our request for helping with participant recruitment. Among the organizations that were willing to help, most only agreed to post information about our study on their social media accounts, which turned out to be ineffective for participant recruitment. Many community organizations suggested that, while they were interested in the research topic of transportation equity, it was difficult for them to justify spending time on helping with a research project given their limited staff capacity and heavy workloads. Following the failed early efforts, the research team began exploring how the participant recruitment work could be innovatively integrated into the community gathering events that were already planned by various community organizations. Such integration helped the community organizations reconsider participant recruitment as something that was achievable within their existing work commitments. For example, the Jeremiah Program hosted the research team's data collection efforts through their community dinner program. The Hmong American Partnership hosted the research team through one of their Community Impact Monthly Huddles events. Table 1 lists the names and websites of the organizations that helped with recruitment efforts in this research.

Table 1 Information on the organizations that helped with recruitment efforts

Organization Name	Related Community	Organization Website
Anishinaabe Endaad	White Earth Tribal Community	https://www.endaad.com/
A Place to Belong	Transitioning home residents in Fergus Falls	https://www.aplace2belongmn.com/
Acorns-Oak Consulting	Transitioning home residents in Fergus Falls	https://acorns-oak.com/about
Hmong American Partnership	Hmong Americans	https://hmong.org/

Asian American Organizing Project	Hmong, Immigrants	https://aaopmn.org/
Goodwill Easter Seals FATHER Project	Single Fathers	https://www.goodwilleasterseals.org/services/family-stability/father
Neighborhood House	Latinx	https://neighborhoodhousemn.org/
Rise	People with disabilities	https://rise.org/program/rise-crystal/
International Institute of Minnesota	Immigrants	https://iimn.org/
The Aliveness Project	People living with HIV	https://aliveness.org/
The Jeremiah Program	Single mothers	https://jeremiahprogram.org/

The recruitment method resulted a total of 130 participants from ten underserved communities (see Table 2). Community partners were instrumental to our recruitment efforts. Below we describe the specific recruitment channels used for each of the ten underserved communities in this study:

- Latinx Community: A total of 11 Latinx participants participated in the study. They connected with the study primarily through two organizations: the Neighborhood House and the International Institute of Minnesota.
- African Americans: A total of 14 African American transit riders participated in the study. They connected with the study primarily through street intercepts on or while waiting for public transit across the Twin Cities.
- People with Disabilities: A total of 17 participants who identified as having a disability participated in the study. Half of these participants were connected to the study through RISE Crystal. The other participants connected to the study through organizations associated with other community groups included in the study.
- Immigrant Community: A total of 16 first- and second-generation immigrants were included in the Immigrant Community group. They connected to the study through two organizations: the International Institute of Minnesota and the Asian American Organizing Project.
- Aliveness Community: A total of 16 participants who identified as HIV-positive participated in the study. They connected to the study through Aliveness Project, a community center serving HIV-positive individuals.
- Fergus Falls: A total of 20 participants from Fergus Falls participated in the study. All participants connected to the study through A Place to Belong, a Fergus Falls organization supporting people with mental illness.
- Hmong Community: A total of 13 participants from the Hmong community participated in the study. Most participants connected to the study through the Hmong American Partnership and a few others connected through the Asian American Organizing Project.
- Single Mothers: A total of 11 participants who identified as single mothers participated in the study. They all connected to the study through the Jeremiah Program.

- White Earth: A total of eight Native American men from White Earth Nation participated in the study. They all connected to the study through Anishnaabe Endaad, a supportive housing program for Native American men in recovery.
- Single Fathers: A total of eight single fathers participated in the study. Almost all connected to the study through the Father Project program run out of Goodwill-Easter Seals Minnesota.

Table 2 Participant distribution by community group and the amount of smartphone data by community group

Community	Total Participants	Participants with Smartphone Data	Total number of days with smartphone data
African American	14	12	79
Aliveness	16	14	117
Disability	17	7	53
Fergus Falls	20	12	154
Hmong	13	12	83
Immigrant	16	12	107
Latinx	11	4	35
Single Mother	11	9	57
Single Father	8	4	16
White Earth	8	4	22
All	130	*87	695

Note: Some participants are included in multiple community groups. For that reason, the number of total participants in each community will not add up to the total number of participants listed in the "All" row. The "All" row counts each participant once. *Only 87 of the 130 participants (67%) provided quality smartphone data, defined as providing at least 12 hours of activity and trip tracking for at least one day. Of the 43 participants who did not provide quality smartphone data, 14 declined the smartphone data collection component due to concerns about location tracking and/or unfamiliarity with smartphones. There were 29 participants who initially agreed to the smartphone data collection component but later dropped out of the component, failing to provide quality data.

3.2 Participant Compensation

Participant compensation was initially capped at $75 per person, including $40 for the completion of a qualitative interview and $35 for the completion of the 7-day smartphone data collection component. After internal testing of the interview and smartphone data collection instruments within the research team, we found that the 7-day smartphone data collection would requires more effort from the participant than the interview. As a result, we increased the amount of compensation provided to each study participant from $75 to $110. Participants were paid $40 for completing the 40-minute qualitative interview, and $70 for completing the 7-day smartphone-based travel behavior survey—$10 per person per day. Since most interviews were conducted in person, the $40 was provided in cash right after the interviews. In contrast, the $70 compensation was provided after the participants completed the 7-day smartphone data collection in the form of electronic cash payment or though the Greenphire ClinCard, depending on the method most convenient for the participant.

The significant increase in participant compensation from $75 to $110 played an important role in the success of our data collection efforts. Multiple community organizations mentioned that the $110 per person compensation is the right amount for them to gauge interest among their community members. They suggested that, for them to promote the study, the research project needed to provide reasonable financial benefits to the community members they serve.

3.3 Data Collection

The data collection process includes three components: enrollment survey, qualitative interview, and smartphone-based travel behavior survey. The research team completed data collection within four months from November 2022 to February 2023. It is worth noting that the data collection was entirely done during cold weather in Minnesota. Although transportation barriers tend to be more significant and complex during winter months and winter data collection helps to generate richer information on transportation barriers, it is likely that our data may overlook some of the transportation barriers that are more prevalent in summer months. For example, winter biking is a rare activity and therefore our data does not provide insights in barriers faced by summer bikers.

Enrollment Survey

All participants are required to complete a five-minute Enrollment Survey. The enrollment survey collects informed consent for information collected in the study, verifies eligibility to participate in the study, and collects demographic information. The survey also includes questions about participants' transportation resources, activity and trip frequencies, and preferences of transportation solutions. The survey ends with questions asking whether the participants are willing to participate in the qualitative interview and/or the smartphone-based travel behavior survey. Participants can choose to opt out the interview and/or survey components.

The survey was implemented via Qualtrics, which is available to all University of Minnesota researchers. A copy of the enrollment survey can be found in Appendix B.

Qualitative Interview

Following the enrollment survey, participants who choose to participate in the 40-minute interview are contacted by the research team to conduct the interview in-person or remotely (over a video or phone call). All interviews were audio recorded to generate written transcripts.

The interview guide is semi-structured with three important sections to guide the conversation with the participant. A copy of the interview guide can be found in Appendix C. The three sections in the interview guide are Enrollment Survey Follow-Up Questions, Transportation Overview Questions, and Group-Dependent Questions:

- Enrollment Survey Follow-Up Questions: These questions ask the participant to provide more information about the type of everyday activities they conduct, including work activities,

shopping, caregiving, medical and fitness, and civil errands (i.e., going to the government and public service centers). The questions also ask the participant to indicate, if they hardly conduct certain types of activities, whether it is matter of personal choice or transportation barriers that prevent them from conducting these activities.

- Transportation Overview Questions: These questions ask the participant to talk about the availability and quality of transportation options in their daily life. The questions also follow the concept of human flourishing (Vanderweele, 2017) and ask how transportation has affected the participant's ability to fulfill needs in the five key domains of human life: work, family, health, community, and spirituality.
- Group Dependent Questions: These questions are specific and only applicable if the participant belongs to specific community groups. For example, for immigrant communities, we ask about transportation-related barriers for connecting with culture. For people with disabilities, we ask about paratransit services and how transportation is related to their independence.

The qualitative interview created an opportunity for a research team member to interact with each participant either in-person or virtually. At the end of the interview, the research team member was able to help the participant install the app for the smartphone data collection component and provide the participant an overview on how to use the app.

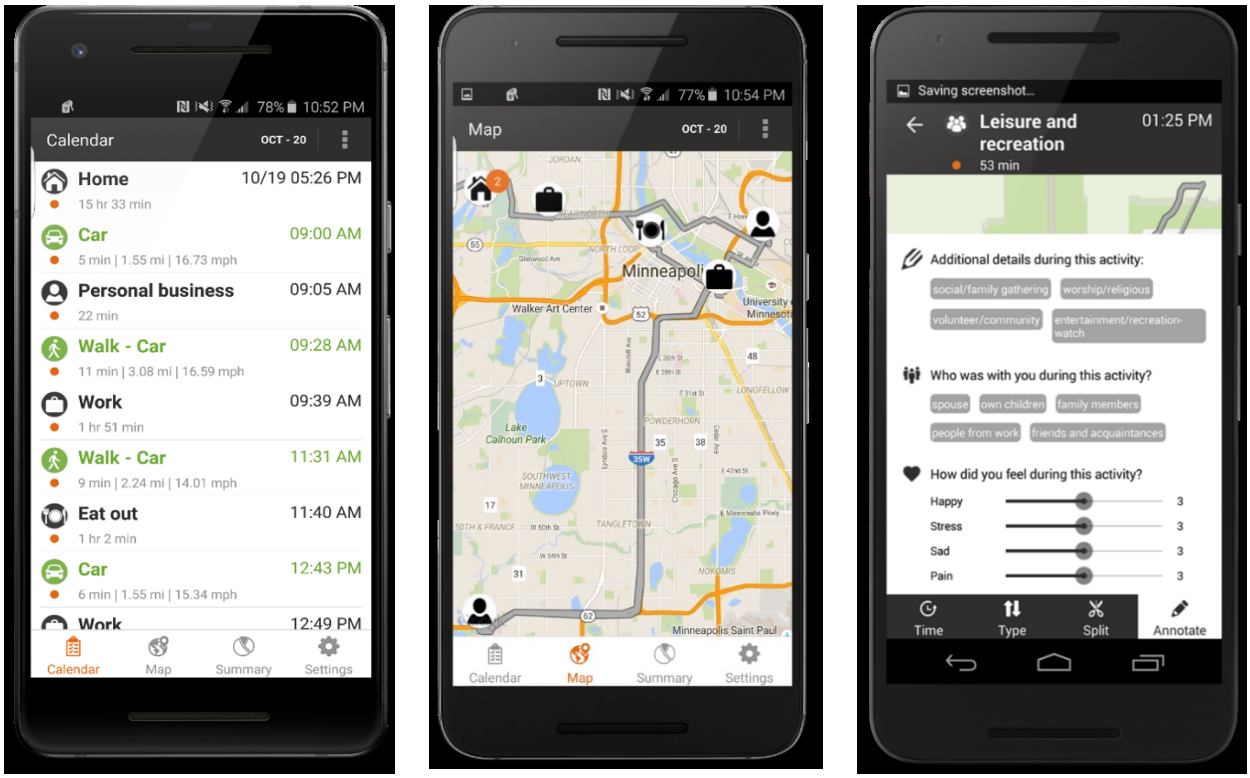
Smartphone-based Travel Behavior Survey

The smartphone-based in-app survey is implemented via the Daynamica app, which asks questions about activities and trips for seven consecutive days. Details about the in-app survey questions are provided in Appendix D. As we mentioned earlier, only 14 of the 130 participants (11%) declined the smartphone data collection component due to concerns about location tracking and/or unfamiliarity with smartphones. Eight of the 14 participants who declined using the app were from the disability community. The disability community in this research include members with developmental/intellectual disabilities and related conditions and most of these members are not comfortable with smartphone use due to unfamiliarity with the smartphone technology. For people who were comfortable using the app but did not own a smartphone, the research team provided them a smartphone to use.

The Daynamica app employs a digital day reconstruction system that utilizes mobile sensing to derive sequenced activity and trip episodes with higher data accuracy and lower respondent burden than the traditional, recall-based day reconstruction method (DRM) (Fan et al, 2017; Kahneman et al., 2004). Specifically, the app utilizes various location and motion sensors in the smartphone to generate speed, position, and acceleration data at regular time intervals and then employs patented algorithms (Fan et al., 2017) to automatically segment time series into activity and trip episodes in real time throughout the day.

In addition to automated reconstruction of daily activity and trip episodes based upon mobile sensing data, the app allows participants to provide information that is not detectable by mobile sensing (e.g., the preferred transportation mode for a particular trip, trip companionship, and trip experiences). Figure 1 shows the main interface of the Daynamica app, including how the app displays the temporal

and spatial information of the automatically reconstructed activity and trip episodes as well as how the user can interact with the app at their convenience to provide additional information about the reconstructed activity and trip episodes.



(a) Daynamica constructs the activity-trip sequence in real time from mobile sensing data, inferring activity/trip start/end time, activity type, and trip mode.

(b) Daynamica captures and displays detailed spatial information of each activity/trip, including activity locations and trip trajectories.

(c) User can interact with Daynamica to confirm or correct activity/trip inferences, and provide additional info (e.g., subjective experience) about each activity/trip.

Figure 1 Daynamica Main Interface.

The in-app survey has multiple advantages:

- It allows the integration of mobile sensing data to generate temporal and spatial information of daily activities and trips, which reduces respondent burden.
- It allows episode-level questions. The reconstruction of activity and trip episodes facilitates the provision of contextualized survey questions at the activity or trip episode level. That is, while the same questions can be asked for each activity or trip, the app could also ask a tailored set of questions for any specific types of activities and trips.
- It allows the incorporation of day-level survey questions to ask about any aspects of daily life that either suppress or reduce demands for transportation like whether the participant has any unmet transportation needs (e.g., any trip cancelations during the day) or any activities accomplished without physical travel (e.g., telework and online shopping).

- It allows the incorporation of exit survey questions, i.e., questions asked at the end of seven days of data collection.

Details about the in-app survey questions are provided in Appendix D which includes episode-level questions, end-of-day questions, and exit survey questions. The participant either used their personal smartphone, or a device lent to them. As shown in **Error! Reference source not found.**, 87 out of the 130 participants (67%) completed the smartphone travel behavior survey, resulting 695 days of activity and trip data. On average, participants contributed 8 days of smartphone data per person. Figure 2 illustrates the sequential activity and trip data captured by the Daynamica App within seven consecutive days from a sample participant in this study. With spatial and temporal data on these captured activities and trips, the researchers can easily summarize daily average activity, trip duration and distance by community group.

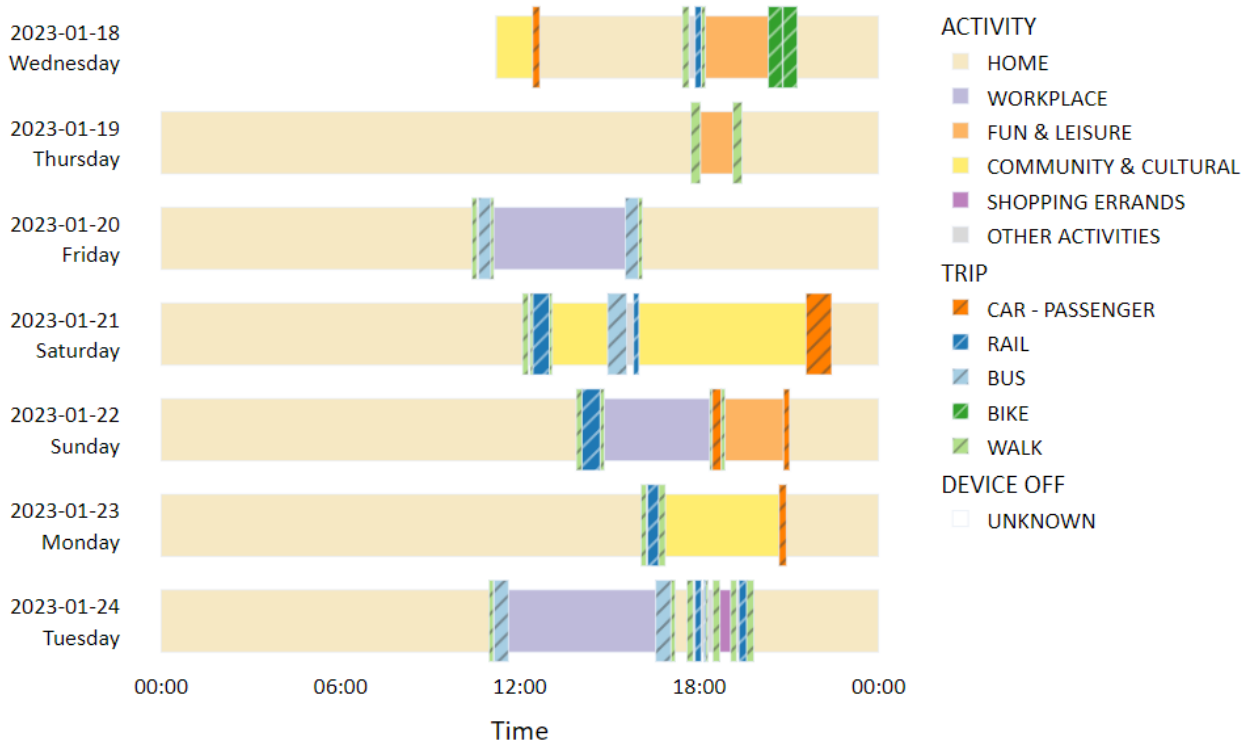


Figure 2 Activity and Trip Data Captured by the Daynamica App for Seven Days from a Sample Participant

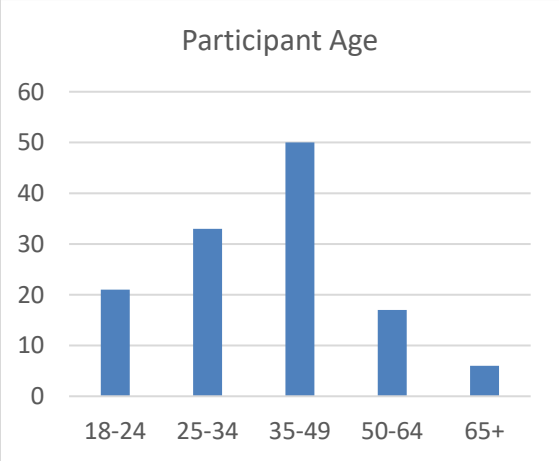
3.4 Data Analysis

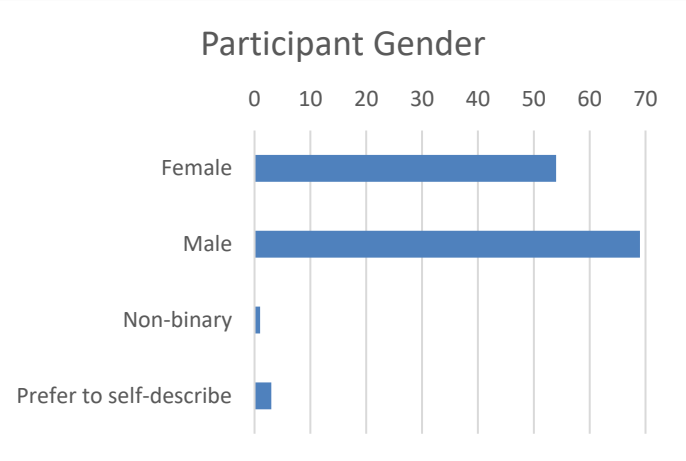
The research team transcribed the audio recordings of the interviews and conducted thematic text analysis of the transcripts. For the data generated via the seven-day travel behavior survey, summary measures of travel behavior were tabulated, visualized, and reported. Statistical analyses were mostly descriptive analysis summarizing the demographic characteristics of the study participants. The thematic text analysis included topic occurrence analysis. For statistical analysis of the travel behavior data, some of the outcomes of interest will involve counts per unit time (e.g., number of trips per day per person).

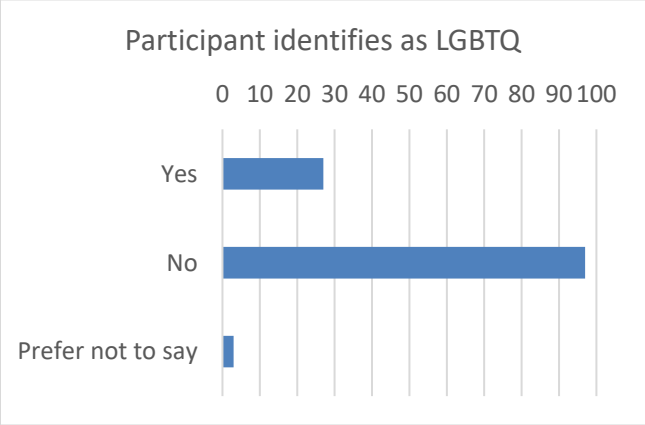
Chapter 4. Study Findings

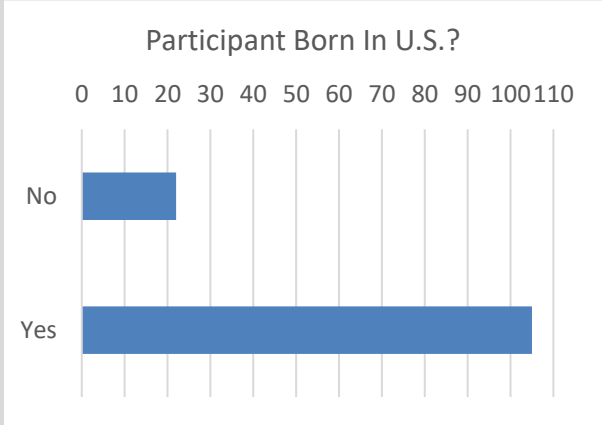
4.1 All Participants

Participants in the study represented a wide variety of communities and identities. Results from the intake survey completed by all participants help demonstrate the diversity of participants. As shown in Figure 3 below, participants ranged in age from young adults to over 65. Participants generally skewed slightly male with 69 of the 130 participants identifying as male and 54 identifying as female. 27 participants identified as LGBTQ. Participants spanned many racial groups; while white was most represented with 44 participants, African American, Asian, Latinx, and American Indian also made up significant portions of participants. Education levels of participants spanned from less than a high school diploma to having a graduate or professional degree. Most participants (74) were employed full- or part-time, while 34 were unemployed at the time they completed the survey. Annual household income skewed low across all participants, with 63 in households making less than $25,000. Finally, participants came from a range of household structures; some lived with spouses and children while others lived with friends or roommates. It is worth noting that no participants lived alone in our study sample, which is not surprising given that 75% of the participants have a household income lower than $50K.









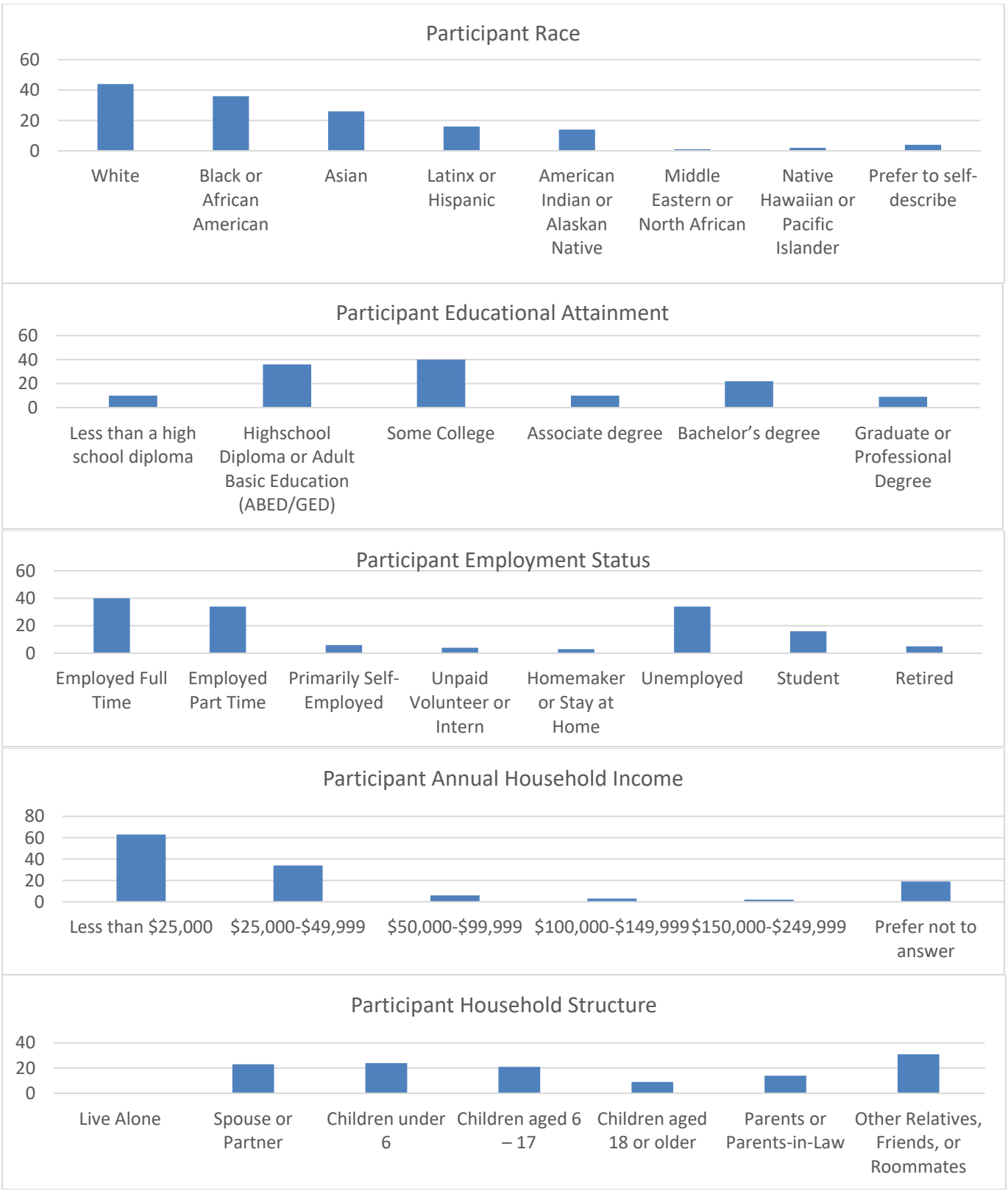


Figure 3 Participant Distribution by Age, Gender, Sexuality, Foreign-Born Status, Race, Education Level, Employment Status, Household Income and Household Structure

Figure 4 below shows the geographic distribution of all participants from the study. While most participants lived in the Twin Cities metropolitan area, two community groups – the Fergus Falls community and White Earth community – represent participants living in rural areas in northwest and west central Minnesota.

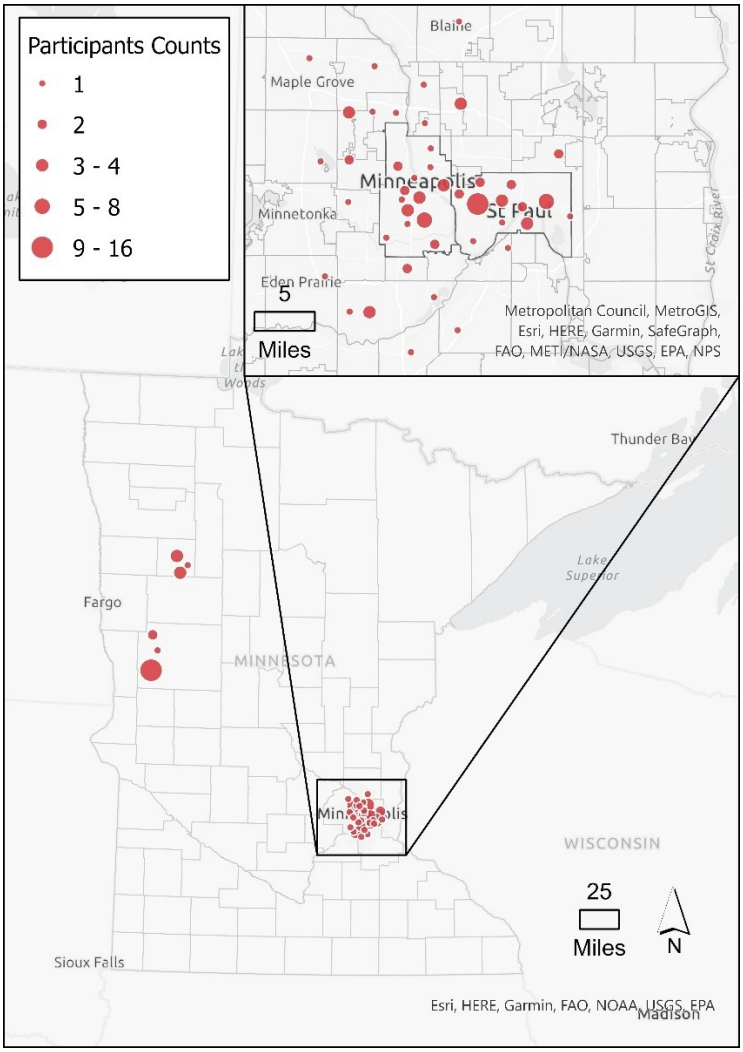


Figure 4 Geographic distribution of All Participants

Figure 5 shows the average daily activities of all participants in the study. Work activities had the highest number of participants engaging almost every day; half of participants worked almost every day with another 26% of participants working a few times a week. Shopping Errands had the highest number of participants engaging at least a few times a week at 80%. Over half of participants engaged in the majority of activity categories at least a few times a week. The only two activity types that did not reach the 50% threshold for at least a few times a week were Community or Cultural activities and Civil Errands.

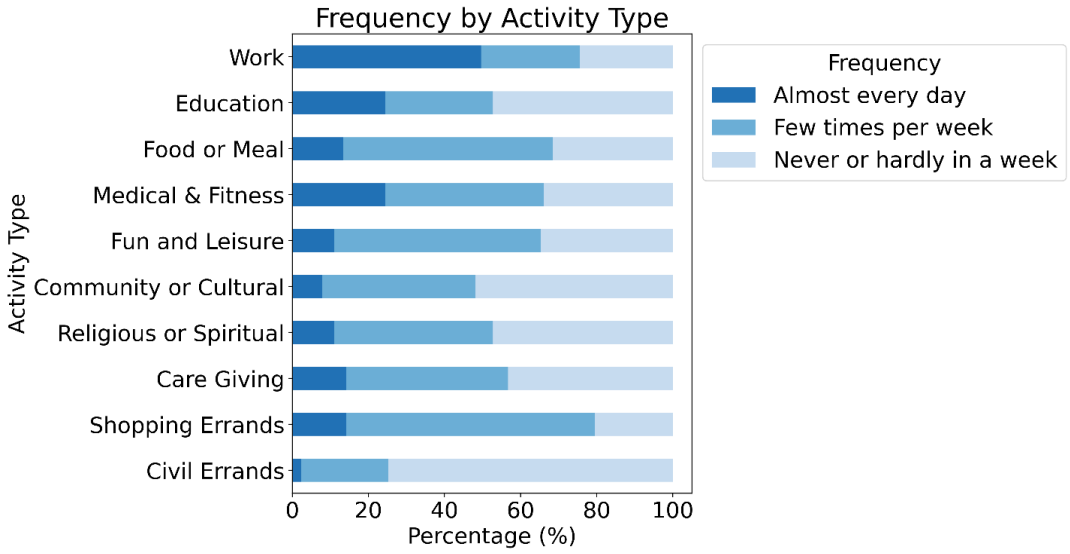


Figure 5 Frequency of Daily Activities by Activity Type for All Participants

Figure 6 shows the average daily trip frequency broken out by transportation mode. Driving by yourself was the mode most frequently used almost every day with 43% of participants. Another 10% of participants drive themselves a few times per week. Walking or wheeling was the mode most frequently used at least a few times a week, with 65% of participants responding that they walk or wheel almost every day or a few times per week. 80% or more participants never or hardly used the following modes: paratransit service; bicycle, skateboard, or scooter; or telework. Notably, of participants using paratransit, most use it almost every day, a theme that will be further explored in the disability community section.

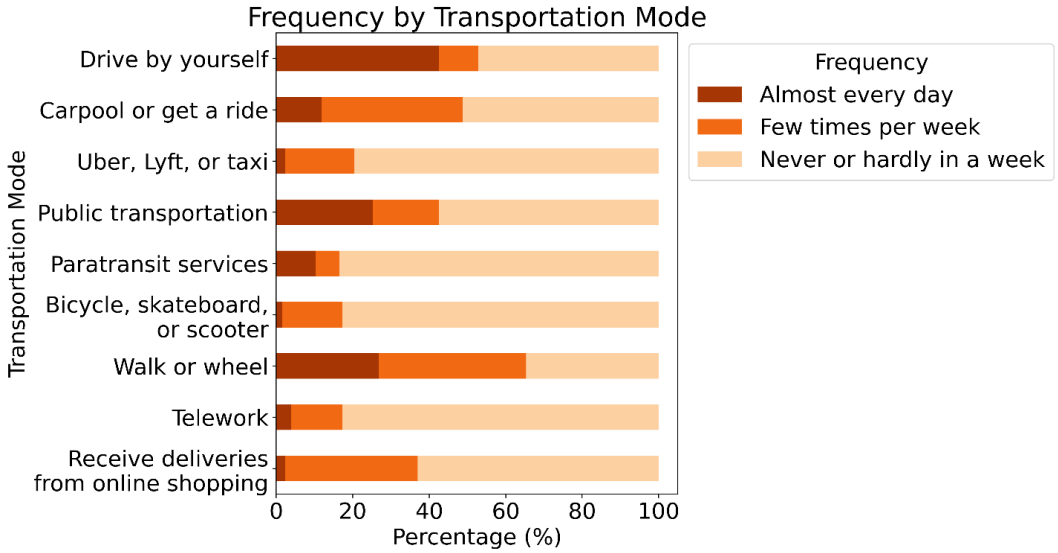


Figure 6 Frequency of Daily Trips by Mode Type for All Participants

Data from the smartphone-based travel survey further illustrates the transportation modes used by participants in the study. Figure 7 shows the breakdown of participant travel time in minutes by transportation mode. The daily average trip duration was 67 minutes including weekday and weekend

days. The average participant spent 59 minutes traveling on a weekend day and 70 minutes traveling on a weekday. Time in cars made up the largest portion of travel time, with the three vehicle-based travel modes (car – driver, car – passenger, and vehicle) accounting for an average of 50 minutes out of the 67 minutes of daily average trip duration. Walking made up the next largest portion of time at an average of eight minutes. Public transportation modes of rail and bus made up a combined six minutes of travel time on average.

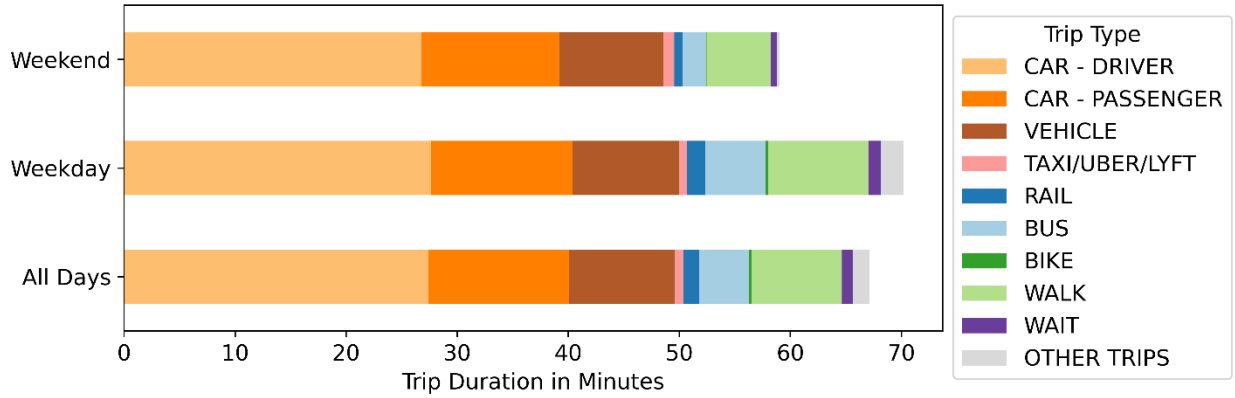


Figure 7 Average Daily Trip Duration by Mode Type among All Participants

Figure 8 illustrates the average trip length in miles broken out by transportation mode. The average participant traveled 23 miles on a weekday and 27 miles on a weekend day. Interestingly, this is the opposite pattern noted in the trip duration chart, potentially reflecting the impact of dealing with traffic on weekdays that make shorter trips (in miles) take longer. Based upon Figure 8, car-based modes were even more dominant when looking at distance compared to looking at time. Car miles accounted for 21 out of 24 miles traveled on the average day. While walking represented the second largest mode by travel time, it only accounted for an average of 0.56 miles. Bus and rail combined for an average of 1.3 miles. This data emphasized the degree to which participants rely on cars to make trips of any significant distance.

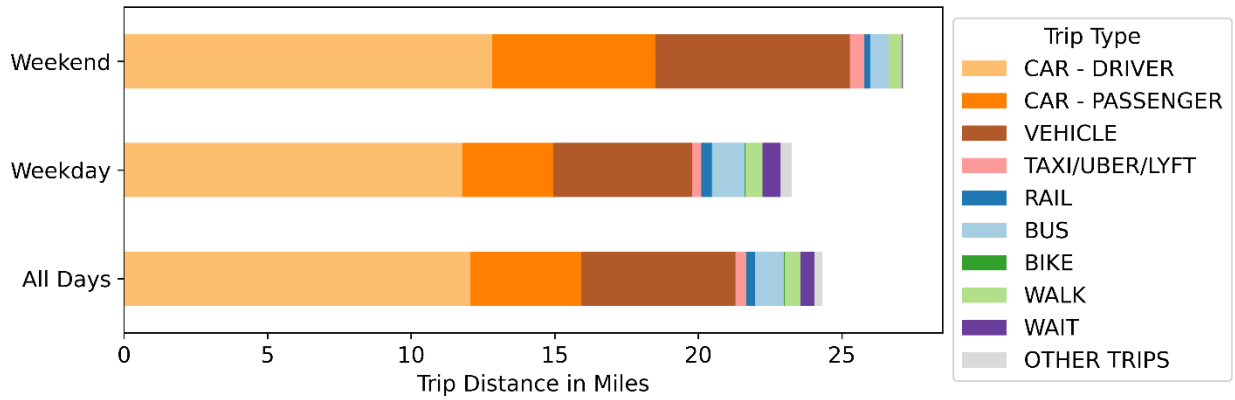


Figure 8 Average Daily Trip Distance by Mode Type among All Participants

Figure 9 shows trip frequency by mode type for all participants. The average participant took 4.14 trips per day. Three of those trips were in one of the three car-based modes. Walking accounted for an

average of 0.56 trips per day while bus and rail combined for 0.34. Again, the prominence of car-based travel came through in trip count data.

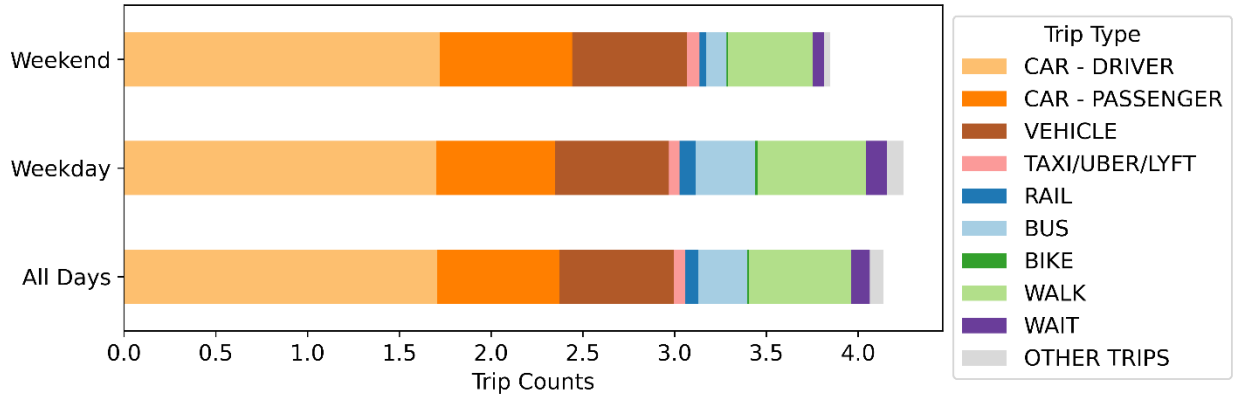


Figure 9 Average Daily Trip Counts by Mode Type among All Participants

The intake survey asked participants to select three transportation improvements out of a list of options. Figure 10 below shows the results of that question across all participants. The top two improvements, easier access to a car and better road quality, highlight the importance of and preference for driving as a transportation mode. Better conditions for walking was ranked as the third most preferred improvement and was selected by 43 participants. The next five improvements all relate to access and quality of public transit options. This reflects participants' interest in using public transportation as well as the many barriers they face in doing so.

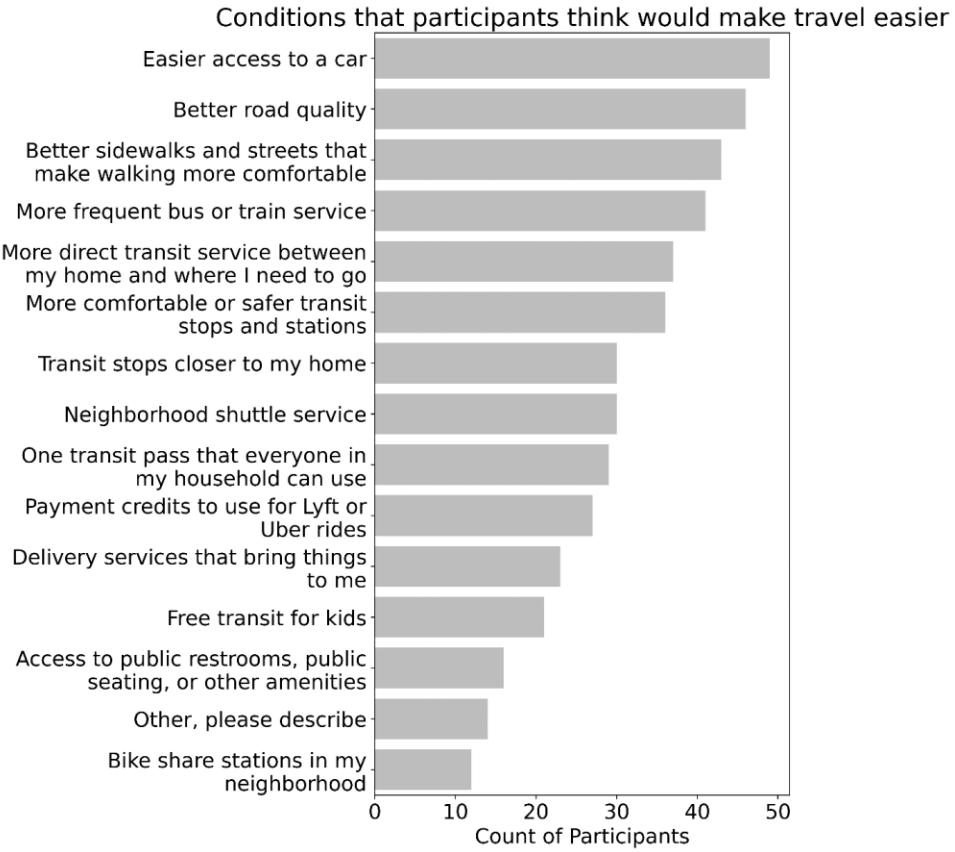


Figure 10 Conditions that participants think would improve travel experience.

The community sections that follow will explore how these recommendations, as well as overall travel behavior and barriers, differ by community and reflect the unique characteristics and challenges communities face in their daily travel. Appendix E showcases artistic posters featuring quotes from study participants and themes linking transportation to major life outcomes.

4.2 Latinx Community

The research team interviewed 11 participants who identified as Latinx living in the Twin Cities metropolitan area. Participants in this group learned about the study through different connections including the International Institute of Minnesota and the Neighborhood House serving families and individuals in St Paul, Minnesota. Interviews were conducted over the course of the study period, between November 2022 and January 2023. Four of the participants agreed to complete the follow up smartphone-based travel behavior survey, generating 35 days of activity and travel data. Challenges with public transit service and desires for and dependence on personal vehicles emerge as key themes for the Latinx community.

Community and Participant Characteristics

Participants in the Latinx community group came from a large range of backgrounds and were connected to the study through different organizations including the International Institute of

Minnesota and Neighborhood House. The International Institute is described in the Immigrant community chapter of this report (Section 4.5). The Neighborhood House is a nonprofit organization in Saint Paul that runs a range of programs to support family needs, with a focus on immigrants and refugees. Services include food support, housing stability, early childhood education, and youth literacy. The project team worked with the adult education programs at the Neighborhood House to connect with students in English and digital literacy classes. Interviews were conducted at the Neighborhood House with adult students during or after their class time.

As shown in Figure 11, participants in this group spanned all age ranges and skewed more female than the study overall, with eight of the 11 participants in this group identifying as women. Five out of the 11 participants were born in the United States. Median household income of participants was $25,000 to $49,999. Four of the 11 interviews were conducted in Spanish.

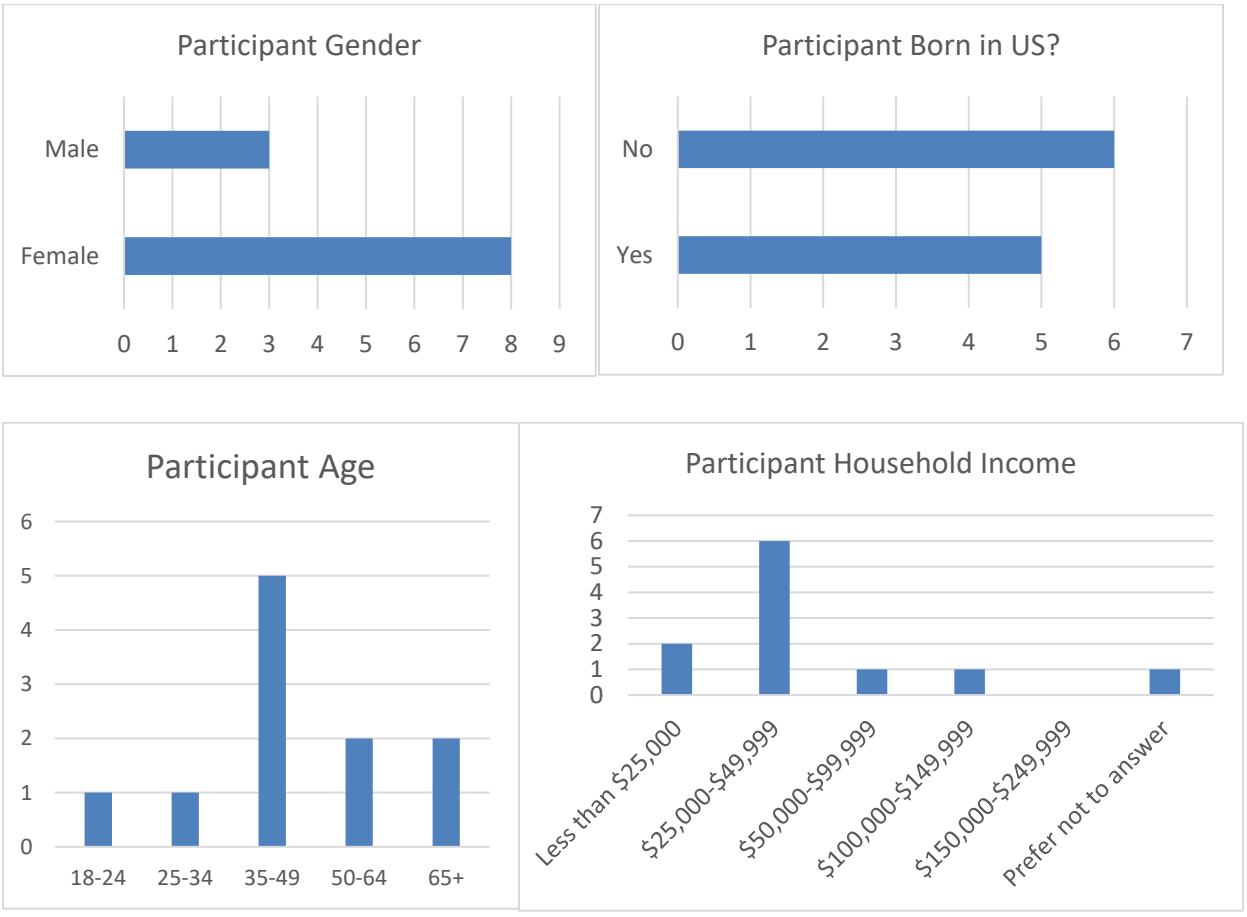


Figure 11 Participant Distribution by Gender, Foreign-Born Status, Age, and Household Income.

As shown in Figure 12, Latinx participants lived across the Twin Cities metropolitan area.

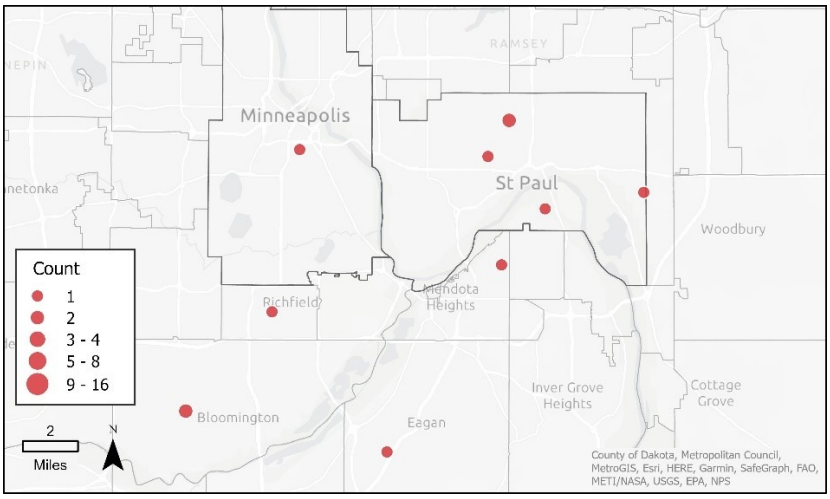


Figure 12 Geographic distribution of Latinx Participants

Figure 13 illustrates daily activity frequency of Latinx participants. Compared to all study participants (see Figure 5), Latinx participants more frequently worked almost every day. They were also more likely to participate in religious or spiritual activities and caregiving activities at least a few times a week. Finally, Latinx participants were more likely to participate in educational activities at least a few times a week compared to all participants. This may reflect that many participants in this group connected with the study through an educational organization.

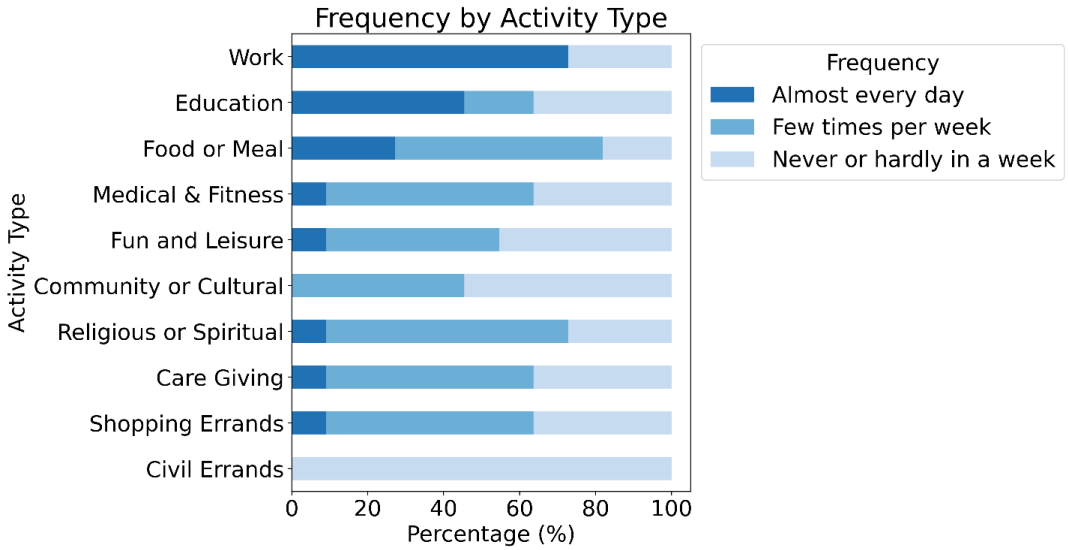


Figure 13 Frequency of Daily Activities by Activity Type among Latinx Participants

Figure 14 illustrates daily trip frequency of Latinx participants. Compared to all participants in the study (see Figure 6), Latinx participants were more likely to drive themselves somewhere and less likely to take public transportation as a regular mode of transportation.

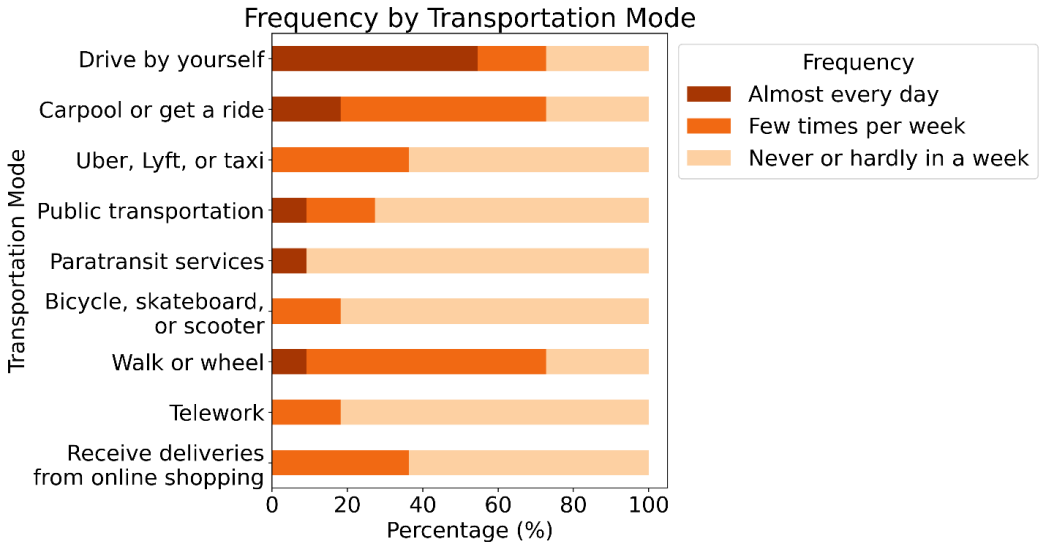


Figure 14 Frequency of Daily Trips by Mode Type among Latinx Participants

This car dependency trend observed in Figure 14 above also appears in the data from the smartphone-based travel behavior survey. Compared to all participants in the study, Latinx participants spent more time and more miles driving their own cars. Latinx participants spent about 32 minutes per day driving (as shown in Figure 15) compared to 27 minutes spent by the average study participant (as shown in Figure 7 in Section 3.1 All Participants).

