



The impact of access to public transportation on the mental well-being of senior citizens post driving-cessation in rural New York

Citation

Matos Amaro da Silveira, João. 2024. The impact of access to public transportation on the mental well-being of senior citizens post driving-cessation in rural New York. Master's thesis, Harvard University Division of Continuing Education.

Permanent link

<https://nrs.harvard.edu/URN-3:HUL.INSTREPOS:37378508>

Terms of Use

This article was downloaded from Harvard University's DASH repository, and is made available under the terms and conditions applicable to Other Posted Material, as set forth at <http://nrs.harvard.edu/urn-3:HUL.InstRepos:dash.current.terms-of-use#LAA>

Share Your Story

The Harvard community has made this article openly available. Please share how this access benefits you. [Submit a story](#).

[Accessibility](#)

The impact of access to public transportation on the mental well-being of senior citizens
post driving-cessation in rural New York

João Matos Amaro da Silveira

A Thesis in the Field of Psychology
for the Degree of Master of Liberal Arts in Extension Studies

Harvard University

May 2024

Abstract

Driving cessation is a difficult challenge for many older adults, especially in rural areas where access to basic and social needs are commonly only possible through vehicular transportation. Individuals who have given up their license, are in the process of becoming non-drivers, or are unable to drive their vehicle due to medical or financial concerns commonly find themselves struggling with feelings of isolation, helplessness, fear of a sedentary life, and a decrease in the number of meaningful social connections. In order to be able to fulfill their minimum mobility needs, many individuals in this situation find themselves dependent on existing public transportation or alternative (non-profit or volunteer) transportation systems.

This study looks at two neighboring counties in rural New York State, Tompkins and Tioga Counties, one of which has an existing internal transportation system providing transportation to residents within the county (Tompkins), and one which does not (Tioga), in attempts to compare how access to these public transportation systems impacts the well-being of individuals who are limited in their access to transportation. Using a simplified well-being scale, researchers collected data on 17 participants (10 from Tioga County, 7 from Tompkins County) on to their feelings regarding their ability to fulfill their mobility needs, as well as collecting qualitative information on the situations they found themselves in, what needs were being unmet, and the consequences of not being able to access transportation.

Though statistical analysis of the data proved the comparisons made between groups to be non-significant, the qualitative and descriptive data collected in this study can help provide helpful insight for future studies attempting to further explore this question, specifically in this area. Among the major discoveries of this study was that participants from Tompkins county felt like they were being underserved by the existing public and alternative transportation systems available to them. Indeed, the existence of a public transportation system does not consistently predict higher well-being scores in individuals, and as such the quality of said public transportation system is to be taken into account, as well as the access it provides specifically to those who do not have access to their own vehicle.

Acknowledgments

I would like to thank my Thesis Director, Jennifer Molinsky, for all of her support, encouragement, and patience throughout this entire process. I am also grateful to my Research Advisor, Dante Spetter, for all of her guidance throughout my time at Harvard.

This study would not have been possible without the support from the organizations we have partnered with: The Ithaca Housing Association, Catholic Charities Tompkins/Tioga, and Tioga Opportunities, Inc. I would also like to thank the Tompkins County Public Library, the Coburn Free Library in Owego, and the Elks Lodge in Owego for their support in the data collection and dissemination processes.

I would like to thank my parents, Monica and Andre, for their never-ending support, their love and care, and for giving me every opportunity that has brought me here. I am fortunate beyond belief to have been raised by you. And my sister Marina, who has always been there for me and will always be an inspiration to me.

Finally, I would like to thank my husband Edgar. Your courage, perseverance, and your candor motivate me every day to do better and be a better person. I am forever grateful for your presence, forever calmed by your voice, and hope to be there for you to the very end.

Table of Contents

Acknowledgments.....	v
List of Tables.....	viii
List of Figures.....	ix
Chapter I. Introduction.....	1
Background of the Problem.....	2
Social Engagement and Support Networks.....	6
Gender and Driving Cessation.....	8
COVID-19 and Public Transportation.....	10
Mobility Needs.....	11
Tompkins and Tioga Counties.....	12
Research Aims, Goals, and Hypothesis.....	15
Chapter II. Materials and Methods.....	16
Participants.....	16
Focus Groups and Personal Interviews.....	18
Survey Structure.....	20
Data Analysis.....	22
Chapter III. Results.....	23
Survey Results.....	23
Major Themes and Obstacles to Transportation.....	30
Mobility Needs Unfulfilled.....	31

Unreliability of Existing Transportation Systems.....	33
Isolation and Inactivity.....	36
Economic Impact.....	39
COVID-19.....	40
Chapter IV. Discussion.....	42
Limitations.....	46
Future Directions.....	49
Appendix 1.....	51
Appendix 2.....	52
Appendix 3.....	53
Appendix 4.....	55
References.....	57

List of Tables

Table 1. Demographic Features of Participants by County..... 24

Table 2. Success rates for obtaining access to transportation between both counties..... 30

List of Figures

Figure 1. Comparison of scores between counties.....	27
Figure 2. Comparison of scores between public transportation users and non-users.....	27
Figure 3. Comparison of scores between genders (male vs. female).....	28
Figure 4. Comparison of scores between licensed and unlicensed participants.....	28
Figure 5. Comparison of scores between counties: times they needed transportation.....	29
Figure 6. Comparison of scores between counties times: unable to find transportation...29	

Chapter I

Introduction

Driving cessation is a common challenge faced by people as they reach the later stages of life. Due to the natural decline in motor skills and audiovisual processing that comes with aging, it is widely accepted that there comes a point in most people's lives where driving is no longer a safe option for personal transportation. Be it a decline in eyesight (Liddle et al. 2008), issues with unintended acceleration (Freund et al. 2008), or elevated levels of anxiety related to their own perception of their decline in driving ability (Hansen et al. 2020), there is a wealth of research on the reasons why it becomes less safe to drive as one reaches the later stages of their life.