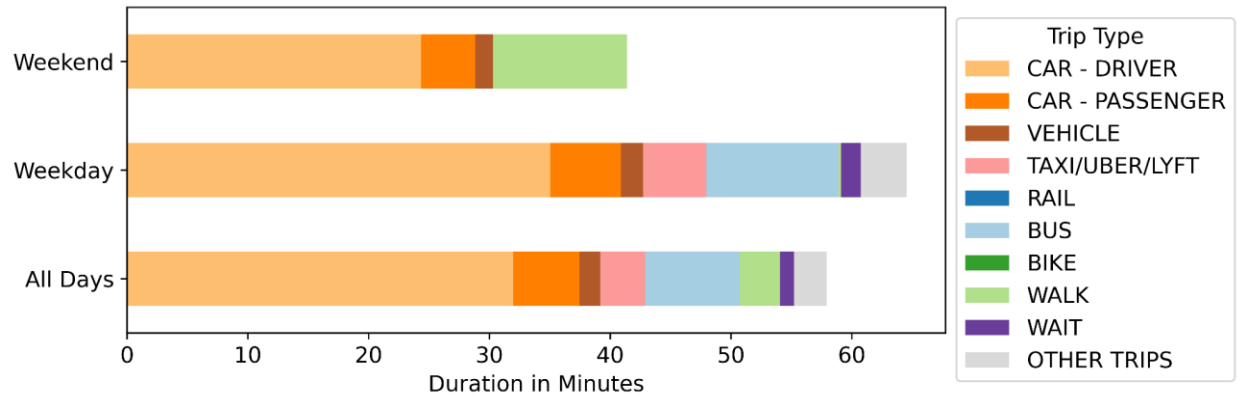


Figure 15 Average Daily Trip Duration by Mode Type among Latinx Participants

Figure 16 and Figure 17 illustrate the average daily trip distance and trip frequency by mode type among Latinx Participants. Compared to all participants in the study, Latinx participants traveled fewer miles on an average day, traveling about 17 miles per day compared to the average for all participants of 24 miles per day. However, they traveled a similar number of miles as a car driver compared to the average participant (11.09 miles for Latinx participants and 12.06 miles for all participants). Therefore, car-driver miles represent a higher proportion of traveled miles for Latinx participants than for the average study participant.

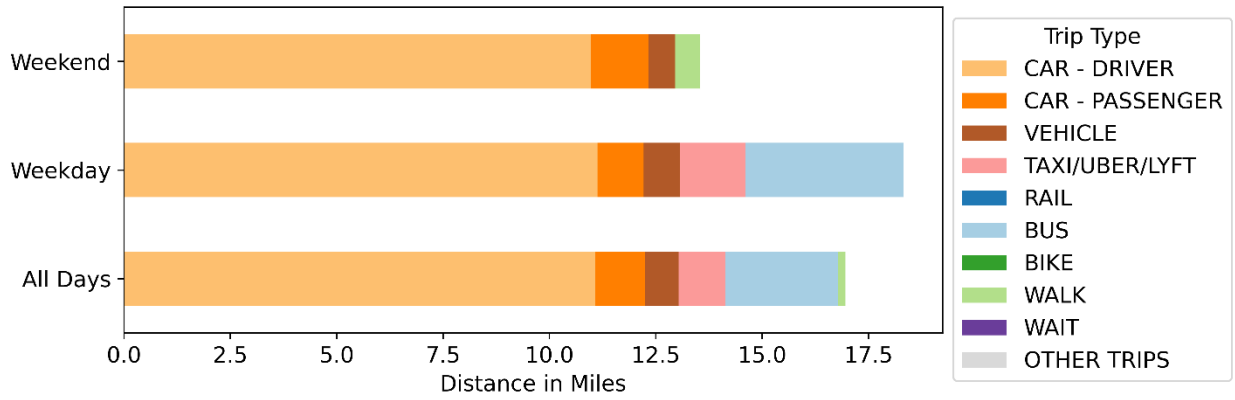


Figure 16 Average Daily Trip Distance by Mode Type among Latinx Participants

Latinx participants took a very similar number of trips per day compared to the average study participant; Latinx participants took 4.4 trips per day compared to the average of 4.14 for all participants. Trip count data also highlights the difference between weekend and weekday travel. Latinx participants took an average of 0.9 trips on buses during the week but none on the weekend. While weekend travel was lower overall, it also skewed more towards walking, with Latinx participants taking an average of 0.3 walking trips during a weekend day but only 0.1 on a weekday.

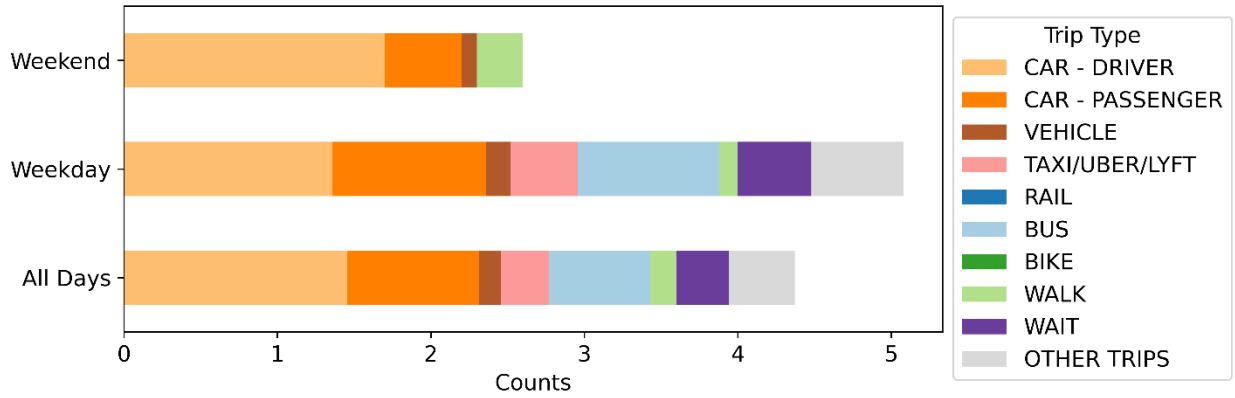


Figure 17 Average Daily Trip Counts by Mode Type among Latinx Participants

Data from the smartphone-based travel behavior study generally indicated that Latinx participants travel fewer miles and spend more time in cars while taking the same number of trips per day as the average participant. However, it is important to note that because only four Latinx participants completed the smartphone-based survey, the findings from this data do not fully reflect Latinx participant travel behavior.

Despite the skewing toward private vehicles in the intake survey data and the smartphone-based travel behavior data, the majority of participants in this group previously have or continue to use public transit as one of their major modes of transportation. These experiences will be highlighted in the reflections on and suggestions for the Twin Cities' public transit system in the qualitative interview data analysis

below. Ultimately, data from the qualitative interviews highlight the importance of having a personal vehicle to get around. People who previously used transit have transitioned to primarily using a car, and those still using transit often express hopes that they will have their own car. In the qualitative interviews, participants also expressed disappointment in public transit and their reasons for driving personal vehicles as their primary mode.

Qualitative Interview Data Analysis

The research team employed a qualitative, interpretivist data methodology to draw out themes from community group interviews. The methodology involved close reading of interview transcripts and coding content into key topic areas. The iterative process of identifying themes and pulling out key quotes led to the following analysis of three themes: 1) Barriers to the use of public transportation, 2) Preference for and dependency on cars, and 3) Inadequate public transportation for fulfilling essential activities.

Specifically, the analysis will first explore participant opinion around public transportation looking at the key barriers of learning to ride the bus, and safety. This section will close with positive reflections on public transit. Next, the analysis will delve into reflections on driving and personal vehicles as a mode of transportation, both the benefits and the challenges. Finally, the analysis will look at how transportation affects participants' engagement in a range of daily activities.

Theme 1. Barriers to the use of public transportation

Learning to ride public transportation

Latinx community members shared how intimidated they felt when learning to use the public transit system. This topic was mostly mentioned by participants that did not speak English fluently, but it also came up in an interview with a younger Latina born in the United States. In interviews, participants mentioned that they did not know basic aspects of the bus system from how to pay to how to notify the driver when they wanted to get off. Norms like exiting out the back door rather than the front door took an uncomfortable interaction across the language barrier for one participant to understand. Finding information is especially challenging for someone still learning English. As an interviewee who enrolls in an English language class and who primarily travels in a personal car shared:

> I want to learn how to travel in the bus. Because sometimes the car doesn't work, or it breaks down. Or in the snow, I can't leave. We need to take a bus. What I don't know is how much a bus costs. Do I have to pay each time I get a bus? If I get on one bus, get off, and get on another bus, do I pay again? These are things I don't know.

Most interviewees shared how they overcame this learning curve through trial and error. Multiple interviewees spoke of getting lost on their first bus ride(s) as they tried to learn the system. Even for a fluent English speaker, the first bus trip posed challenges. As she shared:

> My friend had lent me her bus pass, so I got on the bus, and I realized I didn't know how to communicate at what stop I need to get off. I ended up going a couple of bus stops past where I

> needed to go. But I was too shy to talk to the bus driver. So I was just observing and noticed how people indicated that they needed to get off, they were like pulling the string right? So I felt really embarrassed to know that, but I had never been in the public bus before.

In addition to learning through trial and error, many interviewees used apps including Google Maps and the Metro Transit app to figure out bus service. Immigrant participants found it useful to have a tool in their native language. Especially for younger participants, using apps was a logical tool in navigating a new city. As a young participant shared:

> When I arrived, I had Google maps. I would put in my point of origin and destination, and it would give me the routes and times and everything. So, I was like okay, I can figure out from here to here, the bus goes by at this time, I would get here, wait fifteen minutes… Because when it is cold, twenty minutes is an eternity waiting for the bus. So that is how I started.

Safety concerns

Many participants cited safety concerns as a reason they did not take or did not enjoy taking the bus or light rail. Many of these concerns were rooted in perceptions of other people on transit vehicles. For example, one participant, when asked about what makes the buses feel unsafe, responded, “Probably that there are a lot of strangers who I don't know or don't know what kind of state that they're in.” Another participant shared that she had witnessed altercations and fights between bus riders. She noted that there is a seasonality to bus safety. “In winter, it's not too busy on the bus. But if I take the bus during the summer, that’s when it's crazier. It's a lot of homeless, a lot of people yelling and fighting, things like that.” In some instances, the bus driver stopped the bus, called the police, and waited. The experience was not only discomforting in a safety sense, it also significantly extended the travel time for her and other bus riders.

Concerns with safety also mentioned worries about safety while waiting for the bus. It was suggested that safety concerns related to the neighborhood can impact use of public transportation. One Latina mother shared that she did not have confidence in her daughter’s safety walking to, waiting at, and taking the bus to high school:

> Because I don’t have confidence that my daughter can walk two blocks, wait for the public bus to get to school. I don’t have confidence that the bus won’t be delayed. For this reason, I decided to cut hours at my job and drive my daughter to school. For the safety of my daughter and my own safety and certainty. Because we live in an area where there is a lot of violence. I’ve seen things that are not good for a girl.

Positive aspects of public transportation

Two participants shared reflections on enjoying public transit. One Latino father shared that he enjoyed being able to multi-task, sleeping or reading, while riding the bus. He also found he practiced his English through taking the bus. Another immigrant participant enjoyed the experience of exploration, seeing different neighborhoods and new parts of the city. She shared:

> When I came about three years ago, I was using the bus. I loved it. At the beginning, I got lost. I got on a bus, and I didn’t know where I was. But I liked it because I got to know places. And the

> drivers helped me. I didn't speak the language. I only knew where I lived, and they guided me. For me, it was a beautiful experience.

Despite these positive reflections, both of these individuals now use personal vehicles as their primary way of traveling. This reflects the convenience of cars that will be explored in the next section.

Theme 2. Preference for and Dependency on Cars

Across participants, there was a general consensus that having a personal vehicle was the best way to get around the cities. Cars allowed participants to travel where they wanted quicker and more directly than public transit could provide. When one participant was asked why she preferred a car, she responded, "It is available at the time when I can go. Instead, if I go and look for a bus, I would have to wait maybe a half hour or an hour." Another participant referenced the expediency of driving as he weighed transit options. He shared, "Driving has its downsides, because when you drive, you can't text or do other things. But it is much faster to get places. And I want the faster way." Cars improved access to a variety of jobs, as well as leisure activities, family, and church. As one participant shared, "it really helped me to go to my job. It was very convenient to have the car."

Many participants learned to drive after moving to the United States and a couple participants were working on or had recently gotten drivers licenses. However, learning to drive also represented a barrier to some participants. One Latina shared her experience trying to find driving lessons:

> I tried to take classes a few times, but they told me they were for young people. And I would say, no I am not young… But it shouldn't matter because I can pay, and I want to be taught. But no, I didn't find any. So my brother took me to a parking lot.

This experience also highlights the importance of having a network of people who can teach you to drive and will let you borrow their car as you learn. Without a friend or family member to play this role, learning to drive would be difficult.

Participants who had drivers licenses still cited that car-related challenges arose, especially in relation to cost and affordability. Buying a car is expensive, especially for someone on a low or fixed income. One participant shared, "Since I'm on retirement, on social security disability, I'm unable to save up for it. In order to purchase another vehicle, last time, it took me over a year. So it's just a matter of time and to be patient." Participants also shared that gas prices created a cost burden to driving. One Latina who was waiting for her work permit shared, "Right now, since I'm not working, I don't feel confident to go anywhere just because I feel like the gas is more expensive." These cost burdens discouraged participants from driving far and encouraged one to do more of her trips by walking.

Theme 3. Inadequate public transportation for fulfilling essential activities

Besides language barriers and safety concerns associated with the use of public transportation, participants had numerous reflections on how public transportation in the region is inadequate for fulfilling activities that are essential for human flourishing, such as employment, religious and medical activities. One common theme was the slow service. Taking the bus took a long time, both because the waits between buses were too long and the travel time on the bus was too long. One participant shared,

"When I moved here, I was taking the bus, but then I realized... it wasn't convenient for the time. It was too long to wait." Additionally, existing transit routes did not provide adequate service to the places participants needed to go. Participants shared how route locations and trip time affected the locations where they could search for jobs. They suggested that the inconvenience of transit is a combination of limited route options and limited service times. A Latino father shared his experience during the years he relied on public transit:

> I couldn't get better jobs because the commute time to arrive in the morning would be more than two and a half hours. And aside from that, if I would start at 7, I would have had to wake up at 3:30 in the morning. But I couldn't get there because there wasn't transit at that time. So it is something that influences jobs because I have to get a job close that is in the area that includes transit.

The issue of timing mentioned in this quote came up in other interviews as participants noted that the times when bus service or frequent bus service ran did not match the times when they needed to travel. Sometimes, this affected accessing jobs, like for the participant who worked cleaning office buildings and found it hard to use public transit to get to office buildings during off hours.

Another aspect of this challenge is getting to church. Participation in religious and spiritual activities is integral part of culture for many in the Latinx community. Latinx communities emphasize the important roles of religion and spirituality in building strong family and community values and in improving health and well-being (Martinez, 1999; Rehm, 1999). Public transit service is more limited on Sundays which creates barriers for community members interested in going to church services and participating in other activities that are important to their spiritual well-being. A participant shared that the lack of Sunday bus service contributed to her motivation to buy a car. Another participant highlighted the lack of public transportation services on weekends. As he shared:

> When I go to church, I have to do it on Saturdays because buses run every half an hour, which on Sundays, when you normally go to church, they run every hour. So if you miss that bus, you're going to have to stand there for an hour in the cold waiting for the next bus ride home.

Accessing locations outside of the central cities via bus service also came up in a couple interviews with Latinx participants. One young Latina mentioned that her family lives in the suburbs. Since she does not have a car, she relies on rides from others because there is not convenient bus service to where her family lives. Another participant expressed interest in exploring more of Minnesota through public transportation options. She dreamed of having a train to get somewhere like Duluth.

Finally, participants who relied on public transportation shared that accessing medical appointments was more difficult. Bus service limited where they could go and unreliability of busing meant that they sometimes missed appointments. The extra effort it took to get to an appointment through public transit compounds when delays lead to missed appointments. One Latina mother shared:

> If there is a situation [that delays the bus] you're probably going to be late to your appointment, and you going to lose it. So you have to make another one. And if you ask your job for that time

> because you have another medical appointment, you probably won't get paid. So basically, you're losing your time and money.

Inadequate public transportation affected participants' ability to engage in many activities. Whether they limited job searches or rearranged schedules for church or appointments, participants had to weigh availability of public transit throughout their daily lives.

Limitations and Future Directions

The nature of recruitment from different organizations and connections led to a diversity of backgrounds of participants in the Latinx community group. While some themes emerged across participant types, like the intimidation of learning the bus system, other themes were more present among immigrant Latinx participants, like impacts of language barriers. Given the small size of this community group, this study could not thoroughly explore the experience of U.S. born versus non-U.S. born Latinx participants. Future studies could investigate how transportation patterns may vary across immigrant status. Breaking out US born and non-U.S. born Latinx can better demonstrate how the first-generation immigrant experience is shared despite different countries of origin. It could also illuminate whether there are challenges specific to the U.S. born Latinx community that could not be explored in the scope of the current study.

Additionally, only four of the eleven participants participated in the smartphone-based travel behavior survey. This in part reflects that the app is in English and some of the participants in this group primarily speak Spanish and did not feel comfortable using the app. The result is that quantitative data for this community group is limited and may be less reflective of overall trends of Latinx transportation experience.

Recommendations

Given this groups' experience riding public transit, most of their suggestions for transportation improvements during the interviews focused on bus services. Their suggestions touched upon issues of language barriers, tools for navigating services, waiting time experiences, and geographic coverage of transit stops.

On language barriers and accessibility, a participant mentioned that signage with Spanish translation would help her as a non-English speaker navigate the system. On navigation tools, a couple of other participants suggested that having paper flyers about bus routes and schedules would be useful. In one participant's words, "I would have liked to go to the office and take the flyers of the routes." Another participant mentioned that it would relieve some pre-work she would do, writing down the stop and bus times before she left home because she did not have enough phone data to look it up after she left. Having a flier with all the information in her pocket would be a useful tool for her.

Participants also offered suggestions for improvements focused on the experience of waiting for a bus. Participants recommended that more bus stops include seating and heating options for the winter.

Additionally, many participants would like to see more frequent bus service to reduce wait times overall. Improving bus service in other ways also came up throughout interviews. Participants suggested better weekend service options and improving transit access to suburbs.

Two mothers shared suggestions that focused on reducing the distance between home and the bus stop. One participant suggested that having bus routes on more neighborhood roads would improve service for her. It would reduce the time she would have to walk to a bus stop and increase her confidence in the safety of her children when riding because they could wait at a bus stop closer to their house. Another mother recommended having more bus stops to solve the same problem. This mother lived on a street with a bus line, but her children still had to walk to get to the nearest bus stop. Having bus stops close to home, these mothers reflected, would encourage them to let their kids use the bus more.

Data from the intake survey also shows the importance of road quality to this group (see Figure 18). When participants were asked to select improvements to transportation conditions, improving road quality tied for most desired. Interestingly, making walking more comfortable through better sidewalk and road conditions was also selected by six participants. This topic did not come up in many interviews but does reflect an overall interest by participants to move away from driving if it was more convenient.

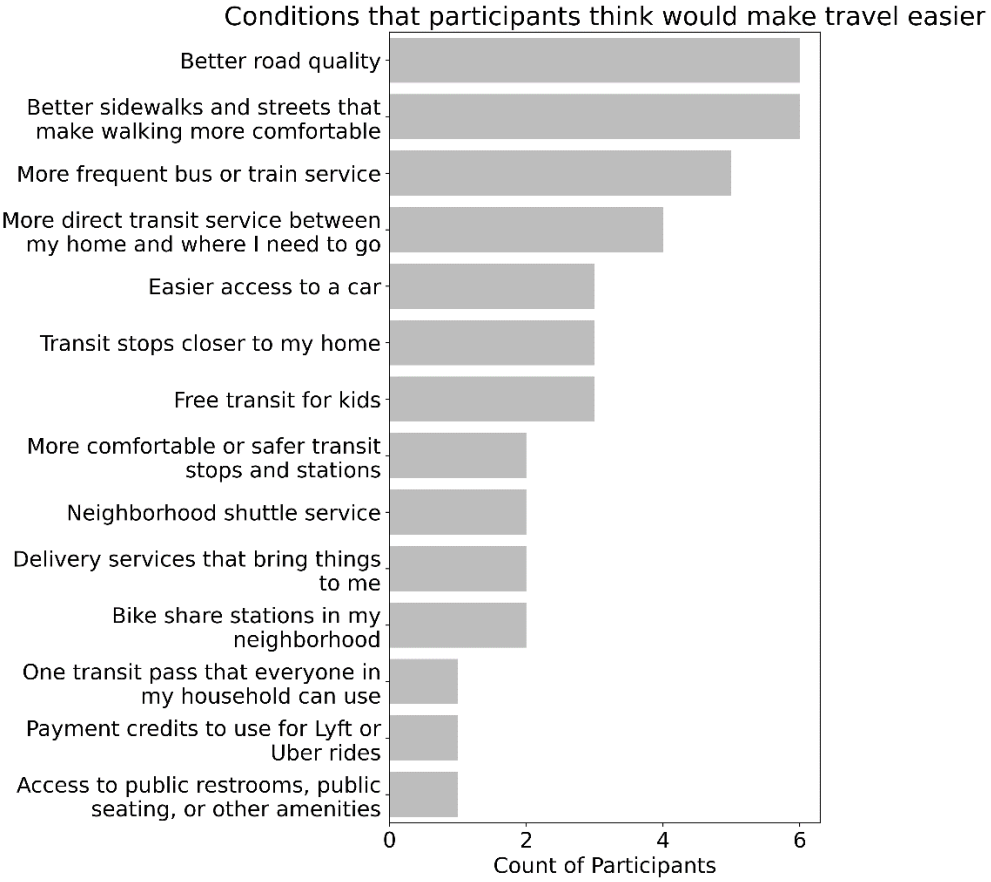


Figure 18 Conditions that participants think would improve travel experience.

In addition to the recommendations made by participants in the interviews, the research team identified a few transportation improvements and programs that could help address transportation barriers in the Latinx community:

- Affordable car-share programs in low-income neighborhoods: Latinx participants expressed the convenience of cars but also struggled with the costs of car ownership. Having an easy-to-use and affordable car-share program could help this community access the convenience of having a car before they have the means to own a car themselves. The Evie partnership with the Cities of Minneapolis and Saint Paul represents a potential example. Run by HourCar, the Evie program has a low monthly rate program from those who meet income qualifications and cars in the all-electric vehicle fleet are intentionally placed in low-income neighborhoods and at multifamily housing sites. The program started fully in 2022 so it's worth tracking its success with overall use and number of low-income users over the coming years.
- Public transit how-to videos: Public transit agencies should create a short outreach video on how to ride the bus and train translated into Spanish and other languages. While most participants eventually figured out how to use public transit, a video in their own language makes taking public transit feel more welcoming. A video is also more accessible and informative than a webpage or other written content. Metro Transit released an introductory video in 2022 with key information about how to ride the bus. Translating this video into commonly spoken languages in the Twin Cities and sending it out through community channels so it reaches the target audiences would be important next steps.
- Explore on-demand programs to meet off-peak needs: Latinx participants expressed frustration that bus service did not provide them access to Sunday church services. Given overall bus ridership suggests lower bus service makes sense on Sunday, public transit agencies should explore alternative options like an on-demand shuttle service in certain neighborhoods that can meet residents' needs without having to increase traditional bus service. On-demand bus services already exist in some suburban communities around the Twin Cities area including Southwest Prime, My Ride in Maple Grove, and Click-and-Ride in Plymouth. Recently, Metro Transit expanded a pilot of Metro Transit Micro in North Minneapolis after a successful first six months. The existing on-demand services are mixed in whether they provide rides on Sundays. Expanding Sunday options and targeting outreach about these opportunities to Latinx riders could address transit challenges for riders in this community.

4.3 African American Transit Riders

The research team interviewed 14 participants who identify as African Americans transit riders. All participants are from the seven-county Twin Cities metropolitan area, with most of them from the area's two central cities: Minneapolis and Saint Paul. Twelve of the 14 participants completed the follow-up smartphone travel behavior survey, resulting in 79 days of activity and trip data.

Community and Participant Characteristics

Participants in the African American community group were recruited through street intercepts that took place in buses, light rail trains, and transit stops across the Twin Cities region. After recruitment, interviews occurred at various locations, including restaurants, fitness centers, and participants' homes. As shown in Figure 19, six of the 14 participants had an annual household income below $25,000 and four had an annual household income between $25,000 and $50,000. Two participants preferred not to provide income information, and only two of the participants had an annual household income above $50,000.

All participants were born in the U.S. and had resided in Minnesota for at least two years. The age distribution is diverse among the participants. As shown in Figure 19, six participants were 18 to 24 years old, four participants were 25 to 34 years old, one participant was between 35 and 49 years old, and three participants were between 50 and 64 years old.

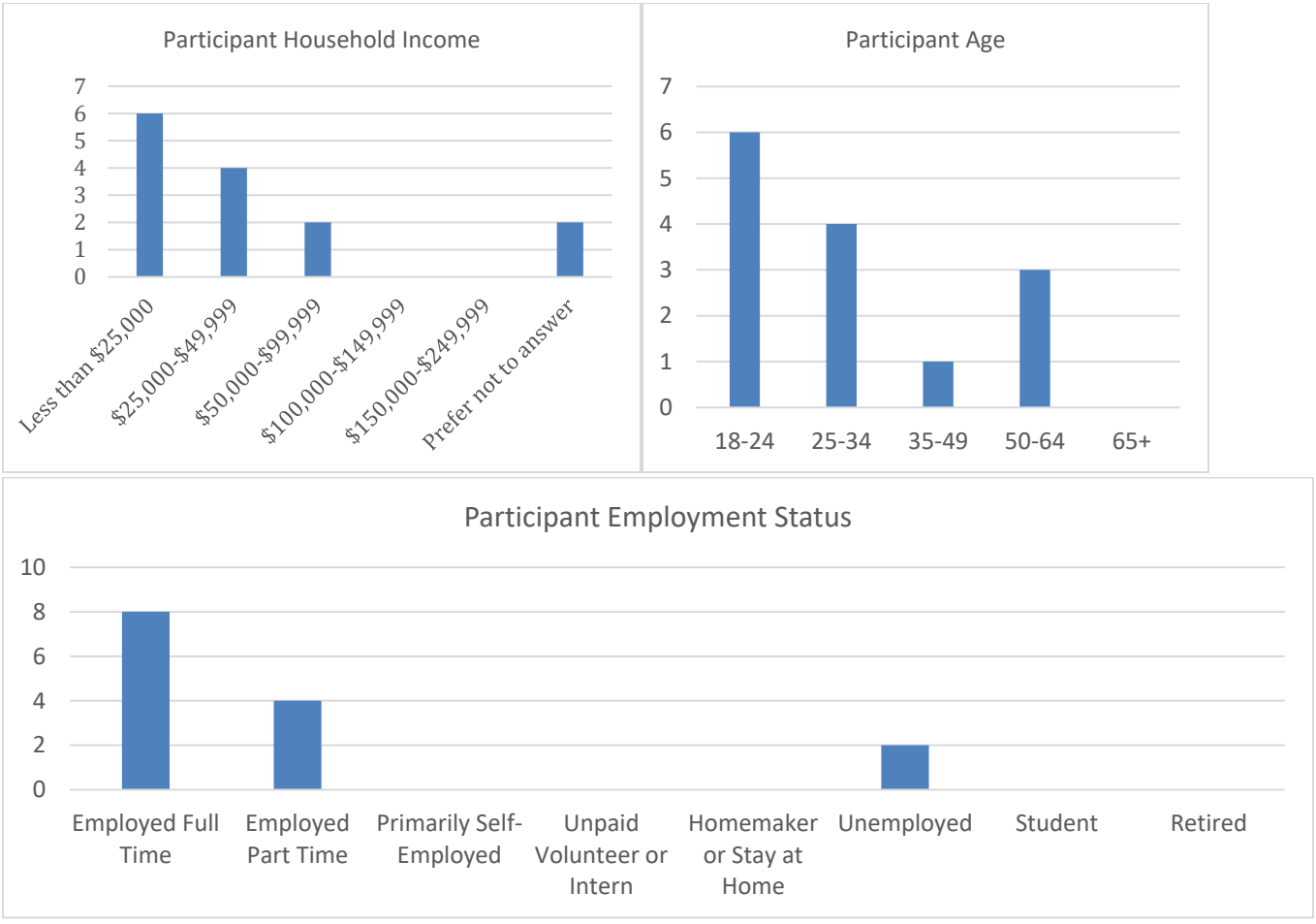


Figure 19 Participant Distribution by Household Income, Age, and Employment Status.

As noted above, African American transit rider participants lived primarily in Minneapolis and Saint Paul (see Figure 20 below).

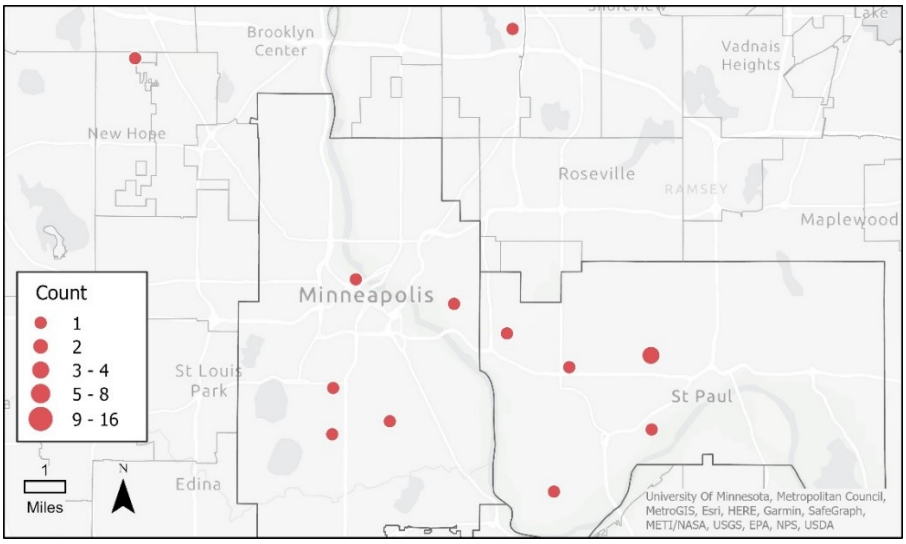


Figure 20 Geographic Distribution of African American transit rider participants

Most participants were employed and work full-time. Only two participants reported as unemployedt. It is worth noting that all participants relied on public transportation as a primary mode of transportation. They were all familiar with the transit system in the Twin Cities region. Many had been riding the buses and trains since they were teenagers. Some participants had a vehicle but also had a lot of experience with the public transportation system. Other participants would like to acquire a vehicle. However, the majority needed help to afford a car at the time of the interview and foresaw themselves relying on public transit in the foreseeable future.

Figure 21 illustrates daily activity frequency of African American participants. Compared to all study participants (see Figure 5), African American participants undertook more medical and fitness activities, more religious and spiritual activities, as well as more caregiving and shopping errands. The age of participants may explain the high percentage of fitness activities. Most participants in this group were male, and many responded as not having any medical related activities when interviewed.

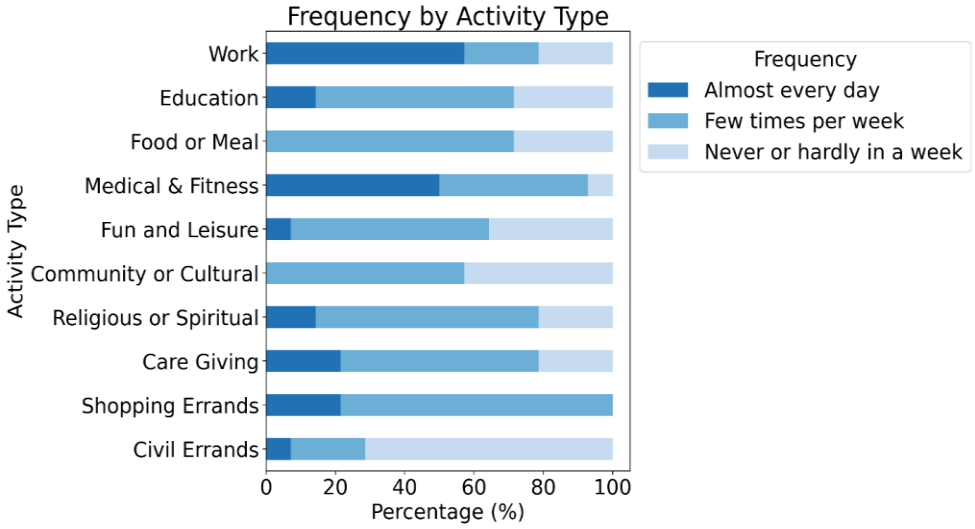


Figure 21 Frequency of Daily Activities by Activity Type among African American Participants

Figure 22 illustrates daily trip frequency of African American participants. Compared to all participants in the study (see Figure 6), African American participants were more likely to use public transportation almost every day and less likely to drive themselves somewhere. African American participants were also more likely to walk and use Uber, Lyft or taxi services when compared to all participants in the study.

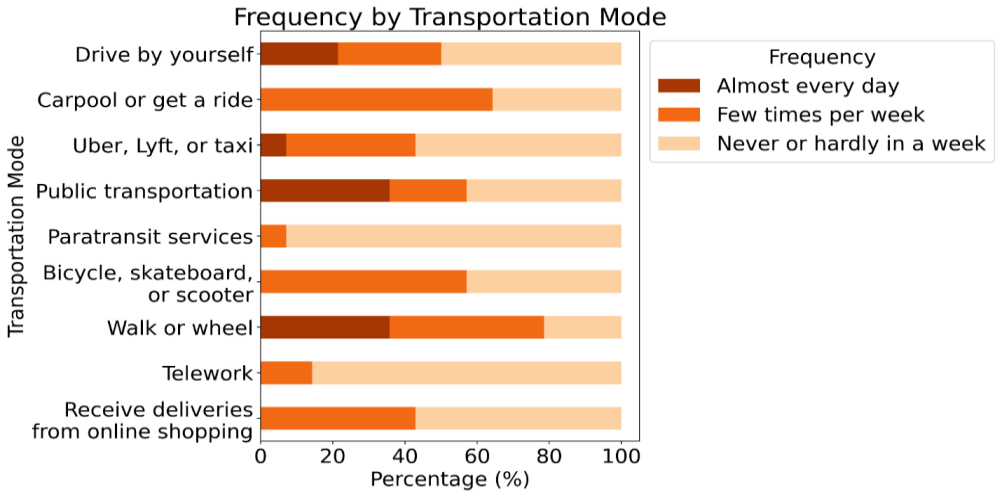


Figure 22 Frequency of Daily Trips by Mode Type among African American Participants

The trends from the intake survey also appear in data from the smartphone-based travel behavior survey. Figure 23 shows the average daily time participants spend traveling by different transportation modes. Overall, African American participants spent more time traveling each day, 80 minutes per day compared to 67 minutes for the average study participant. Car-based travel modes made up 48 of those minutes, slightly below the 50 minutes of car travel of the average participant. However, African American participants spent significantly longer on public transit. Bus and rail accounted for 13 minutes on the average day whereas the average study participant spent less than six minutes on public transit each day.

Additionally, there is a notable difference between weekdays and weekend days in the data from this community group. Public transit use was lower, just five minutes on weekend days compared to 15 minutes on weekdays. Conversely, use of taxi or ride share increased from one to four minutes. Overall travel also decreased from 86 to 62 minutes total.

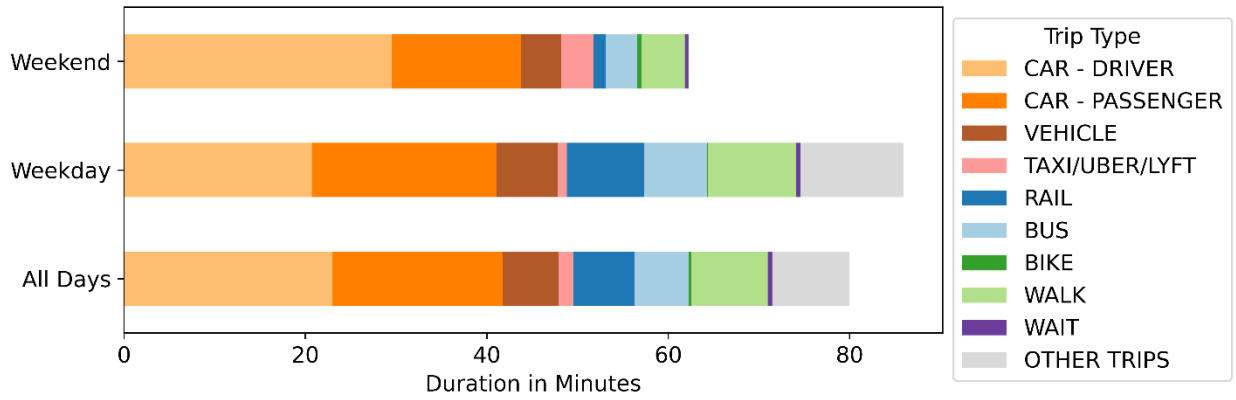


Figure 23 Average Daily Trip Duration by Mode Type among African American Transit Rider Participants

Figure 24 further highlights the dependence on and challenge with public transportation. Participants in the African American transit riders group traveled fewer miles overall than the average participant, 22 miles compared to 24 miles on the average day. However, they traveled twice as far via public transit than the average participant, traveling almost three miles on bus or rail on average, compared with less than a mile and a half for the average study participant. Interestingly, this group spent more time traveling than the average participant, as discussed above, but travels fewer miles. This trend is likely related to their dependence on public transit and the slower travel times on public transit compared to a private vehicle. The associated challenges with this pattern will be discussed further in the analysis of interview themes.

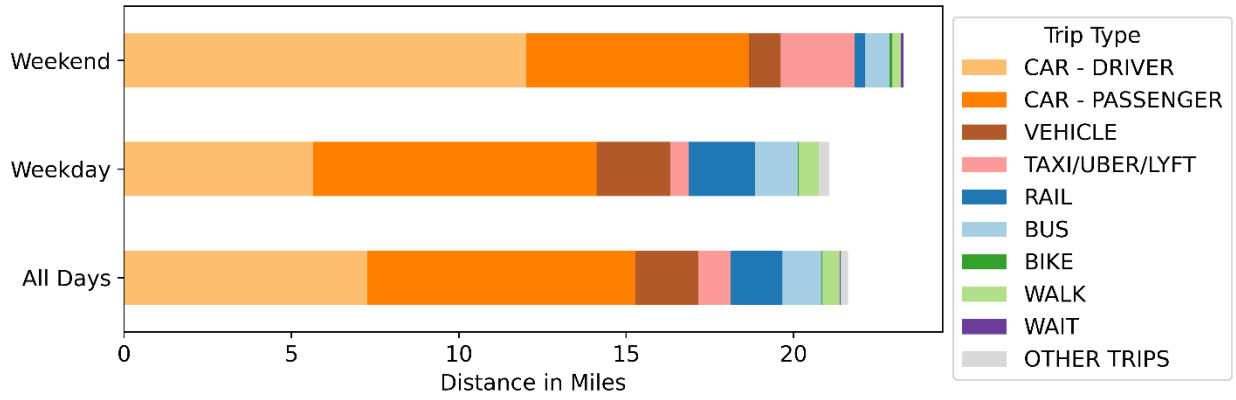


Figure 24 Average Daily Trip Distance by Mode Type among African American Transit Rider Participants

Data on the number of trips taken per day (Figure 25) shows that participants in this group took more trips (5.0 per day) compared to the average study participant (who took 4.14 trips per day). While African American transit riders took a similar number of trips in a car compared to the average participant (3.2 trips compared to 3.0 trips), they took double the number of trips via public transit. African American transit riders took an average of 0.6 trips on bus or light rail per day while the average study participant took 0.34 trips on the same travel modes. Participants in this group also took more walking trips, 0.9 trips per day compared to the average of 0.56 trips. All of these data points show that this group is highly mobile while also taking a lower proportion of their trips in cars.

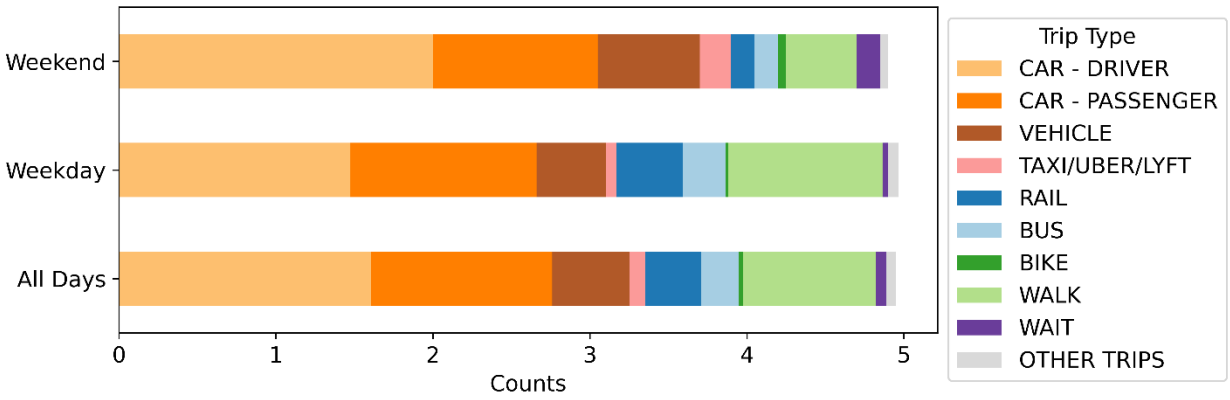


Figure 25 Average Daily Trip Counts by Mode Type among African American Transit Rider Participants

Qualitative Interview Data Analysis

In each interview, the interviewer asked questions about transportation barriers the participant faced and how these transportation barriers affected aspects of their daily lives, including work, family, health, community, and spirituality. All questions were open-ended ones and participants were encouraged to discuss any issues related to transportation.

The research team employed a qualitative, interpretivist methodology to draw conclusions from a small number of interviews, seeking shared experience among participants when it comes to transportation needs, barriers, and solutions in their everyday lives. Analysis involved close readings of interview transcripts and coding passages of text as pertaining to topics, concepts, or understandings. This process was iterative, with codes directing further readings, new codes, etc. The analysis led to the identification of three major themes: 1) the connection between transportation and employment, 2) the impact of transportation barriers on social well-being, and 3) transportation safety concerns.

Theme 1: The transportation and employment connection

Although only two of the 14 participants were unemployed at the time of the interview, almost all participants discussed how transportation barriers had negatively affected their employability and the type of jobs they could access. All interviewees either explicitly mentioned or alluded to losing a job or being unable to take a job that paid more, such as factory jobs, construction jobs, or as a nanny, because they lacked reliable transportation to and from work. Participants reported that they could not access good paying jobs at suburban locations with limited transit routes, losing out on alternative employment opportunities. The strong connection between transportation and employment could mean a life with no financial security and major hardships such as homelessness, mental distress, and depression. As one single mother with two children explained:

> When you don't have ways to get around, it puts a stamp on your whole life. I believe that transportation is just at the beginning of the pyramid, everything else is kind of a domino effect. If you don't have transportation, then you can't keep a job. If you can't keep a job, you can't keep your house because how are you going to pay your bills. Can't keep a house, now you're struggling with homelessness. It's all a domino effect. Fortunate enough for me, I have a lot of

> family support. So I'm able to maintain it. But say there was someone else that didn't have my support in the same situation. They could be falling down that pyramid and now facing homelessness because they can't get to a job in order to support their household. It's affected me because I can't see my son as often, and I can't go to the store and get the things that I need. Because I can't get around whenever I want.

With extensive experience with the transit system in the region, participants highlighted the inadequacy of public transportation services. Long waiting times and inconvenient transit schedules were frequently mentioned as barriers. One participant explained having to refuse a good paying employment opportunity due to inadequate public transportation. She recounted her experiences:

> It affects my employment opportunities in a couple of different ways. So I was looking to work as a nanny out in Bloomington. And I just was straightforward and said, I don't have a license, I ride the bus. And then I didn't get, I wasn't able to work that job because there were no bus stops nearby. So then I wasn't going to be able to get to or from work.

One participant was unable to take construction jobs which offered better wages than his current job. When asked whether access to transportation affected employment opportunities, this participant replied:

> I had this one job here. And when I Googled it, it said that there was a certain bus that would go over right in front of this place of employment. And so I accepted the job. But when I accepted the job, and then found out that that particular route only ran twice, very early in the morning, and late in the evening, eventually I had to leave. I had to quit that job, because I found out that the route times just did not work with regular work hours.

Losing or forfeiting job opportunities had a significant and negative effect on participants' well-being. Many participants described the bitter feeling they experienced dealing with this financial instability. As a single mother participant put it:

> I would say disappointed, defeated, discouraged, angry. All the above said I'm a single mother, I have to work to maintain bills and take care of my kids. So when I don't work, or when I have things setting me back it makes me very sad, depressed.

Other participants expressed similar feelings after losing a job as a result of the transportation barriers, stating:

> It affects you mentally and it can get you depressed, because that can be the only job that you could have got at the time. The good part is that I had money left over. But if I didn't, that would have sucked because I wouldn't have the money to pay my bills, because I wouldn't have been able to get to work. So it brings worry and anxiety and a type of seeking and doing things that you probably don’t want to do or asking people that you probably don't want to ask for rides to work or stuff like that.

The experience of these participants shows that when individuals in underprivileged communities face barriers to transportation, it creates circumstances where they lose gainful employment. For example,

participants mentioned spending hours on the bus and/or train to and from work, which may be thirty minutes away by car. However, it may take buses an extra hour because of all the stops and, occasionally, emergency stops due to disturbances that require the police to respond. Participants described losing employment because of arriving late too many times for work, which then created many financial setbacks and mental distress.

The experience of African American community members unable to take better jobs because of transportation is disturbing as African Americans have historically experienced jobs-housing mismatch and unemployment issues (Fan, 2012). Between 2010 and 2020, the black-white unemployment ratio in the Twin Cities metropolitan area ranged between 2.0 to 4.2 (Myers et al., 2021). The interviews indicate that this community continues to experience hardships associated with access to employment and face significant disadvantages when it comes to seeking and securing employment, all of which leads to a cycle of poverty across generations.

Theme 2. The impact of transportation barriers on social well-being

Social activities play a vital role in overall well-being and human development. Loneliness and social isolation can negatively affect a wide range of life outcomes (Baumeister & Leary, 1995; Holt-Lunstad, et al., 2015). Data from the interviews show that participants faced transportation barriers to participate in social and leisure activities. Participants who did not own a car or adequate transportation reported restricting social and entertainment activities and spending more time at home to avoid the hassles of using public transportation. Travel was limited to essential trips such as work, grocery stores, and fitness. In the winter, most participants reported staying home more to avoid waiting for buses in the cold. Several participants reported unpleasant experiences of buses running late or not showing up at all. Public transportation could be more convenient for participants to participate in social and recreational activities. One participant explained the difficulties:

> Like I wanted to go to that beach, it's somewhere over there in Minneapolis. And I wasn't able to find out which bus route. I mean, I guess I could have Googled it or whatever. But it was kind of an afterthought. It wasn't just readily posted, "hey, look, this bus goes here or there."

Further, many participants did not see taking the bus or train to social or entertainment events as an appropriate means of transportation. Several dismissed the idea for its awkwardness or, as one participant said, "I'd be late because I had to take care of public transport." Having transportation to attend social events is one challenge; getting the same bus back home adds to the difficulty that dissuades many participants from considering public transportation to social or entertainment activities. One participant described his experience, "You can get there. And then you've been asking other people for rides and stuff like that. I think it hinders by burdening somebody else with your problem, so most people don't want to go out."

Even if participants could use transportation for social and entertainment activities, it would significantly impact the frequency of the activity. Waiting for the bus or train to do an activity can be discouraging. If participants end up doing an activity that requires public transportation, they often do it infrequently.

Many preferred a car for social and entertainment activities. For instance, one participant described the difference between having a car and taking public transportation to attend social activities, stating,

> So we take our kids out at least once a week, you know, to go to the mall or to the museums, and then I play soccer twice a week. So without a car, I wouldn't be able to continue to do such activities.

For most participants, transportation did not create a barrier to access to health. Many find getting to hospitals and other health facilities readily accessible due to buses and trains stopping at such locations. Many participants mentioned not needing medical care as of late. However, on occasion, they either lived within walking distance of the health facility or could easily take the bus to and from the hospital.

Theme 3: Safety Concerns

Safety concerns were transportation barriers for this community group. Almost all participants said directly or alluded to experiencing, on several occasions, unsafe encounters with other transit riders while using public transit. Many of these safety concerns came from other transit riders' rude behavior. Some participants stopped riding the bus and transit altogether because of violent encounters they experienced or witnessed while riding the bus and transit. Some described not feeling safe from bus drivers who harassed passengers that could not afford to pay the cost of the fare. For example, a participant explained a situation they witnessed between a bus driver and a teenager who could not afford bus ticket prices on the way to school. An argument ensued between the two parties. The bus driver refused the teenager a ride to school, even when passengers on the bus offered to buy the teenager a ticket. As the participant puts it, "the kid never was able to make it to school." Another passenger felt the driver should have been gracious to the student, irrespective of the negative words uttered by the teenager.

For some participants, threats from other passengers, often related to drugs, were violent. They reported being threatened with knives, guns, and other violent objects. These encounters left them entirely scared that they would choose instead to use expensive ride share such as Uber and Lyft, where many reported feeling safe. A young twenty-year-old avid gym-goer who regularly rode the train spoke of some of the situations he had encountered:

> When people come on the train, they are smoking and drinking when on the train it says not to smoke or drink. They are violating the rules of the train, so I feel like that disappoints me because it's not safe for kids and children who get on the train.

When asked to elaborate further why such behaviors from other passengers were a barrier, he continued, stating, "because of the behavior and actions of the people that were breaking the rules, that were not listening, and they continued to do what they wanted to do. That will endanger other people." When asked to describe further the action taken to address the situation, almost all participants immediately decided to exit the bus or train. A handful thought of calling the police but hesitated, fearing having a negative encounter with police, which might lead to violence. Nevertheless, all

participants directly or alluded to wanting more security on transit vehicles, especially the light rail trains, to address the drug use and violence that had become rampant recently.

Limitations and Future Directions

The research team initially encountered difficulties in recruiting participants from the African American community. The team's strategy to rely upon community partners to recruit African Americans who have extensive transit experiences did not work. This challenge resulted in a change in the recruitment strategy to meet participants where they were: on buses, trains, and transit stops around the Twin Cities and surrounding areas, including Bloomington and Roseville suburbs. As recruitment commenced, it became challenging to recruit African American females. Men were more open to the study when approached by male recruiters, whereas females were hesitant. As a result, our sample overrepresented male participants. Of the 14 participants, 11 were male and three were female. Due to the time constraint to data collection, the gender imbalance was accepted. Future research would need to recruit more females. Having a diverse recruitment team would help to ensure diversity in study participants and further help to enhance the findings.

In addition, future research should include more older African American transit rider participants. Participants were mostly youths, and no participant was above 65. The concerns and barriers associated with transportation may be different between young and older adults. As a result, the interview findings may not be generalized to elderly African Americans.

Recommendations

The research found many transportation barriers for African American transit riders in the Twin Cities and surrounding suburbs in Minnesota. Data from the intake survey (Figure 26) shows how participants in this group prioritized a range of transportation improvements. The two most popular improvements for this group—easier access to a car and payment credits for ride share—underscore the inadequacy of public transportation as a primary mode of travel.

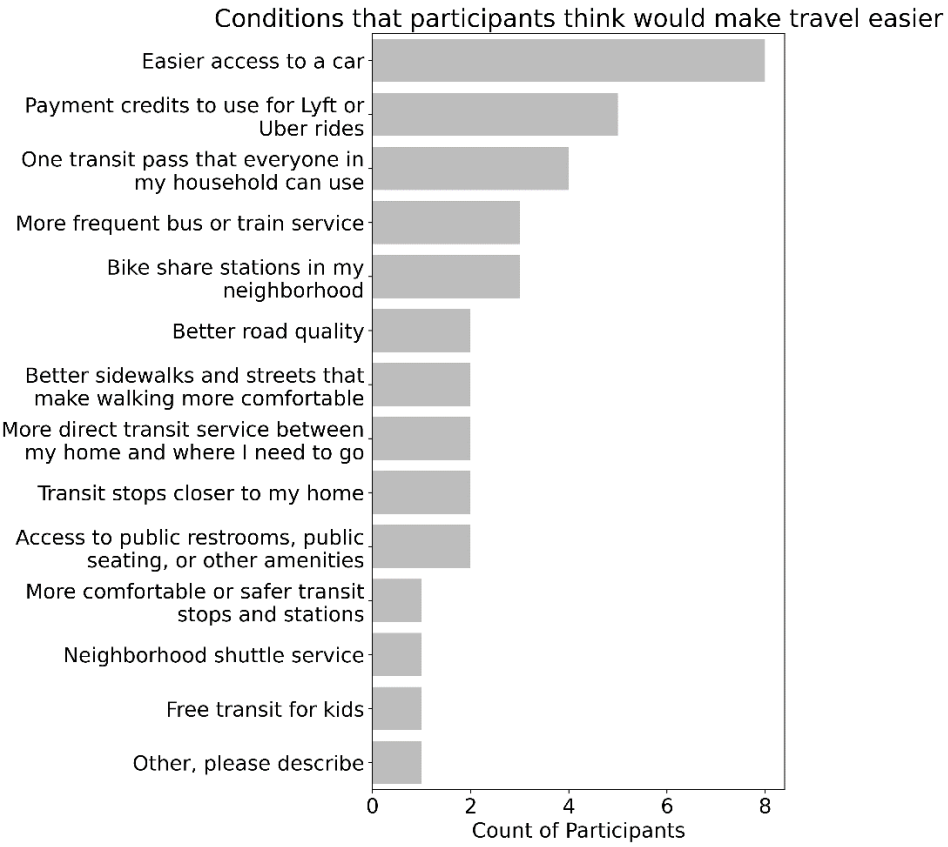


Figure 26 Conditions that African American participants think would improve travel experience.

Transportation barriers in this community group have a negative effect on their employment outcomes and social well-being. In addition, this community group is especially concerned about safety on public transportation. To address the barriers faced by African American transit riders, the research team suggests the following recommendations:

- Increase transit connectivity to major areas such as beaches, parks, churches, and industrial centers. Participants that experienced barriers in employment and activities did so because buses just did not run regularly or, in many cases, did not run in certain areas. As a result, it limits participants to work in certain areas, which makes specific jobs inaccessible. Conversely, respondents who did not experience transportation barriers for work or social activities did not because they lived close to bus routes that ran frequently and where everything was connected.

- Extend bus hours of operation to work locations further away from the city. Fare payment was not a barrier to transportation for participants. Many responded using shared rides for work, which are considerably expensive. Extending hours of operation, especially in areas with factories, to fit the schedule of work shifts will make transportation accessible to transit riders who depend on public transportation.

- More security on the train is needed to improve safety. However, security should be civilian instead of police. Participants overwhelmingly want security presence but disliked the idea of

police presence because of personal safety. Having a security presence that is different from the police to monitor and provide security on the train will eliminate some of the safety barriers described above.

4.4 People with Disabilities

The research team interviewed 16 participants who self-identified as having a disability. A portion of these participants were found with the help of RISE Crystal. Half of our participants were interviewed in the RISE Crystal facility on Wednesday, February 1st. Eight participants were interviewed and three provided quantitative data through the travel behavior survey. The rest of the participants in this community were recruited through other communities analyzed in this project. Of the 16 participants who completed the intake survey and the interview, seven completed the smartphone data collection, generating 53 days of activity and travel data.

Three key themes emerged through the interviews and data provided by participants in this group. First, Metro Mobility is able to provide this community with some independence; however, it fails to be a reliable way to fulfill all of participants' transportation needs due to its inadequacies. Second, this community relies on a support system of friends, family, and/or staff members for a large portion of their transportation needs. Finally, this community relies heavily on door-to-door transportation and does not feel comfortable navigating many pedestrian spaces.

Community Characteristics

RISE is a non-profit organization located throughout Minnesota and Wisconsin. Their primary focus is to provide employment opportunities for those who typically suffer from employment barriers. These communities can be but are not limited to: people with intellectual and developmental disabilities; people with mental illness; people with brain injuries; people who are deaf, deaf blind, and hard of hearing; people with criminal backgrounds; and people experiencing homelessness. RISE Crystal is a RISE facility located in Crystal, Minnesota just north of Minneapolis. It primarily serves people with intellectual and developmental disabilities who live in the northern metro area of Minneapolis. It operates as an employment center helping people in this community find employment opportunities. It also operates as a day center providing social and recreational functions for this community. RISE Crystal is an important hub for connecting this vulnerable population with opportunities, such as transportation benefits, political agency, and social services.

During our interviews participants mentioned a few different ways that RISE Crystal provided them benefits. The first and most important benefit they received was a MetroCard loaded with funds that they could use to access Metro Mobility. The second was political agency, as participants said they often participated in campaigns to contact their local representatives about certain issues relevant to their community (although it should be noted that participants said that these issues were not usually transportation related). Finally, many participants cited that they were able to find employment through

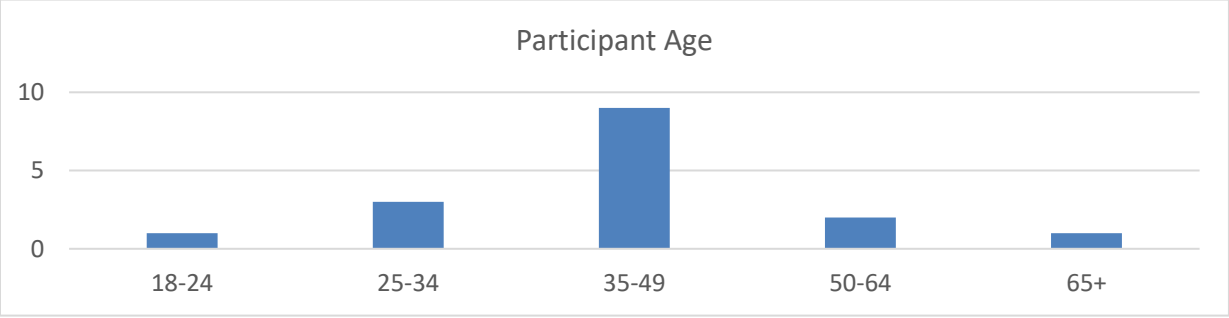
RISE or with RISE's help. RISE Crystal is an important community organization for our participants that was an incredible asset in helping to find and interview participants in our study.

Another organization that needs to be discussed in relation to this community is Metro Mobility. Metro Mobility is the paratransit service in the Twin Cities Metro Area. It is administered by the Metropolitan Council through its Metropolitan Transportation Services division. Per federal regulations through the Americans with Disabilities Act (ADA), paratransit services are required to be provided to any resident within three-fourths of a mile of a fixed transit route during the hours when transit operates in their area. Paratransit provides subsidized public transit for anyone who is not able to rely on the usual fixed route service. In 2021 Metro Mobility had a $82.7 million operating budget and 1.81 million yearly ridership with 17,500 active riders (Kuennen, 2022). Its average subsidy per ride is $42.59 making it by far the most expensive per ride public transit service in the Twin Cities Metro Area (Kuennen, 2022).

This service typically provides door-to-door service, in that it will pick the rider up at a location of the rider's choosing and drop the rider off at a different location of the rider's choosing. The rides need to be arranged four days in advance, which can be done by phone or through their website. There is a fee associated with each ride. It's $4.50 for peak hour service (8 am - 10 am and 3 pm - 6 pm) and $3.50 for non-peak hour service. Metro Mobility operation hours vary depending on the zone in which a rider lives. It also varies by day of the week as some of the further suburban areas are not accessible on Saturday and Sunday. Metro Mobility guarantees arrival at the rider's pick-up point within a 30 minute window. Once the bus arrives at the pickup location, riders then have five minutes to meet the bus. If they do not meet the bus within that window, it is marked on their account as a "no show." After four no shows, the passenger may lose access to the service. Metro Mobility is an important part of this community's daily transportation, however the limitations in the model prevent it from being a dependable option for their every need.

Participant Characteristics

As shown in Figure 27, participants in this group were middle-aged and mostly white, with 75% respondents falling between 25 and 49 years old and 70% describing themselves as white. Our participants were on average in a lower income bracket as 75% of respondents marked that they made less than $25,000 per year (the other 25% marked "prefer not to answer").



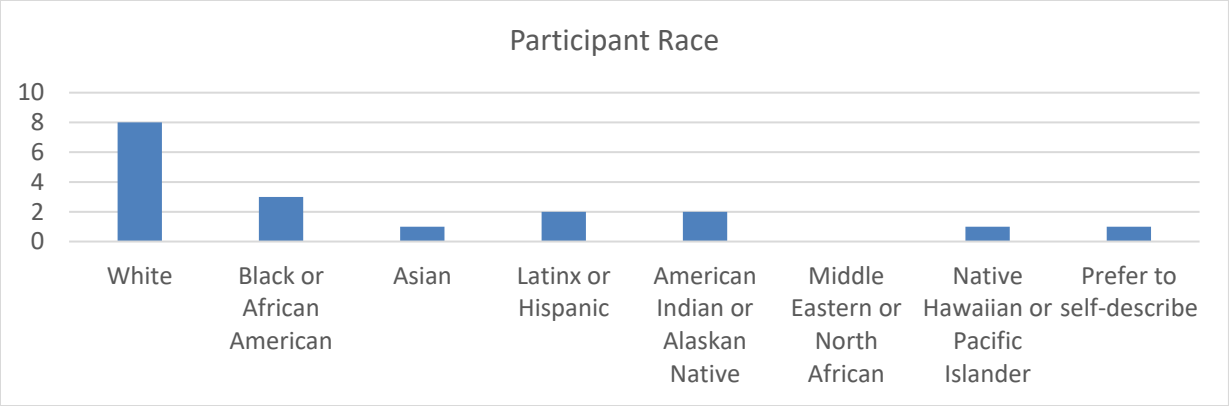


Figure 27 Participant Distribution by Age and Race.

Participants spoke about how employment can be a struggle for them due to a lack of reliable on-time transportation. This was also reflected in Figure 28 as only 18% (3 out of 16) of our respondents were employed full-time and 37% (6 out of 16) were employed part-time. In comparison, 65% of total respondents in our study marked themselves as employed (Figure 3). This difference shows how this community can struggle with employment barriers.

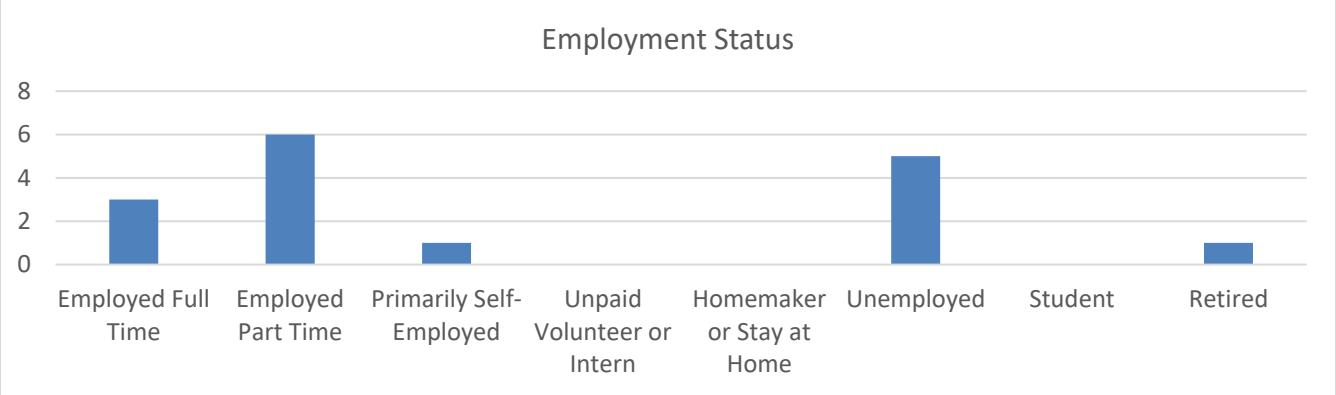


Figure 28 Employment Distribution among Participants with Disabilities

Participants with disabilities lived across the Twin Cities metropolitan area as shown in Figure 29.

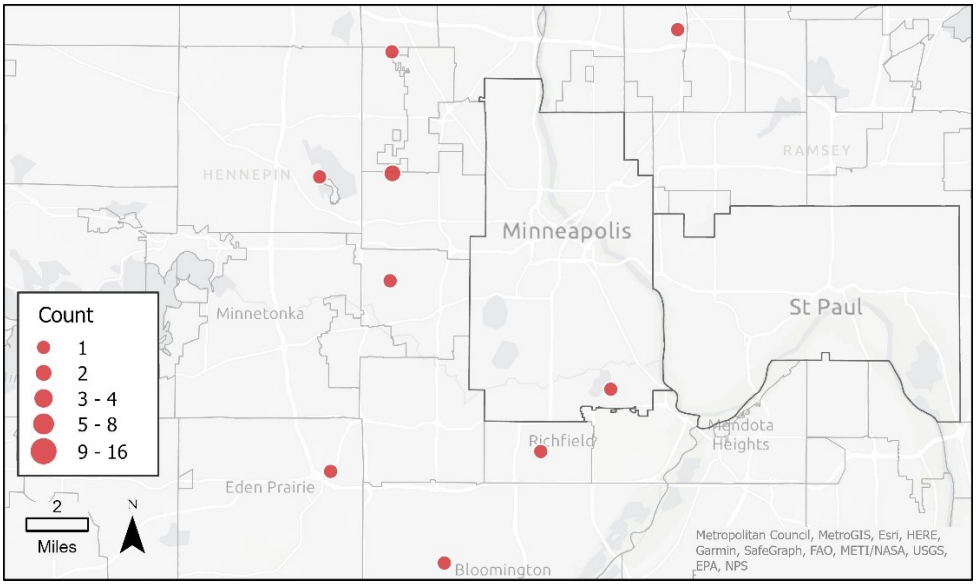


Figure 29 Geographic distribution of Participants with Disabilities

Data from the intake survey further illustrates the overall transportation barriers faced by participants with disabilities. Compared to all participants in the study, they engaged in most activity types less often. This is especially visible in the low percentage of participants who engage in activities almost every day (Figure 30). For example, no participants in this community engage in shopping or errands almost every day and a much lower percentage engage in shopping or errands a few times per week.

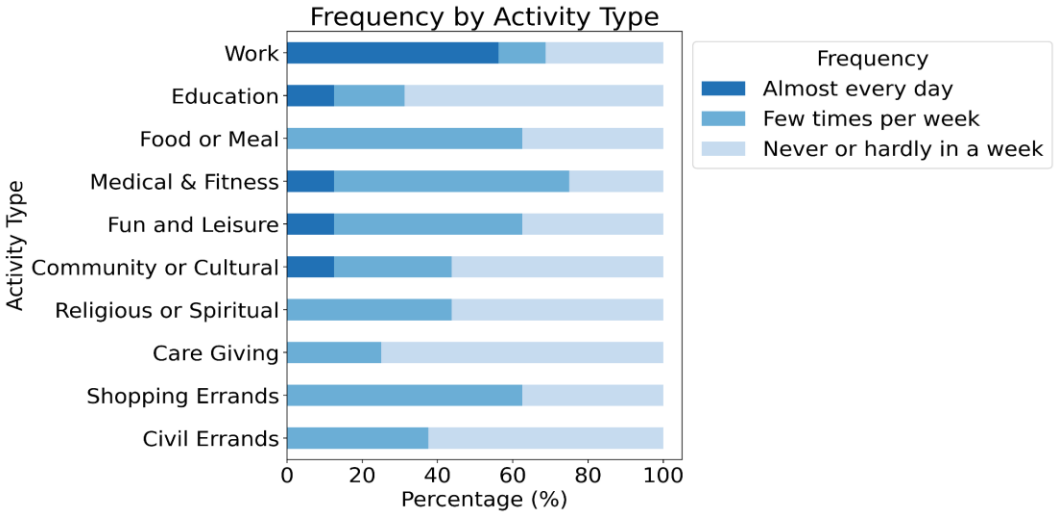


Figure 30 Frequency of Daily Activities by Activity Type among Participants with Disabilities

Figure 31 is extremely telling as all respondents said they rely on paratransit services every day. The respondents also answered that they walk or wheel somewhere, as well as use regular fixed route transit at higher rates than the rest of our surveyed participants.

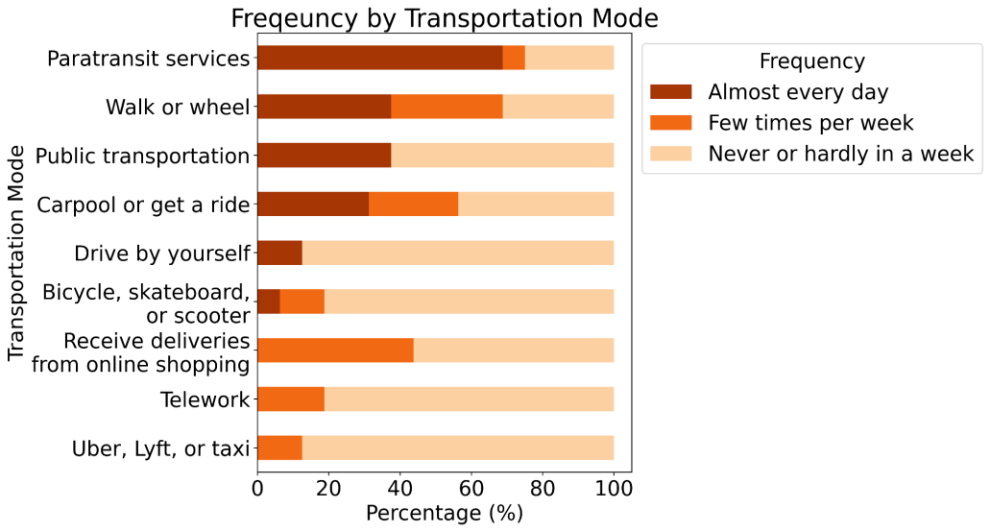


Figure 31 Frequency of Transportation Mode for among Participants with Disabilities

Figure 32 shows clearly how much time these respondents spent on public transit (including paratransit) as compared to time spent in a car as a passenger. These participants were extremely reliant on public transit as their main mode of transportation. While they spent less time travelling, just 31 minutes per day compared to the study average of 67 minutes, they spent significantly longer on public transit. Bus and rail combined for 13 minutes on the average day whereas it only accounted for six minutes for the average participant.

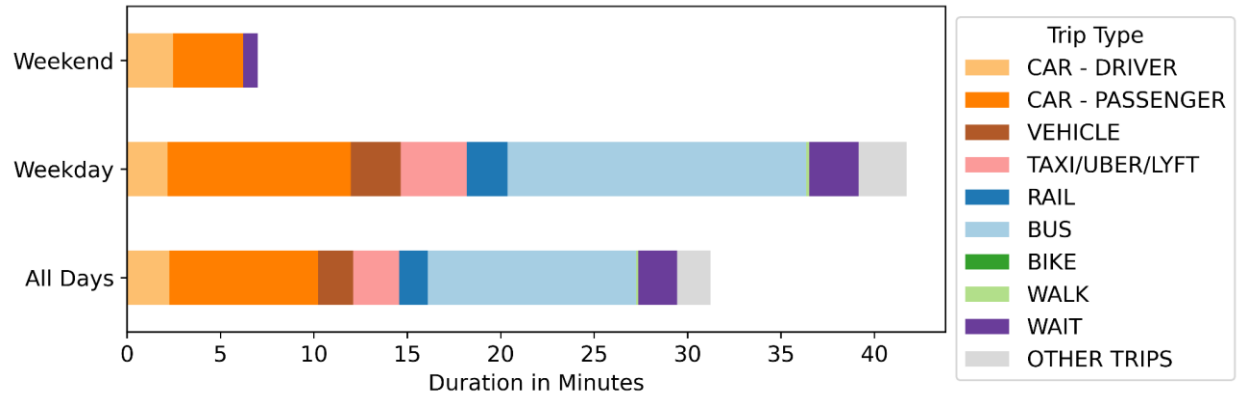


Figure 32 Average Daily Trip Duration by Mode Type in the Community of People with Disabilities

Data on trip distances (Figure 33) further affirms these patterns. Participants with disabilities traveled fewer miles overall, averaging 10 miles a day compared to 24 miles across all participants. However, they still exceeded the average participant on miles traveled with public transportation, spending an average of over four miles on public transportation compared to less than one and a half across all participants.

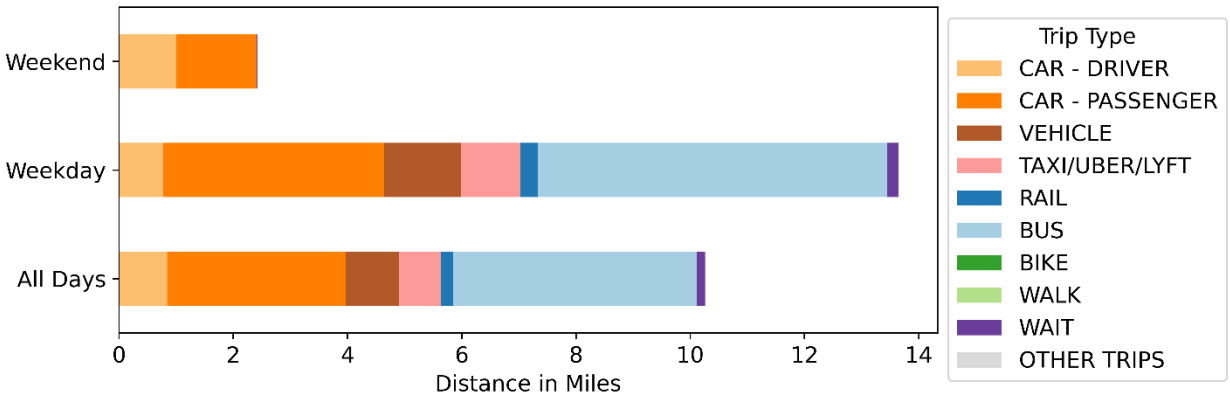


Figure 33 Average Daily Trip Distance by Mode Type among Participants with Disabilities

Data on trip counts (Figure 34) again highlights participants limited daily travel and reliance on public transportation. Participants with disabilities took fewer trips on the average day, taking 2.9 trips per day compared to the average participant who took 4.14 trips. The disparity in trip counts was especially notable on weekends when participants with disabilities took 0.7 trips per day while the average participant took 3.85 trips per day. Participants did not report taking any trips by bus on weekends while they took one trip by bus per weekday. This may reflect barriers to using Metro Mobility on weekend days. Challenges with daily travel and the importance of Metro Mobility in this communities' travel will be further explored through the themes in the following section.

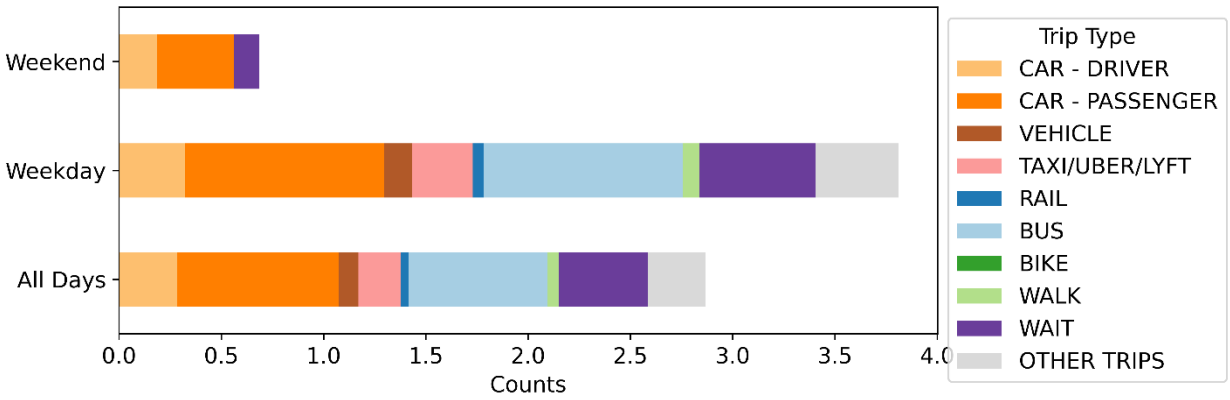


Figure 34 Average Daily Trip Counts by Mode Type among Participants with Disabilities

Qualitative Interview Data Analysis

Through qualitative interviews, three major themes arose within this community: 1) Metro Mobility provides some independence but is unreliable; 2) the necessity for a support system; and 3) reliance on the door-to-door transportation service. In the following text, we discuss these three themes and provide quotations that give further context on how these themes relate to this community's transportation experience.

Theme 1. Metro Mobility - some independence but unreliable

This theme helps define Metro Mobility's relationship to this community. A majority of our participants (especially those interviewed through RISE) relied on Metro Mobility as their main source of day-to-day transportation. Metro Mobility was discussed as being used to travel to their place of employment and for other scheduled events. Participants spoke positively about the service's ability to provide them with independence. As one participant stated, "When you have Metro Mobility, that's all you have. If you don't have Metro Mobility, you're stuck home, nowhere to go."

In a community that is highly dependent upon others, participants enjoyed the fact that Metro Mobility was able to offer transportation that they could use independently. Unfortunately, the positives of Metro Mobility ended there. The main issue participants had with Metro Mobility was its unreliability. After scheduling a ride from Metro Mobility, the ride is guaranteed to arrive within a 30-minute window, but that guarantee isn't always met. Participants spoke at length about the difficulties presented by having to wait for Metro Mobility to arrive. Some participants had to wait over an hour for the bus to arrive. However, the wait for the bus to arrive is often much shorter than how long participants spend traveling to locations on the bus. Many said their time spent on Metro Mobility vehicles was regularly more than an hour. One participant described how long they were on the bus: "I've been on Metro for about 3 and a half hours. They can take all day. I call them the slow-mobile. Slow Mobility."

A major issue that arose from these long travel times was a struggle with maintaining traditional employment. Many participants explained that they wouldn't be able to maintain their employment if they worked in a position that expected them to show up on time every day as they rely on Metro Mobility to get to work. Luckily many of them had employers (often found through RISE) who understood that the participants could not be expected to arrive on time each day. However, without a program such as RISE, the participants would likely not be able to find employment at all if they continued to rely on Metro Mobility as their main source of transportation. One participant explained how she had to switch to having a family member drive her to work because Metro Mobility was consistently late:

> I used to work... at NDI. At first I'd go there on Metro Mobility, and I was so late I had to ask my Dad for a ride everyday. Because it was so late everyday. Well, I said it's not my fault and then they would fault me.

Another major issue participants had with Metro Mobility was their no-show policy. Once the Metro Mobility bus arrives at the participant's location, they have a five-minute window to get to the bus before it leaves and marks them as a no show. As the majority of these participants struggle with mobility issues, arriving at the bus within the five-minute window can be a major challenge. This means that they often have to be ready to leave at the beginning of the 30-minute window and wait close to the door or outside for the bus to arrive. Many participants found the five-minute policy to be unfair and mentioned that they often worried about receiving too many no shows and losing access to the service. One participant described her experience with waiting:

> Sometimes Metro isn't reliable. Like in the wintertime, or even in nice weather, they're sometimes late and that gets to be difficult. It's hard because for me, it's like they can be 30 minutes late for me. But then I have to be only five minutes late for them. That's not fair. Especially in the wintertime.

The final issue that our participants discussed about Metro Mobility was safety concerns. Participants spoke about numerous times and situations where they felt unsafe on Metro Mobility. One issue participants experienced was drivers not strapping them down securely and then driving recklessly. Another participant discussed being taken to neighborhoods where they felt uncomfortable and the driver leaving the door open while attending to another rider. Finally, we had a participant discuss how a certain driver made her uncomfortable, and she stopped leaving her residence on a certain day to avoid this particular driver:

> Oh well, I used to have this driver every Monday morning which I got uncomfortable with and he crawls under my skin because he's always cranky and not cool. Not my favorite driver. So now, I take a day off every Monday and then I don't go to appointments. I wouldn't go to PT for my balance. And my staff would watch me exercise and then like walking in the parallel bars and balancing and then we go grocery shopping. Well my staff shops for my apartment with her own money, not me. I go with her every Monday. I don't see that driver anymore.

Metro Mobility provides a service to a community that has few transportation options. It allows these participants some independence in their daily lives. However, its shortcomings make it an unreliable primary mode of transportation. Participants could not rely on it for all their transportation needs due to its limitations. This leads into the next major theme for this community.

Theme 2. The necessity of a support system

Almost every participant spoke about how they relied on another mode of transportation outside of Metro Mobility for shopping trips, errands, and social activities. Due to the long wait times and unreliability of Metro Mobility most participants said that they do not use Metro Mobility for various errands or social activities. They described how it was almost impossible to rely on Metro Mobility, as the long pick-up window meant that you could end up stranded at a grocery store or other public locations just waiting for the bus to show up. One participant described her feelings being forced to wait for the service:

> Yeah, I mean it (Metro Mobility) is hindering in the same ways that I need to only go to places that are accessible to me. It's hindering in the way that I have to wait for them. I'm kind of just hopeless waiting around.

Participants are also limited to a total of four bags on Metro Mobility. This limited participants' ability to use Metro Mobility for grocery shopping, as most participants preferred to pick up a large number of groceries in one trip. These limitations forced our participants to have another source of transportation that they could rely on for errands or social activities. These sources were usually family members, friends, or staff at group homes.

A consistent theme among participants was the importance of having transportation provided by staff members. Several participants spoke about how their life had improved since moving into a group home as they now had a much more reliable source of transportation. Participants also frequently used insurance-provided rides for medical appointments. When another option other than Metro Mobility was provided for them to use, participants frequently chose it. Transportation needs for participants made it extremely hard to live independently.

Theme 3. Reliance on door-to-door transportation

The final major theme for this community is the reliance on door-to-door transportation. Few participants spoke of walking or rolling as a reliable transportation method. The main barrier for participants was often the state of sidewalks in their neighborhood and the distance to their destination. However, some participants spoke of safety concerns within their particular neighborhood as well. One major issue was snow removal. Participants complained that snow and ice on sidewalks made it far too dangerous and unsafe to rely on this type of travel during the winter. One participant described how difficult snow and ice could make accessing the bus stop:

> Transportation-wise it's always an issue in the winter. I bring up being the stuck on the track because that just recently happened, but it's not uncommon for the winter like that. Taking the bus is a lot harder also in the winter. The bus stops where we wait for the bus a lot of times are not shoveled and therefore it's harder to wait for the bus or get on the bus in that way. The other day there was like a mountain of snow where I'm supposed to be waiting for the bus. So I ended up waiting sort of on the curb close to the road. It was really unsafe.

Given the challenges of navigating sidewalks and crossings, these participants mostly relied on door-to-door transportation by vehicle. They did not feel comfortable using fixed-route public transportation due to not knowing whether they would be able to make it from the bus stop to their final location. Participants often had a great amount of fear or anxiety centered around fixed-route public transit. They spoke of struggling to learn the system and worried about getting dropped off at a bus stop far from their destination and waiting long times at a bus stop. One participant spoke about their fears and anxieties around using public transit:

> I think about taking the regular metro train or transit bus? Yeah, I think that's hard for me because I kind of have social anxiety. So I don't like taking the public bus because I get nervous and then I get scared that I'm gonna get lost and stuff like that. So it's kind of hard for me to take public transportation.

These fears often prevented them from looking at fixed-route transit as a viable option. These various barriers and fears forced almost all of our participants into relying on door-to-door transportation options. Family and staff members helped these participants with their transportation requirements as discussed above. However, the price of purchasing and maintaining a wheelchair accessible vehicle made it extremely difficult for many of these participants to own their own vehicle or to rely on paid services such as taxis.

Limitations and Future Directions

Due to the nature of recruitment for this study through the community organization RISE, our participants mainly used Metro Mobility as their main mode of transportation. While this gave great insight into the limitations of Metro Mobility, further studies may benefit from focusing on riders with disabilities who rely on fixed route transit. This may provide more insights into changes that can be made to improve these riders' experience with fixed route transit and what factors cause riders to rely on a paratransit service such as Metro Mobility instead of fixed route transit.

Additionally, only seven of the interviewees participated in the smartphone-based travel behavior survey. This was due to certain limitations participants had with their disability. This provided limited results from the travel behavior data for this community that may not be representative of the disability community as a whole.

Recommendations

The majority of improvements spoken about by these participants centered around Metro Mobility, as our participants felt that this was an area that could greatly improve. One major theme was hiring more drivers and purchasing more buses in order to reduce travel time for participants. Participants had felt that transit times had increased due to lack of available drivers since the Covid-19 pandemic. Another major improvement mentioned was purchasing new buses to prevent equipment failures. Several participants spoke of times when wheelchair lifts had broken on a vehicle and caused long delays. One additional improvement participants talked about was extending the amount of time drivers can wait for a rider to prevent no-shows as this was a major source of anxiety for participants.

Finally, participants spoke about improving sidewalk conditions. Snow removal was a major issue, as failure to provide adequate snow removal ensured that participants would not be able to use sidewalks during the winter. Participants also mentioned widening sidewalks to provide easier access for participants, as well as fixing cracks or uneven grades. Improving sidewalks also emerged as the top improvement prioritized by participants in the intake survey, as seen in Figure 35. These improvements would greatly help this community with their access to transportation.

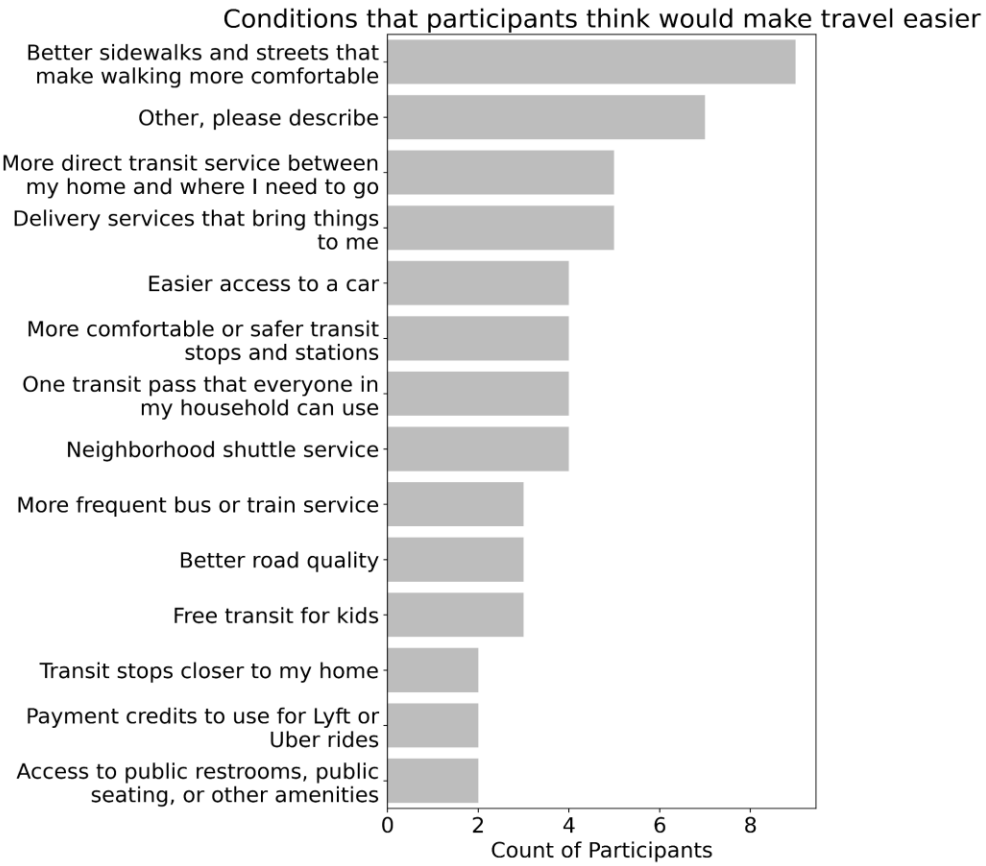


Figure 35 Improvements Desired by the Community of People with Disabilities

In addition to the recommendations made by participants in the interviews, the research team identified a few transportation improvements and programs that could help address transportation barriers in experienced by people with disabilities:

- An outreach program to teach participants who rely on Metro Mobility what fixed route options they have: Metro Mobility's slow service suffers from large demand on the system with more riders than supply. This can cause delays on the service that is already heavily subsidized. An outreach program could help riders on Metro Mobility understand how to use the fixed route transit that is near them. Many of our participants spoke about anxiety or fear with using fixed route transit options that may exist near them. An outreach program could help ease these fears and help switch riders away from Metro Mobility to ease some of the demands of the service for those of whom fixed route transit is not an option.
- Targeted improvements for sidewalks and bus stops in areas. Places that are highly trafficked by Metro Mobility would benefit from sidewalk and bus stop improvements that would increase accessibility for riders who want to use fixed route transit. Metro Transit could benefit from a study to see where these areas are and how benefits to fixed route service or infrastructure could encourage greater mobility for Metro Mobility riders. These improvements could help ease the burden on Metro Mobility by encouraging riders to switch to fixed route transit.

People with disabilities experience major transportation barriers in their daily lives. The participants interviewed for this study could not drive themselves, and as such they were very reliant on public services, such as Metro Mobility, or their social network for their transportation needs. Without reliable transportation this community experiences high barriers to employment and the ability to live independently. While our participants were able to use Metro Mobility and their support network for their transportation needs, these methods sometimes failed to meet their minimum transportation requirements.

4.5 Immigrant Community

The research team interviewed 16 participants who identified as immigrants. Participants learned about the study through connections with two organizations: the International Institute of Minnesota and the Asian American Organizing Project. To accommodate the lives of participants, interviews were conducted in the format most convenient for the participant, including in-person at community spaces, virtually over Zoom, and over the phone. These interviews were conducted between November 2022 and January 2023.

Of the 16 participants, 11 completed the follow-up smartphone-based travel behavior survey, generating 107 days of activity and trip data. It should be noted that there was a participant that was not able to access the intake survey prior to their interview; therefore, this participant was not included in the quantitative distribution graphs below. Nonetheless, the participant was included in the analysis of qualitative interview data.

Community and Participant Characteristics

Participants from the immigrant community were recruited by word of mouth or through partner organizations including the International Institute of Minnesota and the Asian American Organizing Project. The International Institute of Minnesota is a Twin Cities based nonprofit organization that provides services and resources to empower immigrants and refugees in achieving their goals. Their mission is “Helping New Americans achieve self-sufficiency and full membership in American life.” Immigrant participants described the Institute as a valuable resource in helping them understand their new community by offering language classes, job training, and cultural orientation classes where they learned how to use public transportation with free bus passes provided. The research team’s outreach and recruitment efforts through the International Institute of Minnesota resulted in a total of 13 immigrant interviewees. All these 13 interviews are first-generation immigrants.

The Asian American Organization Project is a nonprofit organization with the mission of “empowering young Asian Minnesotans to create systems of change for an equitable, conscious, and just society.” AAOP runs civic engagement, gender justice, and grassroots organizing programs focused on Asian American youth. AAOP allowed the study team to use its phone banking system to reach out to potential participants. The research team’s outreach and recruitment efforts through the Asian

American Organization Program resulted in three immigrant interviews, who are all second-generation Asian immigrants.

As a result, participants in this community group are made up of first (13) and second (3) generation immigrants living in the Twin Cities metropolitan area, excluding Latinx and Hmong immigrants whose transportation experiences are described in Sections 4.2 and 4.8. Participants originate from all over the world including Afghanistan, Cambodia, China, India, Korea, Nigeria, Somalia, and Vietnam. They now call Minnesota home and live in Minneapolis, St. Paul, Fridley, Anoka, Maple Grove, and Falcon Heights. Among the first-generation immigrants, some participants came to Minnesota as recently as six months ago while others have been here for decades, immigrating either at a young age or as an older adult.

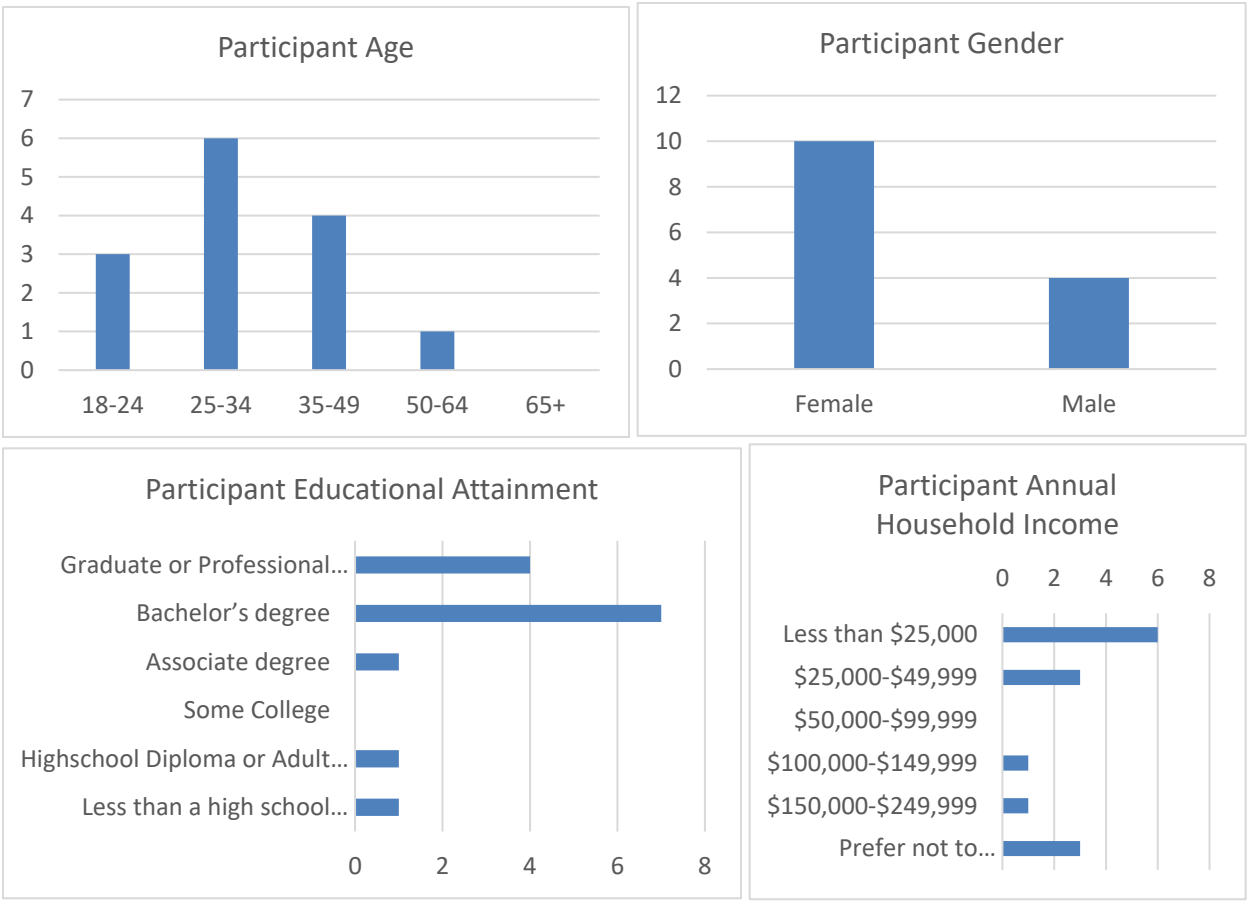


Figure 36 Participant Distribution by Gender, Age, Educational Attainment, and Household Income

As shown in Figure 36, the makeup of immigrant participants skewed female and under 35 years old. There were no adults older than 64 years of age. Participants had high levels of educational attainment with 12 having post-secondary education of bachelor's degrees or above. Annual household income was also skewed with 9 participants making less than $50,000 and 3 preferred not to say.

Immigrant participants lived across the Twin Cities metropolitan area, as shown in Figure 37.

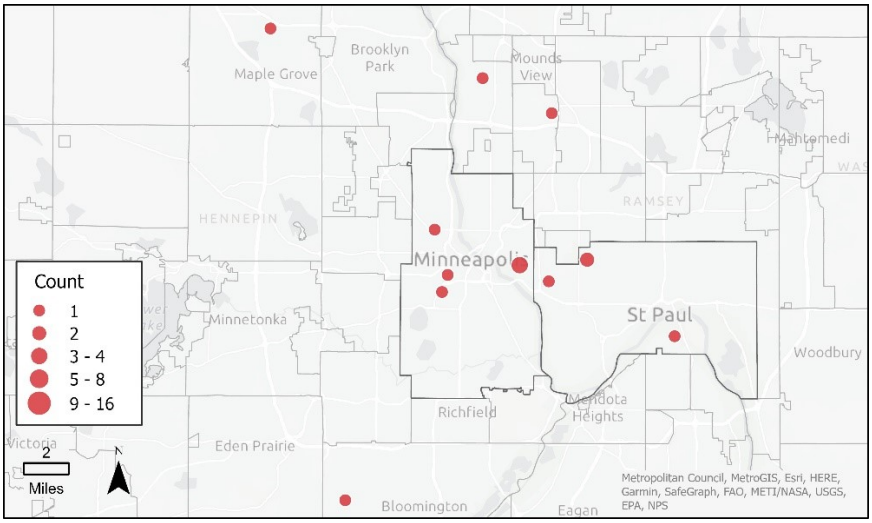


Figure 37 Geographic Distribution of Immigrant Participants

Figure 38 illustrates daily activity frequency of immigrant participants. Compared to the entire sample population of the participants in the study, the immigrant participants had similar activity patterns throughout the week, the exception being immigrant participants engaged in civil errands slightly less than all participants. They also engage in education activities almost every day more than all participants. It is worth noting that immigrant participants in general participated in few non-work and non-education activities, e.g., food or meal, fun and leisure, community or cultural, caregiving, and religious or spiritual.

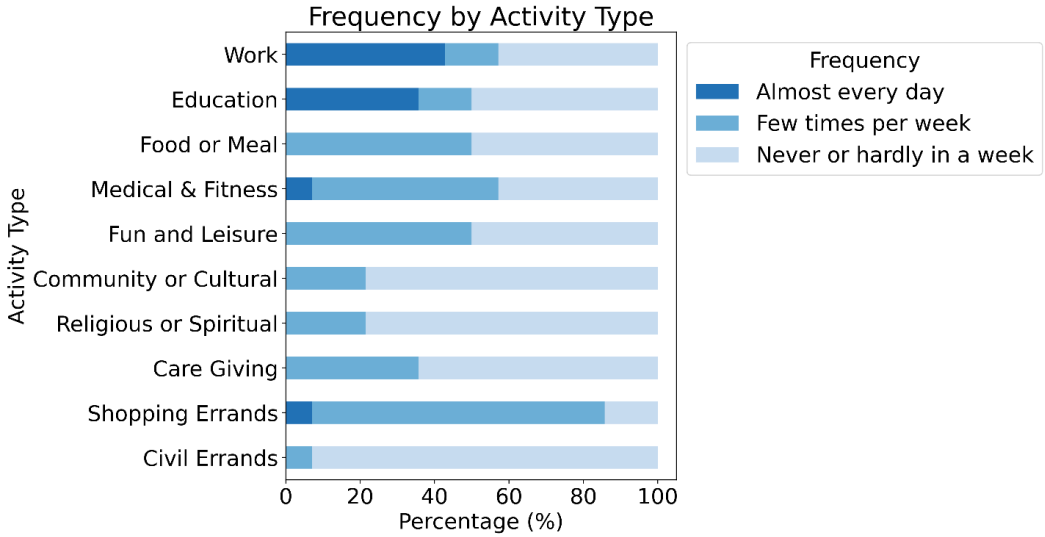


Figure 38 Frequency of Daily Activities by Activity Type among Immigrant Participants

Figure 39 illustrates daily trip frequency of immigrant participants. Compared to all study participants, the immigrant community participants made similar frequencies of driving and carpooling trips. The immigrant participants were more likely to take public transportation and rely upon walking throughout the week in comparison to all participants. They were also more likely to telework during the week than the average participant. No immigrant participant utilized paratransit services.

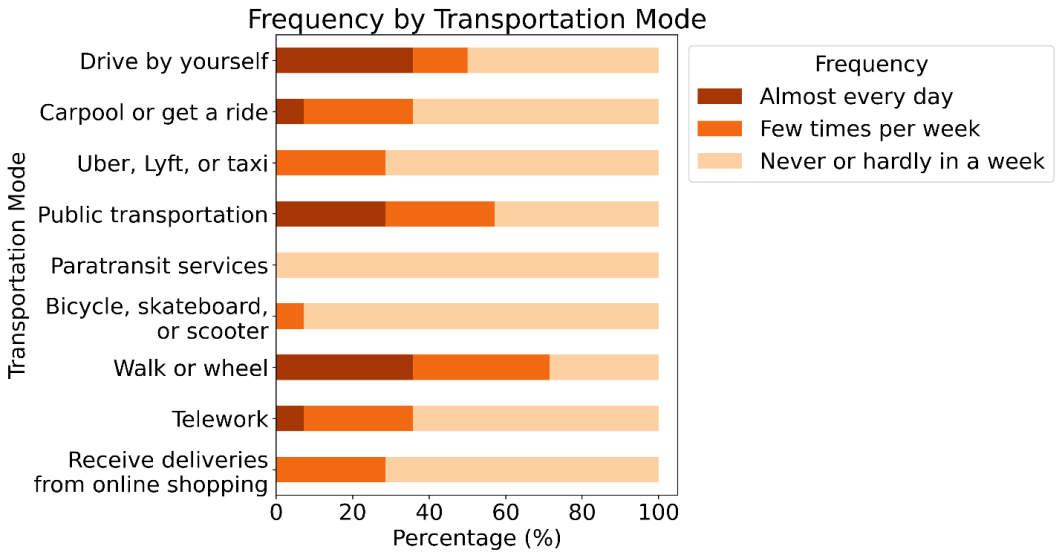


Figure 39 Frequency of Daily Trips by Mode Type among Immigrant Participants

The smartphone travel behavior data confirms that walking was an important mode of transportation for immigrants. Among all participants, the average daily trip duration was 67 minutes, of which eight minutes were walking. In comparison, among immigrant participants, the average daily trip duration was 67 minutes, of which 13 minutes were walking (as shown in the All Days bar in Figure 40). Interestingly, immigrant participants spent longer traveling on weekends compared to weekdays, the opposite of the average participant. Immigrant participants spent 76 minutes traveling on a weekend day and 64 minutes traveling on a weekday compared to 59 minutes of travel on a weekend day and 70 minutes on a weekday for the average participant.

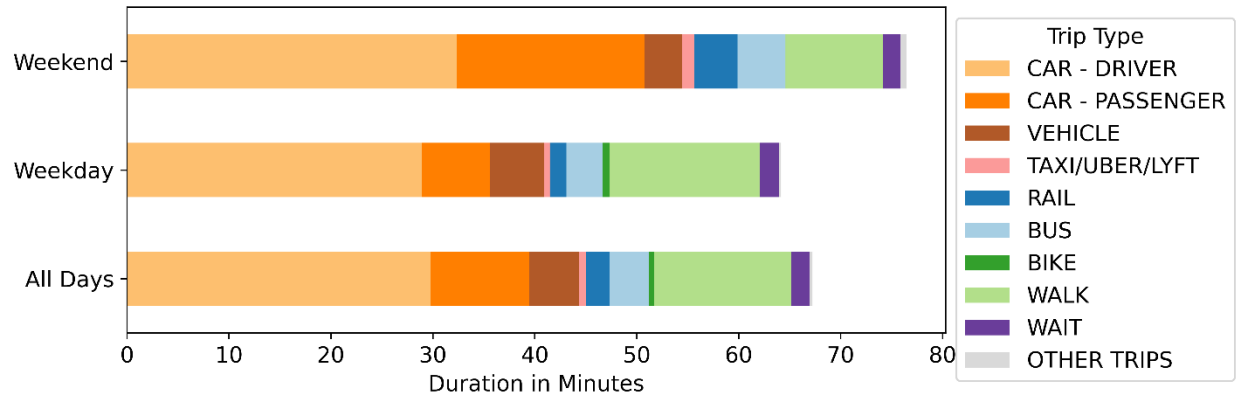


Figure 40 Average Daily Trip Duration by Mode Type Among Immigrant Participants

As shown in Figure 41, immigrant participants traveled slightly further but in similar modes to the average study participant. Immigrant participants traveled about 28 miles a day and the average participant traveled 24 miles a day.

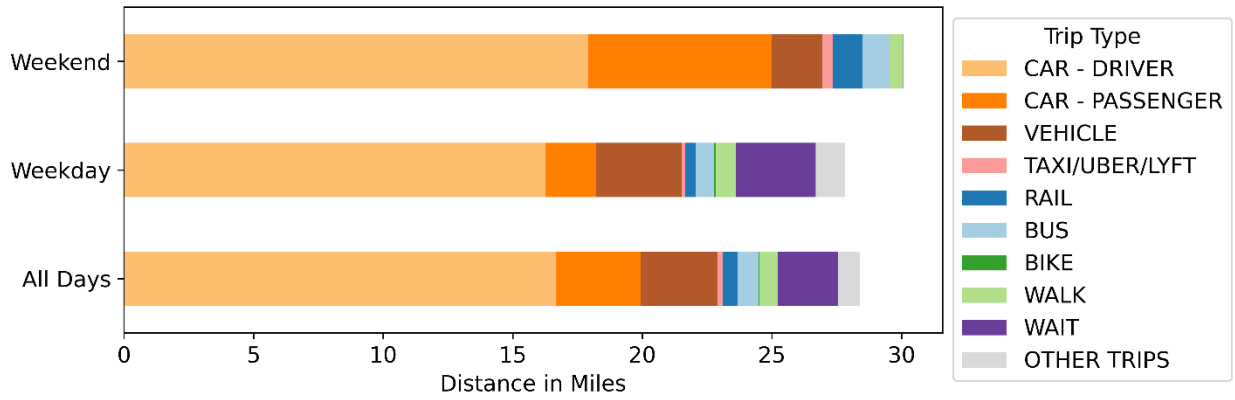


Figure 41 Average Daily Trip Distance by Mode Type among Immigrant Participants

As shown in Figure 42, immigrant participants took slightly fewer trips each day than the average participant, averaging 3.8 trips per day compared to the average participant at 4.14 trips per day. Again, the weekend trip numbers exceeded weekday trips, with participants taking 4.4 trips per weekend day and 3.7 trips per weekday.

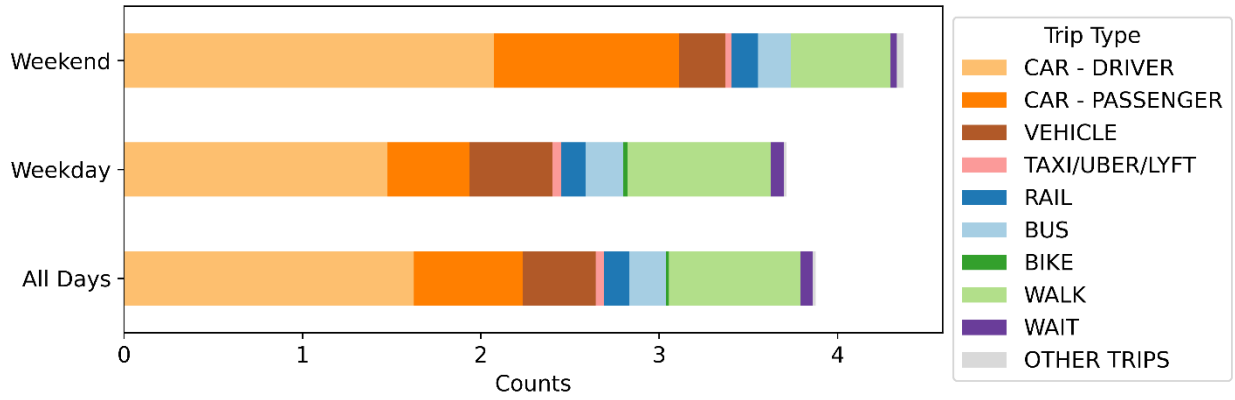


Figure 42 Average Daily Trip Counts by Mode Type among Immigrant Participants

Qualitative Interview Data Analysis

The research team employed a qualitative, interpretivist methodology to draw conclusions from a small number of interviews, seeking shared experience among participants when it comes to transportation needs, barriers, and solutions in their everyday lives. Analysis involved close readings of interview transcripts and coding passages of text as pertaining to topics, concepts or understandings. This process was iterative, with codes directing further readings, new codes, and further analysis.

The content analysis of the immigrant interview data led to the identification of three themes highlighting the transportation experience of the immigrant community group: 1) the inconvenience and inadequacy of public transportation, 2) the importance of transportation for culture and community connections, and 3) the unaffordability of all transportation modes.

Theme 1: Public transportation is inconvenient and inadequate.

The immigrant community participants expressed an interest in taking public transportation; however,

due to various reasons, public transit is not the best option for them. There were 16 mentions of winter being a barrier or deterrence for taking public transit, especially the bus. Participants complained of long walks to bus stops in the cold and the danger of walking on icy or unshoveled sidewalks as well as of long waiting times for a bus to arrive. One of the participants shared his winter experience of waiting for a bus:

> You need to wait for the bus. Actually wintertime, it's very cold. There is nothing to protect you from rain or no shelter. If there is shelter, it is closed in such a way that it cannot protect you, for example, against very cold wind, or, fast coming wind is very cold.

Additionally, there were 12 mentions of bus stops being too far from their homes and eight mentions of buses being too infrequent. There were six participants who described having to make plans well in advance to ensure a smooth journey and there were nine mentions of public transportation taking too long. One participant, a recently arrived refugee working with refugees, explained the difficulties she experienced in working with her clients because they both depended on public transportation. She said,

> I just have two clients…one of them lives in Bloomington. One day he said, we don't have bus stops in Bloomington, we have to go by bicycle and go and get to the bus stops. And also, I have another client, he lives in Minnetonka. He also said always, we don't have any bus stops. We have to go 20 minutes or 25 minutes to get the bus stops. So I don't go to Minnetonka or Bloomington.

In addition to the overall consensus among immigrant community participants that taking public transportation was inconvenient, there was a concern regarding safety on public transit. Several participants reported being nervous at bus stops or on train cars where they've witnessed suspicious behavior from other passengers and a general sense of danger. There were 14 mentions among participants about public transportation feeling unsafe. While participants understood the usefulness of public transit, they would prefer driving themselves, getting a ride, or walking. As one of the participants shared,

> The reason why I don't necessarily use that (the bus) is because I don't know how safe it is. Because especially the bus stops here are usually crowded, like anything can happen. So buses will probably be more convenient. But let's say less safe.

Lastly, there were also nine mentions that public transportation was confusing and people would easily get lost. This was especially true for those with limited English skills even if they used Google Maps or other navigation systems. As one participant shared, "Sometimes they don't announce it (the next stop), or you don't hear it…So if they are not announcing, then we need to be aware that we could keep looking at our phone like Google Maps." There were also six participants who reported that there was no signage on public transit in their first language.

Confusion, safety, and inconvenience all made for an uncomfortable public transportation experience for the immigrant community participants. Nonetheless, there were seven mentions that participants would bus more if it were safer and there were 11 mentions that people want to take public transportation.

Theme 2: Transportation is important for culture and community connections.

Almost all immigrant community participants expressed the importance of having a connection to their culture as a big part of their lives. Being an immigrant in the United States can be very isolating if one does not have support and community in some way or another. One participant described her creative ways to find social interaction through public transportation. She said:

> I don't have family here in Minnesota. I mean, my close friends or relatives or parents or siblings. So sometimes I feel so lonely. Very often, honestly, very often. And especially winter is too long here. So it is easy to stay home for a long time and then I don't have any idea where to go. I don't have any idea. So sometimes, I take your bus or subway just to see the outside.

There were seven mentions of being connected to culture as important and five mentions of participants getting help from family. For some participants, that was not easy for reasons like being a student without access to community or facing transportation barriers. As one recently arrived Afghan refugee shared,

> We are very much new here, we don't know any family, and we have no access to private transportation and public transportation. No, maybe over time, we will be able to find out for example, how to use public transportation, how we can get there at least… So, of course, being connected to people and to families with the same culture, I think it is very much helpful for new families such as us.

There were eight participants that stated they received help from the International Institute and gained a sense of community from other immigrants new to Minnesota. One participant described how it feels to be connected: “It makes me feel more welcome. You know, like not having to go through cultural shock. So having people to relate with whatever I'm going through and having people that can relate with me makes me feel good.” Being engaged with a community of immigrants like oneself is vital to an immigrant’s wellbeing and without access to a community, there can be negative impacts.

Theme 3: All modes of transportation are expensive.

Regardless of how immigrant community participants got around, there was a majority that felt that transportation in general is expensive. There were 18 mentions of transportation being costly in regard to Uber/Lyft, affording a car, gas, getting a driver’s license, paying for parking, and bus/train tickets. A participant talked about gas prices: “The gas price has risen. Doing that commute is something I think about, about gas price, or how much I have to pay, is also something that I think about.” One student who benefited from free public transportation highlighted the affordability issue:

> The point here is if someone is not a student, then this service would not be affordable at all for him. If he is new to the location, or just trying to set things up here, it would be costly for him.

Immigrants, especially those who are recently arrived, often had limited financial resources. They also lacked social resources such as families and friends who can help them to cope with transportation barriers. Many of them found it difficult to own private transportation. Participants reported struggles to obtain a driver’s license due to the cost, having access to a vehicle to practice driving, and finding a

car to drive for the road test. In addition, if they were driving to government services or running errands, they had to consider parking fees and would go out of their way to avoid the cost. If taking public transportation was not an option for them due to safety or time constraints, they must bear the cost of an Uber/Lyft. There's a significant affordability barrier in each mode of transportation that immigrant community participants face throughout their daily lives.

Limitations and Future Directions

The study included a diverse array of perspectives from different immigrant groups living in the Twin Cities, however, the sample was a small subgroup that may not be generalizable to the entirety of immigrant populations in the metropolitan area. Additionally, the immigrant interviews and the smartphone-based travel behavior survey component were limited to participants that could speak and read in English. There was an instance of an interviewed participant using a translator, but that was only possible with the help of a family member of the participant. Finally, there was no representation from older immigrant community members.

Future research should examine elderly and non-English speaking immigrant groups to ensure diverse perspectives from all immigrant communities living in Minnesota. Specifically, there could be more inclusive outreach to recruit older participants. There could also be an opportunity to offer interviews in different languages to accommodate first languages of immigrant communities so their stories can be shared.

Recommendations

Participants made a wide range of recommendations for improving transportation. It is not surprising that many recommendations focused on improving the experience of immigrant community members riding public transportation. Participants suggested warm shelters at bus stops and train stations would significantly improve their transit experience in the winter. There were also recommendations that buses and trains should increase in frequency so that people aren't waiting a significant amount of time to get a ride. There should also be more bus stops placed in neighborhoods so people don't have to walk long distances adding to the inconvenience of public transport. As one participant suggested,

> If we're able to learn about where there's more common routes that people take and what are the transfers, then they keep track of the data of all this is a transfer point… If that route is very common, then we have a direct route from Point A to Point B. I think that it would be really important to study, and create new routes, and prioritize which routes people use.

These suggestions also appeared in data from the intake survey where participants prioritized transportation improvements. As shown in Figure 43, more frequent and closer public transit service were two of the top three improvements selected by immigrant participants.

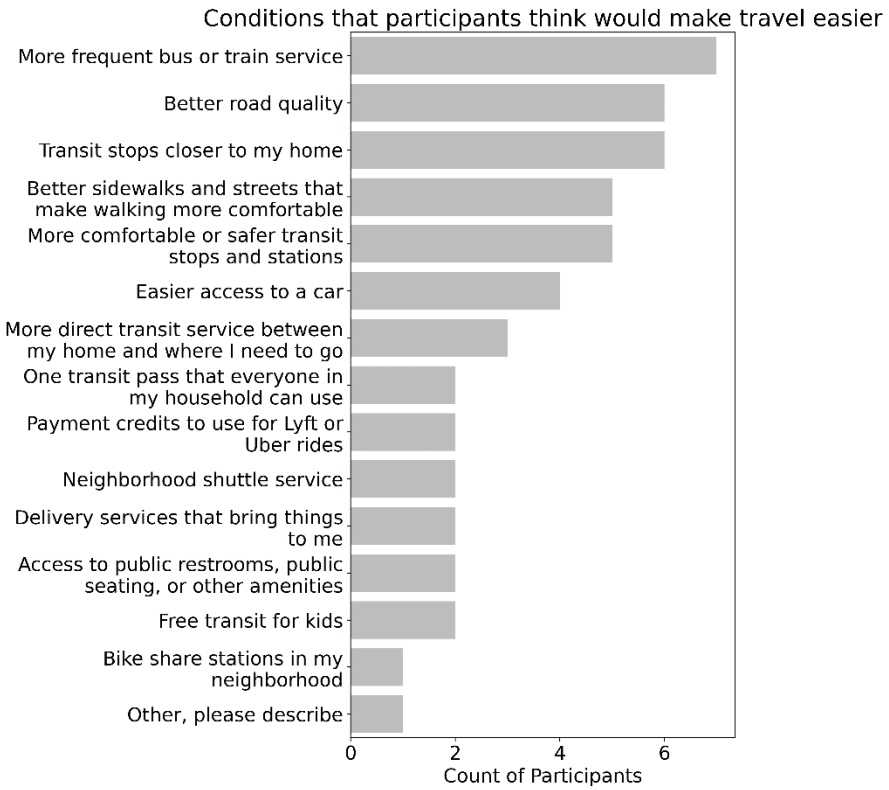


Figure 43 Conditions that immigrant participants think would improve travel experience.

Making riders feel safe while utilizing public transportation should also be a priority. There could be more security around train and bus stops as well as when riding. There could be more cameras installed in buses and trains and at stops and stations. As one participant suggested,

> One thing that I see is that they need to do better monitoring of the bus stops. Sometimes they don't have cameras installed there. They have good cameras installed in the bus system, but they don't have it at the bus stops so maybe that they can make us feel much safer there.

Participants also suggested free Wi-Fi on public transportation to further enhance the feeling of safety and confidence for riders. As a participant highlighted, “I am always using my own phone to the Internet. So yeah, if they provide that also that would be good.” Enhancing public transportation not only helps immigrant communities but the entire community. One participant says, “I appreciate public transportation making it accessible for a lot of folks who don't have cars, and so it’s good to able to help to save public transportation for all.”

Beyond the recommendations to improve public transportation, participants recommended making all transportation modes more affordable. As one participant described, “I say just try to figure out a way to make transportation less costly and more convenient for people that can't really afford it.” Making transportation affordable for immigrants would remove barriers in daily activity participation and help them feel more connected to community and culture.

In addition to the recommendations made by participants in the interviews, the research team identified a few transportation improvements and programs that could help address transportation barriers in the immigrant community:

- Make transportation more affordable: Public transit agencies in the region may consider reduced fare for public transportation or making rides universally free. Voucher programs for rideshare options and gas expenses may be developed to help immigrant communities make essential trips. The immigrant community would also benefit significantly from car ownership and maintenance programs that can help them purchase and maintain used vehicles.
- Making licensing accessible: The immigrant community would benefit from more assistance to obtain a driver's license. This includes financial support to get a license as well as opportunities to practice driving and access to a reliable vehicle for the driving test.
- Affordable Driving School: Participants mentioned that it is difficult for them to get a license as the adult driving schools are not affordable and difficult to find.

4.6 Aliveness Project

The research team interviewed 16 participants who identify as being HIV-positive. All participants are from the seven-county Twin Cities metropolitan area, with the overwhelming majority living in Minneapolis. Of the 16 participants, 14 completed the follow-up smart-phone travel behavior survey, resulting in 117 days of activity and trip data. Participants in this group learned about the study through on-site recruitment at the Aliveness Project and through an individual on the research team who serves on the Membership Advisory Committee at the Aliveness Project. After recruitment, almost all interviews occurred in-person.

Community and Participant Characteristics

The Aliveness Project is a community center in the Kingfield neighborhood in south Minneapolis. The community center serves HIV-positive individuals primarily living in the Twin Cities metropolitan area. It is uniquely positioned to help these individuals with their health and wellness needs because of the daily meals, computer room, mental health services, housing services, and other supportive resources not typically offered elsewhere. The cafeteria at the Aliveness Project serves breakfast and lunch during the week and is considered a sanctuary by many.

As shown in Figure 44, participants in the Aliveness Project community group were primarily male and LGBTQ-identifying. All participants were born in the U.S most participants were between 25 and 49 years old. Thirteen of the 16 participants were male, possibly a limitation of the research. However, most of the members of the Aliveness Project are male and LGBT identifying. All participants had income below $50,000 with the majority having income between $25,000-$50,000. Many participants shared in interviews that they were in recovery from substance abuse.

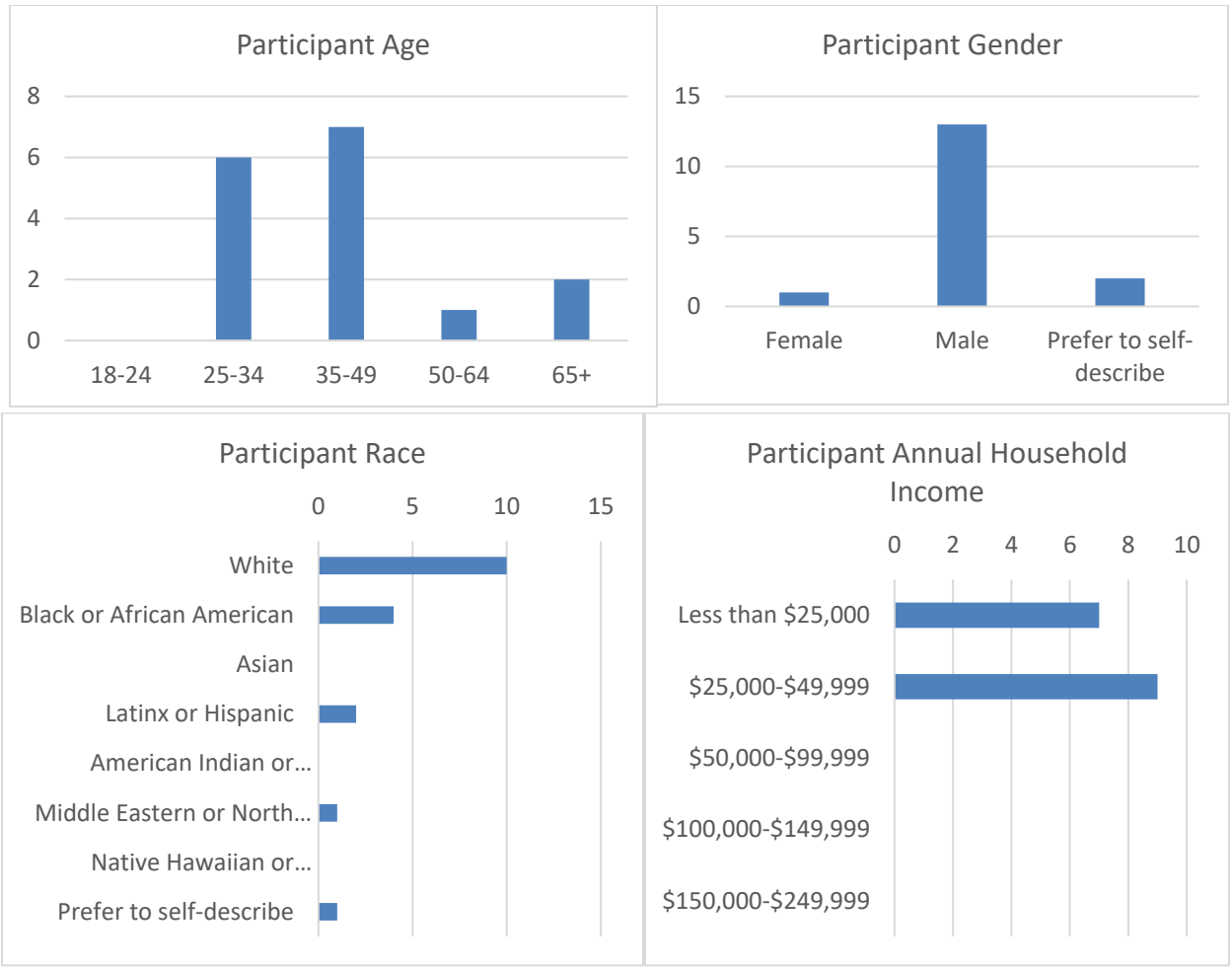


Figure 44 Participant Distribution by Age, Gender, Race, and Household Income

As shown in Figure 45, most participants were either employed full-time or part-time, five reported being unemployed, and two were retired. It is worth noting that a few participants had more than one job and two participants were unpaid volunteers. All participants were US-born, and one participant reported having immigrant parents.

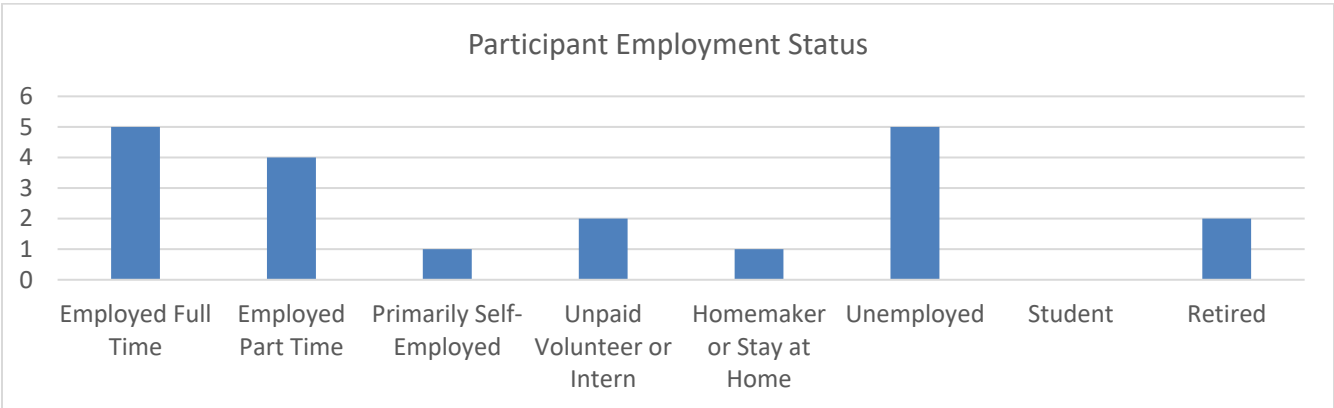


Figure 45 Participant Employment Status

Six participants reported having their own vehicle and almost everyone reported taking public transportation to some extent. When it comes to household size, five participants reported a household size of 10, one participant reported a household size of seven, five reported living alone, and three reported having one or two housemates. The reason many participants lived in extremely large households is because of Sober Living and/or Sober Homes. Sober Homes are semi-structured living environments designed to help individuals in early recovery. Almost all participants lived in Minneapolis or Saint Paul, as shown in Figure 46.

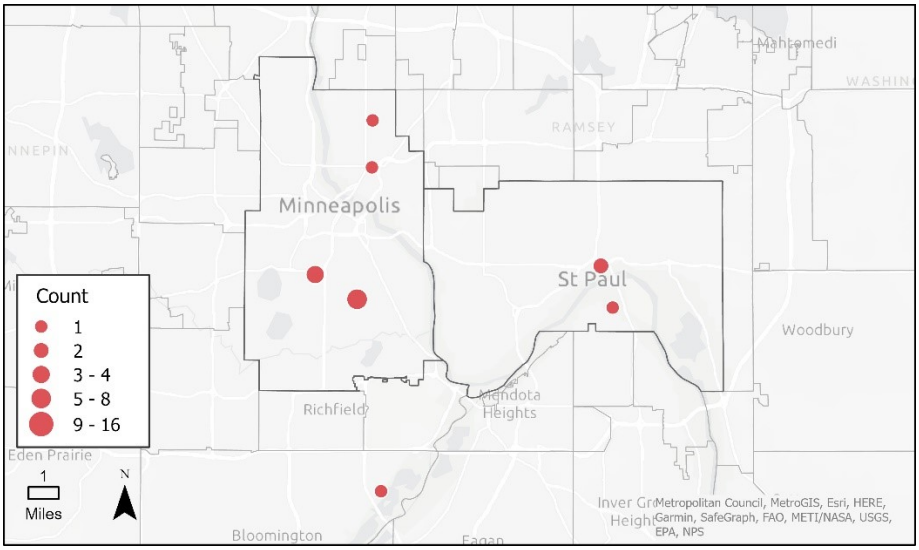


Figure 46 Geographic Distribution of Aliveness Project Participants

Figure 47 illustrates daily activity frequency of Aliveness Project participants. Compared to all study participants (Figure 5), Aliveness Project participants engaged in significantly more work and educational activities, as well as significantly more medical and fitness activities. While roughly two-thirds of Aliveness Project study participants reported some kind of employment, that percentage is higher than employment rates of general membership of the Aliveness Project.

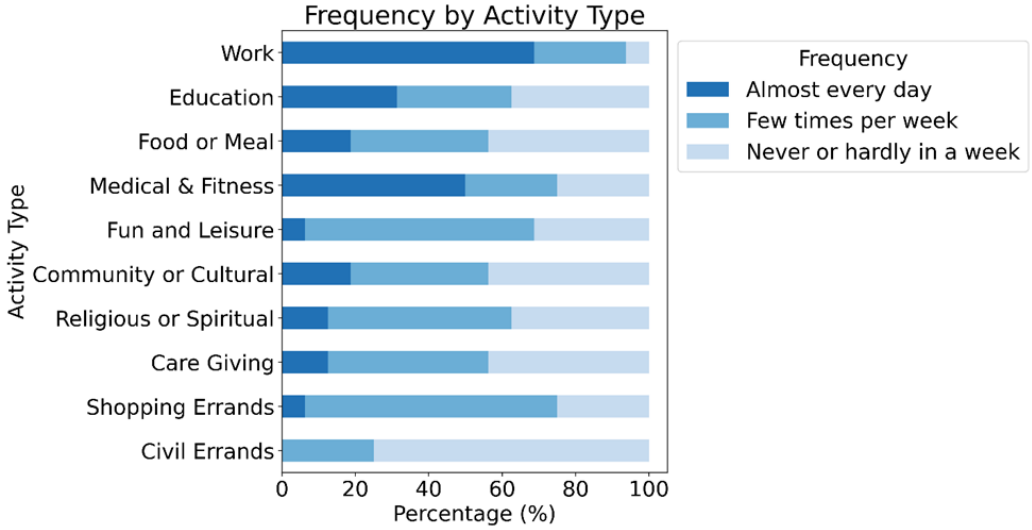


Figure 47 Frequency of Daily Activities by Activity Type among Aliveness Project Participants

Figure 48 illustrates daily trip frequency among Aliveness Project participants. Compared to all participants in the study, Aliveness Project participants were much more likely to use public transportation as well as walk or wheel.

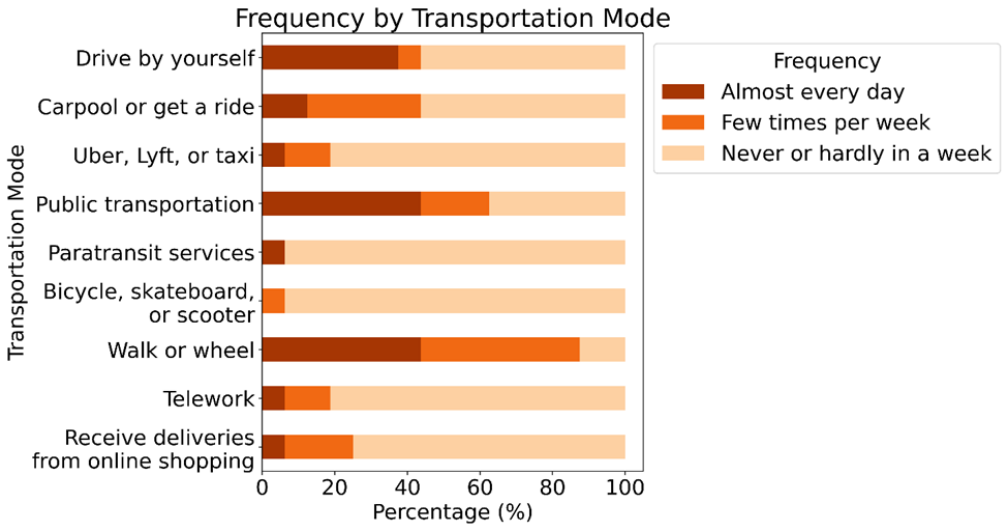


Figure 48 Frequency of Daily Trips by Mode Type among Aliveness Project Participants

Data from the smartphone-based travel behavior survey further illustrates the travel patterns mentioned above. Aliveness Project participants spent more time traveling than the average study participant, spending 79 minutes traveling a day (see Figure 49) compared to 67 minutes for the average participant in the entire study sample. Aliveness Project participants spent significantly more time traveling on bus than the average participant, spending an average of 11 minutes on buses each day compared to just five minutes for the average participant. Aliveness Project participants also spent more time walking; while the average study participant spent eight minutes walking a day, Aliveness Project participants spent 15 minutes walking a day.

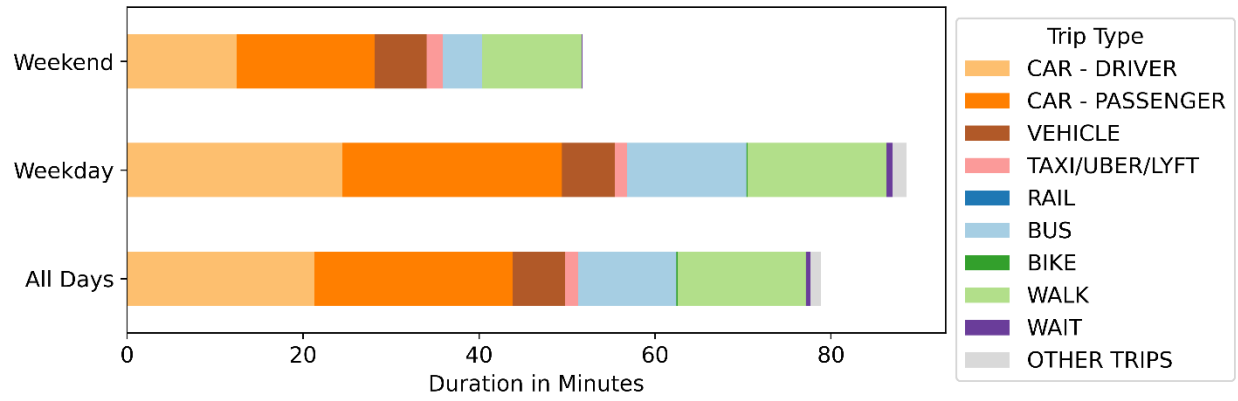


Figure 49 Average Daily Trip Duration by Mode Type among Aliveness Project Participants

Aliveness Project participants traveled fewer miles a day than the average study participant, traveling 19 miles compared to 24 miles for the average participant. They traveled significantly fewer miles in a car; while the average study participant traveled 21 miles in a car each day, Aliveness Project participants

traveled just 16 miles in a car each day. Aliveness Project participants also walked more, walking a mile a day or double the distance of the average study participant.

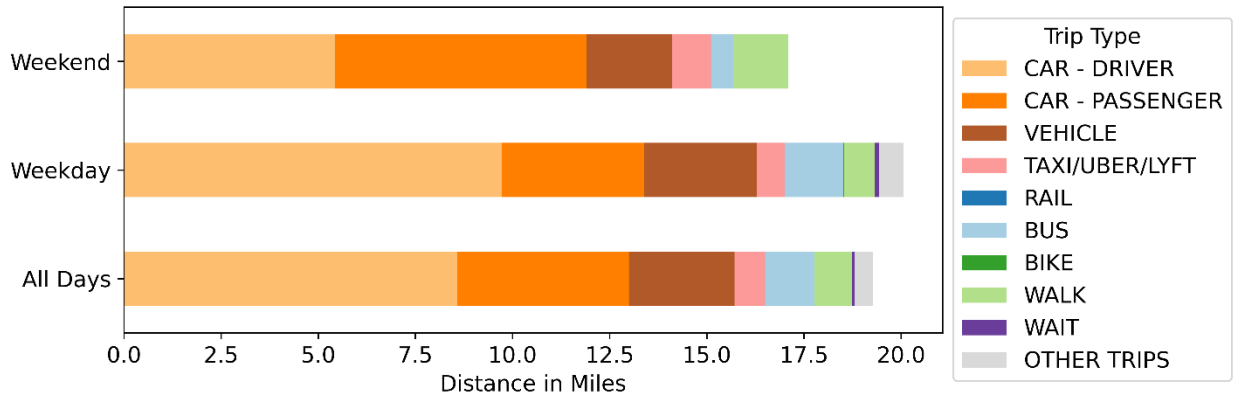


Figure 50 Average Daily Trip Distance by Mode Type among Aliveness Project Participants

Aliveness Project participants took slightly more trips per day than the average study participant, taking 4.6 trips compared to the average participant who took 4.14 trips. Aliveness Project participants took more trips by bus (0.8 trips) and by walking (0.9 trips) than the average study participant who took 0.3 trips by bus and 0.56 trips walking.

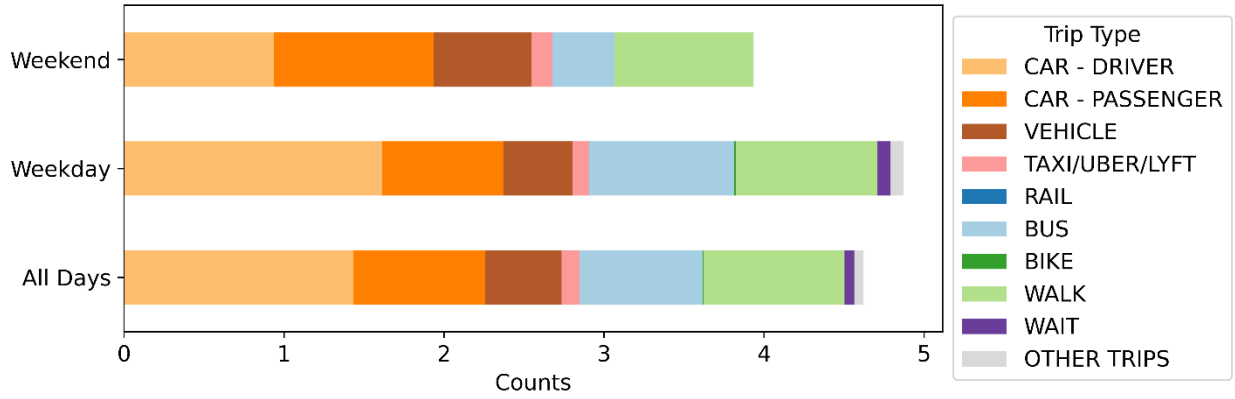


Figure 51 Average Daily Trip Count by Mode Type among Aliveness Project Participants

Qualitative Interview Data Analysis

In each interview, the interviewer asked questions about transportation barriers the participants face and how these transportation barriers affect aspects of their daily lives, including work, family, health, community, and spirituality. Most questions were open-ended, and participants were encouraged to discuss any issues related to transportation.

The research team employed a qualitative interpretivist methodology to draw conclusions from a small number of interviews, seeking shared experience among participants when it comes to transportation needs, barriers, and solutions in their everyday lives. Analysis involved close reading of interview transcripts and coding passages of text as pertaining to topics, concepts, or understandings. This process is iterative, with codes directing further readings, new codes, and further analysis.

The analysis of interviews from Aliveness Project participants led to the identification of three major themes: 1) the connection between transportation, nutrition, and health, 2) the impact of transportation risks and personal safety, and 3) hidden affordability barriers.

Theme 1: Transportation, Nutrition and Health

Individuals who are HIV+ are generally concerned about nutrition and access to healthy food. Twenty percent of the participants in the Aliveness Project reported that they make trips related to food and meal activities almost every day (as shown in Figure 47). What is specific to the Aliveness Project is the weekday meals serving its members. Another service the Aliveness Project offers is a member-specific food shelf. Members can access the food shelf once a month and obtain up to four bags of groceries. Groceries range from fresh fruit and vegetables, milk, eggs, cheese, breads, nonperishable goods as well as frozen fish, meats, and vegetables.

Some members reported difficulty navigating public transportation with two to four bags of food when public transportation was their primary mode of transit. As one 69-year-old woman explained:

> I know several women my age that would be more than thrilled to use it (the Light Rail). But they're afraid to use it for the same reason I am, because they're going somewhere alone, say the grocery store and they're going to have their hands full of groceries when they're coming home. They want to feel safe.

The interviews indicated this community experiences hardships associated with access to healthcare services. One participant described challenges with transportation for more complex medical appointments. Medical providers often do not allow a patient to come to a colonoscopy appointment without some sort of pre-arranged transportation options because the patient would not be able to drive or take public transportation after the procedure. The participant shared:

> I had to go to the hospital, and I live in St. Paul. So, it's in Minneapolis. The doctor wanted me to come to the office, not be sedated, but to take some medicine that would make me loopy and unable to drive home. I was like, well, I know, Lyft and Uber are expensive, but it's also like, am I going to feel safe with a person that I don't know if I'm really out of it? And so, I guess I resented that. They said, can't one of your friends bring you? I said well, most of my friends like don't have a car. So it wouldn't really be an option for them to bring me and so I guess what was really annoying is okay, I'm white and I present like a fairly middle class person, but I'm not."

The reported challenges associated with accessing food or healthcare services were mostly among participants who lived in individual home settings. Participants living in Sober Houses reported being able to go grocery shopping with their housemates who own vehicles.

Theme 2: Transportation, Risks and Personal Safety

Safety concerns were a significant transportation barrier for this community group. Most participants taking public transportation experienced unsafe encounters while using public transportation. Three participants reported being threatened or assaulted while waiting for a bus. For example, one

participant described the illegal drug activity on public transportation, especially the light rail, that jeopardizes his sobriety along with the violent tendencies of some individuals:

> Like I said before, I mean, it's always a danger. I'm going on the bus system because of the illegal drug activity that jeopardizes sobriety and the violent tendencies of certain individuals. I'm not trying to be stereotypical but it's really just statistic that now because I hear a lot of talks about the light rail, how dangerous that can be.

Several participants were concerned about drug use on light rail, which was particularly concerning for participants in this group as many of them were in recovery from substance abuse. One participant specifically mentioned that "there are a lot of drugs and a lot of crime going on the light rail which now makes me not want to take it."

Participants also brought up safety concerns in relation to harassment. One LGBTQ-identifying individual described an encounter while standing out on the street corner waiting for the bus,

> I've been called the F word just from standing out on the street corner waiting for the bus. And that limits my want to continue to just exist sometimes. So being an LGBTQ plus person and presenting as such, it's daunting.

For most participants, the light rail posed more of a danger than taking the bus. Specifically, buses have a bus driver and having a person with transportation authority seemed to bring some comfort or sense of security. One participant described her fears while taking the light rail,

> As an older woman often traveling alone, I don't feel very safe on the train. My son is a transgender person, and he's mentioned the security issues on the train as well. There's a little button you can push, but it's like there's nobody in the car.

In addition to being safer, participants also reported the bus being cleaner than the train. One participant described the issue of cleanliness on the light rail. He explained,

> I do enjoy taking the bus over the light rail which tends to be less desirable and cleanliness. And then the trains which run regularly tend to be less clean and filled with people that tend to like smoke or defecate upon the train.

Theme 3: Hidden Affordability barriers

Participants from this group brought up a range of challenges linked to affordability and transportation. Many individuals from marginalized communities don't have or cannot afford data on their smartphones. They rely on Wi-Fi service when available. App-based transportation services are simply not available to some, including some individuals interviewed. Not having data also impacts use of other transportation modes. One participant shared, "Bus is kind of irritating sometimes just because they can get extremely full or they're late. And without data, to check when it's coming."

Additionally, participants struggled with the lack of affordable housing and accessible transportation available in the suburbs. Individuals that work in the suburbs cannot afford to live there. One individual

reported being stuck with very long bus commutes to the suburbs and, on occasion, he missed the last bus due to the demands of work and was forced to take a very expensive Uber ride home. However, participants also believed it would be difficult to live in the suburbs without access to a car. The participant shared:

> I was talking to one of my roommates the other day and he said something about the fact that my plan is to probably move to the 'burbs at some point but it's going to be a process because I can't necessarily move down there without figuring out which store I would transfer to or something and being somewhat close without having a car.

For participants in this community, affordability of basic goods like housing or phone data impacted their ability to use public transportation and forced them to carefully plan trips, housing location, and job location to ensure they could make their daily trips.

Limitations and Future Directions

The research team encountering difficulty recruiting female participants from the Aliveness Project community. Historically, women have not been at great risk for contracting HIV compared the men or gay-identifying males. However, the largest group contracting HIV is now straight women of color. Future research may identify additional recruitment channels that could help to recruit HIV-positive women.

Further, future research may tailor survey and interview questions based upon the characteristics of the community group. For example, the question in the intake survey on housing status does not allow for participants to choose some form of group housing or Sober Home. Fortunately, many participants volunteered that information during the in-depth interview. The question about chronic conditions in the intake survey is another example in which the question was found to be confusing for Aliveness Project participants. Technically, HIV is a chronic condition. However, only seven of the 16 participants reported having a chronic condition, indicating that many of the HIV individuals do not perceive HIV as a chronic condition.

Recommendations

Participants outlined three major themes as far as recommendations:

- Extended hours and/or more buses to the suburbs. Participants expressed that accessing the suburbs primarily for job opportunities was difficult with the existing public transportation options. More frequent service and extended hours would allow participants easier access to well-paying jobs.

- Improved safety measures on public transportation. Participants expressed a desire for more sheltered bus stops with overhead lights. Lighting at stops improve participants sense of safety at night. Additionally, participants shared a desire for more security presence on public transit.

- Affordable housing development in suburban communities. Participants indicated that their transportation barriers are often associated with lack of affordable housing in job-rich areas. If

housing became more affordable, individuals from marginalized communities would be able to live in the community where they work.

Additional suggestions and/or themes are identified in Figure 52 from the intake survey. In alignment with this community's high use of public transit, three of the top four prioritized suggestions relate to bus and train: having one transit pass for a household, safer and more comfortable transit stops, and more direct transit service where I need to go. The final priority in the top four was payment credits for shared mobility services, highlighting interest in using shared mobility if it was more affordable.

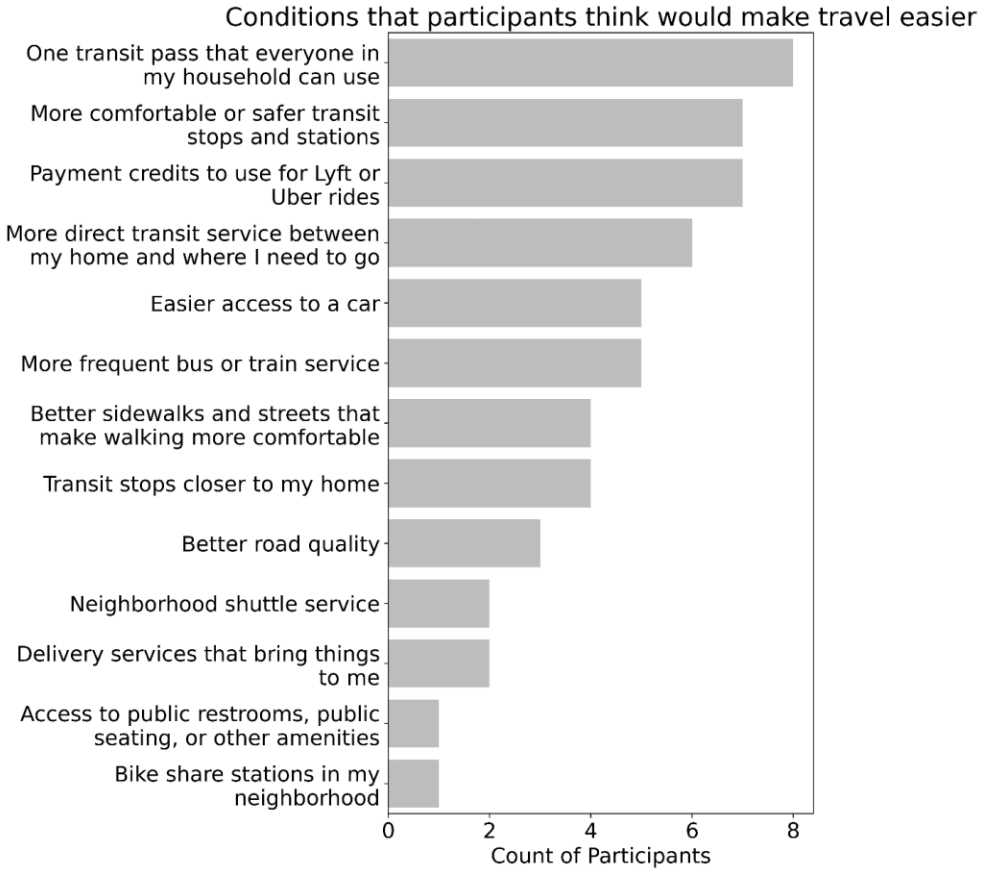


Figure 52 Conditions that Aliveness participants think would make travel easier.

In addition to the recommendations made by participants in the interviews, the research team identified a transportation improvement that could help address transportation barriers in the Aliveness Project community:

- Improve access to healthy food and healthcare facilities. It is important to recognize the connections among transportation, nutrition, and health among HIV-positive population. MnDOT may partner with Minnesota Department of Health and non-profit health-promoting organizations to explore innovative ways to improve this community's access to healthy food and healthcare facilities.

4.7 Fergus Falls, Minnesota

The research team interviewed 20 participants from the city of Fergus Falls in Minnesota. Most participants were transitioning home residents at Matthews House and the Lake Regions Recovery Home. All interviews took place on November 16, 2022 at the location of A Place to Belong, a community support program serving adults with mental illness including transitioning home residents in Fergus Falls. Of the 20 interviewees, 12 completed the follow-up smartphone-based travel behavior survey, which generated 154 days of activity and trip data.

Community and Participant Characteristics

Fergus Falls is located approximately 185 miles northwest of Minneapolis and St. Paul and 60 miles southeast of Fargo, North Dakota, along the I-94 corridor. It is the county seat of Otter Tail County, and according to 2020 Census, is home to 14,119 people. The mission of the city is to provide the resources, opportunities and environment to assure the best possible quality of life (About the City | Fergus Falls, MN). According to the U.S. Census Bureau 2020 data, 17.5% of the Fergus Falls city population were below 18 years of age and 25.5% were above the age of 65 years. The female population is 53.8% of the total population of the City of Fergus Falls. The racial composition of the population is predominantly White alone (92.3%)**.** Among the city population, 14.1% of people under 65 years of age reported having disability and 11% of people were below the federal poverty line.

Participants in Fergus Falls came from a wide range of backgrounds and most participants lived in transitioning homes in Fergus Falls. Some came from neighboring townships. They were connected to the study through A Place to Belong. A Place to Belong is a nonprofit organization that built a social club for individuals age 18 years or above with mental illness. It aims to provide a safe, comfortable, and enjoyable environment to its members and support them in their recovery. The research team traveled to Fergus Falls and met with a total of 20 participants on the morning of Wednesday, November 16, 2022. All interviews were conducted at the building of A Place to Belong.

As shown in Figure 53, participants in this group spanned all age ranges and skewed more female than male, with twelve of the 20 participants in this group identifying as women. In addition, 3 participants (15%) identified as LGBTQ. The sample was predominantly white, which is not surprising given the racial composition of the Fergus Falls population. Specifically, 85% of the participants were White; 15% were American Indian or Alaskan Native, and 5% were African American. All the participants were born in the USA, but 2 participants (10%) had immigrant parents. Seventy five percent of participants had household income less than $25,000, 5% had a household income between $25,000 and$49,999, another 5% had household income between $50,000 and $99,999. The final 15% chose not to disclose income information.

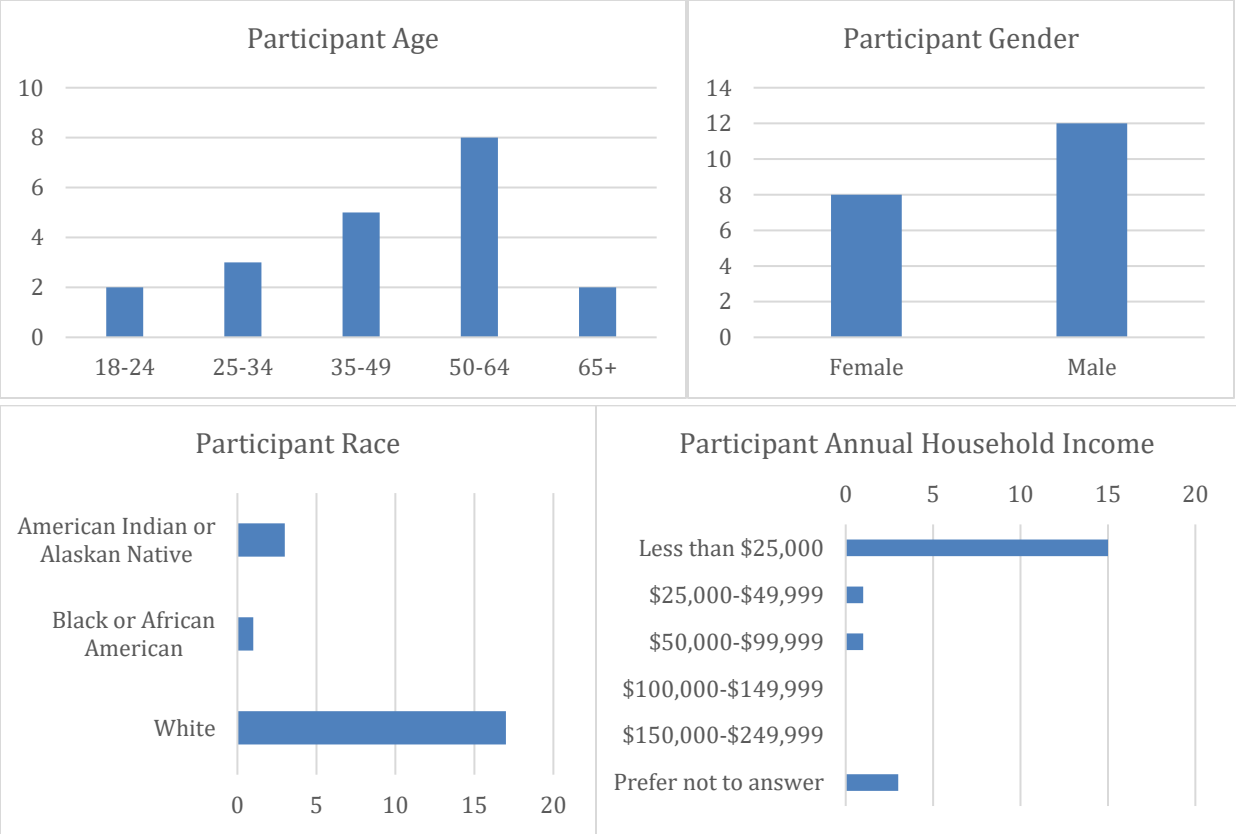


Figure 53 Participant Distribution by Gender, Age, Race, and Income Level.

Figure 54 illustrates participants' employment status. Only 10% of the participants were employed full-time and the majority of participants were unemployed (45%); 25% were employed part-time, 20% were primarily self-employed, 5% were homemakers or stayed at home, 5% were students, and 5% were retired. In addition, 70% of the participants reported having a chronic health condition or disability that hampered their everyday mobility.

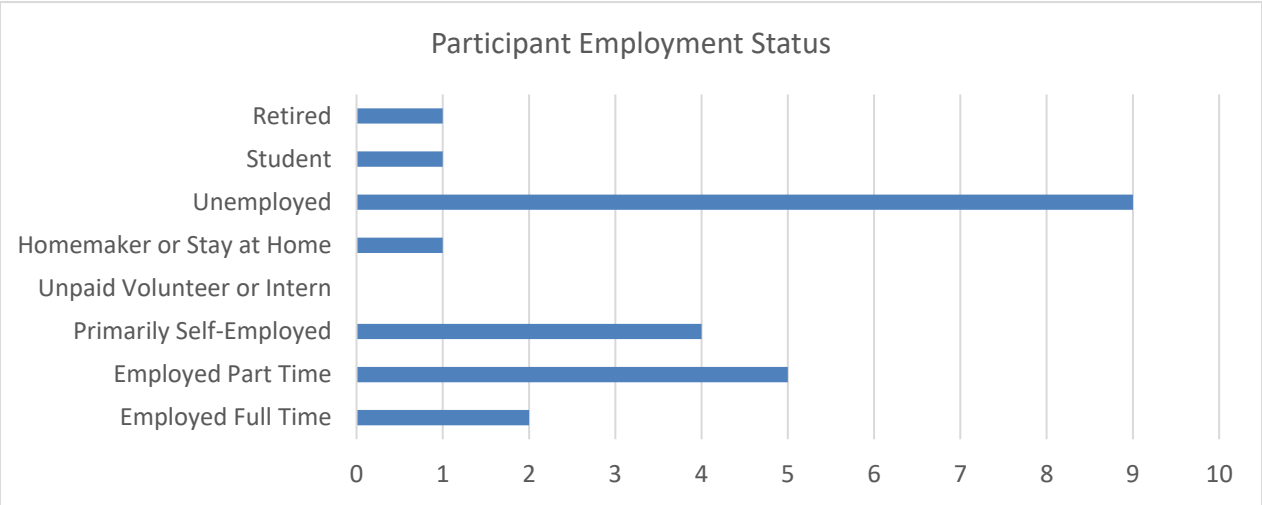


Figure 54 Participant Distribution by Employment Status

When it comes to housing conditions (Figure 55), 55% of the participants were renting or leasing their home, 30% lived in group homes, sober homes, or other kinds of houses, and 10% did not pay to stay in their houses (i.e., some participants were in foster care), and only 5% (i.e., only 1 participant) owned a house. Fifty five percent of the participants did not respond to the household structure question, which asked about who they lived with. 25% of the participants lived with roommates and other friends, 10% lived in their foster care homes, 5% lived with parents or parents-in-law, 5% lived with children between 6 to 17 years old, and 5% had children aged 18 or older living with them.

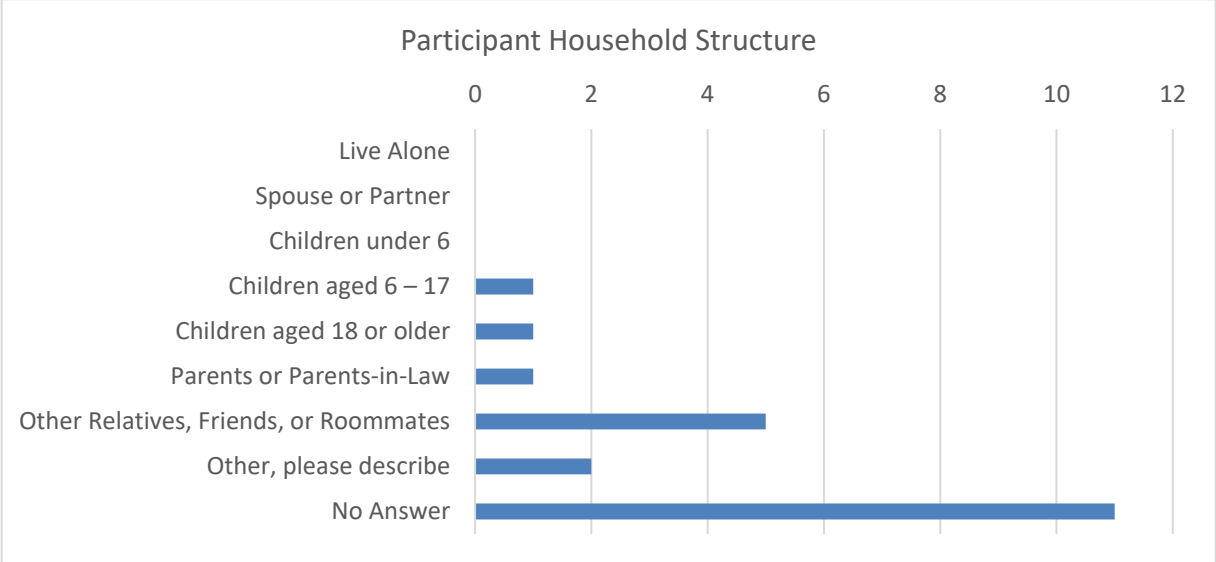


Figure 55 Participant Distribution by Household Structure

The majority of Fergus Falls participants lived in Fergus Falls with a few living in outside of the city in the surrounding area, as shown in Figure 56.

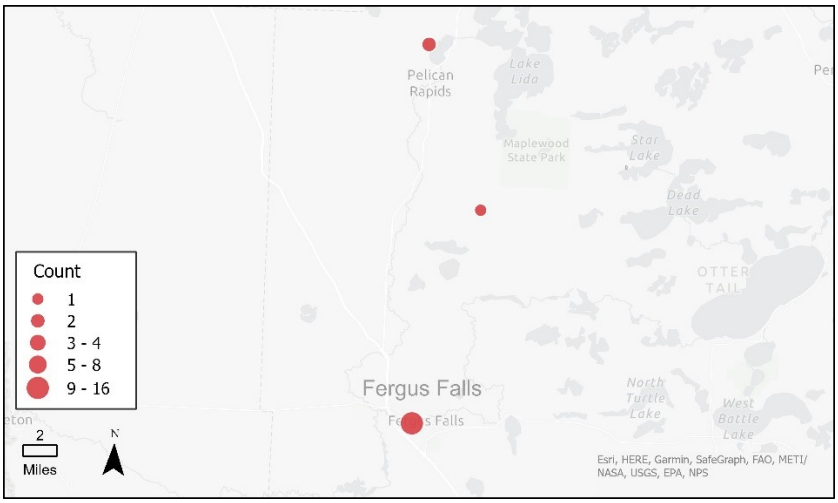


Figure 56 Geographic Distribution of Fergus Falls Participants

Figure 57 illustrates daily activity frequency of Fergus Falls participants. Compared to all participants, Fergus Falls participants worked less frequently, and participated more frequently in discretionary activities, including Food or Meal, Fun and Leisure, and Shopping. Fergus Falls participants also engaged in more care giving activities compared to all participants in the study. These activity patterns of Fergus

Falls participants are not surprising given the employment status of the Fergus Falls participants (only two of the 20 participants were employed full-time).

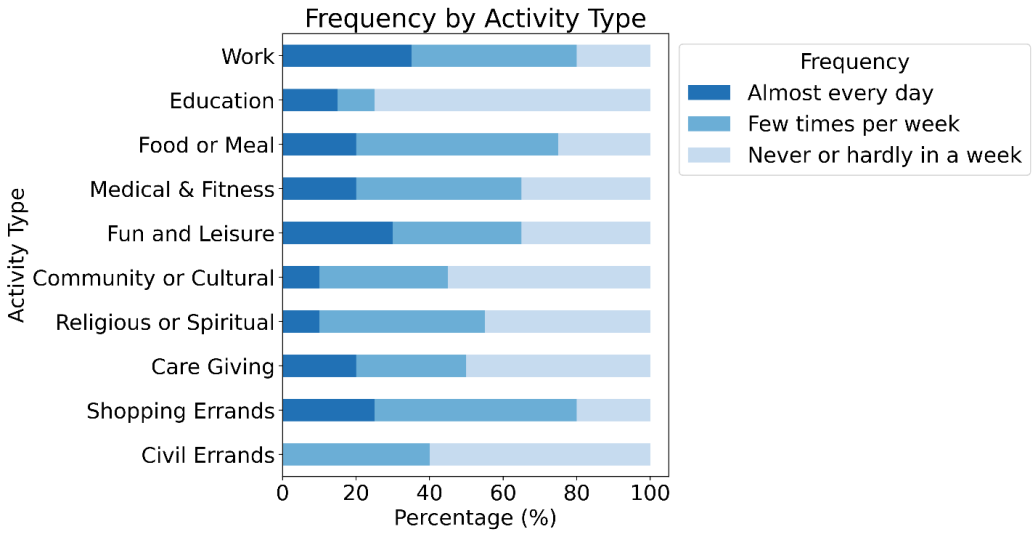


Figure 57 Frequency of Daily Activities by Activity Type among Fergus Falls Participants

Figure 58 illustrates daily trip frequency of Fergus Falls participants. Compared to all participants in the study, Fergus Falls participants were more likely to carpool and get a ride from family or friends. They were less likely to use shared mobility services such as Uber, Lyft, and taxi. They were also less likely to take public transportation.

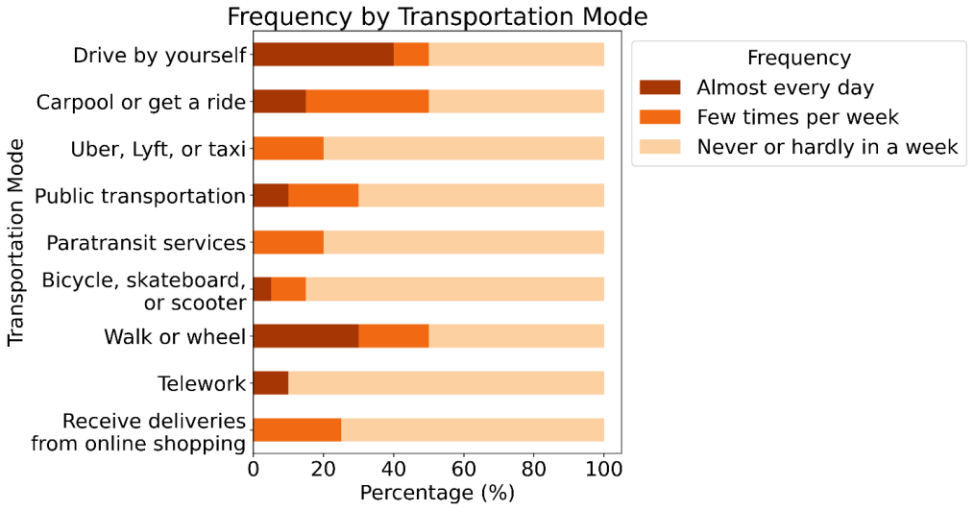


Figure 58 Frequency of Daily Trips by Mode Type Fergus Falls Participants

The limited use of public transportation and shared mobility services among Fergus Falls participants is consistent with the limited availability of public transportation and shared mobility services in the region. The Otter Tail County contracts public transportation services to Transit Alternatives, Inc., which provides door-to-door on-demand public transportation services within the city limits of Fergus Falls, Perham, Parkers Prairie, and Breckenridge. Passengers are expected to book services two days in advance but not all rides are guaranteed. The services in Fergus Falls run from seven a.m. to six p.m. Mondays to Fridays. All rides are provided on a first come, first served basis. There are no Uber or Lyft

services in the city. The only taxi service in the city is A-1 Waynes City Shuttle, which offers in-town taxi trips at a rate of $9 per trip. Given the limited public transportation and shared mobility services, it is not surprising that Fergus Falls participants relied more on carpooling and getting a ride from family and friends.

Fergus Falls participants spent much less time on daily trips (45 minutes per person per day) when compared to all participants (67 minutes per person per day). This is reasonable because Fergus Falls is a small rural town compared to the Twin Cities metropolitan areas or other more urban areas. Most participants in the study were from the Twin Cities metropolitan region where longer travel times are expected. The greater reliance on carpooling and getting a ride illustrated in Figure 58 above also appears in the data from the smartphone travel behavior survey. As shown in Figure 59, Fergus Falls participants spent about 12 minutes out of their 45-minute daily travel time as a car passenger, or about 27% of their total travel time. In contrast, all participants in the study spent about 13 minutes out of their 670-minute daily travel time as a car passenger, or about 19% (as shown in Figure 7 in Section 4.1 All Participants).

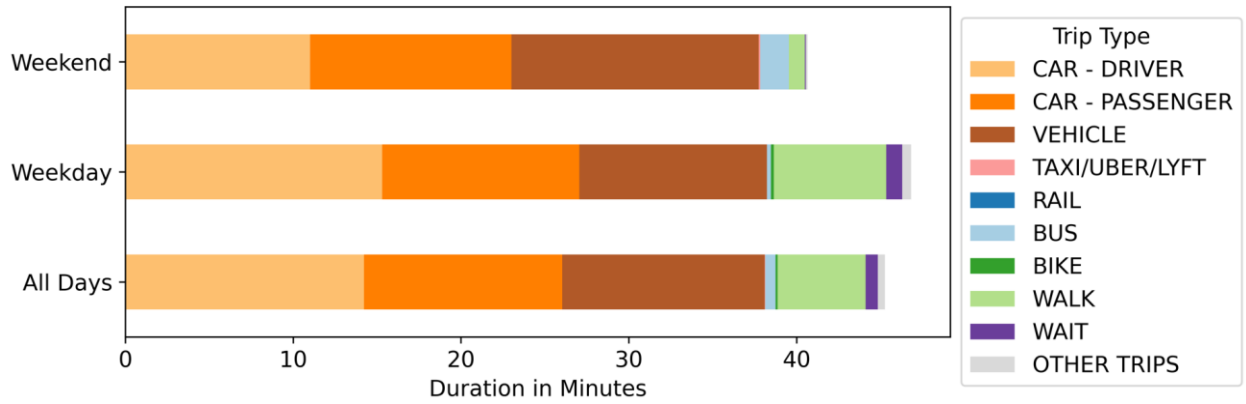


Figure 59 Average Daily Trip Duration by Mode Type among Fergus Falls Participants

Figure 60 illustrates the average daily trip distance among Fergus Falls participants. Compared to all participants in the study, Fergus Falls participants traveled fewer miles on an average day, traveling about 18 miles per day compared to the average for all participants of almost 24 miles per day. Additionally, they traveled significantly fewer miles (around 3 miles a day) as a car driver compared to the average participant (12 miles for all participants).

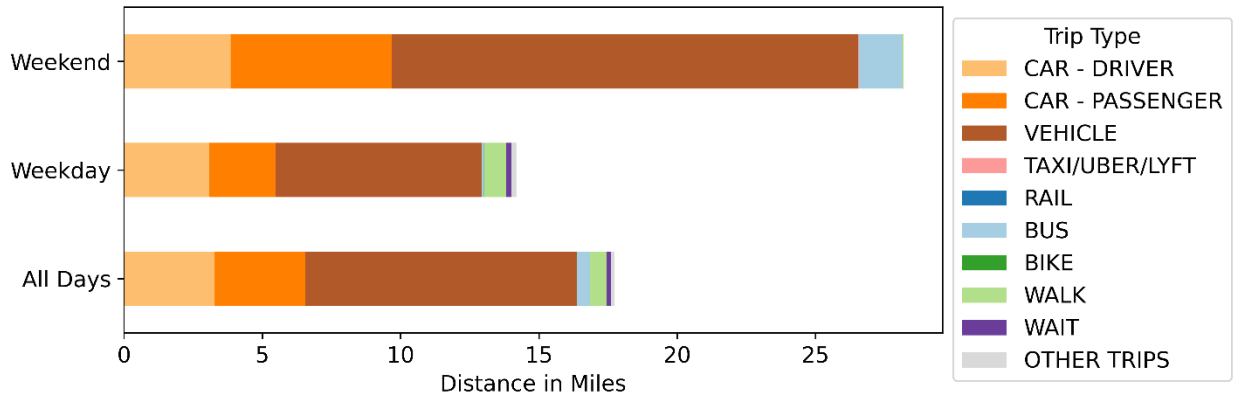


Figure 60 Average Daily Trip Distance by Mode Type among Fergus Falls Participants

Figure 61 illustrates the trip frequency by mode type for Fergus Falls participants. Fergus Falls participants took fewer trips per day compared to the average study participant. Fergus Falls participants took 2.9 trips per day compared to the average of 4.14 for all participants. Data from the smartphone-based travel behavior study generally indicates that Fergus Falls participants spend less time traveling, travel fewer miles, and take fewer trips per day than an average participant. However, it is important to note that because only twelve out of 20 Fergus Falls participants completed the smartphone-based survey, the findings from this data do not fully reflect Fergus Falls participant travel behavior.

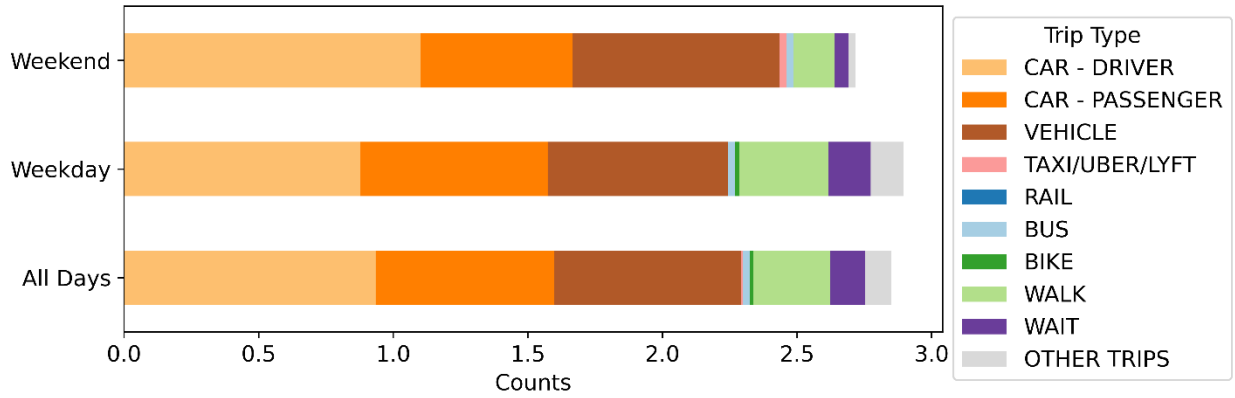


Figure 61 Average Daily Trip Frequency by Mode Type among Fergus Falls Participants

Qualitative Interview Data Analysis

The research team employed a qualitative, interpretive methodology to derive findings from participants' interviews, seeking shared experiences among participants regarding transportation needs, barriers, and solutions in their everyday lives. The analysis involved close readings of interview transcripts and coding passages of text pertaining to topics, concepts, or understandings. This process was iterative, with codes directing further readings, new codes, and then developing themes.

In this analysis, the research team identified two major themes: 1) Barriers to essential employment, food, and healthcare needs; and 2) Dependency on Rides from Family and Friends.

Theme 1. Barriers to essential employment, food, and healthcare needs

Fergus Falls participants shared how their rural town setting and limited transportation options negatively affect their access to essential employment, food, and healthcare needs. Although the town has Otter Express as the transit option and A-1 Waynes City Shuttle as the taxi option, these options require advance booking and are constrained by capacity and availability of drivers. In addition, the requirement for two-day advance booking of the Otter Express restrains people from traveling at the spur of the moment and forces them to plan. Planning is not always possible for various reasons like adverse weather conditions and health issues. Additionally, the two dollar per trip fare at Otter Express can be burdensome for low-income earners as the return trip requires separate booking and fare.

Reliable transportation is essential to execute any plan which requires travel. Unreliability of transportation has affected every aspect of participants' lives including earning a livelihood and accessing healthcare. Participants felt frustration, anxiety, depression, and hopelessness when they repeatedly realize their limitation in accessing job opportunities. Some participants walked a lot and overcame the harsh weather to get to jobs each week. Participants also expressed disappointment and annoyance when they had to miss their medical appointments or when the bus did not show up at the scheduled time despite prior booking. Below we highlight how transportation has affected Fergus Falls participants' access to employment, healthy food, and healthcare.

For grocery shopping, participants traveled to Walmart. For some participants that live outside of town, the trip took as long as one hour by car. Walmart does not provide door-to-door deliveries in Fergus Falls. A participant described her experience grocery shopping:

> We don't really have the ability to order it online and get it delivered. We don't have that here. You can order it online and can bring it out to your car at Walmart but that's the best you can do there. We drive and get groceries once a week-ish just to stock up on the stuff we're low on and that type of stuff. So once a week, and we always have to take a car, because we live quite a bit out of town. So, we're not able to walk or anything.

For employment opportunities, a participant shared an incident when he could not go to a job fair as his car was not reliable:

> I was just about to go to a job fair for Andes Tower Hills—that's in Brandon. And because the fact that my car is the way it is, I decided not to go… I didn't know how my car would be able to be pulled out in the winter. So that was an opportunity that I might have missed out on because transportation.

There were participants who were desperately looking for a job but had to limit their search owing to lack of access to reliable transportation. As one participant noted, "Just a lot of jobs I couldn't get to… I just wouldn't even apply to that job." A white senior man was vocal about resorting to walking in uncomfortably cold weather as car repairs cost more than the car is worth:

> It's painful to walk in around in this weather…Fixing the car is cost prohibitive. I just had a minimum insurance vehicle that I bought for $900. It will cost too much or much more than it

was worth. It is that my income level is down here. You're talking about minimum wage.

In addition, it was difficult for working adults to get to medical appointments, especially when the clinics are out of town. A wife who supports her husband with disabilities mentioned that there were more travel options available for people with disabilities to help them attend medical appointments whereas she had to miss out on her appointments due to limited options:

> He has lots of options for rides. He's got Ucare Transportation, there's Doyle Transportation, there's Cozy Cab. There're several different transportation services. Yes, only for medical or counseling. But for me, I only have one. If I have appointments out of town. I have one company and that's the county and they provide transportation for me out of town. It's really hard because if that person who usually takes me is filled up, I have to cancel my medical appointment. I've had to miss quite a few. Or else they got a cold and get sick. They don't have a lot of volunteer drivers available right now. So it's very limited. If I can get to my appointment, that's fine. But out of town, it's really a challenge.

Theme 2. Dependency on Rides from Family and Friends

Forty-five percent of the participants from Fergus Falls did not own a car. Participants who owned a car often noted that they had to share the car with other household members or reported that the car was not reliable enough for longer and more frequent trips. As a result, most participants in this group did not have access to convenient private transportation. Further, due to the limited public transportation and shared mobility services, people developed their coping strategies around the deficiencies of the available modes of transportation. Accordingly, instead of relying on public modes of transportation, people had chosen to support each other by offering rides, walking even in winter, or carpooling.

A participant who worked with vulnerable people in Fergus Falls like people recently out of prison or undergoing some kind of probation indicated that not having a driving license was common in Fergus Falls. He encapsulated the feelings of those people who struggle endlessly to make ends meet and fight mental illness occurring due to systemic barriers:

> So all of it, it's child support, and all those things take away their ability to drive. Because they're not paying their child support, but how do they pay the child support without getting the job. Then it's kind of countering it. So basically, you're not paying your child support, and we want you to pay your child support. We're going to take your driver's license to ensure that we'll never get that child support. Yeah, it just doesn't make sense. Just like a reentry program, kind of a deal that, you know, hey, if you've lost your driver's license, come to us and we'll see what you need to do. Because problem solving isn't these guys' strong suit, dealing with mental illness. And even for meals, a lot of things are just, they just seem confusing to me. So, yeah, just make things easier especially for those with mental health issues. And those that have gotten so far down that they can't even see the light at the end of the tunnel, just to help them out of that.

Relying on family, friends, or roommates is not always an option. Although people are generous to offer

rides, people sometimes feel reluctant to ask for rides as that would hamper others' busy schedules. One participant shared:

> I have one roommate that has a vehicle and a license and is able to drive. He's a very busy individual. He has a lot of his own things going on. And I live with 10 other people or so. There's only one other person's licensed. So that makes it hard when there's only one other person. I guess there's this guy that I can call that is really generous. He gives rides to people. He's just a phone call away. But he's busy a lot. I've never really tried using the city shuttle or anything like that. We can't really speak on how bad experience was or what it is. I don't really know, but I have taken cabs and stuff and I mean, that's all right. But it's still expensive for the bus around here. The Otter Express you have to call 24 hours ahead of time. I think actually sometimes it's 48 hours ahead of time even. And so that makes it kind of hard to just get a break in a day or something and then figure You want to go somewhere but you don't have a ride. You can't do that because you don't have a ride.

A high school student shared her experience of working when she was 15 years old and how taking classes and working got easier once she had her license and her own car and did not have to rely on her parents to provide rides*:*

> Having my own car made it a lot easier to be able to go to work when I need to go to work. I have more overtime space that I can go to work without having to rely on my parents to get me there. When I started working, I was 15. And it's really hard to work at 15 and have to get rides everywhere to go to work. So you can only work from a specific time to this specific time. When you have your own car and you have that freedom to go whenever, I feel like it helps because I go back and forth between the high school and the college all day long. So I feel like if I didn't have my own vehicle, it'd be really, really difficult to get to my classes that I have to get to.

Limitations and Future Directions

The Fergus Falls case study mostly focused on vulnerable population groups, including people with disabilities, seniors, transition home residents, and people recovering from mental illness. The study does not have significant representation of working adults and students from Fergus Falls. As a result, the findings are not generalizable to the general population of Fergus Falls. Additionally, this study did not have employers' represented in the sample. Hence, employers' challenges with respect to transportation in hiring people or retention of their employees were not investigated.

Interviewees made active efforts to provide information and imagine a transportation system that could work for all. However, participants in general had limited exposure to government-run buses or trains like in the Twin Cities region. Additionally, most people were unaware of the concept of car sharing or shared mobility services like NiceRide, Lime, HourCar, or ZipCar.

Future research may conduct interviews with employers, doctors, and mental health practitioners to identify resources available to improve transportation access to essential employment and healthcare opportunities. Moreover, a driver's license is critical to the every-day mobility of people at Fergus Falls.

It would be helpful to learn about the most common offenses in Fergus Falls that lead to the loss of driving licenses. This could help to identify potential solutions that prevent people from getting into situations in which it is impossible for them to reinstate their licenses. Further, as this city has non-profit organizations working for the welfare of the community, it will be helpful to direct research on how community-based transportation systems could be strengthened.

Recommendations

The research shows that participants in Fergus Falls faced difficulties in getting or maintaining a driver's license and purchasing and maintaining a car. Many participants relied on getting rides from family and friends and choose to walk miles to get to jobs or other destinations. It is worth noting that access to a car in one form or another dominated the perception of transportation for Fergus Falls participants. Since these people rarely had experience with fixed-route public transportation systems or commercial shared mobility services like Uber and Lyft, it was difficult for them to think beyond improvements required for cars or strengthening the operational services of their existing on-demand public transportation system, Otter Express.

The recommendations from the intake survey (Figure 62) illustrate the car-oriented nature of transportation for participants. The top two prioritized improvements were easier access to a car and better road quality. As people walk a lot in Fergus Falls, better sidewalks were rated as the third most recommended transportation improvement.

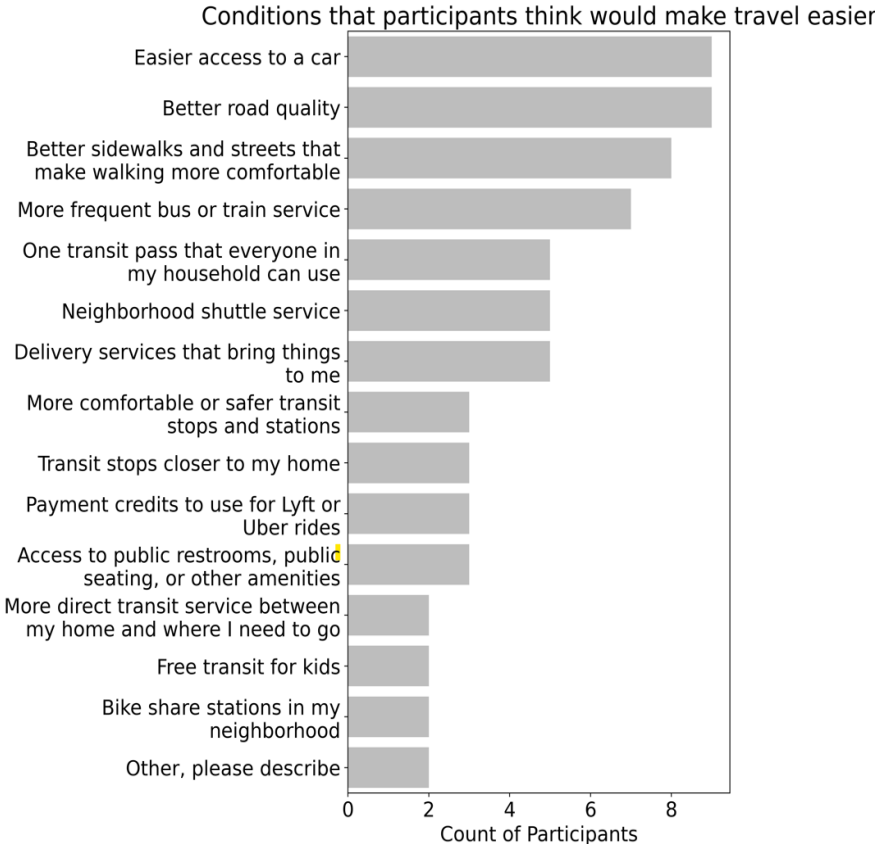


Figure 62 Conditions that Fergus Falls participants think would improve travel experience.

The qualitative analysis indicates that people want to see improvements in the bus system, the Otter Express, in a manner that does not include prior booking, is cost-effective, has fixed routes and fixed timings, increased frequency, and more availability of buses. People suggested that Otter Express should hire more drivers as that would be very helpful in mitigating wait time for customers and may reduce the time needed for prior bookings. A white senior man who wants to use buses more frequently said, "The big thing, if dial-a-ride had one more staff, one more, that would solve their Dispatch problem."

A high school student showed her interest in having a transportation system that could also protect the natural beauty of the place and help Fergus Falls in continuing its tourist business:

> It'd be nice if we had a rental car place here. Especially because this is a place some people come for touristing. So I feel like it'd be really nice to have one here. More busing systems because our bus system only runs from eight to five. So if you need to go somewhere after that time, you can't. If you didn't have the availability like your own car or like to walk somewhere. So it will be nice to see a transportation system that was 24/7.

Taking into consideration various aspects like the economy of Fergus Falls, environment conservation, and the needs of the community, it is best to strategize a transportation system that offers more modal options than the current system. Community organizations can play an active role in shaping the future transportation system of Fergus Falls.

In addition to the recommendations made by participants in the interviews, the research team identified a few short-term strategies that could facilitate in mitigating impacts of lack of transportation in Fergus Falls based on the idea of 'if customers cannot come to us, visit the customers'. For example, the City could support the Farmers Market and provide lower rates for fresh produce for low-income shoppers. Additionally, the research team recommends potential short-term and long-term improvements in transportation systems that could help address transportation barriers in the Fergus Falls. Short-term transportation improvements include:

- Assess and increase availability of affordable car repair: Fergus Falls participants expressed their concerns about the unreliability of their cars and expensive repairs for cars. Providing cost assistance for repairs would be very welcome. This could come through Otter Tail County which currently runs a car loan program for purchasing a vehicle. Alternatively, car repair funds could be administered by Lakes and Prairies Community Action Partnership similar to existing programs at community action partnerships in Hennepin and Ramsey and Washington Counties.
- Car insurance and dealerships: Participants told us about exorbitant insurance prices and unreliable quality of used cars and dealerships. A participant mentioned 'price gouging' that artificially and unreasonably inflates prices for car insurance and resale values of cars. This area can be further investigated to help build customer confidence. Additionally, the Otter Tail County car loan program could be more fully funded and publicized so residents know of existing resources that could help with car purchases.
- Provide support to community organizations to expand transportation operations: Considering the community network in Fergus Falls, government can help in providing expert services in route optimization and time optimization to community-owned transportation agencies, like

Otter Express, to strengthen its operations. The government can give tax deductions or exemptions or provide funding to these agencies to make investments in buying buses and other commercial vehicles.

- Transit Mobile Applications: There needs to be efforts in digitizing ticket services so that it is easier to buy tickets, keep track of the buses, and maintain cost-effective service. A mobile app could allow flexible ticket pricing, addressing cost concerns expressed by study participants. Additionally, it could address participants' desires to have a bus pass system that they could share with other household members as well.

Long-term transportation improvements include:

- Setting up trusted bus or rail services connecting Fergus Falls to urbanized areas: Given the current population size and topology of Fergus Falls, it may not be viable to set up full-facility hospitals and universities in Fergus Falls. However, to have ease of access to better higher educational opportunities, employment opportunities, and cutting-edge healthcare access, setting up frequent and reliable bus or rail transportation services will help people commute between cities. This will largely help people in accessing better quality services at affordable prices.

4.8 Hmong Community

The research team worked with the Hmong American Partnership and the Asian American Organizing Project to recruit Hmong participants for the study. The team interviewed 13 Hmong Americans in late January, with the majority of interviews conducted in-person on January 21 at the Hmong American Partnership building. Of the participants, 12 participated in the follow-up smartphone-based travel behavior survey, generating 83 days of activity and travel data.

Community and Participant Characteristics

Participants in the Hmong community group all live in the Twin Cities metropolitan area. Minnesota has one of the highest Hmong populations in the United States with just over 80,000 people identifying as Hmong, of which about 94% live in the Twin Cities. Of the Hmong population in Minnesota, about 53% are born in the United States. Among the Hmong study participants, a much higher proportion, 10 of the 13 or about 77%, were born in the U.S.

Hmong participants were connected to the study through one of two important organizational partners: Hmong American Partnership and Asian American Organizing Project. The Hmong American Partnership (HAP) is a non-profit social service and community development organization based in Saint Paul. Their mission is "to empower the community to embrace the strengths of our culture while achieving our potential." They run programs to connect community members to government services, health resources, and job training. They specialize in culturally responsive programming to link Hmong immigrants and refugees to a range of information, resources, and programs. HAP set up an event where the study team interviewed nine people connected to HAP programs.

The Asian American Organizing Project (AAOP) is a nonprofit organization with the mission of "empowering young Asian Minnesotans to create systems of change for an equitable, conscious, and just society." AAOP runs civic engagement, gender justice, and grassroots organizing programs focused on Asian American youth. AAOP allowed the study team to use its phone banking system to reach out to potential participants. Four interviewees in the Hmong community group came from this outreach.

As shown in Figure 63, participants in the Hmong group skewed relatively young and female. No participants were over the age of 49 and nine out of 13 were female. Median household income of participants was $25,000 to $49,999.

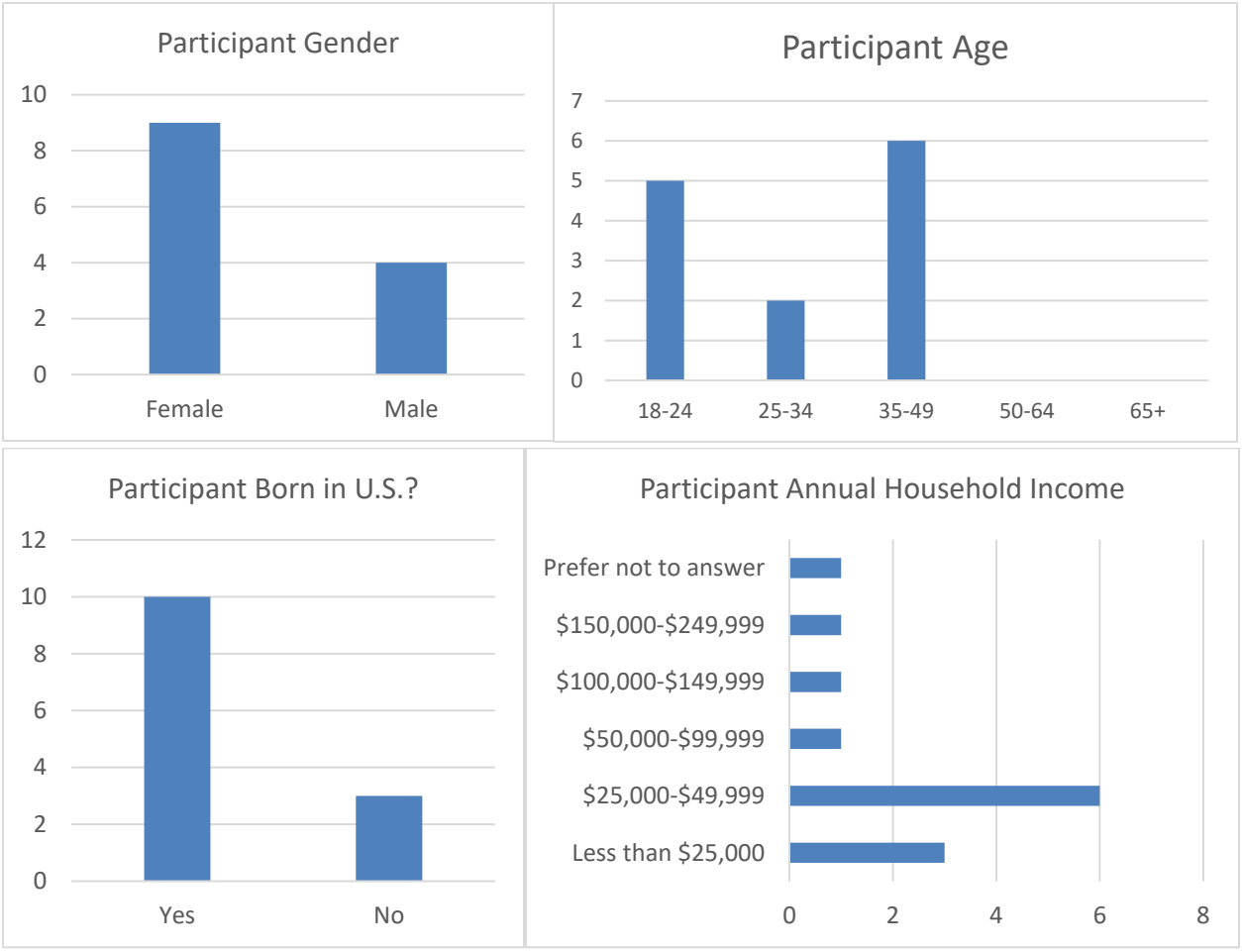


Figure 63 Participant Distribution by Gender, Foreign-Born Status, Age, and Household Income.

Hmong participants all lived in the Twin Cities metropolitan area with most participants living in Saint Paul or the northern suburbs, as shown in Figure 64.

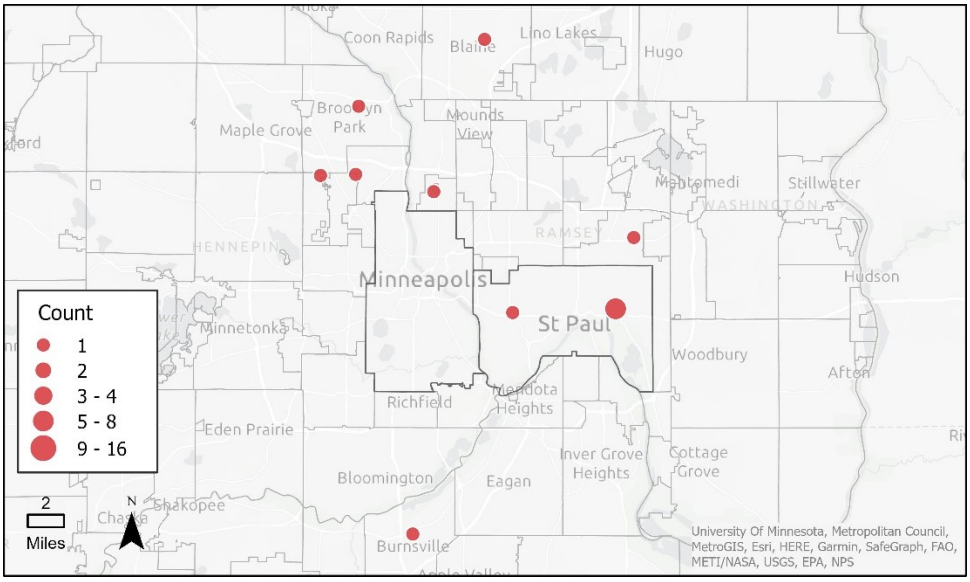


Figure 64 Geographic Distribution of Hmong Participants

Figure 65 shows the daily activities of participants in the Hmong community. Compared to all participants, Hmong participants were slightly more likely to engage in many activity types including: food or meal; medical and fitness; fun and leisure; religious or spiritual; and shopping errands. This data from the intake survey may just reflect a group of participants that are younger and more active than the average study participant.

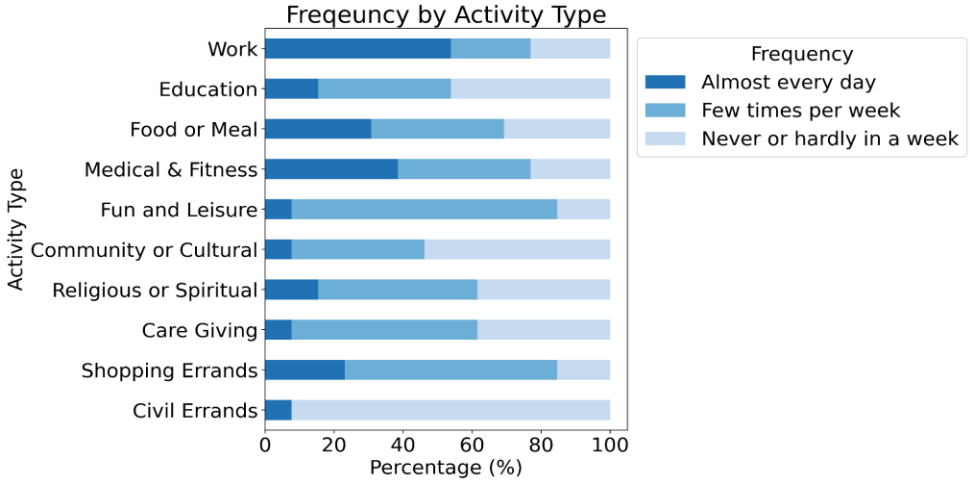


Figure 65 Frequency of Daily Activities by Activity Type among Hmong Participants

Figure 66 illustrates the daily trip frequency and mode among Hmong participants. Compared to all participants in the study, Hmong participants were driving by themselves almost every day much more frequently. Use of most other modes of transportation was much lower than the average study participant; this is most notable in the relatively minimal use of public transportation, but the pattern holds true for most modes including rideshare, biking, and walking.

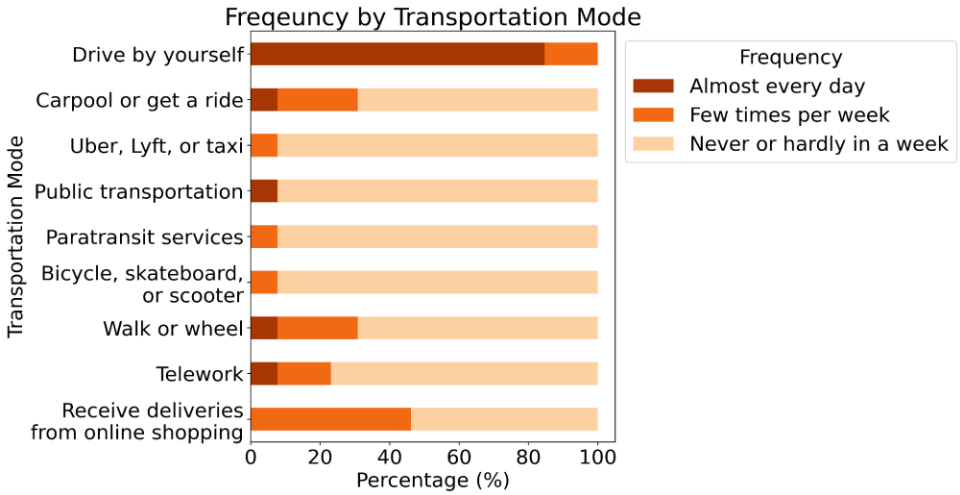


Figure 66 Frequency of Daily Trips by Mode Type for among Hmong Participants

The data from the smartphone-based travel behavior survey further demonstrates the car dependency and high level of activity of Hmong participants. Figure 67 shows the trip duration in minutes by Hmong participants. Compared to all study participants, Hmong participants were spending more time traveling overall, 79 minutes on average for Hmong participants compared to 67 minutes for all participants. Hmong participants also spent significantly more time traveling in a car, 76 minutes on average across all car-based trip types for Hmong participants compared to 50 minutes for all participants. (See all participant data in Figure 7 in Section 4.1.)

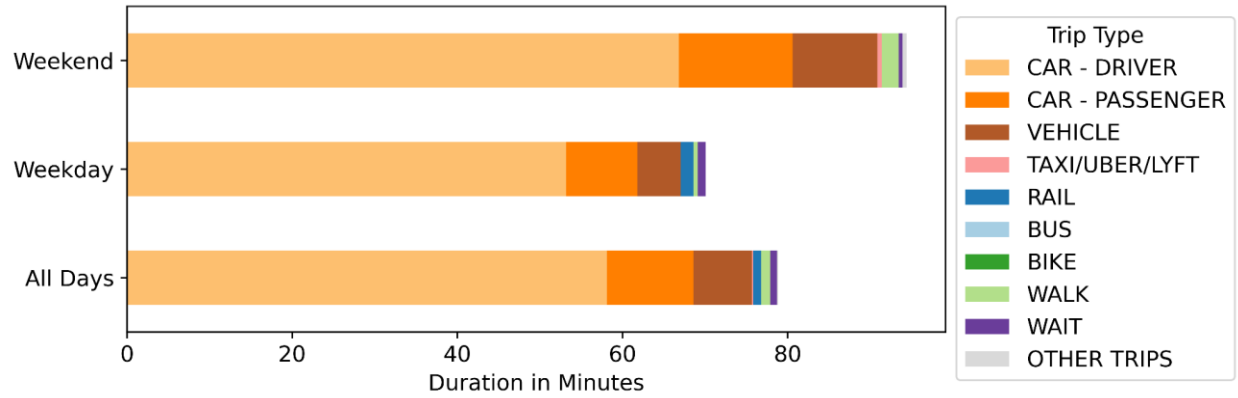


Figure 67 Average Daily Trip Duration by Mode Type among Hmong Participants

Data on miles traveled, shown in Figure 68, affirms these same patterns. Compared to all study participants, Hmong participants were traveling more miles, 42 miles on average for Hmong participants compared to 24 miles for all participants. They were also traveling significantly more miles in a car, 42 miles on average for Hmong participants compared to 21 miles for all participants.

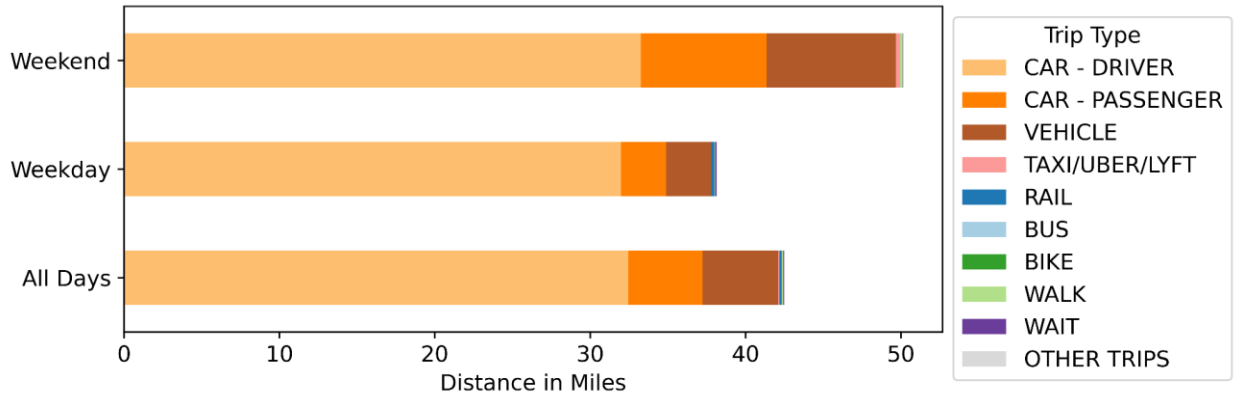


Figure 68 Average Daily Trip Distance by Mode Type among Hmong Participants

Data on the number of trips taken per day was slightly higher for Hmong participants than all participants. As shown in Figure 69, Hmong participants took an average of 4.5 trips a day compared to the average for all participants at 4.14 trips a day. Notably, in the trip data from Hmong participants, the number of trips and minutes was higher on weekends than on weekdays. This trend was reversed for the average study participant who took more trips and spent longer time traveling during the weekdays.

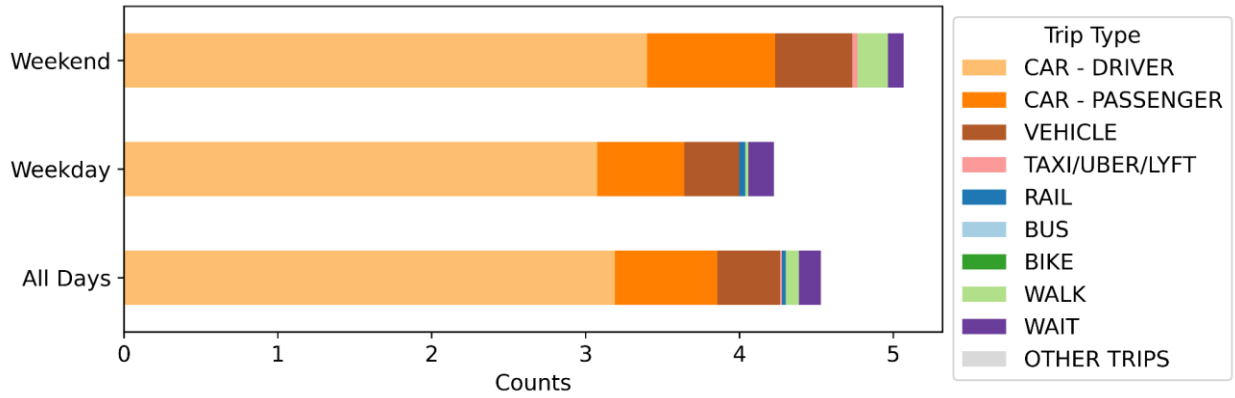


Figure 69 Average Daily Trip Counts by Mode Type among Hmong Participants

Overall, the travel behavior survey data shows a group of participants that were very active and primarily using cars. The key patterns—that they spend a lot of time traveling and spend more time traveling on weekends—help support one of the major themes for this community: that driving is a primary form of caregiving and community connection. Additionally, the low rates of public transportation use align with the hesitancy participants expressed around accessibility and safety on buses and trains. These themes will be explored in depth in the qualitative interview data analysis below.

Qualitative Interview Data Analysis

The research team employed a qualitative, interpretivist data methodology to draw out themes from community group interviews. The methodology involved close reading of interview transcripts and coding content into key topic areas. The iterative process of identifying themes and pulling out key

quotes led to the following analysis of three themes: 1) Driving as caregiving; 2) Hesitance around public transportation; and 3) Culturally relevant outreach.

Theme 1: Driving as caregiving

In Hmong culture, family is a large part of everyday life, and it's important to have close relationships with elders in the community. That includes supporting one another and seeing each other often. Many Hmong interviewees expressed the importance of caregiving and supporting their family members. One young Hmong woman described:

> I guess in my family right now I am the oldest in the house. So I've taken on a lot of responsibilities that I've haven't had to take on in my adult life… My grandma, she can't speak English. She's also very hard of hearing. So, whenever we go anywhere, she needs me there. I cannot not be there. For transportation, I am her only source. And I have a younger sister, she's a teenager. She wants to go places and she can't necessarily drive yet. So I also take her places wherever she needs to be or take her to school if she's late.

Having a car or reliable transportation was essential to participants helping their families including raising children and caring for their elders or older parents. Participants provided rides or ran errands for family members to visit the doctor, go to school, or pick up pharmacy prescriptions and groceries. One busy mother described the numerous trips made in her day to support family members:

> Every morning I used to drop off the kids, then pick them up and drop them off at home. When I got off work, I went to grandma's house. Pick up grandma, take her to the store and come back. I go back home, by the time I know, it's like nine o'clock at night.

There were seven participants who said that their car was essential for their caregiving responsibilities and five saw driving as a form of caregiving. There were also seven that said having a car improves their family connection and care. One participant described the reliance their family has on them:

> So with someone who has to support family members at the capacity that I am, I think personally for me and my family, it's essential for me to have a car. I would not be able to complete all the tasks that I'm responsible for with just public transportation, because of the amount of time it takes for me to get from one place to another… Like for example, if he [my father] needed to see a psychiatrist, but we couldn't get him in because I had to work or something then it would delay his care.

There was an overall theme among participants that they would feel stress if they were unable to drive for their families. When asked how not having a car would impact them, one participant replied, "I will feel depressed." The interviews highlight the necessity of having reliable transportation that allows families to stay connected and support one another.

Theme 2: Hesitant about public transportation

Data collected in the intake survey indicated that every participant had at least one car in their home, and they drove on a weekly basis. Participants made it clear that taking public transportation,

specifically the bus, was their least preferred mode of transportation. Less than 20% of Hmong participants take public transportation. It was evident that there was anxiety among participants surrounding public transportation with concerns of safety and inconvenience.

There were seven participants that mentioned safety as a barrier to taking public transportation. One woman described:

> We did move from St. Paul to downtown Minneapolis, and I thought about taking the train because I didn't want to have to find parking downtown. But it was scarier because I leave around 11 at night. So it was like, I don't know if I want to stay out there by myself.

There were three participants that felt uncomfortable with other people at bus stops. These concerns about general safety riding the bus or train weighed on participants' decision on transportation mode. One participant shared:

> It's really easy, but then some days there're people that want to pick fights and stuff and then it kind of delays your time catching on to the next bus. That's one of the things that I didn't like. Also, there's more problems at night.

Participants also expressed safety concerns regarding anti-Asian sentiments. A recent graduate explained not wanting to take public transportation in Saint Cloud:

> There was a lot of Asian hate crime. So the fact of feeling safe around my community, anywhere outside of the university, I no longer felt safe anymore. So I think carpooling and my own car was the most reliable.

Another woman described her fears about taking public transportation:

> Especially when I think of safety, like the public transits because that's something that I obviously prefer taking if I don't have to take my car if there's no parking… I'm thinking about safety, what it looks like for a woman of color, specifically, and as an Asian woman, and what that looks like. I don't feel safe, and if I don't feel safe if I'm being attacked, or I'm being harassed, Is there something nearby on these public transits that I can go to?

As these reflections demonstrate, participants' worries about public transit were heightened by racist acts against Asian Americans that especially increased since the pandemic began. Not knowing if there would be a response by security or law enforcement made public transit feel unusable.

Additionally, participants don't want to take public transportation because of the inconvenience. There were five participants that thought the bus was slow and four stated that bus stops were far away. One participant shared:

> It's hard to take the bus to certain areas because I would have to walk pretty far because there are no bus stops near me. So I would have almost half a mile to the nearest bus stop from where I'm at currently. So that's the hard part of it. As well as the stops really are just all over the place. So even if I did have to stop by myself, I'd walk like 5-10 minutes somewhere because of how far it is the other way.

Another participant explained:

> I'll say the barrier just where I'm located, I don't think that there's necessarily buses running around. Because I live in Blaine. I'm not too sure if there are buses. But right in my neighborhood, we have no bus stops. I don't think that I even have the opportunity to use one of those.

Instead of dealing with the challenges of slow public transportation, one participant takes their personal vehicle. They shared:

> So where I live, the transportation service isn't as easily accessible. I think there is a bus route, but to get me from my house to St. Paul, the trip will be too long. So I'd rather take my personal car which will cut the trip in half, and that will allow me more time to complete my work and also work with my clients.

If participants did not have access to a personal vehicle, they would prefer an alternative option to a bus like rideshare or carpooling. One participant described how helpful car sharing and carpooling was:

> I currently live at home with my family. And so I'll try to coordinate driving with my parents, because we share a car at the moment. And then aside from that, since I work with some really nice coworkers, if I don't have a way to work or back home, they would assist me and drop me off or pick me up. So that's the main way I get around, which is like the most convenient.

Another participant described the difficulties of walking in the cold to the bus and preferred to pay for an Uber instead of walking and waiting. They shared:

> I didn't drive so I would have to take the bus and the bus system as reliable as it is, took like one and a half hours to get from my house to the school and then one and a half hours back to get to a high school and then I'd have to take the bus 30 minutes or so back home. And I would try to do that maybe like two or three times a week. And that got difficult. Sometimes I would just opt for Uber because it was a lot quicker because sometimes I didn't want to walk all the way to the bus stop and wait for like 10-15 minutes in the cold.

While the convenience of using rideshare options like Uber and Lyft are available, they still come at a cost, with four participants noting Uber and Lyft as expensive. One participant shared,

> Before I drove, I had to take a Lyft or Uber, which was before I had my license. That made it very hard because it's very expensive. So I would work and pretty much my whole check will go towards that.

The theme highlights a general distaste for using public transportation because of perceived threats; participants often chose alternative rides even with their increased financial burdens.

Theme 3: Culturally relevant outreach

Participants expressed that cultural and language barriers posed challenges for engaging in most modes of transportation, especially public transit. At least five participants mentioned that the lack of translated material for public transit affected use by non-native English speakers. One regular bus rider shared: “They need to have some other languages so people can read their own language and understand. Because most of the elders still don't know how to ride the bus. They don't know or they don't understand.”

Another participant shared that many clients she works with have their children write down their route and bus stop on a piece of paper that the client can then show to bus drivers or others waiting at the bus stop to get help navigating the transportation system. These workarounds reflect the challenges Hmong populations face when learning and using public transit if they are not comfortable English speakers.

Additionally, one participant spoke about how even representation in marketing materials can make someone feel unwelcome in a space. They shared:

> If public transit is not showing cultural diversity in the images… then our communities are not going to feel comfortable and safe to go on these trains or any of these public transit. They feel if they see... images that really depict the culture of Minnesota, and that's one of the communities here. Maybe they'll feel a little bit more comfortable, like oh, look, we're on their bus.

This reflection shows how signals from the language of materials to the photos on advertisements can impact a community’s perception of how welcoming transit service is.

Another interviewee spoke about the importance of culturally appropriate outreach. She mentioned that translating materials is not a universal solution in the Hmong community because some elders are illiterate.

> I do find that word of mouth works wonders in the Hmong community. People try to put things out in different languages, but a lot of our elders are illiterate. So, even if you write it in Hmong, they can't read that… I think that the Hmong community really likes things to be more personal and the way that they would like someone to sit down and explain it to them instead of having to read it.

This participant’s insight speaks to the challenge and opportunity of providing culturally aware outreach. While changing visuals and translating materials are good solutions, they will not reach all members of the community. The lack of existing engagement through these methods results in a less accessible transportation system, especially for older Hmong residents.

Limitations and Future Directions

The Hmong community analysis does have some limitations, largely resulting from taking a small sample group for the study. The group has an over-representation of participants born in the United States

compared to the Hmong population in Minnesota as a whole (about 77% of the study and about 53% of the Minnesota Hmong population). Additionally, all participants in the study were under the age of 50 and spoke English. In part due to the challenges posed by translation, the study did not engage any participants interviewed in Hmong. This likely limited the study's engagement with the elderly Hmong population. Therefore, the study uses reflections from participants on their parents' and grandparents' experience to understand how transportation patterns may be similar and different between generations.

Future research should look to include more older and foreign-born Hmong participants. Providing translation services and working with organizations with elderly programming or services could help fill this gap in the research presented in this study. Recruiting through additional channels could also generally expand the number and types of participants engaged in future research.

Also, future studies should further explore how to acknowledge and represent caregiving through providing transportation, especially for children and elders. As shown in the travel behavior survey data, most trips taken by the Hmong participants were in cars. However, this study finds that many of these trips were connected to caregiving responsibilities. Further exploring the link between caregiving and car usage could provide more nuance on the transportation challenges and needs for this community group.

Recommendations

Data from the intake survey (Figure 70) reflected the importance of car use and hesitance around public transit explored in the themes above. When asked to select improvements to transportation conditions, improving road quality was the most desired improvement. Additionally, the top five included easier access to cars, more comfortable and safer public transit stops, and more direct transit service to locations I need to go. All of these selections underscore both the importance of car ownership in this community and the challenges of safety and accessibility of public transit.

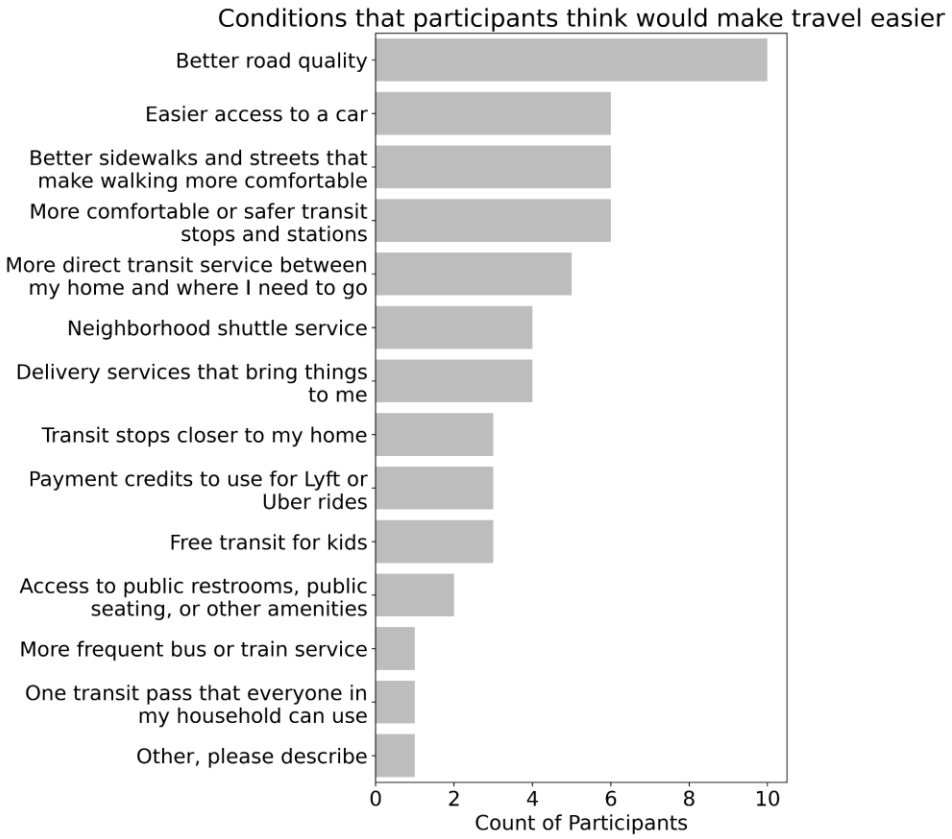


Figure 70 Conditions that Hmong participants think would improve travel experience.

A couple key recommendations emerged from participant interviews. The first recommendation is having better safety measures for public transportation at stops and during rides. For participants, that looks like adding cameras to bus stops and having more security on the bus. As one participant suggested, “I'm thinking about colleges and areas where they have those blue emergency lights. Do they have those to protect people like us who are very vulnerable targets to people to abuse?” Additional safety measures could also include making bus stops more comfortable with seating at every stop and more streetlights to provide assurance at night.

The second recommendation is better transportation related outreach and translation services for older Hmong adults that have limited English language comprehension and reading skills. Given how reliant family members are with each other, there’s pressure to always be available for rides, especially since Hmong elders have language barriers. One participant described how comforting it is to have culturally competent transportation services available to their grandmother. They shared:

> I guess one, a very big load that has been taken off me is that my grandma does go to a senior home three times a week, and I don't have to worry about getting her there because I work. Because they actually have transportation for her. The person who's transporting them speaks the language, understands her medical needs, and picks them up from home and drops them off right at the center, so there's no way of them getting lost. So three times a week. He does come by, pick her up and bring her back home.

If there are more transportation options for older adults, it could help the whole family. That means having inclusive signs with words and pictures to guide riders. It also means having Hmong transportation educators in the community to destigmatize public transportation through direct engagement.

In addition to the suggestions that emerged through surveys and interviews with participants, the research team identified transportation improvements that could help address barriers in the Hmong community:

- Assistance for caretaking travel costs: Participants need their vehicles to support their families, and six participants cited rising gas prices as a challenge. Help for those that help others could come in the form of gas vouchers for people on limited incomes or those who receive assistance from social services like EBT or WIC. A transportation voucher system could also be set up for older adults to help them cover transportation costs, whether that's a shared ride service or helping pay for gas for family members that drive them.
- Supporting alternative transportation: The participants interviewed are opting for rideshare over public transportation, and they should not have to take on the expense because they feel unsafe on the bus or need to help a family member quickly. Instead, there should be vouchers for rideshare programs like Uber or Lyft so people can safely travel with ease in cases of acute stress or harassment.
- Outreach around existing programs: Finally, given the need for and reliance on cars in the Hmong community, outreach about public programs that help with car purchasing and vehicle repair like those run through Community Action Partnerships for Hennepin and Ramsey and Washington Counties should increase. These programs can serve important roles for low-income families and sharing information about these programs is key. If information is translated and available through trusted community members or organizations, it will help ensure Hmong community members who could benefit will find the resource.

4.9 Single Mothers

The research team interviewed 11 participants who identified as single mothers. These participants were all associated with the Jeremiah Program, a non-profit organization serving single mothers experiencing poverty. The interviews took place on Wednesday, February 8th at the Jeremiah Project location in the Rondo neighborhood of Saint Paul, MN. Of the 11 participants who completed the intake survey and the interview, nine participants completed the smartphone data collection, generating 57 days of activity and travel data.

Community and Participant Characteristics

Founded in 1993 in Minneapolis, Minnesota, the Jeremiah Program's mission is to disrupt the generational cycle of poverty by providing options to single mothers who are working on obtaining higher education. The first Jeremiah Program campus in Minneapolis opened in 1998. The program expanded in 2007 with the opening of the Saint Paul campus in the historically disenfranchised Rondo

neighborhood. As of 2023, the Jeremiah Program has grown into a national organization with multiple campuses in Minnesota, Texas, Massachusetts, New York, Nevada, and Maryland.

The Saint Paul campus provides free day care and reduced income housing for single mothers currently enrolled in a higher education program. A mother can stay in the program for up to four years, while she completes her college degree. For each enrolled single mother, the program provides day care services for her kids as well as the option to live in their reduced income housing on-site.

The participants that we talked to took part in different aspects of the program, as some lived on the campus and some lived off-campus but used the day care service on the campus. The Jeremiah Program also provided other community benefits to help the mothers with other day-to-day family-related problems, including identifying grants for supporting car ownership. The Jeremiah Program is an incredibly important community resource in the lives of the participants and we thank the program for connecting us with the participants.

As shown in Figure 71, the majority of participants were in the lowest income bracket, with 72% of the respondents making under $25,000 a year. Most participants identified as Black or African American.

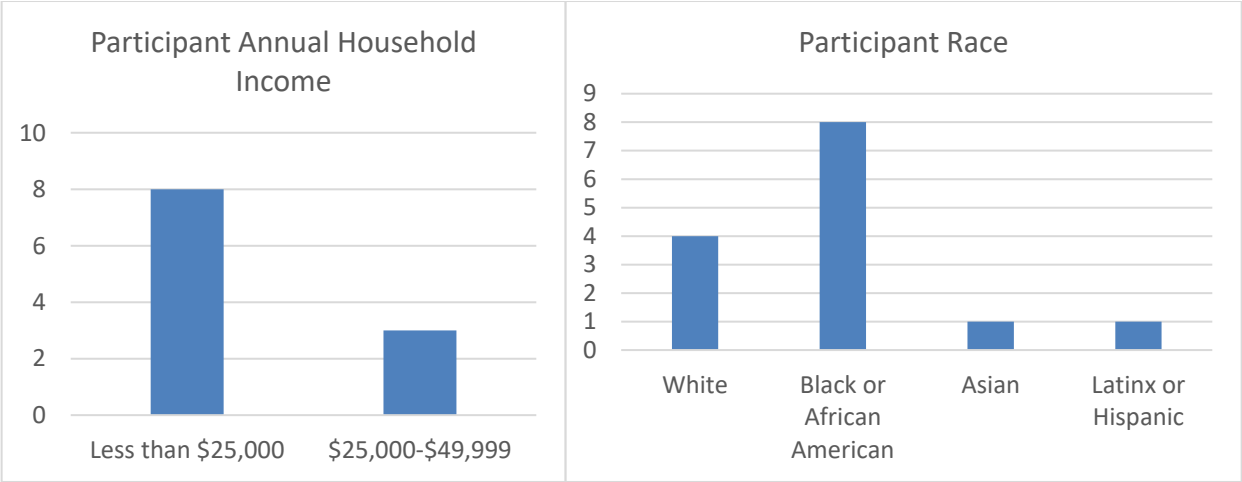


Figure 71 Participant Distribution by Household Income and Race.

All single mother participants live in the Twin Cities with most participants living at the Jeremiah Program campus in Saint Paul (see Figure 72).

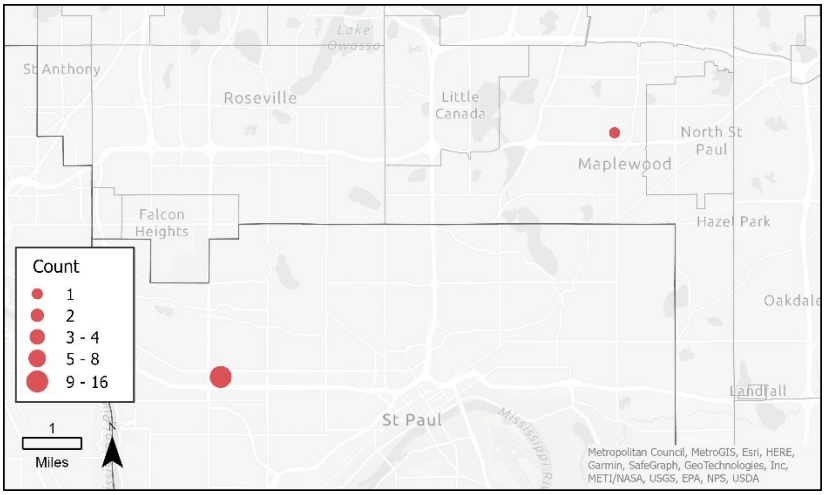


Figure 72 Geographic Distribution of Single Mother Participants

Figure 73 illustrates daily activity frequency of single mother participants. Compared to all participants, participants in the single mother group more frequently engaged in education, caregiving, and shopping activities. These all align with their roles as single mothers in a program specifically for mothers in school.

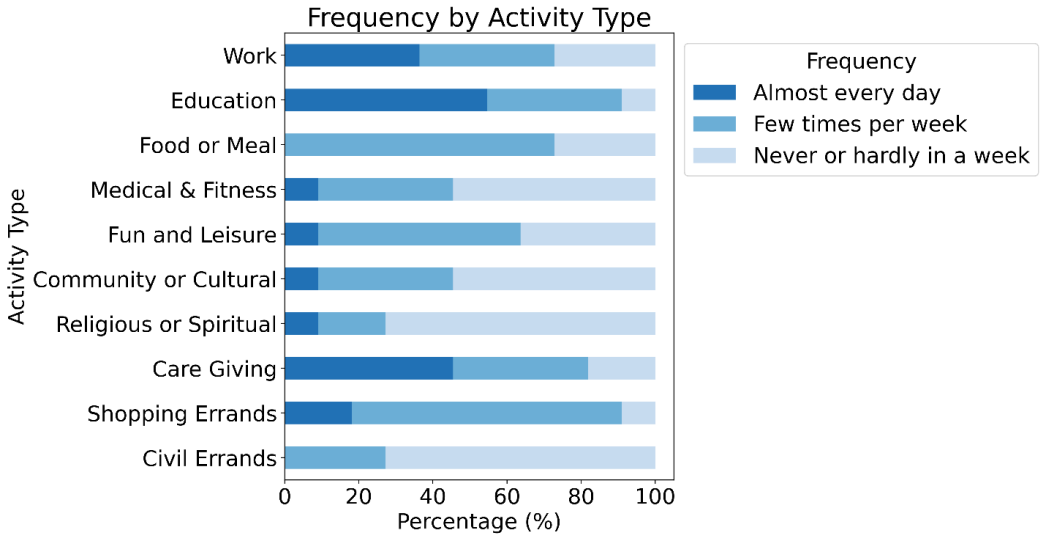


Figure 73 Frequency of Daily Activities by Activity Type among Single Mother Participants

As shown in Figure 74, when asked about their transportation habits, 100% of the respondents said they drove somewhere every day. This s much higher than the average of the total participants in the project, which is only about 40%. This is an indicator of how important car ownership is to this particular community. In comparison, only about 20% of single mothers stated that they used public transportation at all in a week, which is much lower than about 40% of total participants. Another interesting note for this community is about 55% of respondents received online orders in a given week, as compared to under 40% of total participants. Online orders were spoken of as an important asset to this community especially when access to their vehicle was limited due to the unaffordability of car trips.

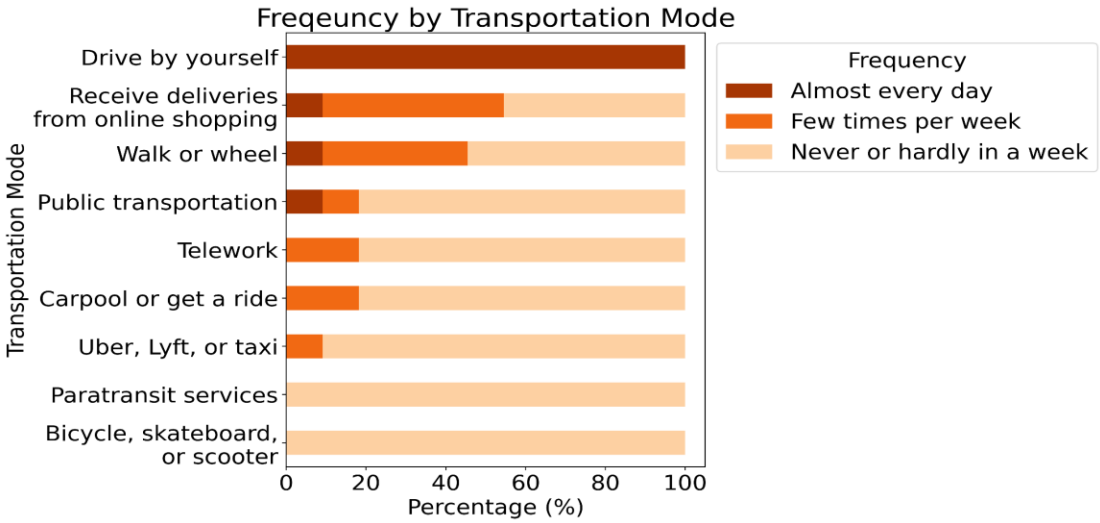


Figure 74 Frequency of Transportation Mode among Single Mother Participants

Data from the smartphone-based travel behavior survey reaffirms the importance of a car to single mother participants. Figure 75 shows that car-based travel was participants' primary transportation mode. There was minimal use of other transportation modes. Additionally, single mother participants spent more time traveling than the average study participant, spending 89 minutes a day traveling compared to 67 minutes for the average participant.

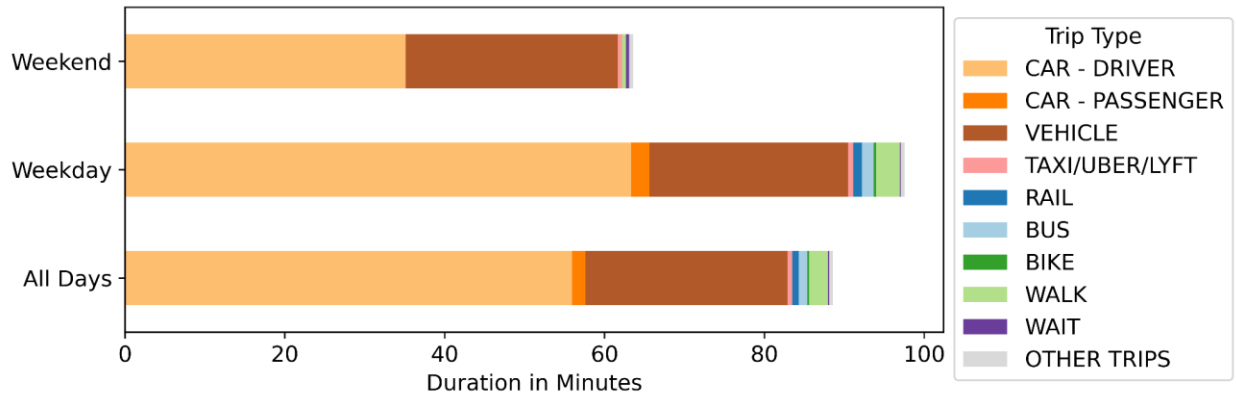


Figure 75 Average Daily Trip Duration by Mode Type among Single Mothers participants

Data on miles traveled by mode type shown in Figure 76 continue to highlight the same patterns. Single mother participants traveled farther than the average study participant, covering an average of 37 miles in a day compared to 24 for the average study participant. Additionally, almost every single mile was traveled in a car, an even starker representation of the car reliance of this community.

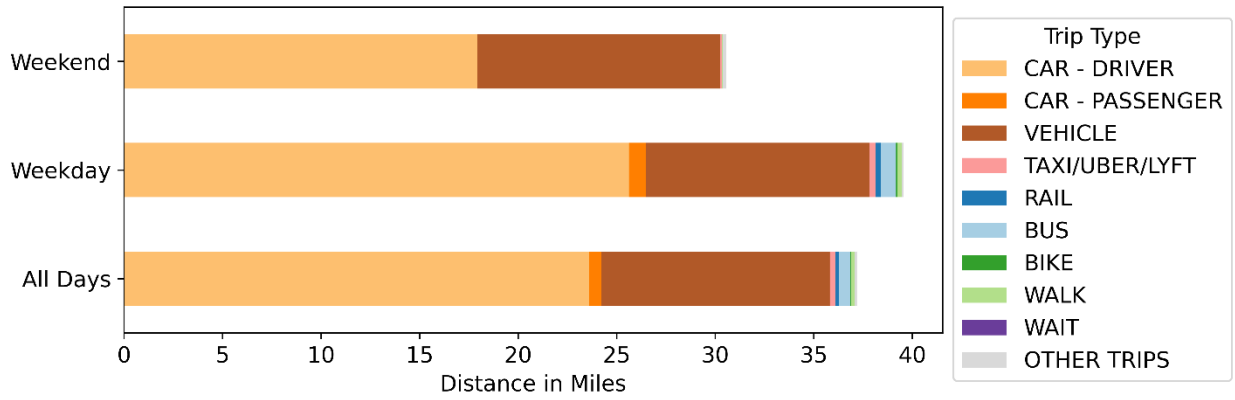


Figure 76 Average Daily Trip Distance by Mode Type among Single Mother Participants

Data on the number of trips taken per day (Figure 77) show that single mother participants took significantly more trips per day, 6.4 trips, compared to the average participant who took 4.14 trips per day. As with the other data from single mother participants, the car was the dominant travel mode, accounting for 6 of those 6.4 trips per day. The necessity of using a car for transportation is further explored in the themes from the qualitative analysis below.

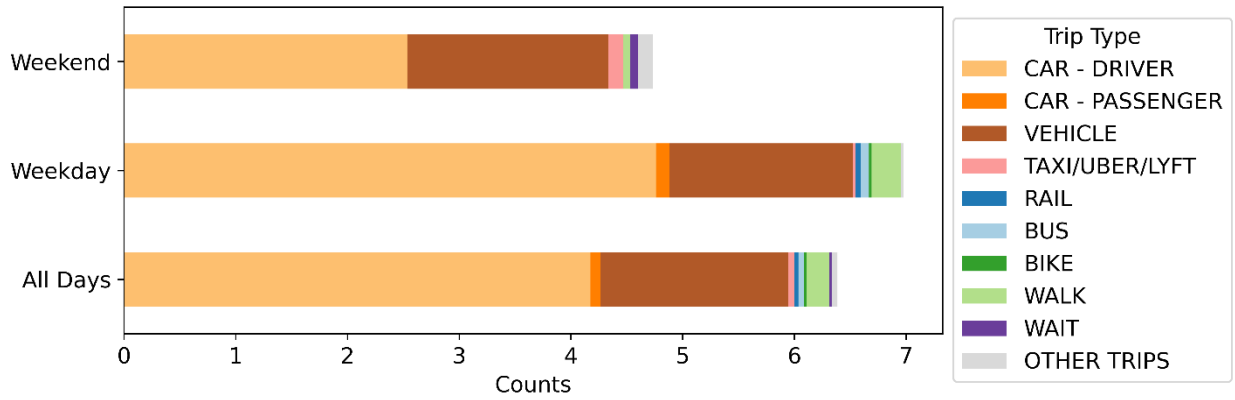


Figure 77 Average Daily Trip Count by Mode Type among Single Mother Participants

Qualitative Interview Data Analysis

Through our qualitative interview data analysis three major themes arose within this community: 1) the necessity and unaffordability of automobile ownership; 2) the desire to use public transit, but the lack of viable options to do so; and 3) community support for maintaining car ownership. In the following text, we discuss these three themes and provide quotations that give further context on how these themes relate to this community's transportation experience.

Theme 1. The necessity and unaffordability of automobile ownership

Single mothers in general rely on complex trip chaining to fulfill everyday life activities. They often have to make multiple stops during one trip in order to accomplish several tasks. Noland and Thomas (2007) found a significant correlation between single parents and the need to trip chain. The participants in this study were no different. In most interviews, participants discussed at length the importance of being

able to drop their kids off at daycare before heading to work, and being able to pick them up again afterwards. Another example was going grocery shopping or stopping to pick up necessary items before returning home so that they could provide for their family. As one of the participants stated:

> I could take the bus, but the issue with that is I work from eight in the morning to four p.m. And I would have to wake up, find a bus stop, drop my daughter off at school. Then find another bus stop and figure out how to get to either Brooklyn Park or Eden Prairie depending on which day of the week it is. And then after work I would need to find another bus. That'll bring me back to where I need to pick her up from and then take another bus to get home.

When relating these stories, participants spoke about how important a car was for them to be able to make these trips as their multiple destinations were often far from each other. These participants spoke about how they were often on a very tight schedule juggling multiple commitments, as they were the primary caregiver, attending school, and the sole earner of household income. It became a great burden on them if they were forced to spend more time traveling due to not having a vehicle. As a participant shared:

> My daughter is very extroverted. She likes to do things. So I'm looking at setting her up for Girl Scouts. I'm looking at setting her up for cheerleading and in more swim classes as well in gymnastics. Because those are all things that she's into and wants to do. And I want to be able to drive her to these places and get there on time. By simply just driving her to these places we get there. And then when we leave, we don't have to wait on a bus. We don't have to wait on Uber, we don't have to wait on a rideshare. We can just get back in the car and go to the next place or go to the store or have our mommy daughter dates and then come home.

The interviews show that every single participant relied on their private vehicle for daily transportation needs. Walking, biking, or transit was not a transportation mode that most participants could depend on, as they often saw it as taking too much time out of their busy lives.

However, car ownership is a double-edged sword as participants also spoke at length about the struggle to be able to afford a car and the expenses that come with it. As stated above, a majority of our participants earned less than $25,000 a year in income. This made car ownership a huge financial burden for our participants. Participants spoke about the difficulties that arose from being dependent on a car, the first of which was owning old and unreliable vehicles. Some participants limited how far they were willing to travel as they did not trust their vehicle to be able to complete long trips. These participants often spoke of wanting to find higher paying jobs in the suburban areas around the Twin Cities. However, they didn’t feel that they could trust their vehicle to provide transportation there and back. This limited their potential income. One of the participants shared how owning an unreliable car limits her job search:

> I feel like it's caused a lot of conflicts because it's like, there are jobs, good jobs, but they're far out and when your transportation goes out, you're like, Okay, how I'm going to get to work? So you got to work within the radius of where you live. Because sometimes your tire pops and things like that happen or people slide into you on the highway. And you lose your car. And I feel like the buses in Minneapolis and St. Paul don't always go out to the outer suburbs. And that's

> where the good jobs are. Yeah, and that's where you can get paid good. And I think it causes a big issue.

Another issue was the expense of repairs and gas. Participants relayed multiple stories about their car suddenly breaking down and being unable to afford these repairs. Being without a car often made it difficult to save money for repairs because of the vulnerable position they were put in without car access. Ride hailing services are incredibly expensive, and participants were often forced to rely on them as they didn't feel comfortable traveling with their kids on public transit. One participant said that when they were without their car, they would have to spend as much as $60 a day on ride share services to do their daily trips. This quickly became unaffordable for participants and made it even more difficult to save money to purchase a new car or pay for repairs.

Theme 2. A desire for but lack of viable public transportation options

Many participants expressed a desire to use public transit more, but they felt that the public transportation system failed to meet their needs. Participants spoke about not wanting to stand out in the cold with young children while waiting for the bus or light rail. A major talking point for participants was how far the bus stop was from their location. Many felt that a four- or five-block walk with children was too far in the winter to get on public transit and prevented them from using public transit. As one of the participants shared:

> Because there's not enough stops in certain areas, or the bus stops running at a certain time or it doesn't even go to the area where you need to go. You'll have to take a 20- or 30-minute walk. And I know for other hikers, that's okay but for me, that's really hard.

Another major issue participants had with public transit were concerns about the length of time it took to get places. As discussed previously, participants rely on the ability to trip chain. With public transit this can become quite difficult as taking public transit will most likely increase travel time, especially for trips with multiple destinations. Infrequent transit service also makes it difficult as a participant could end up waiting a long time for the next bus or train. As caregivers, employees, and students, participants had little time to devote to long transit trips and felt that they could not rely on public transit as a viable option.

In addition, safety on public transportation was a cause for concern. Several participants had stories of seeing fights or violence on transit. Another participant had a story of a man urinating next to her while waiting for the light rail, and others talked about the rampant drug use on the light rail. These situations often made participants feel unsafe on public transit for themselves and their children. One participant described an unsafe experience that made her avoid public transit:

> So one time on the train, I was trying to learn how to pay for it. And some guys just came and pee like a little bit. Right next to me. I was like, are you serious? He said well you got to go, you got to go or you mess your bladder up, so you're smart enough to know that you don't need to hold it. But you're just going anywhere. He said I'm sorry little lady and I just walked off on the

> stop…I never figured out how to pay for it because I walked off and just caught the bus because the guy stood there and peed.

Theme 3. Community Support for Car Ownership

The final theme of this community was the value assets that their community provided to them for car ownership. Participants spoke of several programs that the Jeremiah Program had helped connect them with in order to purchase a vehicle or pay for maintenance or repairs. Microgrants is a program that several participants spoke of using for car repairs. This program is run by Ramsey County and allows applicants to apply for small grants for vehicle repairs. Several participants spoke about relying on this program to maintain their car or were currently hoping to receive a grant to pay for repairs.

Several participants mentioned that the repairs required for their vehicle often exceeded their current savings. One participant told a story about having to apply for a new credit card and taking on debt in order to fix their car. This turned into a massive amount owed as the interest payments on that particular card were incredibly high:

> Well, there was a time that I actually went to the Cub Foods right here on University and I was with my three-year-old and my car wouldn't start. So we were stuck in the parking lot for 20 minutes. And then I had to get my other daughter from school. So it was just a lot was going on. So I was overwhelmed, and I had to call my sister, and she had to come get me, and my car had to stay there. And I had to pay to get it towed to a mechanic to see what was wrong. So they told me the problem, and it was $900 to get it fixed, and I had to apply for a credit card to make payments from because I couldn't pay the $900 up front.

These stories help provide context for how important these programs can be in helping to overcome transportation barriers. Another program provided by Ramsey County helps applicants receive a car loan for up to $6,000 with reduced payments. This is a program that several participants had used after they became a part of the Jeremiah Program in order to obtain a vehicle. These programs had a major effect as they helped these participants purchase their own car which as discussed is a massive asset for a single mother. The Jeremiah Program was vital in helping the participants find and apply to these programs and showed the importance of community support in participants' transportation needs.

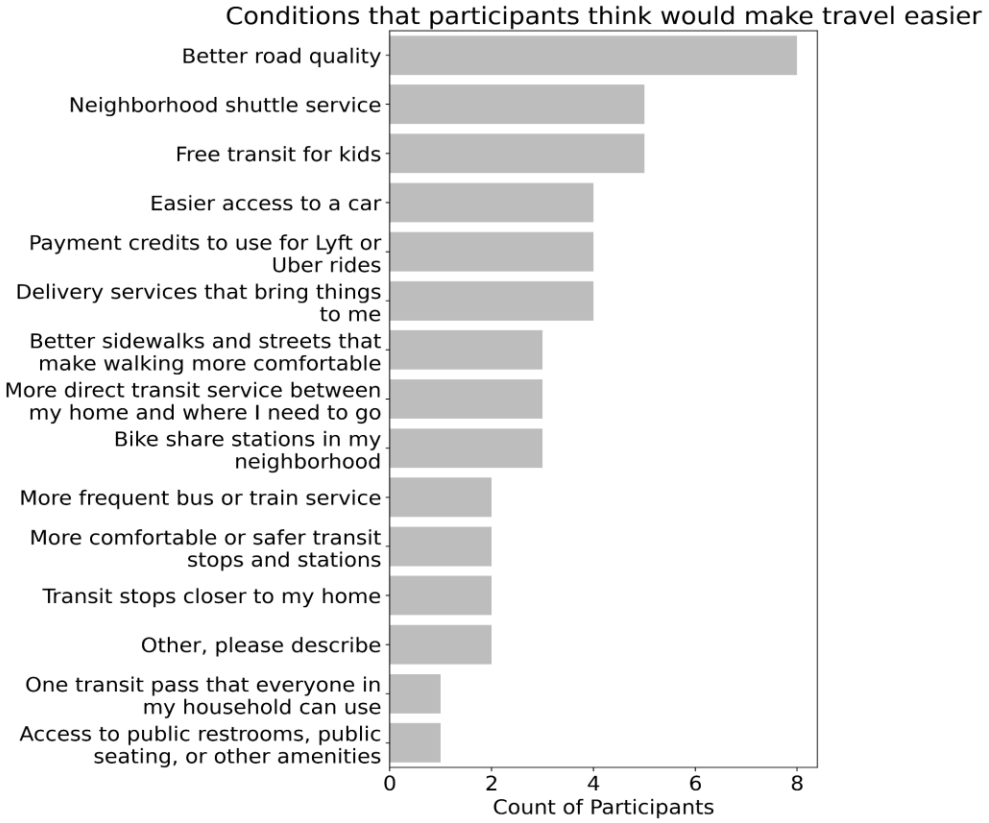
Limitations and Future Directions

The nature of recruitment for this community led to a relatively homogeneous group of participants, as all were participants of the Jeremiah Program and therefore had to similar experiences. Due to the benefits provided to these mothers by the Jeremiah Program, all the participants had regular access to a vehicle. Future studies may benefit from specifically targeting single mothers without car access to better understand the transportation experience of single mothers who regularly use public transportation as their main mode of transportation.

Recommendations

Participants spoke about improvements that could be made in transportation networks in order to benefit their needs. As shown in
Figure 78, the main improvement that participants wanted to see was improving the road conditions. Participants spoke about the difficulty that poor roads had on the condition of their vehicles. Participants described popping tires in potholes and having chucks of ice damage their vehicle. Participants expressed a desire to have better snow removal and quicker repaired potholes around their community. These conditions could make life difficult for participants, as a new tire or car repair could put them in financial debt as discussed above.

Another improvement that many participants were interested in was more transit options, especially for children. Participants spoke of wanting free transit passes for kids, credits for ride hailing services, having shuttles for daycare services, or shuttles for parents to well-traveled areas such as grocery stores. As public transit was not often an attractive option for them, participants wanted a more local option that they could feel comfortable taking their kids on if their car was unavailable. Another improvement that many participants spoke of was having bus stops closer to their location. Participants explained how difficult it could be to walk several blocks to the bus stop in the winter with small children. Participants said that they may be more likely to use the bus if there was an option that was closer to their location. Participants also spoke about improving sidewalk conditions. Broken sidewalks could be an issue for their children and icy and snow-filled sidewalks made it hard for them to walk in the winter. Participants



felt that they may be more inclined to walk places during the winter if the sidewalk conditions were improved.

Figure 78 Conditions that single mother participants think would improve travel experience.

In addition to the recommendations made by participants in the interviews, the research team identified a few transportation improvements and programs that could help address transportation barriers in the Single Mother community:

- As referenced in the Latinx community report, car-sharing programs, such as Evie, could also be greatly beneficial for single mothers. As discussed above, single mothers often require a car for their transportation needs but struggle with the costs associated with private vehicle ownership. Car sharing programs could provide a lower cost option for single mothers who may not be able to afford their own private vehicle.
- Community shuttles for young children: traveling to and from daycares with children often adds an extra step that unnecessarily complicates the transportation burden of single mothers. Community shuttles could help ease this burden by providing transportation for kids to and from daycare. These programs could be modeled after current school bus programs and should be targeted towards lower income communities for maximum impact.

Single mothers are a highly car dependent community as they rely greatly on the ability to trip chain due to their caregiving responsibilities. In our current society, this requires them to use a car in order to complete trips with multiple stops, as public transit is often not reliable for these types of trips. However, this community often struggles with affordability as they are mostly lower-income and they may struggle to pay for car repairs which greatly hinders their daily transportation and opportunities. The analysis shows that single mothers rely on cars for their transportation needs despite issues with affordability.

4.10 White Earth Nation

The research team interviewed 8 Native American participants from the White Earth Nation, which is also called the White Earth Band of the Minnesota Chippewa Tribe. Participants in this group learned about the study through Anishinaabe Endaad, a supportive housing program for Native American men seeking recovery. All interviews were conducted on December 19, 2022 at Anishinaabe Endaad's two housing sites located inside the White Earth Indian Reservation in north central Minnesota. Four of the eight participants in this group completed the follow-up smartphone travel behavior survey, resulting in 22 days of activity and trip data.

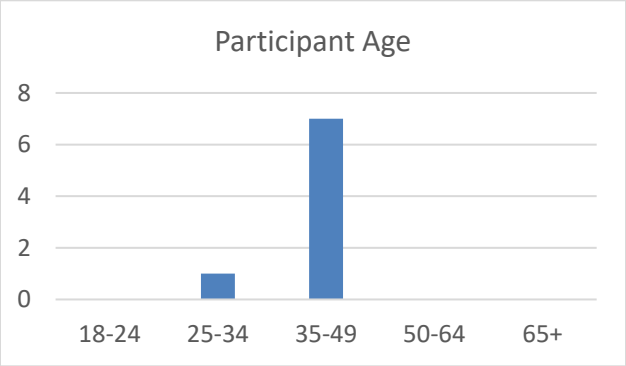
Community and Participant Characteristics

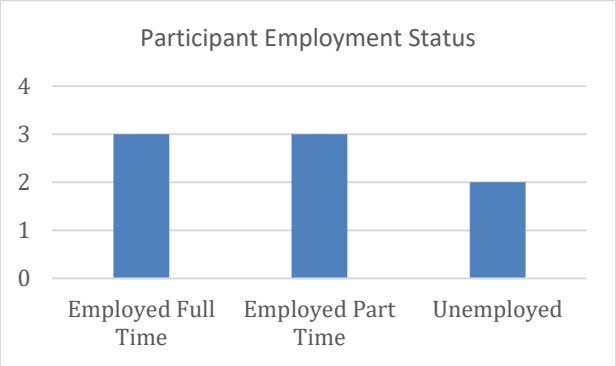
The White Earth Indian Reservation is around 829,440 acres and includes Mahnomen County and portions of Clearwater and Becker Counties (MN Indian Affairs Council: Gaa-Waabaabiganikaag / White Earth Nation). It is the largest Indian Reservation in the state of Minnesota by land area. Located 68 miles east of Fargo and 225 miles northwest of Minneapolis/St. Paul, the area is geographically diverse

because it has prairie in the west, rolling hills and many lakes and rivers in the middle, and conifer forests in the east (MN Indian Affairs Council: Gaa-Waabaabiganikaag / White Earth Nation).

According to U.S. Census 2020, the total population at the White Earth Reservation is 9,955. The population density is extremely low at 0.012 persons per acre. More than half of the population self-identify as American Indian or Alaska Native. The median age of males in White Earth Reservation is 35.9 years, and 35.8 years for females. For the population aged 25 years and over, only 13.6% have a bachelor's degree or higher education. The median annual household income for people who identify as American Indian or Alaska Native alone in White Earth Nation is $27,975. The poverty rate of people who identified as American Indian or Alaska Native alone in White Earth is 38.8%, and the overall poverty rate at White Earth is 24.8% (White Earth Reservation | Federal Reserve Bank of Minneapolis). Shooting Star Casino and Hotel is the largest employer in the area.

The eight study participants in this community group were male, and none of them identified as LGBTQ. They were all born in the USA, and none had immigrant parents. They self-identified as American Indians or Alaska Natives. As shown in Figure 79, seven out of eight participants were middle-aged. Of the eight participants, two were unemployed, three were employed full-time, and three were employed part-time. Half of the participants preferred not to report their household income, three participants reported income below $25,000, and one participant reported an income between $25,000 and $49,999. Half of the participants had a high school diploma or Adult Basic Education (ABED)/ (GED); two participants had some college, and the other two had less than a high school diploma education. It is worth noting that seven of the eight participants were clients of Anishinaabe Endaad, i.e., Native American men in recovery. One of the participants was a case manager at Anishinaabe Endaad.





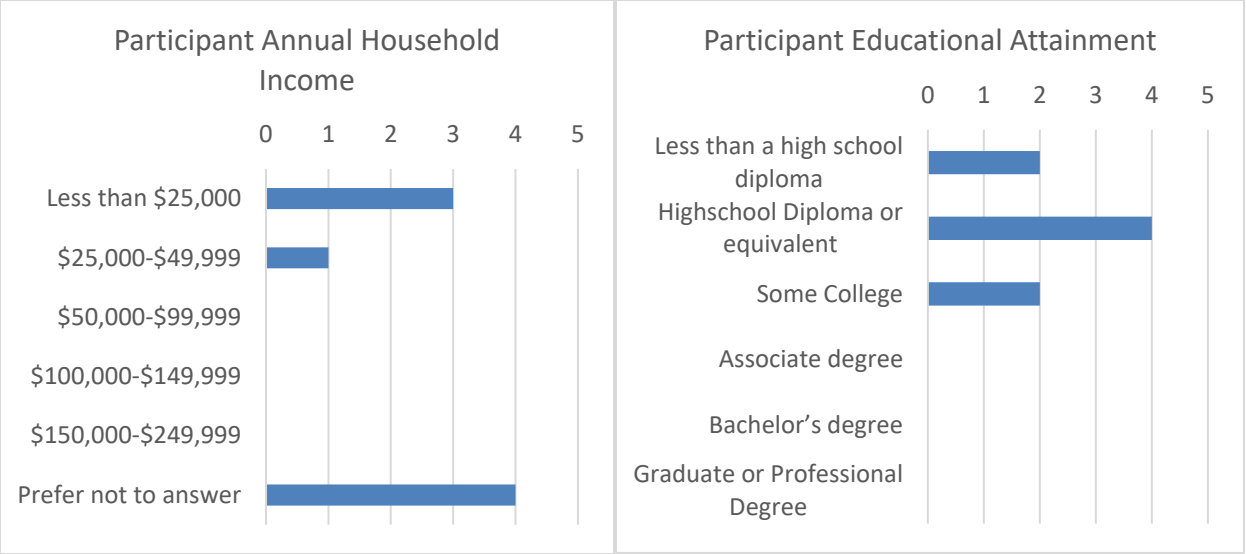


Figure 79 White Earth Participants' Distribution by Age, Employment Status, Income Level, and Educational Attainment

As shown in Figure 80, White Earth participants all live north central Minnesota where the White Earth Nation reservation is located.

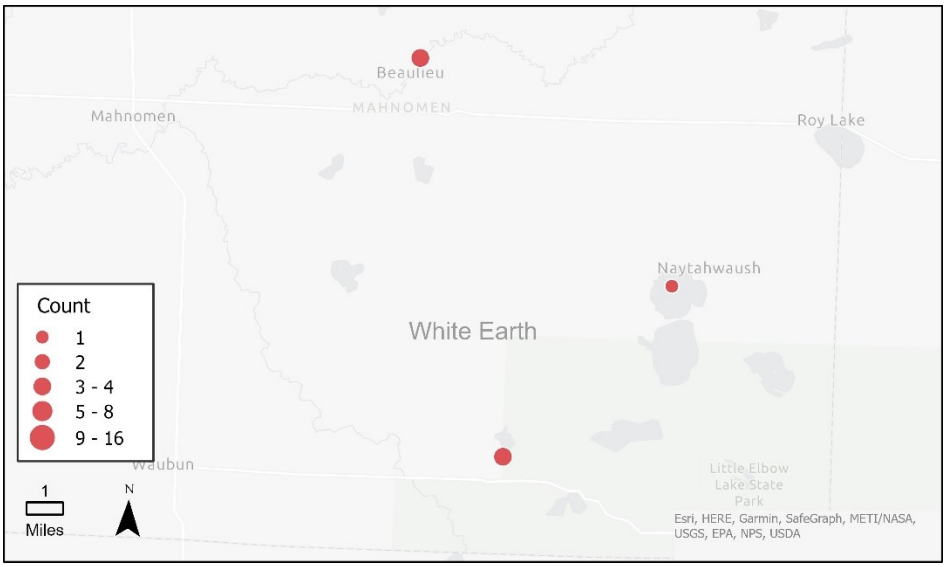


Figure 80 Geographic Distribution of White Earth Participants

Figure 81 below illustrates activity participation among White Earth participants. It is evident that White Earth participants in general engaged in work and nonwork activities much less frequently than all participants in the study. Although the low frequency of work activities was likely due to the high unemployment rate among this population, the low frequency of nonwork activities was likely due to transportation barriers. The White Earth participants did not travel on a daily basis to purchase food or meals, do other shopping errands, or engage in medical and fitness activities and fun and leisure activities. The only exception was religious and spiritual activities, of which White Earth participants are engaged on a regular basis despite transportation barriers. This highlights the importance of spiritual activities to participants in this community group.

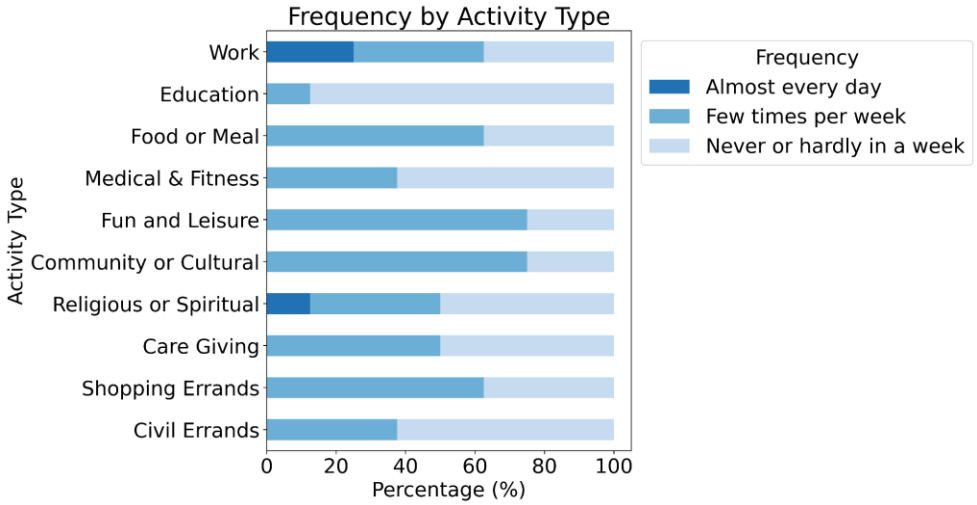


Figure 81 Frequency of Daily Activities by Activity Type among White Earth Participants

Figure 82 below shows the self-reported frequency of using a given mode of transportation. Compared to all participants in the study, White Earth participants walked much more frequently. For all other modes, the frequency of use by White Earth participants was much lower than that of all participants. This is not surprising because 1) White Earth participants in general make fewer trips per day when compared to all participants; and 2) White Earth participants face greater transportation barriers given unemployment, poverty, and the extremely rural setting of their community. Public transportation and shared mobility services in the White Earth Nation are limited. There are two transit providers in the region, White Earth Public Transit and Tri-Valley Transit. Both transit providers offer door-to-door services and White Earth Public Transit also operates seven routes. The interview data described in the next section shows that these transit services were inadequate. Further, there are no Uber, Lyft or taxi services in the region. As shown in Figure 82, participants never used these services. None of the White Earth participants reported teleworking. This can be associated with the fact that Shooting Star is the largest employer in the area and in-person services in the hotel industry are vital to its business.

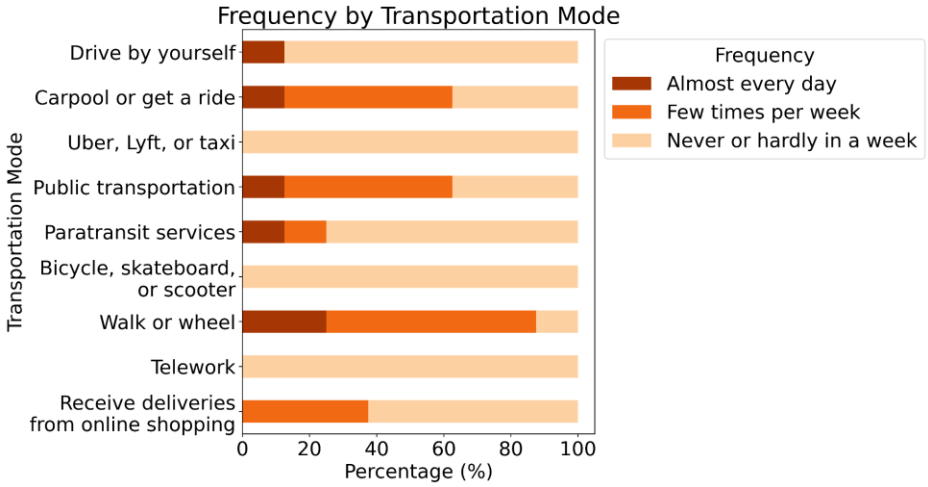


Figure 82 Frequency of Daily Trips by Mode Type among White Earth Participants

Figure 83 below illustrates average daily trip duration by travel mode among White Earth Participants. This data further confirms that White Earth participants traveled less than the average study participant, spending 47 minutes a day traveling compared to 67 minutes for the average participant. White Earth participants also spent more time walking. White Earth participants spent about 14 minutes out of the 47-minute average daily trip duration walking, or 30% of their total travel time. This contrasts with eight minutes out of the 67-minute average daily trip duration by the average study participant (as shown in Figure 7 in Section 4.1 All Participants), which accounts for 12% of total travel time.

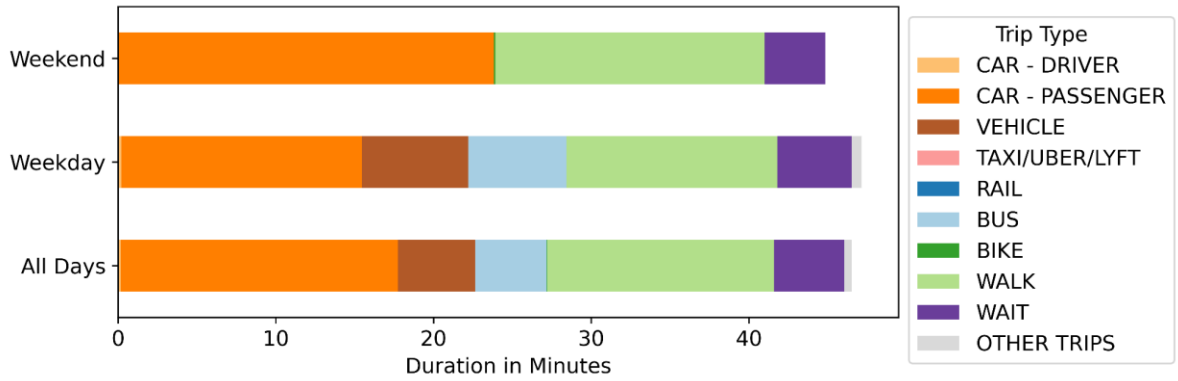


Figure 83 Average Daily Trip Duration by Mode Type among White Earth Participants

Data on travel distance also shows the limited travel of White Earth participants. They traveled an average of nine miles a day whereas the average study participant traveled 24 miles a day. Trip distance data shows that participants did not use the bus at all on weekend days while using it to travel almost 2.5 miles on an average weekday. This may partly reflect more limited public transit service on the weekends.

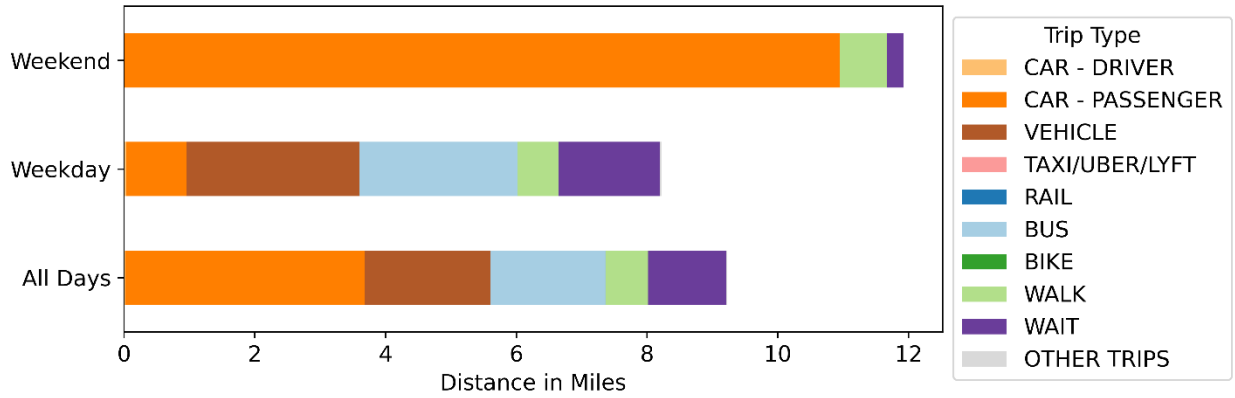


Figure 84 Average Daily Trip Distance by Mode Type among White Earth Participants

Data on the number of trips taken per day affirms the patterns identified above. White Earth participants took just 3 trips per day compared to 4.14 trips per day for the average study participant. The trip count data highlights the prominence of walking for White Earth participants. Over half of their

daily trips or 1.7 out of their 3 daily trips were walking trips. The transportation barriers faced by these participants that led to fewer overall trips and more walking trips will be explored in the themes below.

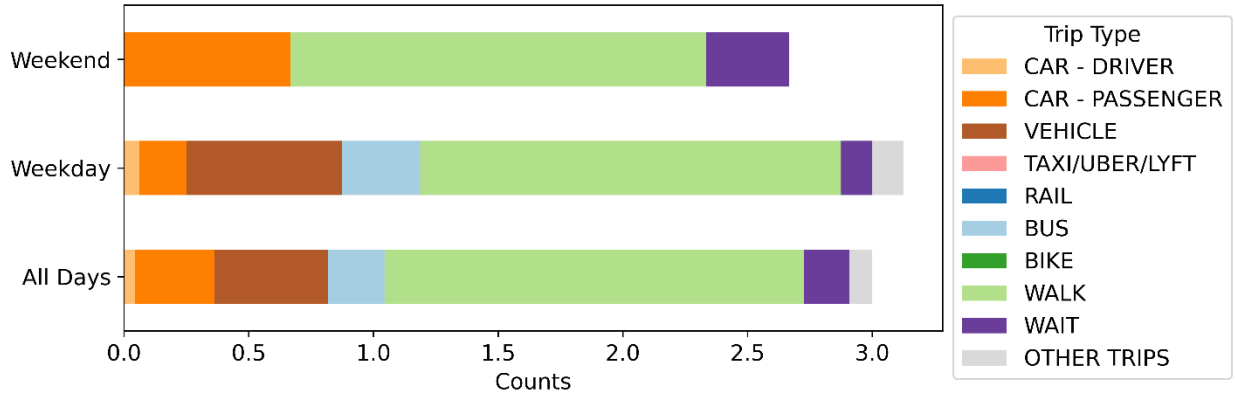


Figure 85 Average Daily Trip Frequency by Mode Type among White Earth Participants

Qualitative Interview Data Analysis

The research team employed a qualitative, interpretivist data methodology to draw out themes from community group interviews. The methodology involved the iterative process of close reading of interview transcripts and coding content into key topic areas. The process led to the identification of three major themes: 1) Deficiencies with transit systems and its impact on employment 2) Limited access to healthy food and spiritual activities, and 3) A Re-prisoned Life: No driver's license, no car, no job.

Theme 1. Deficiencies with transit systems and its impact on employment

In White Earth, public transportation options include buses run by White Earth Public Transit and Tri-Valley Heartland Express (T.H.E. Bus). White Earth Public Transit only provides services within the White Earth Indian Reservation. Tri-Valley provides services in Polk, Red Lake, Norman, Marshall, Kittson, Pennington, Mahnomen, and Clearwater counties. All the participants mentioned White Earth Public Transit. They did not speak much about the Tri-Valley Heartland Express.

Participants expressed their opinions about the service provided by White Earth Public Transit. White Earth Public Transit operates door-to-door route deviation services along seven weekday routes (Routes #1-7) and three Saturday routes (Routes #8-10) within the White Earth boundary. Due to the nature of route deviation services, participants shared their experience of waiting for a long time, especially during winters, for the bus to arrive. Additionally, they expressed their frustration regarding the norm of scheduling a bus ride for every one-way trip and inflexibility around booking a two-way ride. The booking system and waiting system prevented participants from getting to their destination on time and limited use of public transit to only trips which were absolutely necessary. A participant talked about his frustration when he has to wait in winters:

> So imagine anybody would be frustrated with waiting for a bus or something when it's cold out. But like I said, I usually have a number of different modes of transportation such as vehicle and so I really don't wait.

To cope up with these issues, participants preferred having a private vehicle or getting a ride from friends, families or other community members. Additionally, a participant distinctly talked about perceptions of public transportation users in White Earth versus public transportation users in more urbanized areas. He shared that the idea of using urban public transportation was welcomed as people choose to use the transit system because it adds value to their everyday travel; using public transportation in rural areas like White Earth was a matter of poverty more than choice. He stated that he felt humiliated*:*

> Probably in the bus, I cannot stand it. I don't know if it's just humiliation thing and so forth… If we were down in Minneapolis, that's a different story. I want to say that people are going to make fun of you because you're riding the bus because you don't have your own vehicle. So let's go with this situation.

The largest employer in White Earth is the Shooting Star Casino and Hotel. The majority of the White Earth participants worked in Shooting Star where their working hours did not coincide with the service hours of White Earth Public Transit. Additionally, it was difficult for White Earth Public Transit to function during heavy snow. Thus, taking the White Earth Public Transit services to and from work was not a viable option for participants. They circumvented this barrier through private transportation arrangements like getting a ride or having a car or hiring someone for pick-up or drop off services to get to work. A participant who hired someone for getting to work shared about how expensive it is:

> It's kind of difficult. But once it snows, they close it down. And because of the weather, and last week, I had to bum rides and hired people to come pick me up, like three or four days last week, because of the weather last week. So hire people. We don't have Lyft or taxis here. So I asked some of my co workers to come pick me up. Pay like 18 to 20 dollars just for the ride there and back from work. Yeah, I wish I had my own car.

Theme 2. Limited access to healthy food and spiritual activities

The closest grocery store, Walmart, is up to an hour away by car from locations in White Earth. The other stores nearby mostly sell junk food. Limited availability of transportation options, inflexibility of booking a two-way trip, anxiety of unnecessary waiting in harsh winters, and getting stuck at any location after transit service hours adversely impacted access to healthy food for White Earth participants. Additionally, it was difficult for this population to make grocery trips privately as the unemployment rate was high in among these participants. That added constraints to purchasing or hiring a private vehicle. Generosity of community members to offer rides helped participants to a great extent in accessing fresh and healthy food. The condition of participants of White Earth and the community effort was well described by a case manager:

> We got a little gas station that sells junk food and a huge population of our community, all they know is that store. So they are not getting good food. No healthy foods. It’s a problem in our community and actually people are doing something about it now. I think they brought in the healthy food truck that comes in once a week and sells produce and stuff like that. But other than that, if you didn't have a vehicle, probably want to be able to eat a healthy meal or ride to

> Walmart so our community folks are generous to provide you with a ride and get to the Walmart and buy stuff.

White Earth participants showed deep interest in and enthusiasm to frequently attend the Sweat Lodge ceremony that an important part of their culture. However, due to transportation barriers and heavy reliance on getting a ride, they could attend the ceremony only occasionally. The White Earth participants appreciated the assistance that they received from case managers and other community members in making those trips. A participant described the ceremony:

> The sweat lodge, it's part of our ceremonial stuff that we do. I drive and I usually pick up a lot of people in the community and bring them with because they don't have transportation. It's probably 40 miles away from where we live. So it's a trip.

Barriers to transportation have not only affected their engagement in spiritual and cultural activities but also their connections to family. White Earth participants shared that their families lived far away from them and the transportation options to travel to those locations were very limited. They longed to see their families on a regular basis instead of meeting them sporadically. Participants shared that mobility constraints like limited transportation and loss of a driver license created barriers to maintaining healthy family relationships, working at full potential, and achieving overall wellbeing. For a few participants, these constraints and lack of independence could trigger depression. One participant mentioned:

> I was in a lot of depression, frustration can get to where you want to go when you need to and stuff. For me, I don't have a driver's license because of a DUI when I was 18. I'm trying to get that back right now so I can be a little more independent.

Theme 3. A Re-prisoned Life: No driving license, no car, no job

A car is fundamental to the freedom of mobility for White Earth participants. Seven of the eight participants did not have a car and did not have a driver's license. The majority of the participants lost their driver's license due to issues with child support or driving while intoxicated (DWI). Due to the limited public transportation system, White Earth participants could not independently engage in grocery shopping, finding jobs, keeping a job and accessing other services. Thus, White Earth participants relied on case managers to have a functional life. A case manager elaborated on this situation:

> We're really rural, that we have a transit. It gets people to work from eight to 4:30 Monday through Friday. Other than that, there's a lot of swing shift work from four to midnight… but there's no public transportation after hours. So that affects a lot of people. Driver's license is a barrier. We're on the reservation. I know a lot of our men in the area here are with either child support or DWI or something, They got their license taken away and there's a lot a huge population of the men in our in our area that are not eligible for their license.

This vicious cycle is illustrated in Figure 86 below, which is detrimental for people in recovery who try very hard to get on their feet and resume a normal life.

Figure 86 Pictorial representation of web of challenges for White Earth Participants

Limitations and Future Directions

This study has a very small sample size. All the eight participants were males in recovery. Hence, the findings of this study are unique to this population and cannot be generalized. This study gives insights into areas of life where transportation barriers have created greater adverse impacts for residents of White Earth (for example: access to food). However, this study does not speak of challenges faced by students, women, people with disabilities or senior populations living in White Earth Nation. Additionally, only 50% of the participants contributed to smartphone-based data collection which is not reflective of the entire population at White Earth.

Future research can be made more specific to this region and can cater to more diverse populations i.e. people of all age groups and genders, working and not-working, with disability and without disabilities, and people from different occupations. This would provide a more holistic view of how transportation is connected to healthcare, different occupations, and employer requirements. It would also be interesting to explore how transportation can play a role in educational opportunities for American Indian populations like those at White Earth Nation.

Recommendations

The study found that the loss of a driver's license greatly hampers the lives of the participants and makes it more challenging for them to resume a normal and independent life. Thus, it is important to build programs around reinstatement of license. For example, the penalty fees or fines can automatically be withdrawn from offenders' salaries. One participant mentioned in his interview:

> I'd like to see more programs to help a person get their driver's license back. Installments are set. If you have to pay, you have to pay like $100, that is your dues. Then they only have an option to pay 250. Yeah, and then I can't have higher than that. I can't pay 500 because for me it'd be 680 to get my license back. So I have this $500 check... I was like well, can you take this and then take 200 in the future for me? Oh, no, we can do that. But we can take 300 and then 300. It makes no sense.

Participants were dependent on case managers for their mobility, though they prefer taking rides or carpooling with their community members. This carpooling can be further strengthened to build robust shared-mobility services for the community. These shared-mobility services could start with rides to Walmart, Sweat Lodge ceremonies, and reverse work commute. Additionally, cheaper taxi services could be made available in town so that people could travel independently as well without the burden of owning and maintaining a car. Some recommendations were targeted to the maintenance of roads and their safety. Participants lived on a road that comes late in the queue for snow plowing services; hence, the snow accumulates and driving becomes unsafe. Better plowing services could be made available or there could be shuffling in the counties' ranking system.

Adding more streetlights and repairing existing streetlights would improve participants' sense of safety. A participant showed his concern regarding streetlights remaining unfixed for years and feeling unsafe in the night due to high crime rates and animal threats:

> In my village, Naytahwaush, there's no sidewalks or streetlights. There're a few streetlights but they get knocked out as kids throw rocks at them. So they will just stay out for a long time until people in the community complained to the reservation about it. And then something will get done eventually, but not right away. I assume streetlights have been off for years. My area is just 20 miles from here. We are the last in the community in the county for sure. We're on the reservation lands, so county roads matter more than our roads. So we're always last getting plowed out. The reservation has services too and they'll try to get to us. But they got a lot of communities to do. All I know is when it snows, we're always last to get plowed out. Actually, we rely on a tribe to come in, do all that type of work. I feel anxious and unsafe at night. There's a high crime rate where I am from. People steal, people hit each other. And if you're not careful, you could be a victim of that. So we just got our guard up all the time. There's all kinds of animals around here. Deer everywhere, bears, cougars. Big cats. There's a lot of bear out there. The bear population grew in the past five years. I don't know why but there's a lot of bear.

Additionally, White Earth participants' intake survey responses, shown in Figure 87 below, indicate their top recommendation is more frequent bus service or train service. They attached equal importance to (i) easier access to car, (ii) more direct transit services between my home and where I need to go, and (iii) neighborhood shuttle service. These choices are understandable as they are associated with reducing waiting time while being cost-effective.

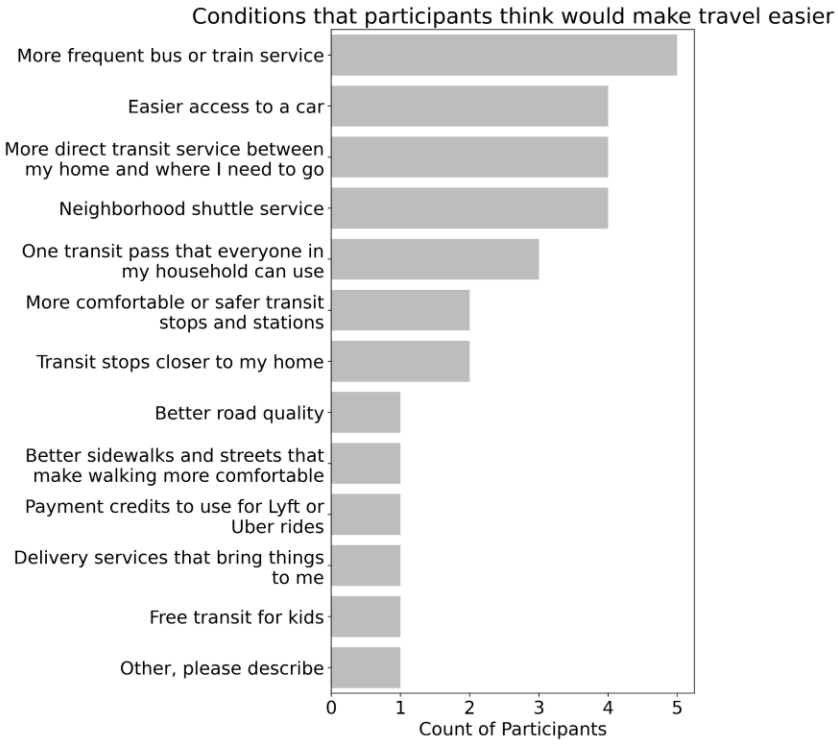


Figure 87 Conditions that White Earth participants think would improve travel experience

In addition to the recommendations made by participants in the interviews, the research team identified a few transportation improvements and programs that could help address transportation barriers in White Earth Nation:

- Driving license reinstatement programs: There should be an assessment in White Earth Nation about what offenses are most common, reasons for those offenses, and preventive programs or measures to reduce the occurrences of those offenses. Programs that help in better financial management for timely payment of penalties and dues could be designed and rolled out. Surveillance of drinking and driving can change its approach to more preventive measures like limiting to alcohol at certain times of day.
- Evaluation of food truck initiative at White Earth and other shuttle services for groceries: Recently, there has been an initiative to arrange for food trucks once a week for the community. The success of the food truck initiative can be assessed and evaluated to either strengthen it further or frame other effective solutions. Potential limitations with food truck could be: (i) the choices of products get limited; (ii) the logistics and supply chain to the end customer can be difficult to manage; and (iii) people will have to stand outside in cold , which would make the shopping experience less enjoyable. Additionally, a participant mentioned shuttle services to Walmart, which were once suspended due to a stealing incident. These services can be further assessed for their effectiveness. One alternative to food trucks, based on the findings from other case studies in this project and taking into consideration needs of this community, could pre-arrange grocery trips at least 3 times a week for the community via bus. Ideally, grocery trips could (i) provide door-to-door service to ease challenges related to carrying many and/or

heavy shopping bags; (ii) provide a more reliable and comfortable two-way trip to the store; and (iii) reduce isolation through engaging community and addressing a basic need of food access.

4.11 Single Fathers

The research team interviewed eight single fathers who connected with the study through Goodwill-Easter Seals Minnesota, a non-profit organization that offers job training and career support to eliminate barriers to work and independence. The FATHER (Fostering Actions To Help Earnings and Responsibility) Project became a program of this organization in 2004. It assists fathers in overcoming the barriers that prevent them from supporting their children economically and emotionally (FATHER Project, 2017).

Of the eight participants in this group, seven were interviewed on January 24, 2023 at the office of the FATHER Project in Minneapolis. The other participant was interviewed virtually on December 21, 2022. Of the eight interviewees, four completed the follow-up smartphone-based travel behavior survey, which generated 16 days of activity and trip data.

Community and Participant Characteristics

The 2022 U.S. Census stated that there were 10.9 million one-parent family groups with a child under 18 years of age, 80% of which were run by mothers. Among those remaining 20% single-parent families, 41% were never-married single fathers and 38% were divorced single fathers (U.S. Census Bureau). In this study, there is no distinction on the basis of marriage or divorce or never married single fathers. Of the eight participants, seven of them had caregiving responsibilities at least a few times a week. All of the participants were born in the US and none of them had immigrant parents.

As shown in Figure 88 below, participants in this group were predominantly between 35 to 49 years old. The majority of participants identified as Black or African American. 50% of the participants were unemployed and only 37% of participants were employed full-time. Five out of eight participants had an annual household income less than $25,000, one participant had income between $25000 and $49,999, one participant had income between $50,000 and $99,999, and one participant preferred not to answer.

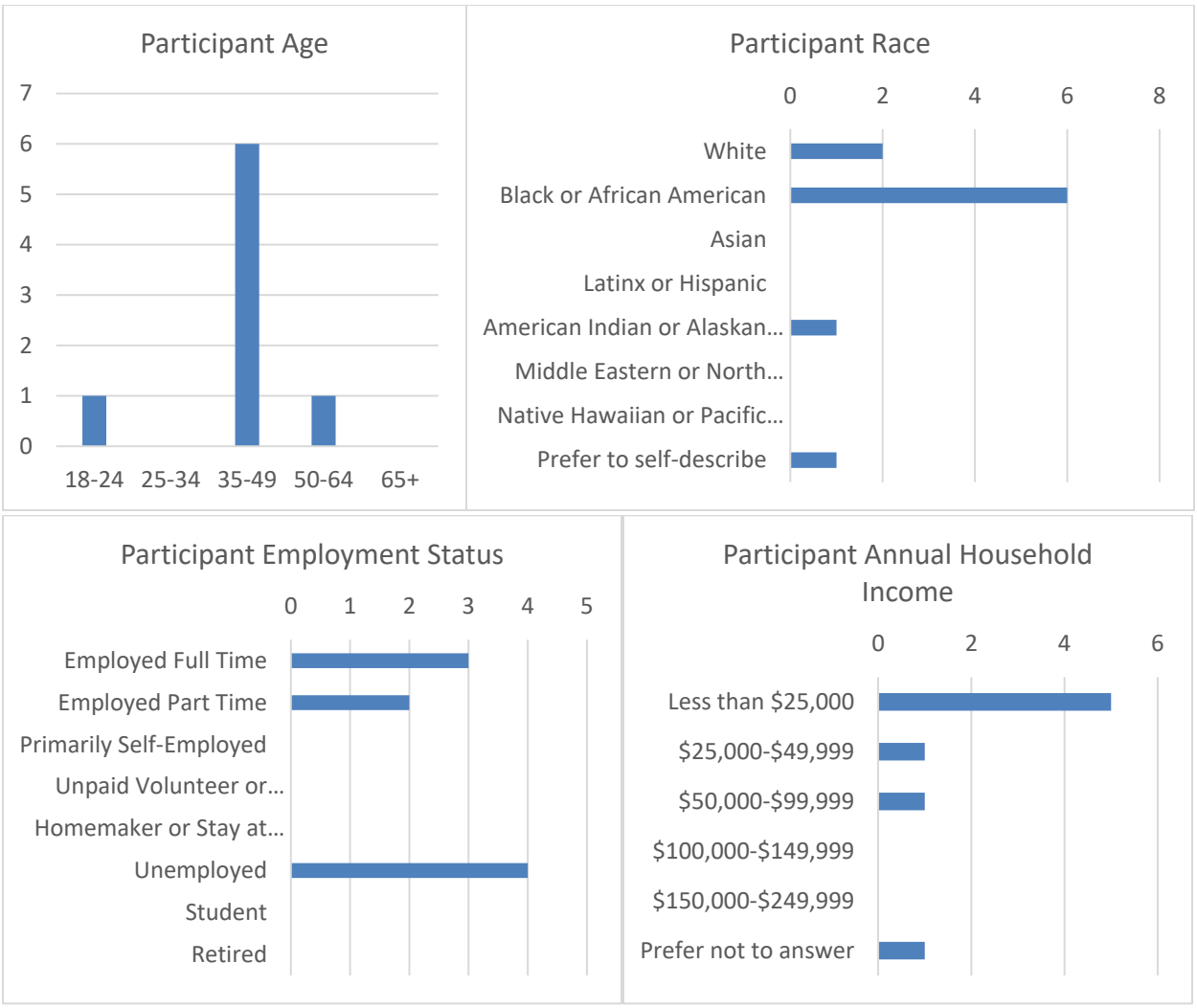


Figure 88 Single Father Participants Distribution by Age, Race, Employment Status, and Household Income

Of the eight participants, two of them had a chronic condition. Figure 89 below illustrates the level of education of the participants. 50% of the participants had some college, 25% participants had a high school diploma or equivalent, 12% had less than a high school diploma, and the final 12% had a graduate degree. When it comes to housing status, none of the participants owned a house. Half of the participants lived in rented or leased houses and the other half lived in other kinds of supported housing, like living with their parents where they do not need to pay rent. Figure 89 also illustrates the household structure of the participants, showing about half of participants lived with their children.

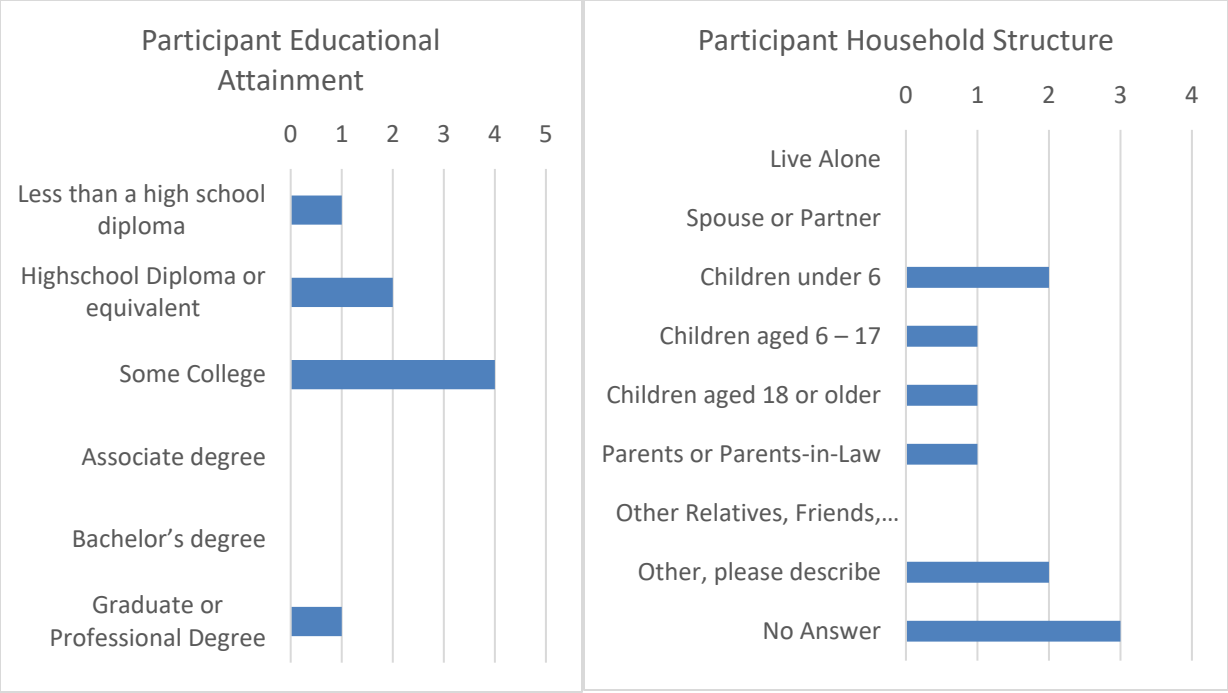


Figure 89 Single Father Participants Distribution by Educational Attainment and Household Structure

Participants in this group used and relied on public transport as the majority of the participants did not own a car (six of eight participants). Most participants in the single father group lived in the city of Minneapolis (see Figure 90).

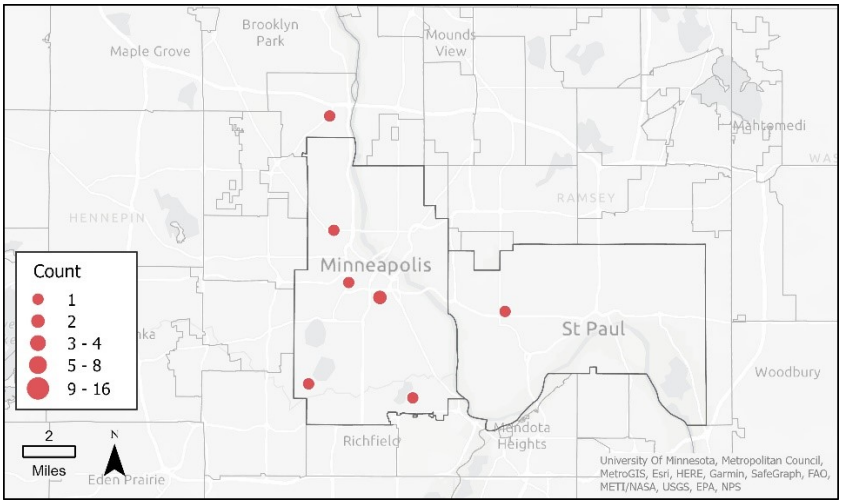


Figure 90 Geographic Distribution of Single Father Participants

As shown in Figure 91 below, the activity patterns of this group were different than the average study participant in many areas. This group traveled less than the average participant on an everyday basis for work and education. Only 37% of Single Fathers participants as compared to 49% of all participants traveled for work almost every day, reflecting the high unemployment rate in this group. Additionally, only 12% of Single Father participants traveled for educational purposes almost every day as compared to 24% of all participants. However, the percentage of single father participants traveling few times a

week to take classes was more than all participants, 62% and 28% respectively. This group was engaged more frequently in traveling for food or meals, for caregiving, for religious or spiritual purposes and for civic errands. While 47% of all study participants never or hardly engaged in religious or spiritual activities, only 25% of single father participants never or hardly engaged in religious or spiritual activities.

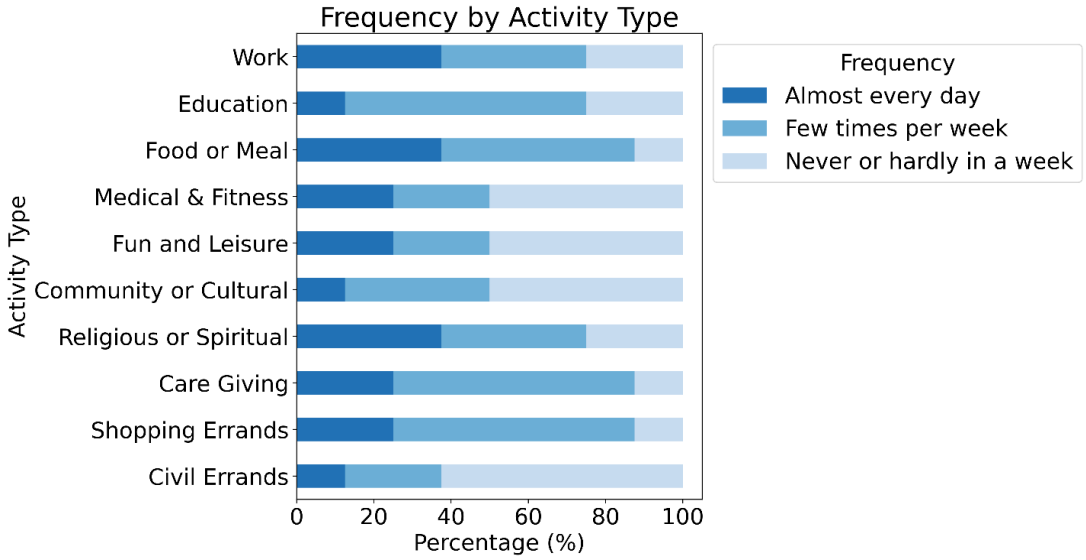


Figure 91 Frequency of Daily Activities by Activity Type among Single Father Participants

Figure 92 below describes the mode of travel frequently used by single father participants. The graph explicitly shows that this group relies heavily on public transportation as 62% use public transportation almost every day, compared to 25% of all participants. The percentage of participants driving by themselves was significantly lower than all participants i.e., 25% and 42% respectively. The heavy reliance on public transportation and significantly lower use of private cars could be because very few participants in this group owned a car.

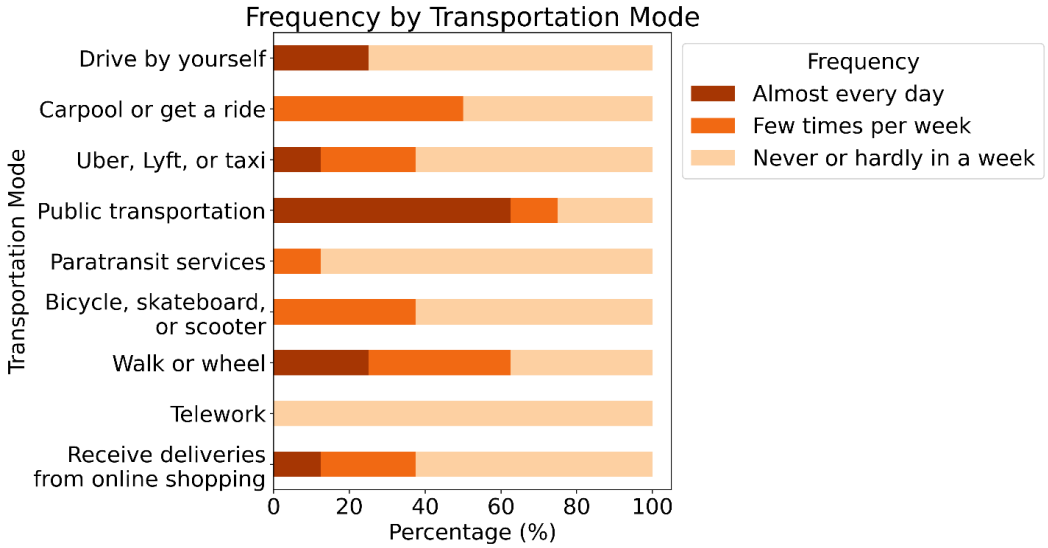


Figure 92 Frequency of Daily Trips by Mode Type among Single Father Participants

As shown in Figure 93 below, the total time spent travelling on an average day for the single father group is significantly more than the total time spent traveling by all participants group, 99 minutes for single fathers as compared to 67 minutes for all participants. The two dominant modes of travel were by vehicle and walking. Single fathers spent 60 minutes in cars each day (combining all three car-based travel modes). However, the Single Father group makes minimal use of car rides (car-passenger) spending 2 minutes on average compared to 13 minutes for all participants. Also, this group spent more time walking as compared to all participants, walking 25 minutes an average day compared to eight minutes spent walking by the average participant. This data is consistent with car ownership and use in this group as compared to all participants. Importantly, only four participants from this group contributed to smartphone-based travel behavior survey, so this is not reflective of the entire group.

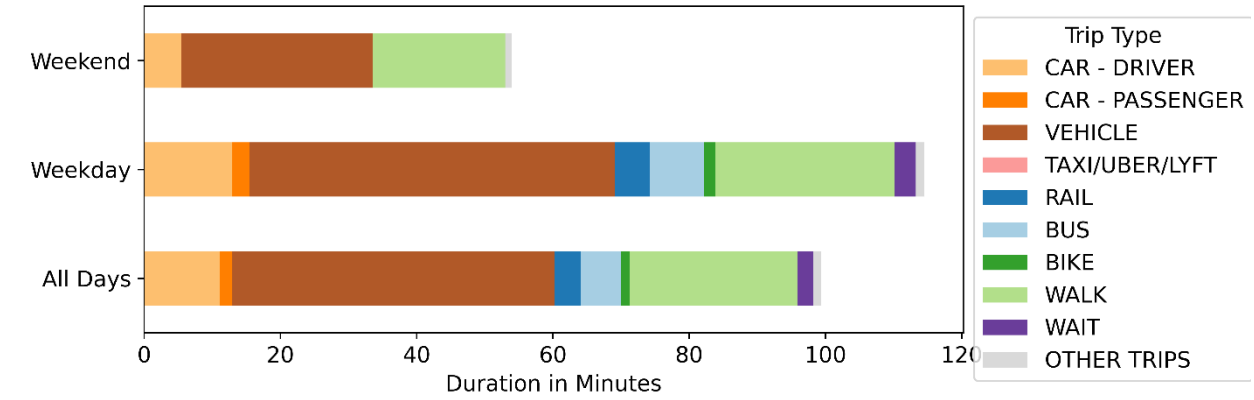


Figure 93 Average Daily Trip Duration by Mode Type among Single Father Participants

Figure 94 illustrates the average daily trip distance among Single Father participants. There was not much difference in the total distance travelled on average day between the Single Father group and all participants group. Single fathers also traveled about the same distance in a car each day, 20 miles across all three car travel modes, compared to the average participant traveling 21 miles in a car. Single Father participants walked significantly more (2 miles on average) than the average study participant who walked only 0.55 miles on average. The longer distance traveled by walking helps explain why single father participants spent longer traveling than the average participant but covered about the same number of miles.

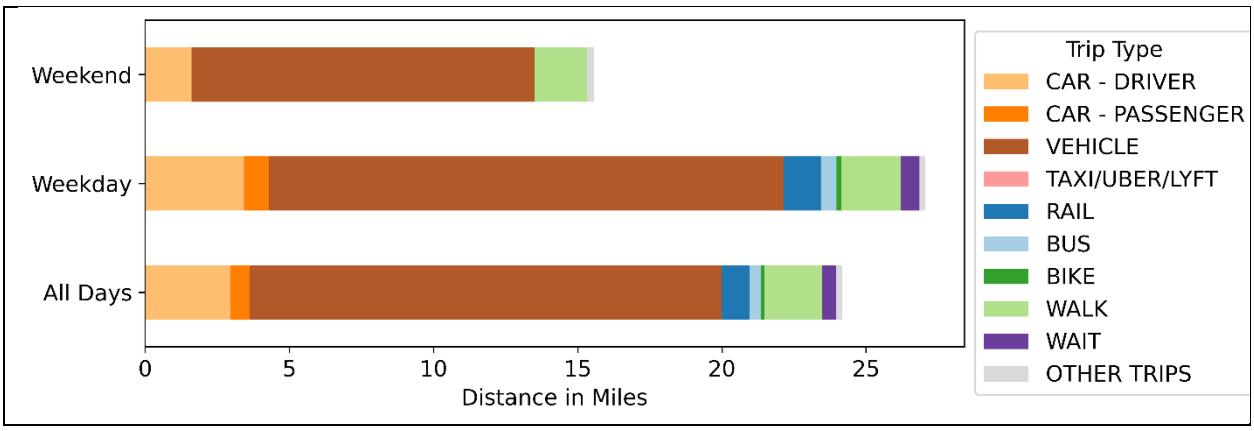


Figure 94 Average Daily Trip Distance by Mode Type among Single Father Participants

Figure 95 below illustrates the trip frequency by mode type for Single Father participants. The Single Father participants took more trips per day (5.9 trips per day) than all participants (4.14 trips per day). Consistent with the data above, the walking trips per day for Single Father participants were more than all participants, 1.9 trips per day and 0.56 trips per day respectively. In general, Single Father participants traveled for more time, covered more distance, and took more trips than all participants. However, this data may not be fully representative of this community group as only half of the participants took the smartphone-based travel behavior survey.

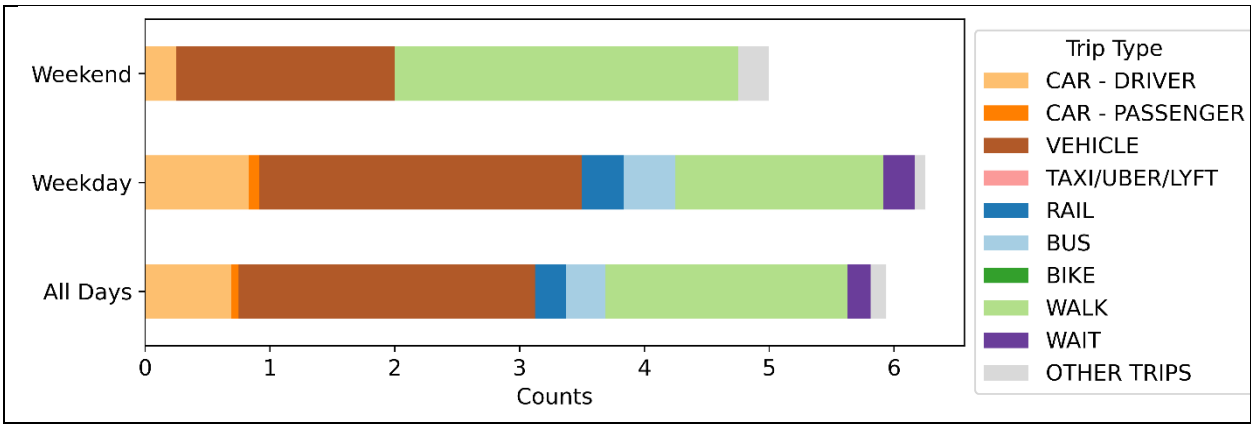


Figure 95 Average Daily Trip Frequency by Mode Type among Single Father Participants

Qualitative Interview Data Analysis

The research team employed a qualitative, interpretive methodology to derive findings from participants' interviews, seeking shared experiences among participants regarding transportation needs, barriers, and solutions in their everyday lives. The analysis involved close readings of interview transcripts and coding passages of text pertaining to topics, concepts, or understandings. This process was iterative, with codes directing further readings, new codes, and then developing themes.
In this analysis, the research team identified two major themes: 1) Preference for public transportation under the right conditions, and 2) Transportation affects employment, housing, medical access, and spiritual well-being.

Theme 1. Preference towards and concerns against public transportation use

Of the eight participants, only two owned cars and drove themselves every day to work or other places. However, both of these participants expressed their desire to use public transportation as that would reduce their commute stress and save them from parking hassles. Additionally, they stated that the primary reasons they used a car was that it took less time and was convenient to get to different places. One participant that works as a teacher shared that traffic while driving his car increased his stress levels but that using public transit would require him to ride three buses:

> I suppose I feel stressed during the commute. It's over an hour of sitting in a car a day. Like I said, I would like to use public transportation. In my case I don't know how it could be improved. I live in South Minneapolis, so I would have to take a bus to downtown Minneapolis and go from downtown Minneapolis to downtown Saint Paul, and then get a different bus from there. I don't know how it could be covered better just with the distance.

A participant whose job was right near the train station, shared his barriers taking a car to work compared to going by train:

> Because all my jobs are connected to train, having a car is a barrier to me. I gotta find somewhere to park and then I'm looking forward to parking ramps or I got to find street parking. I gotta go blocks away and walk. Rather if I leave my car at home, it's safe. I jump right on the bus or a train or jump on the train. Stuck me right up front of my job.

Although public transportation helps in easing stress levels and is cost-effective compared to private modes of transportation, all the participants expressed their deep concerns with safety on public transportation. As Single Father participants were actively engaged in caregiving for their children, their foremost concern was safety of their children on public transportation. They felt anxious to let their children use public transportation on their own. All participants mentioned frequent altercations on public transportation and drug and alcohol abuse on buses and trains. One participant who has three daughters mentioned that he prefers taking his daughters anywhere by car rather than letting them go alone in bus:

> Because my daughters and stuff, trying to travel when they want me sometimes having a rough patches or being honest, public transportation doesn't seem to be safe for my kids. It is not safe for your kids… My oldest will be 16 next week. Pray for me. Then I have 10-year-old and eight-year-old girls, not together with the mom for three girls. So, it's a battle but I try to do as much as I can. Yeah, I mean, just outside the way the world is. You know how crazy, you got people with crazy minds and alcoholics and people on drugs or whatever and things happen, random stuff happened with the shooting, random shootings and stuff like that, so I just don't.

One participant mentioned that he decides to ignore whatever concerning situations he sees on the train just for his and his children's safety:

> I don't worry about it. You know, I've been in situations. With my son growing up, public transportation being our main mode of transportation where I've had to pick and choose my battles. Whether it be obscene language or things going on, do I want to step into this and be like, Hey, you got women and children on this bus you know, but then if you like say pick and choose your battles, because I'm not going to risk my safety or my son's just to stop something that we could just deal with and I could speak with him about it another time.

A few participants despised trains for being a drug hub and expressed frustration at the inactivity on the part of people and system to stop it or improve the situation. One participant frustrated with the current conditions of trains shared:

> I ride it almost daily and I see drugs on there all the time. That's unfortunate. So currently, when there's stuff going on, that they know and then the police, they know is illegal. And the cops walk through and totally ignore what's going on. It's frustrating because walking through isn't gonna fix the problem on trains… they have to actually like start handing out tickets and you bringing people in jail I think before they realize that, hey, smoking on the train is gonna get you in trouble, you know?

Also, a few participants reported instances of defecation on the trains which makes passengers feel uncomfortable and unhappy about the train ride. One participant shared his experience at the light rail station:

> I've got up there and within five minutes one time, was going out to the Mall of America on the light rail and someone just right on Lake Street. Glass on both sides. You can see the people up there. He just started urinating on an open box of food that was on a bench. And I don't know if it's chicken wings, they look kind of like dates, that dried fruit or whatever dates are. And you just peed right in here and just walked off. And just like that, someone walked up behind them, didn't see him, and picked one up and ate it. And I'm like he just peed in there. And he just shrugged his shoulders. It's like they don't care how they're living up there. I don't care what they're doing. From one thing to the next, and I don't even want to sit down and wait comfortably for the bus.

Theme 2. Transportation limits employment and housing choices and medical and religious activities

Half of the participants in this group were unemployed and those who were employed shared that their choice of employment was influenced by bus or train lines. Some of the participants shared that the wait time for the bus or instances when buses failed to show up impacted their abilities to keep a job. One participant expressed his annoyance regarding irregularity of the bus,

> Standing outside waiting for a bus that never shows up. Does go through that a lot at the VA center. Like I knew you go to that bus shed over there. It says the bus will be here at this time, then bus is never there. And then when they pull up, they sit for 10, 20 minutes until the next time that's on the bus schedule. So if you say 3:15 here, that's supposed to be pulling out. He's already sitting back there. So he's not going to pull out at 3:15. He's going to pull out at 3:23 somewhere down the line because he's going to get his 10-minute break that he was late for pulling up. I've learned how they work. So if he's late from each station, till he gets to his break station, he's gonna miss the time that he's supposed to pull up. So he's gonna skip that time and do his recitation. And then now that puts the time from this time that he's probably pull that to the next time, which is 20, 30 minutes later. Trust me. I've had to walk from the VA to my house because he never showed up and then as I'm walking, here he is coming up. But now he got to turn around and get to the VA and sit 15. When he said that, yeah. And it's not my fault that you will learn why were you late. What's the issue? What if there's no snow on the ground? There's no nothing going on? What prevented you from making your own time?

Some participants expressed that transportation availability factored into housing decisions. One participant who spent time homeless during a time of crisis stated that it’s tricky to choose a house, as rents will be cheaper if houses are farther out but there is no reliable transportation available, and a car becomes necessary. He shared:

> Over the last year, I stayed in many sites where there wasn't public transportation so it kind of hindered me for the whole year. Now kind of suffering because all my bills and stuff back up. That's how I ended up at the homeless shelter because of nonpayment of rent I mean. It can be very helpful or it can be turned into good public transportation or not. Everything we need, we

> need transportation especially nowadays. Reliable transportation. If I had a rocket ship, I would go. Maybe cheaper, cheaper price also fits in your price range, but kind of further out. The further you go out of the city, you go, stuff like that. You know, if you can afford to drive back and forth, you can probably pay less. But if you stay in the city, you can get jacked up.

Multiple participants in this group do not have stable housing or living conditions. Thus, as they move around, they have to figure out different transportation options to get to places like pharmacies, doctors' offices, or church. One participant shared his experience of strategizing his trips to the pharmacy and grocery store around available bus lines,

> Well, I gotta say, I always try to make certain places close to the bus line. You know what I mean? Like I go get my medication at Walgreens. Walgreens is right on the bus line, right on Lyndale and Broadway. That's where I go get my medication. So I could take two other buses to get there. So that and such as Walmart. I needed to go to Walmart. I could just take the C line and go to Walmart; the transit center is right across the street from Walmart, which is a good thing. It's a good thing to always be organized and to have proper planning when you're taking trips.

Another participant expressed sadness that he had to miss his medical appointment as there was no public transportation to get to that hospital:

> In some cases, getting to certain doctor's or clinics that have to rely on a medical vehicle or something, it's hit and miss with the person's experience and having to wait an hour for a ride that's scheduled to come pick you up.

It was noted above that this group goes to religious and spiritual centers more often than all participants. Given the lack of private vehicle and means to afford Uber or Lyft or other kinds of ride share services, public transportation is critical to make their religious and spiritual visits.
One participant mentioned that going to church on Sundays is difficult due to less serviceable hours of the bus,

> With my residential shift right now, it was easier to get to my home church from home because the bus was a block away. The times didn't match up so I didn't have to be this much earlier, this much later with the reduced service, understandably. Now staying where I'm at, it would be more difficult for me to make it there by transferring buses and those buses connecting on a Sunday.

Limitations and Future Directions

This study has a very small sample size and half of the participants were unemployed at the time of the interview. Therefore, caution should be taken in broadly generalizing from this sample. However, some key themes are noteworthy. Single fathers are more likely to worry about the safety of their children owing to a trait of protection embedded in many fathers. Additionally, hindrance in employment and job opportunities due to lack of transportation is a common theme in many communities covered in this study. However, despite the barriers, the Single Father participants showed greater interest than some

other groups in using public transportation. In many instances, finances and employment constrained participants' transportation choices. However, it should be investigated further if this set of the population would make public transportation their personal choice or if it is only a mode of last resort when a car is not available. The qualitative analysis suggested that the major barriers to taking public transit were (i) safety concerns and (ii) lack of direct routes to employment location which greatly increases their commute time.

Future research should explore single fathers of all age groups with more diversity across geography, racial representation, and occupation. Further research could also explore whether there are differences between divorced single fathers and never married or widowed single fathers. For example, there was one participant who preferred to live near his ex-wife's house and have a car so that he could meet his children and take care of them and their schooling few times a week. This preference might come through more strongly in a study of divorced single fathers. Further research could also investigate whether transportation plays a role in the mental and emotional wellbeing of Single Fathers, their social status and social image.

Recommendations

The Single Father participants unanimously recommended that measures should be taken to make trains and buses safe modes of public transportation. Safety on public transportation was their topmost priority. However, they showed hesitance in deploying police on the bus or train. As the majority of participants in this group were African American, the hesitancy may have been shaped by experiences of bad policing, or future anxiety of being unnecessarily troubled as suspects. One participant shared his experience on train where police mistook him for a drug dealer:

> That was cool, good until you get police on the men. Yeah, it's intimidating to me by now. I'm a verbal person. So I kind of tell them I'm not the kind of guy you look for. If you see me with my work badge on, know that I'm not one of those kinds of people. So you don't need to question and check me. Go find somebody else to bother.

Another participant talked about taking strict measures like fines, penalties, and jail for drug abuse, drug dealing, and inappropriate behavior on trains and buses. One of the participants recommended having self-monitoring, self-accountability, or community police to keep public transportation safe and having systems that reward good behavior.

> Actually with more responsibility, more people speaking up in the community, meaning trying to let people know that their behavior is okay, instead of just sitting by like, we'll see stuff and no, it's not me at all. I'm just gonna leave. I think if we held people responsible, that we policed our own communities a little better, then people will know that I can't get away or it's not just a belief it's going to be, I'm just holding each other accountable, responsible for rewarding good behavior.

Almost all the Single Father participants who frequently used public transportation recommended that trains and buses should be kept clean to make the experience more welcoming for riders: “When I say clean up the buses, we can. That would make more people be okay with getting on the bus.”

Figure 96 below illustrates the self-reported preferences of participants that could improve their travel experience. More frequent bus and train service is given the highest priority. This is consistent with the participants’ experience of living in in more residential areas and using public transit. The Single Father participants have equally ranked (i) easier access to cars, (ii) more comfortable or safer transit stops and stations, (iii) more direct transit service between my home and where I need to go. This is understandable and consistent with the findings of the qualitative analysis where participants talked about commute stress, irregularity of the bus, long wait times, and the convenience that comes with car.

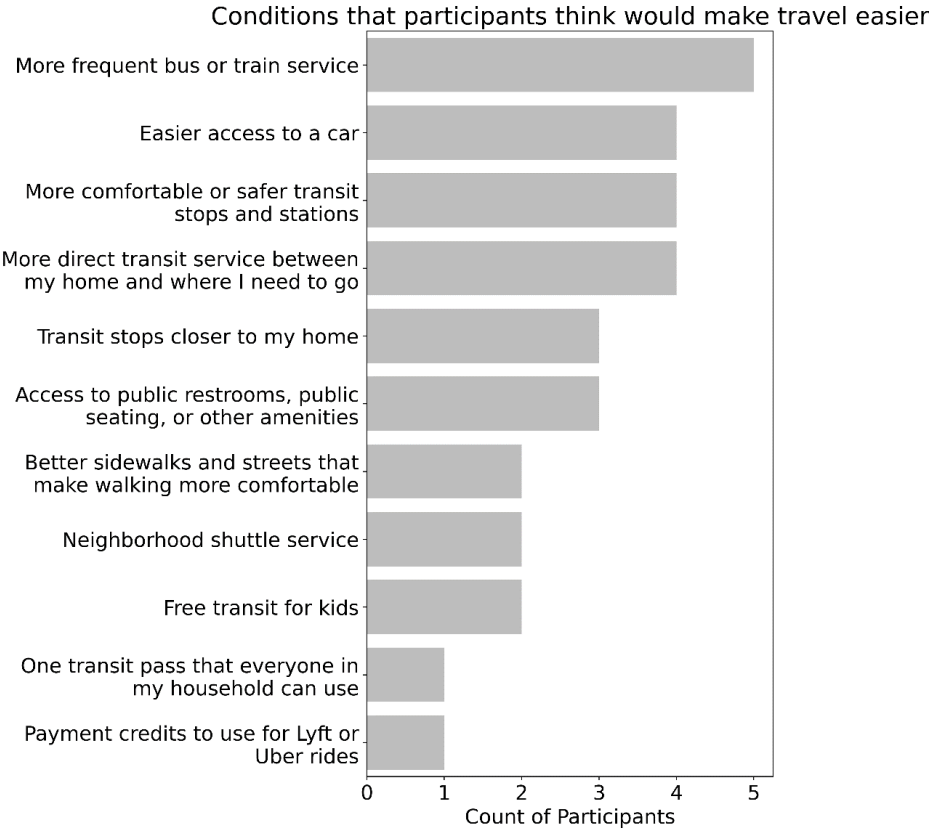


Figure 96: Conditions that participants think would improve travel experience

In addition to the recommendations made by participants in the interviews, the research team identified a few transportation improvements and programs that could help address transportation barriers for Single Father participants:

- Universal Transit Pass: Having a universal transit pass will enable these participants to freely and more frequently take public transit. A digital pass or purchasing the pass through a mobile application will ease their stress and make their commute less of a hassle. There can be premium transit passes that enable the user to pay for parking as well. This will help people travelling to or from a location outside of bus or train serviceable hours. There was one

participant who mentioned that he skips going to activities like concerts or shows as he finds parking expensive in downtown and does not have the option of returning home with public transit given limited late night options.

- Extension of railways and buses into suburbs: The participants have recommended increasing the availability and frequency of trains and buses. However, this should not be limited to downtown or main city areas but extend to more residential areas and suburbs as well. This helps in cost-effective and stress-free two-way commutes for Single Father participants. It would also help them find better employment opportunities.
- Church Shuttles: The study found participants had preferred to visit their home church. Considering that running bus services on weekends at the same level as weekdays would be expensive, community-based or neighborhood-based shuttles for weekend activities church services should be explored. Ideally, the service would be mobile application-based for real time tracking and scheduling rides.

Chapter 5. Conclusions and Recommendations

For underserved communities, their lived experience shows that transportation is essential to all aspects of their lives, including work, family, health, community, and spirituality. Prevailing policy conversations among the general population have focused on physical conditions of the transportation infrastructure, e.g., congestion levels, pavement conditions, lighting, and snow removal. In contrast, for underserved communities, good transportation means much more than infrastructure quality and maintenance—a dignified life, a place to call home, a living-wage job, and essential connections with family and friends.

Engaging with underserved communities was a challenging task. After earlier failed efforts, the research team achieved success by implementing new strategies for community engagement and participant recruitment. These new strategies included 1) meeting communities where they are to ensure inclusivity and equitable participation, and 2) providing reasonable compensation to community partners and study participants whose participation was essential for the completion of the study.

The strategy of meeting communities where they are recognized the systemic barriers and challenges faced by these communities, such as limited access to resources, language barriers, transportation issues, and distrust in institutions. Specifically, by integrating participant recruitment work into the community gathering events that were already planned by various community organizations, the community organizations reconsidered participant recruitment as something that was achievable within their existing work commitments. Furthermore, in communities where the research team was not able to build connections with community organizations (e.g., the African American transit rider community), meeting participants where they are (on buses, trains, and transit stops around the Twin Cities and surrounding areas) proved to be an effective recruitment strategy.

The strategy of providing reasonable compensation also played an important role in attracting study participants. Following the increased participant compensation, community organizations welcomed the opportunity to collaborate because they felt that the research project could provide financial benefits to the community members they serve. Providing compensation to community partners and study participants fostered a mutually beneficial relationship. In addition, based on our recruitment experience, it became evident that participants were frequently motivated by the cash compensation rather than the topic of the research study. It was observed that some participants did not feel that they had anything valuable to say until they started being interviewed. Therefore, the absence of an appealing compensation strategy could have resulted in the failure of data collection efforts.

Table 3 summarizes the major themes on the transportation experience of the underserved communities included in this research. Of the identified themes, we find three common threads: inadequate public transportation, car-related challenges, and the impact of transportation on major life outcomes. Two of the three threads, inadequate public transportation and transportation affecting major life outcomes, occur across all ten communities. This is an important finding because very few transportation equity indicators clearly state the role of public transportation or the connection

between transportation and major life outcomes as major factors for promoting transportation equity. For example, the Transportation Equity Scorecard developed by Williams et al. (2020) highlights six major categories of transportation equity factors including access to opportunity, health and environment, safety and emergency evacuation, affordability, mobility, and burdens. Of these six categories, access to opportunity and health and environment can be considered as making an effort to connect transportation to major life outcomes. However, the category is not comprehensive and does not emphasize that transportation is essential to all aspects of people's lives. Other than connecting people to job opportunities, healthy food, and healthcare providers, this research provides strong evidence that transportation is essential for maintaining family and community connections as well as for attending religious and spiritual meetings.

Table 3 Major themes on the transportation experience of underserved communities

Community	Themes on the Transportation Experience	Inadequate public transportation	Car-related challenges	Transportation affecting major life outcomes
Latinx	• Barriers to the use of public transportation • Preference for and Dependency on Cars • Inadequate public transportation for fulfilling essential activities	X	X	X
African American	• Transportation and employment connection • Impact of transportation on social well-being • Safety Concerns	X		X
People with disabilities	• Metro Mobility - some independence but unreliable • The necessity of a support system • Reliance on door-to-door transportation	X		X
Immigrant	• Public transportation is inconvenient and inadequate • Transportation is important for culture and community connections • All modes of transportation are expensive	X	X	X
People with HIV	• Transportation, Nutrition and Health • Transportation, Risks and Personal Safety • Hidden Affordability barriers	X	X	X
Fergus Falls	• Barriers to essential employment, food, and healthcare needs • Dependency on Rides from Family and Friends	X	X	X
Hmong	• Driving as caregiving • Hesitant about public transportation • Culturally relevant outreach	X	X	X
Single mother	• The necessity and unaffordability of automobile ownership • A desire for but lack of viable public transportation options • Community Support for Car Ownership	X	X	X

White Earth	• Deficiencies with transit systems and its impact on employment • Limited access to healthy food and spiritual activities • Re-prisoned: No driving license, no car, no job	X	X	X
Single father	• Preference towards and concerns against public transportation use • Transportation limits employment and housing choices and medical and religious activities	X		X

Furthermore, transportation equity tools including Williams et al. (2020) rarely mention public transportation as an important factor for promoting transportation equity. Many cities and regions in the U.S. have suffered chronic disinvestment in public transportation. The disinvestment creates a vicious cycle and effectively makes those who cannot afford to drive cars as an underclass in mobility and accessibility. U.S. cities and regions have not provided transit users the same level of service provided to private car owners. This outcome is not surprising given the social construction of transportation. As a core component of the built environment, transportation systems are socially constructed entities that manifest the social structures and cultural assumptions that are often constructed by the dominant race or class. As a result, transportation systems tend to come with embedded power structures and systematic inequalities that can enslave underserved communities and disproportionately benefit the dominant race or class. The embedded inequities create the dichotomy of "public" and "private" transportation as public transportation is considered the inferior mode for the underclass and private transportation is considered the default mode for the middle and upper classes. Given the above, improving public transportation is inherently important for addressing transportation inequities and considering the needs of marginalized communities. It is also important to recognize that when transportation systems are designed to benefit everyone, we can collectively thrive and create a more inclusive and sustainable society.

Of the ten communities, seven communities reported a common thread of car-related challenges. The three communities that did not report car-related challenges were African Americans, people with disabilities, and single fathers who heavily rely on public transportation in their daily lives. They did not report car-related challenges mostly because they have not had much experience owning and using a car for their daily activities. The communities who have had some experience owning and using cars all reported car-related challenges, especially in relation to cost and affordability. To them, owning a car comes with significant burden. Many participants who had access to a car mentioned that the cost burdens discourage them from driving farther distances or more frequently. In addition to cost burdens, participants mentioned challenges associated with obtaining a driver's license. For example, Latinx and immigrant communities shared about the lack of adult driving schools as a barrier for obtaining a driver's license as most of them had to learn driving skills after arriving in the U.S. during their adulthood. Participants in Fergus Falls and the White Earth Nation shared their experience of losing their driver's licenses due to issues with child support or driving while intoxicated. In these rural communities, losing a driver's license means being unable to access employment, key services, and community life. It creates major obstacles in everyday life and a vicious cycle of not resuming a normal life and not being

able to get the driver's license back.

One can argue that transportation equity can be advanced by subsidizing and enabling private transportation in underserved communities. Yet, such private transportation systems, if they exist, are the equivalent of public transportation systems that aim to provide ubiquitous mobility and access to all communities regardless of race, class, gender, and ability levels. Here, we recommend a reconceptualization of public transportation as any transportation means and services that de-commodify transportation, i.e., people can acquire a socially acceptable standard of mobility and accessibility independent of their income. Following this reconceptualization, all forms of publicly subsidized mobility services in underserved communities can be considered public transportation, regardless of whether the services employ the traditional public transportation vehicles such as buses and trains. This new conceptualization broadens the scope of public transportation and welcomes new innovations in public transportation services.

While the ten communities included in this study exhibit geographical and demographic diversity, it is crucial to acknowledge that they represent only a small fraction of historically and presently underserved communities within the transportation system. Future research endeavors should aim for greater inclusivity by incorporating additional community groups. It is equally important to explore intersectionality among these groups to gain a more nuanced comprehension of transportation barriers and inequities. For instance, examining the intersection of national origin and immigration status, as well as gender and race, can provide deeper insights into the unique challenges faced by different individuals and communities. Furthermore, this study integrated the Centering the Margins approach with the Human Flourishing Framework to explore transportation inequities. Future research may integrate approaches like Community Impact Assessment (CIA), Health Impact Assessment (HIA), or the Livability Framework to understand the equity impacts of transportation projects and programs. Evaluating the effectiveness of these frameworks can guide future decision-making processes to prioritize equitable outcomes.

For each of the ten communities included in this study, the research team has provided recommended actions addressing their unique transportation barriers. Nonetheless, given the common threads identified in Table 3, higher-level recommendations can be developed to improve transportation equity across multiple underserved communities. To that end, the research team makes the following recommendations.

First, transportation practitioners may adopt the human flourishing framework to identify transportation-related underserved communities as communities whose transportation barriers have hampered their ability to live a good life. Once the underserved communities are identified, transportation agencies may promote transportation equity by aligning funding and investments to improve transportation access and opportunities for these communities. Several strategies and tools can be employed to implement this framework, including performance measures and dashboards, project selection criteria, and equity scorecards. Specifically:

- Establishing performance measures and dashboards can help track transportation equity progress in

specific underserved communities. These measures can include indicators such as access to public transportation, connectivity to essential services, affordability, and travel experiences. By monitoring these metrics and tracking changes over time, transportation agencies can identify areas that require focused investments and interventions to improve equity.

- Integrating equity considerations into project selection criteria ensures that transportation investments prioritize the needs of underserved communities. This may involve criteria such as proximity to marginalized neighborhoods, the potential for improving access to education, healthcare, and job centers, or addressing historical disparities. By explicitly including equity criteria, decision-makers can allocate resources to projects that have a significant impact on improving transportation access for underserved communities.
- Equity scorecards provide a systematic framework to evaluate and compare transportation projects based on their equity impacts. These scorecards can assess projects against various equity dimensions, such as socioeconomic disparities, racial or ethnic disparities, or environmental justice considerations. By using a standardized evaluation process, transportation agencies can make more informed decisions about project prioritization and ensure that investments are distributed equitably.

Second, transportation practitioners may reconceptualize public transportation as any mobility service that de-commodifies transportation and helps people to achieve a socially acceptable standard of mobility and accessibility independent of their income. This involves shifting the focus from transportation as a commodity to transportation as a fundamental right. One approach is to provide no-fare transit, making public transportation free for all users. By eliminating fares, financial barriers to accessing transportation are removed, ensuring that everyone can benefit from public transit regardless of their income. This approach has been implemented in some cities around the world as a means to enhance equity, increase ridership, and reduce reliance on private vehicles. More importantly, recognizing transportation as a right, similar to education and healthcare, involves a paradigm shift in policy and societal attitudes. It means prioritizing equitable access to quality transportation services as a fundamental need for individuals to participate fully in society. This requires legislative and policy changes, public support, and the allocation of resources to ensure transportation is accessible and affordable for everyone.

Third, transportation practitioners may encourage transformative innovations that can significantly broaden the scope of public transportation services and move beyond traditional bus and rail services. Public transportation programs may be designed to offer and/or subsidize on-demand transportation services and address specific mobility needs. By offering publicly subsidized ride-hailing or microtransit services, individuals can access affordable transportation when and where they need it. This is particularly beneficial for areas with limited traditional public transit infrastructure or for individuals with mobility challenges who require personalized transportation solutions.

Fourth, transportation practitioners may collaborate with non-transportation government agencies and frontline community organizations to explore how transportation programs can be paired with non-transportation programs to improve major life outcomes in underserved communities. For example,

transportation services can be coordinated with medical appointments, ensuring that individuals can access healthcare services conveniently. Collaborative programs may also include providing reliable transportation options to job training programs, job fairs, or directly to job sites. Following the human flourishing framework, transportation considerations could also be more explicitly built into food access and nutrition programs as well as social services and community support programs. There is an immediate and pressing need to establish a wide consensus that transportation programs can be paired with non-transportation programs to address the broader social, economic, and health needs of underserved communities.

Finally, transportation practitioners may promote more diverse public engagement in transportation decision-making processes through active involvement of underserved communities and efforts to study lived experiences of these communities. This research has effectively demonstrated that, in addition to quantitative data, it is crucial to include qualitative information when studying unique transportation needs, challenges, and aspirations faced by underserved communities. Simply relying on trip origin and destination data may overlook important aspects of people's lived experiences and how transportation impacts their daily lives. Qualitative research methods, such as interviews, focus groups, and surveys, allow for a deeper understanding of individuals' experiences, preferences, and the social and cultural factors influencing their transportation choices. By incorporating these qualitative insights, transportation projects and policies can better address the specific needs and aspirations of communities, leading to more effective and inclusive solutions.

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Appendix A. Sample Recruitment Flyer

Improving Transportation Equity

By Centering the Needs of Underserved Communities

UNIVERSITY OF MINNESOTA
Driven to Discover℠

Participate in Research Study to Improve Transportation Equity

What is the study?

The University of Minnesota is recruiting participants to partake in a research study that aims to understand barriers to transportation within underserved communities across the state of Minnesota.

What does the study include?

In order to study the barriers to transportation, we need to understand travel behavior. As such the study includes 2 parts:

- Travel behavior Survey: record and self-report travel behavior for 7 days using a smartphone app.
- Interview: 60-minute qualitative interview

Will I be compensated?

Yes! Participants will be compensated $40 after successful completion of the interview and additional up to $70 after the smartphone-based travel behavior survey completion.

Am I eligible?

If you are 18 years or older and face transportation barriers in your everyday life, you're eligible to participate.

Fill out the eligibility form by scanning the QR code or checking the link below: [Insert QR code linking the enrollment survey]

DEPARTMENT OF TRANSPORTATION

Appendix B. Enrollment Survey

Enrollment Survey for Transportation Equity in Minnesota Study

Description: Interested participants will be directed to complete this survey from study recruitment materials. The survey will confirm eligibility for the study (depending on the target group) and collect initial demographic or other characteristics information. The research team will contact the study participant to confirm or not confirm their participation in the study. If the participant is confirmed, we will discuss next steps: completing the consent form, beginning the travel behavior tracking component.

Total Duration: Less than 5 minutes

Survey Legend
{question label; with display logic if included}
[type of question/question format]
    Multiple choice options
Skip Logic or Survey Flow Details

BEGINNING OF SURVEY

{intro} Thank you for your interest in this study about transportation and systemic inequity. This 5-minute survey will verify your eligibility and collect some demographic information. If you are eligible to participate, we will contact you to schedule next steps. We plan to recruit 10 to 15 participants from your community, so not everyone interested will be able to participate. For participation, you will be compensated $40 for completing the interview and an additional $40 for completing the smartphone-based travel behavior component. If you experience any technical difficulties or have general questions, please contact us at equitymn@umn.edu.

{consent} Insert language from Informed Consent document.

{zipcode; if location is "Yes"} What is your zip code?
[text entry, zip code validation]

{intro_demographics}: The following questions ask about socio-demographic characteristics. Each question is optional. This information will help the research team evaluate shared and unique characteristics across study participants.

{age}: What is your age?
[range, 18–110]

{gender} What is your gender?
[select one]
    Woman
    Man
    Non-binary

Prefer to self-describe (text entry)

{sexual_orientation} Please indicate if you identify as LGBTQ+ (Lesbian, Gay, Bisexual, Transgender, Queer)

[select one]

Yes
No
Prefer not to say

{race} What best describes your race or ethnicity?

[select multiple]

American Indian or Alaskan Native
Asian
Black or African American
Native Hawaiian or Pacific Islander
Latinx/ Hispanic
White
Middle Eastern/ North African
Prefer to self-describe [text entry]
Prefer not to answer

{nativeborn}: Were you born in the United States?

[select one]

Yes
No

{parents, if nativeborn is "Yes"}: Did either of your parents immigrate to the U.S. before you were born?

Yes
No
Not Sure

{education}: What is your highest level of education that you've completed?

[select one]

Less than a high school diploma
Highschool Diploma or Adult Basic Education (ABED/GED)
Some College
Associate degree
Bachelor's degree
Graduate/Professional Degree

{disability}: Do you have a long-lasting or chronic condition (physical, visual, auditory, cognitive or mental, emotional, or other) that substantially limits one or more of your major life activities (your ability to see, hear, or speak; to learn, remember, or concentrate)?

[select one]

- Yes
- No
- Prefer not to answer

{hhmakeup}: Who lives in your household with you, besides yourself?

[select multiple]

- No One [exclusive]
- Spouse/Partner
- Children under 6
- Children aged 6 – 17
- Children aged 18 or older
- Parents/Parents-in-Law
- Other Relatives/Friends/Roommates
- Other [text entry]

{hhcount; if hhmakeup is not "No One"}: How many people live in your household, including yourself?

[text entry, number validation]

{employment}: As of today, what is your employment status?

[select one]

- Employed Full Time
- Employed Part Time
- Primarily Self-Employed
- Full Time Student
- Part Time Student
- Unemployed Looking for Work
- Unemployed Not Looking for Work
- Retired
- Unpaid Volunteer or Intern
- Homemaker or Stay at Home

{jobs ;If employment = "Employed…" or "Primarily Self…"}: How many paid jobs do you have?

[select one]

- 1
- 2
- 3
- 4 or more

{workfrequency ;If employment = "Employed…" or "Primarily Self…" or "Unpaid…"}: How many days per week do you work or volunteer during a typical week?
[range, 1 through 7]

{income} What was your pre-tax annual household income in 2021? (Optional)
[select one]

Less than $25,000
$25,000-$49,999
$50,000-$99,999
$100,000-$149,999
$150,000-$249,999
$250,000 or more
Prefer not to answer

{home}: Do you own or rent your current home?
[select one]

I own my home and am no longer making mortgage payments
I own my home and am making mortgage payments
I lease/rent my home
I do not pay to stay in my home
Other [text entry]

{home_license}: How many licensed drivers are there in your household?
[drop down, 0 to 10+]

{home_vehicles}: How many cars are owned, leased, or available for regular use by the people who currently live in your household?
[drop down, 0 to 10+]

{errand_responsibility} Who in your household is currently most often responsible for getting errands done (like grocery shopping, going to the pharmacy, childcare trips, etc.)?
[select one]

I am
Spouse/Significant Other
Another person in my household (family member, roommate, care-taker, etc.)
Someone who lives outside of my household (child, or neighbor, etc.)
I share these responsibilities equally with others in my household
Most of our household errands are done online

{intro_transportation} The following questions ask about transportation resources and preferences. How often do you conduct the following activities in a normal week with normal weather this fall? [multipart question, choices: almost every day - few times per week – never or hardly in a week]

- Work: paid or volunteer labor

- Education: at school, learning event
- Care Giving: doing work or buying something for a significant other, typically unpaid.
- Medical & Fitness: going to gyms, medical appointments, going to the pharmacy, etc.
- Food or Meal: eating at a restaurant or picking up take-out.
- Shopping Errands: in-person shopping or picking up online orders
- Civil Errands: going to the government and public service centers
- Fun & Leisure: going to the movies, seeing friends, other relaxation activities
- Community or Cultural: related to historical or social development of your community
- Religious or Spiritual: related to personal religious or spiritual beliefs

{modeuse} How often do you use the following transportation modes in a normal week with normal weather this fall?

[multipart question, choices: almost every day - few times per week – never or hardly in a week]

Drive somewhere by yourself?
Carpool or get a ride somewhere?
Take an Uber, Lyft, or taxi to go somewhere?
Ride public transportation (bus, light rail, BRT, etc.) to go somewhere?
Use paratransit services?
Ride a bicycle, skateboard, or scooter to go somewhere?
Walk or wheel to get somewhere?
Receive deliveries from online shopping?

{travellimitation} In the past 2 weeks, have limited transportation options and/or lack of transportation options kept you from traveling where you needed or wanted to go?

[select one]

Yes
No

{easetravel} From the list below, select the top three things that you think would make travel easier for you:

[select multiple, limit to 3]

Easier access to a car
Better road quality
Delivery services that bring things to me (groceries, medicine, etc.)
One transit pass that everyone in my household can use
Free transit for kids
More frequent bus or train service
Neighborhood shuttle service
More comfortable/ safer transit stops and stations
Transit stops closer to my home
Payment credits to use for Lyft or Uber rides

Access to public restrooms, public seating, or other amenities
Better sidewalks and streets that make walking more comfortable
More direct transit service between my home and where I need to go
Bike share stations in my neighborhood
Other _____

{intro_participation} These final questions ask about how you would like to participate in the study.

{daynamica} This study includes a 7-day travel behavior observation component that is completed with a smartphone. If you do not own a smartphone, we can lend you a device for the duration of the study. Completing this study component will take 5 to 10 minutes each day. You will be compensated for completing this component. You will use less than 3 MB of data per day to upload recorded data. The app can be used without cellular data enabled but must be connected to WIFI periodically throughout data collection instead. Note that if you do not want to complete the travel behavior component, you may not be asked to participate in the study. Are you willing to track 7 days of travel behavior using a smartphone?

[select one]

Yes, I can download a mobile app to my smartphone
Yes, I can use a smartphone that you lend me
No, I would prefer to track travel behavior some other way
No, I do not want to participate in the travel behavior component

{interview} Each participant will participate in a 60-minute interview either in person, over zoom, or over the phone. Do you have preference for how you would like the interview conducted?

[select one]

In person
Over zoom (video or audio conference)
Over the phone
No preference

{contact} How can we best contact you?

[select one]

By email
By phone
By text

{email, if contact is "email"} Please enter your email address.

[text entry]

{phone, if contact is "phone"} Please enter your phone number.

[text entry]

{End of Survey, Eligible}

Thank you for completing this survey. We will be contacting you in the next week to confirm your participation in the study and discuss next steps. If you do not hear from us then, or if you have further

questions, comments or concerns, please contact us at equitymn@umn.edu.

{End of Survey, Ineligible}

Thank you for completing this survey. Unfortunately, you do not meet the qualifications for this study. We sincerely appreciate your time and consideration. If you have further questions, comments or concerns, please contact us at equitymn@umn.edu.

Appendix C. Qualitative Interview Questions

Qualitative Interview Questions for the Transportation Equity in Minnesota Study

This document compiles all of the questions that could be asked of study participants. Not every question will be asked. A 60-minute interview may only contain 8 to 10 open ended questions (not including follow-ups/probes). The questions that are asked will depend on the enrollment survey and other target group characteristics. Questions are organized by Survey Sections and subsections which describe the general topic of the question. The flow of the interview will start with the Introduction, then ask Transportation questions then jump around depending on participant's response. Daynamica follow-up questions and Group Dependent questions will be used when there is no other easy segue. A summary of information collected from other survey instruments is provided for reference.

Information Gained from Other Survey Instruments ————————

Enrollment Survey: geography; demographics (age, gender, sexual orientation, education, race, disability); household makeup/housing; employment (income); errands; grocery store proximity; mode use; travel limitations; transportation improvements; study activities.

BEGINNING OF SURVEY QUESTIONS

Introduction

Did you have any difficulties getting here? Did you find the place alright? (If in-person)

(Provide an introduction of interviewer and outline interview format, "freely ask any question you may have"; "if you'd like to end the interview at any point, let me know"; "this interview will be recorded via an audio device"; "we will use this recording to create a written transcript then will keep or dispose the recording as indicated by the consent form you signed"; "This information will be kept private or shared as indicated by the consent form you signed"; "Our primary interest will be how transportation resources affect your quality of life but we would also like to hear any other details that you think are worth mentioning"; "We will use the information collected in this study to create a report for the Minnesota Department of Transportation providing recommendations on how to better consider equity in transportation planning"; "I will now start the recording")

To start, can you tell me a bit about yourself? What is your background, what are your interests?

Enrollment Survey Follow-Up Questions

You mentioned in the enrollment survey that you identify as (insert race), can you elaborate on your ethnicity, race or culture?

You mentioned in the enrollment survey that you engage in working activities in a typical week. Do you work from home at all? If yes, what factors influence your choice of studying/working at home?

You mentioned in the enrollment survey that you engage in shopping activities in a typical week. What affects your decision on how to shop, whether in person or online? What factors influence your decision of home delivery vs. in-store pick-up for online orders?

You mentioned in the enrollment survey that you're a caregiver or indicated that you conduct caregiving activities at least few times a week. Can you tell me more about whom you care for and what you do for them?

You indicated in the enrollment survey that you conduct medical and fitness at least few times a week. Do you mind sharing a brief description of the purpose of this activity?

You indicated in the enrollment survey that you go to government or public service centers at least few times a week. Do you mind sharing a brief description of the purpose of these trips?

Are there trips in your daily life difficult to plan or make? Could you describe what factors make these trips difficult? Any resources that you can think of to make these trips less difficult to plan or make?

Transportation Overview

(*Insert time allotment*)
Our primary interest in this study is assessing the quality of transportation or barriers to transportation among study participants.

Availability
(Focus on coverage of the services and affordability)
What are the transportation options available to you? How easy or difficult is it for you to make the trips that you need or want to?

- What is your most preferred and least preferred mode of transportation? Why?
- What transportation modes would you like to use more but cannot use? Why?
- Are there transportation modes that you hardly use in making your daily trips? Was it a matter of personal choice or you had transportation barriers to use these modes? Could you describe these barriers if any? Any resources that you can think of to remove these barriers?
- Are you able to afford most transportation modes? Does fare payment pose any challenges when using parking, public transit, and on-demand services such as Uber and Lyft?

Quality
(*Focus on reliability, safety, security, speed, and comfort*)
(*Probe participant to provide more detail on the quality of transportation options they mention*).

- Of the transportation options that you commonly use, how reliable are they? How safe do you feel using those modes? Do you feel like you get to where you're going quickly? Are they comfortable?

- Can you tell me about times you have been disappointed or frustrated using the transportation options you commonly use? Why were you disappointed or frustrated?

- Were you able to overcome the issues? If yes, how?

Fulfillment

Vanderweele (2017) generally suggests that five domains of human life to promote human flourishing: spirituality, family, work, health, and community. This simple and easy-to-understand model illustrates the main life domains recognized by most people. Here, we ask how transportation helps fulfill work, family, health, community, and spirituality-related needs.

<u>Work</u>
How has transportation affected your employment opportunities, such as where or when you can work? Has transportation affected your ability to keep a job?
If applicable, how has it affected your educational opportunities, such as where or when you can take classes?

<u>Family</u>
How has transportation affected your housing options for where you choose to or can live?
How has transportation affected your access to family support or your ability to support your family by running errands, taking kids to school, or taking kids out?
If applicable, how has transportation affected your caregiving responsibilities? Does it help or hinder? How?

<u>Health</u>
How has transportation affected your access to healthcare and wellbeing resources? Does it help or hinder? How?

- How about any of these services that you might not readily think of: pharmaceutical services, alternative medicines, mental health services, exercise, healthy food?
- Can you tell us how transportation help or hinder your medical-related activities?

- How about social activities, entertainment, recreation?

Are there aspects of your daily transportation that either benefit or harm your physical and mental health? For example, getting exercise via walking and biking or feeling stressed during the commute.

What transportation improvements do you think can be made to promote health and access to health care?

Community
How has transportation affected your access to and participation in community events and activities? Does it help or hinder? How?
How has your community or social network helped provided any transportation benefits to you?

- In what ways has your community helped you with your transportation needs?

- Probe participant about any community asset mentioned.

- *If no*: are there things that you would like more support in?

Have you had any experience of being engaged in transportation planning and policy making in your community?

- Have you ever provided feedback on a proposed transportation project or participated in any other forms of transportation decision-making?

- How would you like to be contacted about transportation projects or policies? How would you like to be able to provide feedback?

How has transportation affected your access to government services? Does it help or hinder? How?

Spiritual
How has transportation affected your spiritual or religious activities? Does it help or hinder? How?
What transportation improvements do you think can be made to promote access to spiritual or religious activities?

Group-Dependent Questions

(*sub-headings indicate group characteristics*)

Immigrant Community (1st/2nd Generation)

How did you learn to navigate the transportation system here in Minnesota? What resources would have improved your experience, if any?
(*English as second language*) Are there aspects of the language or languages that you encounter throughout your day that are difficult to understand? Which aspects, if any, are easy to understand?

- Did you find resources written in your language?

- How does your understanding of these languages help or hinder you from accessing transportation resources?

- How comfortable do you feel with the languages utilized in transportation? (*Flyers, signs, websites, announcements, and other information material*)

How connected do you feel with members of your own culture?

- What does that look like?

- What are the potential transportation-related barriers preventing you from connecting with your own culture?

People with Disabilities

(*Ask follow-up about how the participant's disability factors into the quality of service of the transportation resources they use, especially when those services are not tailored toward people with disabilities.*)

How has transportation affected your ability to find housing or employment?

- What transportation barriers, if any, do you experience consistently that make it difficult for you to live independently?

- What do you think should be improved for you to live more independently?

(*If not mentioned, ask about paratransit services in their area, e.g., Metro Mobility in the Twin Cities, targeted toward the disability community*). Have you heard of these services? Have you used them? If not, why not? If yes, what worked or did not work well?

Rural Community

What do you think is working well with transportation resources in rural towns? What do you think can be improved?

Have you tried using on-demand transportation services? On-demand transportation services include public transit options like dial-a-ride or services like Uber and Lyft. How well are you able to schedule your trips using these services?

Gender/Sexuality

(*If participant mentions gender as a factor of experience*) You mentioned that your gender plays a role in your transportation experience. Can you tell me more about the role you think gender plays in transportation or other aspects of your life?

(*If the case group is defined by a LGBTQ+ characteristic or if the participant indicates this characteristic in the enrollment survey or in the qualitative interview.*) How has your gender or sexual orientation affected your access to or experience with transportation services or resources, if at all?

What transportation barriers, if any, do you experience consistently that make it difficult for you to make your trips?

What do you think should be improved for you to make your trips better?

Businessowners

What barriers in transportation do you face while operating your business? Barriers could pertain to the ability of employees or customers to get to your business (with parking, sidewalk, or bike infrastructure), the delivery or shipping of goods to run your business, and disruptions from transportation facility construction.

- Do you experience barriers in other government (*city or county*) managed systems tailored for business owners, such as grant programs or training opportunities?

End of Survey

That was the last question I planned to ask. Do you have any questions for me or other comments you would like to add?
(*Detail next steps, mostly done with participation, confirm if follow-up is welcome and by which method (phone or email)*).
Do you have any questions about the next steps?
Thank you so much for participating in this study. We greatly appreciate the time you have taken. Best wishes to you. I hope you have a good rest of your day.

Appendix D. In-app Travel Behavior Questions

In-App Travel Behavior Questions for the Transportation Equity in Minnesota Study

Description: Participants completing the travel behavior component with a smartphone will use the Daynamica app to record their trips and activities and complete daily survey questions. The app will automatically record mobile trips and stationary activities. It then will prompt the user to identify the trip mode or activity type and to complete survey questions based on the type of trip, activity, or day. There is an activity survey, a trip survey, and an end of day survey.

Activity Types: The study participant will be able to assign one of the following types to the activities they record. The descriptions will be provided to participants. (Max 12 activities).

- Home: at your primary residence
- Work: paid or volunteer labor
- Education: at school, learning event
- Care Giving: doing work or buying something for a significant other, typically unpaid.
- Medical & Fitness: going to gyms, medical appointments, going to the pharmacy, etc.
- Food or Meal: eating at a restaurant or picking up take-out.
- Shopping Errands: in-person shopping or picking up online orders
- Civil Errands: going to the government service centers
- Fun & Leisure: going to the movies, seeing friends, other relaxation activities
- Community or Cultural: related to historical or social development of your community
- Religious or Spiritual: related to personal religious or spiritual beliefs
- Other: none of the above

Trip Types: The study participant will be able to assign one of the following mode types to the trip they record which will affect the survey questions asked.

Personal Car - Driver: personal vehicle
Personal Car - Passenger: personal vehicle
Taxi\Uber\Lyft: commercial car services
Bus: use a public transportation road vehicle
Rail: use a public transportation rail vehicle
Wait: To wait for a bus, rail, or car ride
Bike: use a mechanical or electric bicycle
Walk: move using legs or mobility device
Other: none of the above

ACTIVITY SURVEY

For all activity types except Home activities. Some questions have additional display logic depending on the type of activity.

1. {companyactivity} Who was with you during this activity? Select all that apply.

[select multiple]

No one [exclusive]
Spouse / partner
Own / foster children
Grandchildren
Parents
Other family members
Colleagues / co-workers
Friends / acquaintances
Pet(s)
Other

2. {rectype, if Activity is Medical & Fitness}: Did this activity involve any of the following categories of physical activity? Select all that apply. *
[select multiple]

Light activity
Moderate activity
Vigorous activity
None of the above [exclusive]

**Note: include pop-up definition of physical activity categories.*

Light activity (e.g., walking slowly, sitting at your computer, making the bed, eating, preparing food, washing dishes)
Moderate activity (e.g., sweeping the floor, walking briskly, slow dancing, vacuuming, washing windows, shooting a basketball)
Vigorous activity (e.g., running, swimming, shoveling, soccer, jumping rope, carrying heavy loads)

3. {shoptype, if Activity is Shopping}: Did your shopping activity include purchasing any of the following items? Select all that apply.
[select multiple]

Food / groceries
Clothing / fashion
Household supplies
Gas or other transportation items
Other Essential items
Other nonessential items
None of the above [exclusive]

4. {fulfillment} Was this activity related to a common aspect of human life? Select all that apply.
[select multiple]

Work

Family
Health
Community
Spiritual/Religious
Does not apply [exclusive]

5. {activityexperince} How would you rate the overall experience of this activity?
   [select one; slider]
   Not good at all 1 2 3 4 5 Very good

6. {activityposemotion} Did you have any of the following positive emotions during this activity? Select all that apply.
   [select multiple]
   Meaningful
   Happy
   Calm
   Loved
   Respected
   None of the above [exclusive]

7. {activitynegemotion} Did you have any of the following negative emotions during this activity? Select all that apply.
   Stressful
   Tired
   Scared
   Sad
   Lonely
   None of the above [exclusive]

TRIP SURVEY

Some questions in the trip survey have display logic determined by the type of trip.

1. {companytrip} Who was with you during this trip (or part of this trip)? Select all that apply.
   [select multiple]
   No one [exclusive]
   Spouse / Partner
   Own / Foster children
   Grandchildren
   Other family members
   Colleagues / Co-workers
   Friends / Acquaintances

Pets
Other

2. {parkingdifficultly; if mode is Personal car- Any} How difficult was it to find a parking space?
   [select one; slider]
   Not difficult at all 1 2 3 4 5 Very difficult

3. {transitpayment; if mode is Bus or Rail} How did you pay for this trip on public transit?
   [select one]
   Prepaid fare card
   Debit / credit card
   Cash / coins
   Mobile app
   Other
   I did not pay

4. {planrating}: How difficult was it to plan and make this trip? ˇ
   [select one; slider]
   Not difficult at all 1 2 3 4 5 Very difficult

5. {costrating}: How affordable was this trip? ˇ
   [select one; slider]
   Not affordable at all 1 2 3 4 5 Very affordable

6. {saferating_trip}: How safe did you feel while making this trip? ˇ
   [select one; slider]
   Not safe at All 1 2 3 4 5 Very safe

   Note: Explore algorithm for removing {planrating}, {costrating}, and {saferating} from future trips that match time of day and trip trajectory (i.e., origin/destination)

7. {tripexperince} How would you rate the overall experience of this trip?
   [select one; slider]
   Not good at all 1 2 3 4 5 Very good

8. {tripposemotion} Did you have any of the following positive emotions during this trip? Select all that apply.
   [select multiple]
   Meaningful
   Happy
   Calm
   Loved
   Respected

None of the above [exclusive]

9. {tripnegemotion} Did you have any of the following negative emotions during this trip? Select all that apply.
   Stressful
   Tired
   Scared
   Sad
   Lonely
   None of the above [exclusive]

10. {if tripnegemotion is not None of the above} Please indicate which factors below made you feel these negative emotions.
    Environmental factors during the trip
    People encountered during the trip
    Other trip-related reasons
    Non trip-related reasons

END OF DAY SURVEY

This survey will be completed once for each day. The survey will be available to complete toward the end of the day or at any point after.

1. {homework} When you were at home today, roughly how many hours were spent on work or study?
   [select one; slider]
   0, 2, 4, 6, 8, 10, 12, 12+ hours

2. {homecaring} When you were at home today, roughly how many hours were spent on caregiving for family, friends, or others?
   [select one; slider]
   0, 2, 4, 6, 8, 10, 12, 12+ hours

3. {hometasks} When you were at home today, roughly how many hours were spent on caring for yourself?
   [select one; slider]
   0, 2, 4, 6, 8, 10, 12, 12+ hours

4. {onlineshop} Did you buy anything online today that will be delivered to you?
   [select one]
   Yes
   No

5. {delivery} Did you receive any deliveries today from online shopping?
   [select one]
   Yes
   No

6. {nobarriers} Would you make any additional trips to any of the activity categories below if transportation was widely available and easy to use? Select all that apply ¨
   [select multiple]
   Work
   Education
   Care Giving
   Medical & Fitness
   Food or Meal
   Shopping Errands
   Civil Errands
   Fun & Leisure
   Community or Cultural
   Religious or Spiritual
   Other
   No additional trips [exclusive]

7. {trav_disc} Did you experience any form of discrimination today?
   [select one]
   Yes
   No

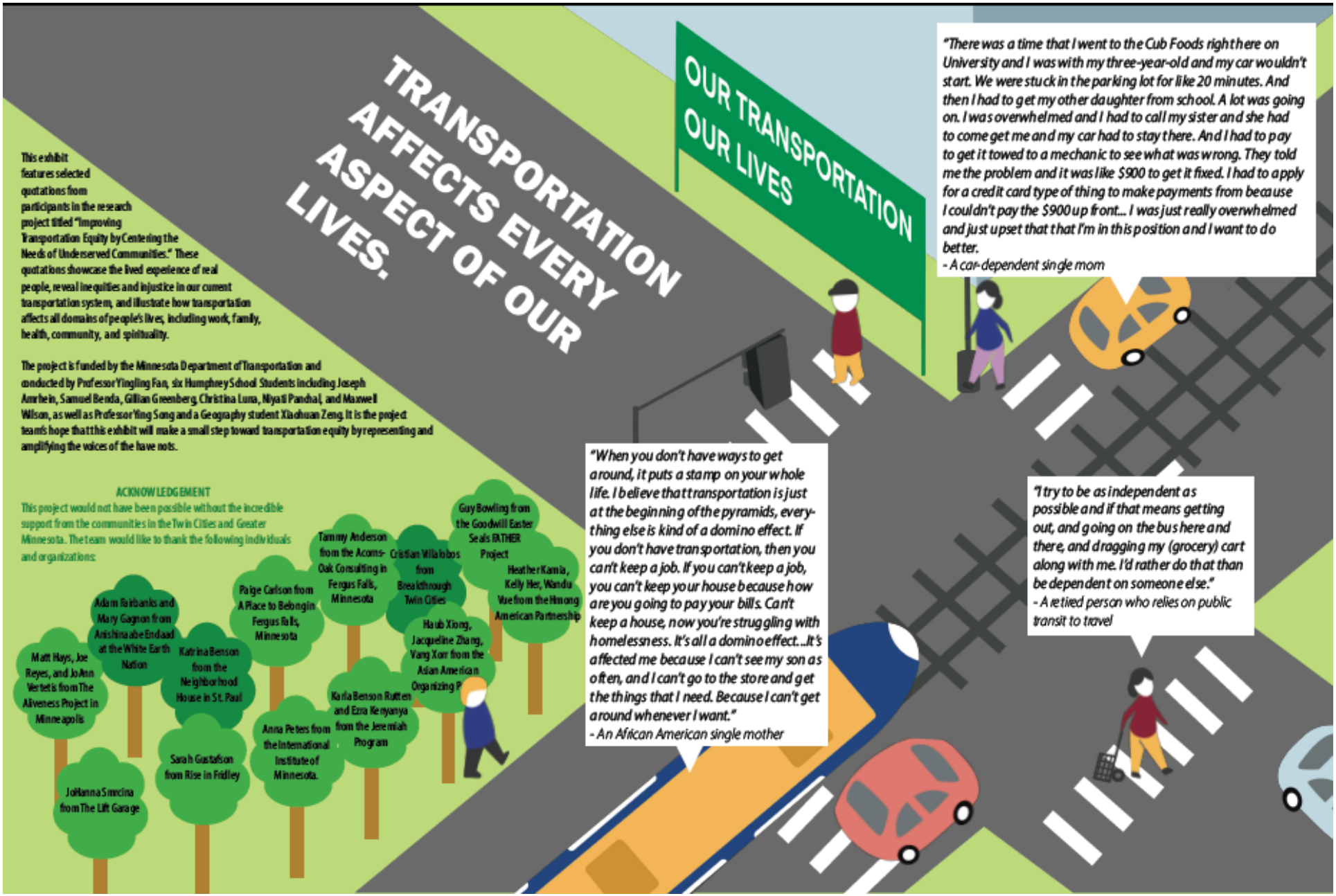
8. {if trav_disc = Yes} Please indicate the type of discrimination you experienced today?
   Age
   Disability
   National Origin
   Race/Color
   Religion
   Sex and Gender Identity
   Other

9. {community} Did any of the following groups or people help you make your trips today? Select all that apply.
   [select multiple]
   A community organization
   A government service
   A family member

A friend or neighbor
Someone I don't know
Another
None of the above [exclusive]

10. {if day number =7; travel_pattern} Would you say your travel patterns during this week represent an average week?
    Yes, about the same
    No, I made significantly more trips this week
    No, I made significantly fewer trips this week

Appendix E. Artistic Posters Featuring Quotes from Study Participants


TRANSPORTATION AFFECTS EVERY ASPECT OF OUR LIVES.
OUR TRANSPORTATION OUR LIVES
This exhibit features selected quotations from participants in the research project titled "Improving Transportation Equity by Centering the Needs of Underserved Communities." These quotations showcase the lived experience of real people, reveal inequities and injustice in our current transportation system, and illustrate how transportation affects all domains of people's lives, including work, family, health, community, and spirituality.
The project is funded by the Minnesota Department of Transportation and conducted by Professor Yingling Fan, six Humphrey School Students including Joseph Amrhein, Samuel Benda, Gillian Greenberg, Christina Luna, Niyati Pandhal, and Maxwell Wilson, as well as Professor Ying Song and a Geography student Xiaohuan Zeng. It is the project team's hope that this exhibit will make a small step toward transportation equity by representing and amplifying the voices of the have nots.
ACKNOWLEDGEMENT
This project would not have been possible without the incredible support from the communities in the Twin Cities and Greater Minnesota. The team would like to thank the following individuals and organizations:
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Paige Carlson from A Place to Belong in Fergus Falls, Minnesota
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Haub Xiong, Jacqueline Zhang, Vang Xorr from the Asian American Organizing P
Matt Hays, Joe Reyes, and JoAnn Vertetis from The Aliveness Project in Minneapolis
Katrina Benson from the Neighborhood House in St. Paul
Karla Benson Rutten and Ezra Kenyanya from the Jeremiah Program
Anna Peters from the International Institute of Minnesota.
Sarah Gustafson from Rise in Fridley
JoHanna Smrcina from The Lift Garage
"There was a time that I went to the Cub Foods right there on University and I was with my three-year-old and my car wouldn't start. We were stuck in the parking lot for like 20 minutes. And then I had to get my other daughter from school. A lot was going on. I was overwhelmed and I had to call my sister and she had to come get me and my car had to stay there. And I had to pay to get it towed to a mechanic to see what was wrong. They told me the problem and it was like $900 to get it fixed. I had to apply for a credit card type of thing to make payments from because I couldn't pay the $900 up front... I was just really overwhelmed and just upset that that I'm in this position and I want to do better.
- A car-dependent single mom
"When you don't have ways to get around, it puts a stamp on your whole life. I believe that transportation is just at the beginning of the pyramids, everything else is kind of a domino effect. If you don't have transportation, then you can't keep a job. If you can't keep a job, you can't keep your house because how are you going to pay your bills. Can't keep a house, now you're struggling with homelessness. It's all a domino effect...It's affected me because I can't see my son as often, and I can't go to the store and get the things that I need. Because I can't get around whenever I want."
- An African American single mother
"I try to be as independent as possible and if that means getting out, and going on the bus here and there, and dragging my (grocery) cart along with me. I'd rather do that than be dependent on someone else."
- A retired person who relies on public transit to travel

TRANSPORTATION AND WORK

CAR SHARING WITHIN FAMILIES LIMITS JOB OPPORTUNITIES

"I have started to look for a full-time job. I have to consider the distance though, because my husband and I share one car, so I have to consider him."

- A recent Asian immigrant

TRANSPORTATION IMPACTS THE QUALITY OF WORK WE CAN DO

"I just have two clients and one of them lives in Bloomington. One day he said, we don't have bus stops in Bloomington, we have to go by bicycle and go and get to the bus stops. And also, I have another client, he lives in Minnetonka. He also said always, we don't have any bus stops. We have to go 20 minutes or 25 minutes to get to the bus stops. So I don't go to Minnetonka or Bloomington."

- An Afghan caseworker serving Afghan refugees in Minnesota

MANY JOB OPPORTUNITIES REQUIRE HAVING A CAR

"I think the main barrier for me right now for finding a job is not having a car, a private transportation or reliable transportation... For whatever job announcements I read, one of the main requirements is to have a driver's license and a car."

- A recent Afghan refugee looking for employment

PUBLIC TRANSPORTATION IS INSUFFICIENT

"For a while I was working in western, far from my house and it was a two plus hour bus ride. Three transfers, and I could get to work but once work was over, I couldn't get back because there weren't buses going to Minneapolis at 8pm."

- Josef Oreskovich, personal trainer and person in recovery

"I was looking to work as a nanny out in Bloomington. And I was straightforward and said, I don't have a license, I ride the bus. And then I didn't get it, I wasn't able to work that job because there were no bus stops nearby...And also usually, I would start work at six. That's when everyone else starts with a morning shift. I'm still waking up two or three hours before the bus comes. But I'm not getting there till seven or eight. So I'm not able to start on time. That means I have to leave later. Also, sometimes I'll get off at two o'clock, but I won't be able to leave work till 2:30 because that's when the next bus comes. It's just hard to do a lot of travel work, because I'm just not able to 100% rely on the bus to get me to and from work in different locations."

- A young African American woman without a driver's license

"I couldn't get better jobs because the commute time to arrive in the morning would be more than two hours, two and a half hours. And aside from that, if I would start at 7, I would have had to wake up at 3:30 in the morning. But I couldn't get there, because there isn't transit at this time. So it is something that influences jobs because I have to get a job close that is in the area that includes transit."

- A Latino father

TRANSPORTATION AFFECTS JOB RETENTION

"Sometimes it does, like when I miss the rides [through Metro Mobility], I can't go through anything else because sometimes my Lyft will run out and then I don't have the money to pay for rides or whatever... So I'm just sitting at home sometimes."

- A disabled participant

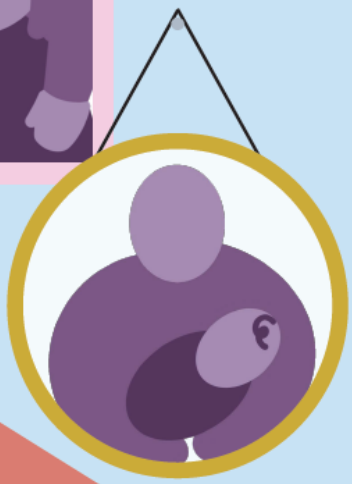
TRANSPORTATION AND FAMILY

TRANSPORTATION CAN IMPACT HOW WE HELP OUR FAMILIES

"The first day our children had to go to school, they were not ready to go to school without us. They wanted us for the first day to accompany them to the school...First of all, I call the school, if we could sit with our children in the school bus, at least not to go to the school for the first day, to accompany them, and at least to give them the feeling that they are not left alone, you know, parents care. They said no, they cannot do that. Then I call the resettlement agency, the case manager, and she told me that, if she could find any volunteer to help, this is fine then. She couldn't find any volunteer though, so they couldn't do anything for us. We just then took our children and they sat in the bus, they went through bus, you know. I and my wife, we had to walk about 15 or 20 minutes then to go to the school that was also the first day of snow here in our area. And the weather was very cold. So then, we went to the school, we visited the school, we saw our children and we told them we are here to take care of you. Because public transport is not going directly there... we had to return home walking about 20 minutes. So it means that we didn't have any support from any other source, even from the resettlement agency."
- A recently resettled Afghan father

TRANSPORTATION AFFECTS ACCESS TO FAMILY SUPPORT AND DAILY NEEDS

"I'm not able to see my family as much just because my mom was kind of far, my grandma lives kind of far. So there's no way I could ever get a bus out there because it's so far. It's like a 45 minute drive. On the bus, that would be like two or three hours probably. And then it's just a lot if I want to run errands. It's kind of an all day thing because it's like you have to wait and you can only get so much stuff with what you can carry because I have to walk and carry it home. After I'm done on the bus, I walk from the bus stop with all my stuff. So I tend to not get as much as I need or I don't go out as often as I'd want to to run errands just because it's a lot of work to do that."
- An African American woman on running family errands



MAINTAINING A CAR IS DIFFICULT FOR LOW-INCOME SINGLE MOTHERS

"I took my car into the shop because it's not working properly. And I found out that both rear tires are actually way too small for my car. So I need new tires. They said that it's better to get them all at the same time. And then I also need a wheel alignment and I need some kind of valve replacement in the back to make sure that my car doesn't vibrate anymore, and it's safe to drive. And all of that equals more than what I currently have, equals about $1,086. I'm working to find grants and things like that that will help me pay for that so that I can get my car fixed and it can be the safe for not only me to be in but for my kids to be in too."
- A single mother living in assisted housing

TRANSPORTATION AND HEALTH

TRANSPORTATION AFFECTS ACCESS TO HEALTHCARE

"Without transportation, how do you get around to doctor's appointments? How do you get around to simply do the things that you need to do? So I've had to miss out on a few things from not having transportation. I've missed a couple of appointments that I had set up when I lost my car."
- An African American single mother

"Well, I definitely don't go to the doctor or the dentist probably as often as I should only because it's just like to get there to get back. It's just a whole other thing. And then usually I am working. So it's like to go to work and then get a doctor or get a dentist. It's just like a lot, a lot, a lot. And it feels like there's not enough time in the day to do that all."
- A young African American woman on doctor visitation

"I have one (volunteer taxi service) and that's the county and they provide transportation for me out of town. It's really hard because if that person who usually takes me is filled up, I have to cancel my medical appointment. I've had to miss quite a few."
- A resident in Fergus Falls

"For things like the doctor or the dentist, there is one place that I've been consistently going to since I moved to Minnesota, and despite the fact that I've changed my address five times, I still tried to stay consistent with that one place because I'm familiar with it now. And so, because this particular place actually is further away from where I currently live because it was closer to my previous address, I have to take that into consideration. If I want to see the doctor, I'll probably have to take more time off from work because it's just farther away now."
- A young Asian American woman who uses bus as her primary mode of transportation

TRANSPORTATION LIMITS FOOD SUPPLIES

"I myself I go to grocery stores and markets to purchase or deal in it as we don't have access to private transportation or car. But we have supermarkets and groceries around us. I know some of them about eight or 10 minutes. Some of them 15 minutes or 20 minutes and some based on our needs. I have to mainly walk. I walk and I just purchase the amount that I can carry my hands on."
- A suburban immigrant

"Since I don't have any transportation, sometimes I can't bring home as much groceries as I want to. Because I'm catching the bus and the train. And I'm on bags of rip and stuff like that. Due to weather conditions, sometimes it's snowing, the bags can get wet, they can fall out, you will lose groceries and stuff like that."
- A young African American woman

TRANSPORTATION AFFECTS ACCESS TO HEALTHY FOOD OPTIONS

"We got a little gas station that sells junk food and a huge population of our community, that's all they know is that store. So they are not getting good food. No healthy foods.....I think they brought in like the healthy food truck that comes in once a week and sells produce and stuff like that. But other than that, if you didn't have a vehicle probably want to be able to eat a healthy meal or ride you know, to Walmart so our community folks are generous to provide you with a ride and get to the Walmart and buy stuff."
- A tribal community member from the White Earth Nation

TRANSPORTATION, COMMUNITY, AND SPIRITUALITY

TRANSPORTATION AFFECTS ACCESS TO SPIRITUAL EVENTS

"A wooden thing like, like a wigwam. Like a house, a wedding house. You put turrets over it. There's a hole in the middle. person on the outside. There's some rocks in the foyer and they bring them rock into the sweat. Pour water on them. It is some sweat like cleansing for something to do with our culture...The sweat lodge. It's part of our ceremonial stuff that we do. I drive and I usually pick up a lot of people in the community and bring them with because they don't have transportation. It's probably 40 miles away from where we live. So it's a trip."

- A White Earth Tribal Community Member

PUBLIC TRANSPORTATION CAN BE A COMMUNITY CONNECTION

"When I came about three years ago, I was using the bus. I loved it. At the beginning, I got lost. I got on a bus and I didn't know where I was. But I like it because I get to know places. And the drivers helped me. And I didn't speak the language. I only knew where I lived, and they guided me. For me, it was a beautiful experience."

- A Latina woman living in Saint Paul

TRANSPORTATION CAN CONNECT US TO COMMUNITY AND CULTURE

"I don't have family here in Minnesota. I mean, my close friends or relatives or parents or siblings. So sometimes I feel so lonely. Very often, honestly, very often. And especially winter is too long here. So it is easy to stay home for a long time and then I don't have any idea where go to anywhere. I don't have any idea. So sometime I take your bus or subway just to and look just to see the outside."

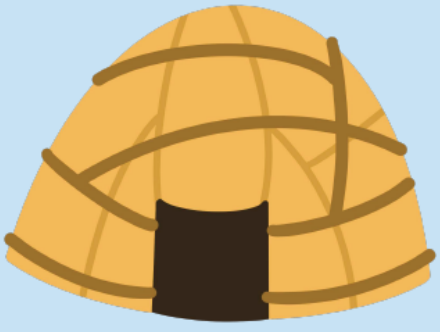
- A Korean immigrant community member

"We are very much new here, we don't know any family, and we have no access to private transportation and public transportation. Maybe over time, we will be able to find out for example, to public transportation, how we can get there at least. You know, even if we have access to public transportation, sometimes we have to walk with our children, and they are more vulnerable. They get tired very quickly. So, of course, being connected to people to families with the same culture, I think it is very much helpful for new families such as us."

- A recent Afghan refugee

"I've been wanting to go to the Asia Mall. But I haven't been able to go there because, to take the bus, it's like an hour and a half from where I live. I'll probably I'll try to go there eventually. But just places like that that are not immediately close to the most convenient areas. My perspective of Minnesota has really just been limited to the small radius that I've been able to travel with the bus. Hopefully in the future I'd be able to go to all these places that other people are talking about in Minnesota."

- A Chinese American who recently relocated to Minnesota



TRANSPORTATION AND SAFETY

DRUGS AND DANGER ON THE LIGHT RAIL

"Like I said before, I mean, it's always a danger. I'm going on the bus systems because of like, you know, the illegal drug activity that's jeopardizes sobriety and the violent tendencies of certain individuals that are rioted and I'm not like, you know, trying to be stereotypical but it's really just statistic that because I have a lot of talks about the light rail how dangerous that can be...It can be dangerous in there's always drugs somewhere honored. You Yeah. I've seen people pop guns on it. Yeah. Crazy crap."
- Joshua Heinle, a gay male in recovery, and a member of the Aliveness Project

PARENTS WORRIED ABOUT TEEN BUS USE

"Because I don't have confidence that my daughter can walk two blocks, wait for the public bus to get to school. I don't have confidence that the bus won't be delayed. For this reason, I decided to cut hours at my job and drive my daughter to school. For the safety of my daughter and my own safety and certainty. Because we live in an area where there is a lot of violence. I've seen things that are not good for a girl."
- A Latina mother with high-school aged daughter

LGBTQ+ INDIVIDUALS, HATE CRIME, SAFETY AND TAKING THE BUS

"I've been called the F word just from standing out on the street corner waiting for the bus. And that limits my want to continue to just exist sometimes. So being an LGBTQ plus person and presenting as such. It's daunting."
- Jakub Barberg, 39 year old gay male in-recovery, and a member of the Aliveness Project

"On campus, everything is pretty close by but I would say the only thing that I experienced is that during COVID, there was a lot of Asian hate crime. So the fact of feeling safe around my community, anywhere outside of the university, I no longer felt safe anymore. So I think carpooling and my own car was the most reliable."
- A young Hmong woman on the Saint Cloud bus system

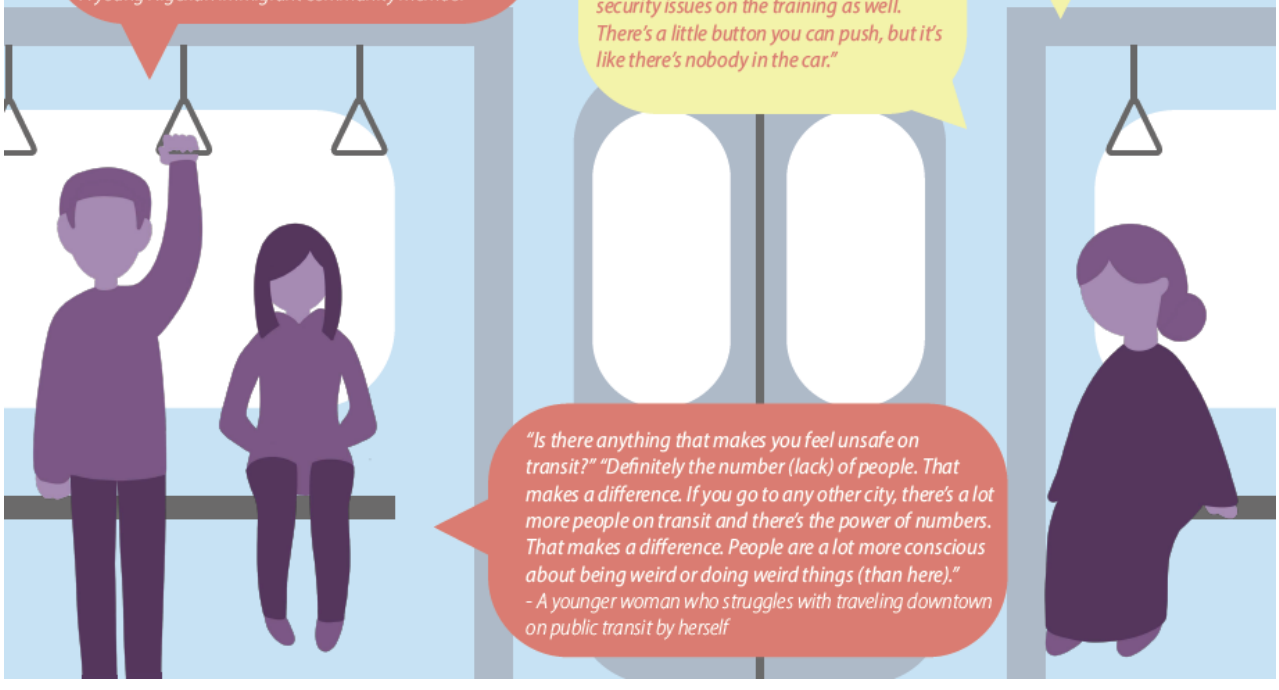
SAFETY CONCERNS ON THE BUS

"...it's just the reason why I don't necessarily use that (the bus) is because I don't know how safe it is. Because especially the bus stops here are usually, like crowded, like anything can happen. So buses will probably be more convenient. But let's say less safe."
- A young Nigerian immigrant community member

WOMEN, SAFETY, AND PUBLIC TRANSPORTATION

"As an older woman, often traveling alone I don't feel very safe on the train. My transgender son in his 20's mentioned the security issues on the training as well. There's a little button you can push, but it's like there's nobody in the car."

"I know several women my age that would be more than thrilled to use it [the Light Rail]. But they're afraid to use it for the same reason I am, because they're going somewhere alone, say the grocery store and they're going to have their hands full of groceries when they're coming home. They want to feel safe."
- JoAnne Veritas, older woman who is 69 years old, and a member of the Aliveness Project



"Is there anything that makes you feel unsafe on transit?" "Definitely the number (lack) of people. That makes a difference. If you go to any other city, there's a lot more people on transit and there's the power of numbers. That makes a difference. People are a lot more conscious about being weird or doing weird things (than here)."
- A younger woman who struggles with traveling downtown on public transit by herself

BARRIERS AND CHALLENGES

UNRELIABLE TRANSIT CAUSES FRUSTRATION

"Yes, so I had just got off work. It was the first day it snowed, very big snow when it was very cold outside. I just got off work, working a 16 hour shift. And I was waiting out for the bus. And the bus didn't come for an hour. And it was freezing cold outside and there was snow everywhere. And I was so tired. So I was so disappointed that the bus did not come for an hour."

- A young African American woman on waiting for the bus

DISPARITIES IN WINTER ROAD CONDITIONS

"One thing that frustrates me every morning when I'm taking my daughter is when I take a ride on Milton, the whole street there, the ice, there's just chunk of ice on the road that needs to be shoveled or cleaned out. I feel like neighborhood roads are not being cared for. I feel like it's just the main highways and other places where they shovel and make sure it is clean and safe but not within the neighborhood road. So my car just like wiggles, and it's frustrates me every morning."

- A single mom who attends St. Catherine University

"It's hard because for me, it's like they can be 30 minutes late for me. But then I have to be only five minutes late for them. That's not fair. Especially in the winter time."

- Members of the Rise Crystal who have disabilities and rely on Metro Mobility

PEDESTRIANS FACE SPECIFIC BARRIERS

"For us to shop for daily needs, I have to walk, and I have to purchase the amount that I can carry it with my hands. The main barrier is mainly you don't have this footpath path available and now it is somewhere available and somewhere it is not. You have just to go through green area. Even if you cross traffic signals there is no proper footpath everywhere."

- A suburban immigrant community member

"When you have Metro Mobility that's all you have. If you don't have Metro Mobility you're stuck home, nowhere to go."

- Members of the Rise Crystal who have disabilities and rely on Metro Mobility

"There are sometimes where you have to be you have to be very obvious that you're waiting for the bus or else the bus driver is not going to notice and they're just going to try to pass and it's like, Oh, I really needed the thing to go to right after that and now I'm going to be late for it. Now I have to wait an additional like 10, 15, 30 minutes for the bus to come. Or I'd have to walk to another bus stop and take another route just to get to where I'm trying to go. So that was difficult, but I feel like that stuff, it happens. And you just have to learn how to live with it."

- A young Hmong woman

CHALLENGES WHEN USING METRO MOBILITY

"It's hard because sometimes they (Metro Mobility) are an hour late and you have to be at a job at a certain time. Like, I could never get a regular job because they (Metro Mobility) would be so late all the time."

"They (Metro Mobility) leave the door open when they go get other clients and it can be very, very sketchy and I just don't feel comfortable sometimes."

"We got to plan everything out. Being immobile it's hard to plan a week ahead. How can I plan out the next four days."

- Members of the Rise Crystal who have disabilities and rely on Metro Mobility

"Around me, they have very broken down sidewalks, and I walk with a walker. You always have to look down to watch for something that might cause you to fall."

- A RISE Crystal community member

POSSIBILITIES AND RECOMMENDATIONS

PEOPLE WANT BETTER PUBLIC TRANSPORTATION SERVICES

"I like public transit because I don't have to drive. I could rest, or sleep, or read. But I drive because... Well, driving has its downsides, because when you drive, you can't text or do other things. But it is much faster to get places."

- A Latino father

"I would like to use public transportation more. It's not that I can't use it. It's just that it takes an incredibly long time to get where I need to go. So it makes it almost impossible for me to take public transportation, unless I have two hours to get there and back."

- A disabled community member

PUBLIC TRANSPORTATION PROGRAMS THAT WOULD WORK FOR SINGLE MOMS

"I would recommend like a van kind of a service where and I'm just thinking about the moms in this building where we can, like on a specific day, like: Hey, we're going to the van. Vans come on this day or the bus comes on this day. And we're gonna go to this grocery store. So if you need things, and you don't have the gas to get there, you don't have another way of getting there, anything like that, we leave on this day at this time. And these are the stores that we're going to. If you need to go to a doctor's appointment, then we'll have a different day. Like you can schedule your van ride that day. That'll get you to where you need to go and bring you back."

- A single mother living in assisted housing

"You know, I when they started building the train here, I thought that would be great to use the train. Because I live in Burnsville, the transit station from my house is so far. It's not even walking distance. That's just like, I'm gonna have to drive 10 minutes to a transit station and then wait there and all that and then it's from where the Burnsville station is to downtown's like, quite the time too. So it's like, but I think it beats the traffic, like you don't just sit in traffic. So I think that would be a better choice if that was the case."

- A Hmong community member

RURAL COMMUNITIES WANT EXTENDED HOURS FOR PUBLIC TRANSPORTATION

"We're really rural, that we have a transit. It gets people to work from 8:00 am to 4:30 pm Monday through Friday when other than that there's a lot of swing shift work from four to midnight. A lot of that work around our area that people work but there's no public transportation after hours. So that affects a lot of people."

- A tribal community member at White Earth Nation

"It'd be nice if we had more like a rental car place here... Especially because...some people come for tourist-ing...More busing systems also because our bus system only runs from like eight to five. So if you need to go somewhere after that time, you can't if you didn't have like the availability, have your own car or like to walk somewhere. So it'd be nice to see a transportation system that was like 24/7."

- A resident from Fergus Falls, Minnesota

BUSES ARE RELATIVELY CLEAN WHEN COMPARED TO TRAINS

"I enjoy taking the bus over the light rail which is less desirable and cleanliness...The trains which run regularly tend to be less clean and filled with people that tend to like smoke or defecate upon the train."

PUBLIC TRANSPORTATION IS AFFORDABLE

"I do take that [affordability] into consider-ation with my mode of transportation. Like I if I'm going downtown, and there's a game going on, I'm not going to bring my car because the parking is like $25 for Game Day parking. The city seems to jack up the meters during games."

- Josef Oreskovich, fitness instructor, person in recovery, and a member of the Aliveness Project.