More recently, we have seen a rise in the amount of research focused on the well-being of those who are undergoing or have undergone the driving cessation process. They have found that elderly individuals who no longer drive tend to face many unique challenges, from lack of access to social and leisure activities to a possible lack of access to basic needs such as healthcare, food, or water. These can all have a negative effect on their mental well-being, leading to a higher risk of suffering from depression (Abootalebi et al. 2021) and feeling isolated or lonely (Qin, Xiang, and Taylor, 2019), among other adverse emotional conditions. These effects can be mitigated by having access to social support structures (Johnson 2008) and alternate forms of transportation, (Hansen, Newbold, Scott, Vrkljan, and Grenier 2020) but no studies analyzing the effect of these mitigating factors have been performed in the rural American Northeast.

The present study is a between-groups comparison of the Tompkins and Tioga Counties in the Finger Lakes region of rural New York. Specific goals for this study are (1) to ascertain whether there is a connection between access to public transportation and well-being; (2) to establish a need for further research into how access to public transportation affects the well-being of individuals; (3) to encourage further investment into research and development of transportation systems in rural areas, particularly in North America where the ability to fulfill basic needs is usually mediated by vehicular transport.

To date, no other work has compared two neighboring counties that differ with regards to their access to public transportation and how it mitigates the negative effects of driving cessation. This study will build toward a better understanding of the role that public transportation has as a form of support system for those who no longer drive.

Background of the Problem

The topic of driving cessation among the elderly has been studied for many years, usually with a focus on studying cognitive and physical decline as indicators that individuals are at a point in their lives in which it is no longer safe for them to remain driving. The study of the process of driving cessation (paying attention to the risks and obstacles in this important transition period and how the loss of this level of agency can negatively affect the well-being of individuals going through it) is more recent but has yielded some important themes to be explored in this thesis.

Studies have attempted to break the process of driving cessation down into stages. Liddle, Turpin, Carlson, and McKenna (2008) qualitatively analyzed the complex process

of driving cessation and common themes were found in participants' responses which were divided into three temporal phases of driving cessation: the pre-decision phase, decision phase, and post-cessation phase. The study was conducted as a part of a larger project, conducting 30–90-minute face-to-face interviews of retired drivers over the age of 65, family members of those drivers, and health professionals who have worked with patients through driving cessation processes.

Through these interviews, themes were found to fit into three temporal stages of driving cessation. In the pre-decision phase, drivers find themselves taking part in a balancing act between their desire for independence and the obstacles to continued driving, sometimes self-restricting and sometimes trying to conceal the difficulties they face while driving. In later stages of the pre-decision phase, they begin to develop awareness of the dangers they face if they continue driving, turning to both aspirational and cautionary anecdotes to guide their decision-making. The decision phase is mostly defined by drivers' fears on what will happen if they cease driving and the challenge of taking ownership of their agency for making this decision. The post-cessation phase is mostly defined by drivers finding new ways to gain independence and access to their needs or adapt to a new living situation, both of which usually require access to support systems. Another common challenge of the post-cessation phase is that of coming to terms with their new condition, where most retired drivers struggle with feelings of loneliness, loss of independence, loss of freedom, and a general sense of coming to the end of one's life. Though this study was somewhat limited, done on only 18 individuals in a small urban area of Queensland, it provides a good baseline on the common themes that are reflected in the literature.

A more recent study conducted by Hansen, Newbold, Scott, Vrkljan, and Grenier (2020) shows very similar results, but points to some interesting problems faced by retired drivers that are specific to rural areas. This study looked at four rural communities in Canada near the city of Hamilton, Ontario which do not have access to public transportation. Some participants used to have access to this service, but it has since been removed. In rural areas elderly individuals commonly find themselves restricted from performing basic societal functions ranging from going to the bank to shopping for groceries due to their inability to drive, which leads to more pronounced obstacles in this transition. The study was conducted through interviews of 23 participants, four of which no longer drove and the rest which had some form of driving limitation or self-regulation.

The main themes found during the analysis of the interview contents included the lack of transportation options and feelings that “everything revolves around driving” in their area, changes to their driving behaviors such as self-regulating how often and what times they decide to drive, challenges with planning for their driving future and feelings of anxiety towards the transition, and the feeling of inevitable social and emotional isolation that will come once they reduce or cease their driving. In addition to discussing their anxiety about no longer driving, participants reported reluctance or confusion around how and when to make use of support systems such as alternate transportation methods devised specifically for their demographic. This study was also somewhat limited in scope, but it provides a good analysis of the unique problems faced by rural retired drivers. The problem of public transportation, or the lack of access to it, is a key issue to this population, and this thesis proposes that comparing two rural populations,

one with some access to public transportation and one without, will provide a better understanding of the role of public support systems in the driving cessation process.

The fear of driving cessation and the anxiety that comes throughout this process is not at all unfounded, as much of the literature on the consequences of ‘giving up the keys’ shows a clear decline in quality-of-life indicators and general well-being. Harrison and Ragland (2003) reviewed 19 studies on the consequences of driving cessation for older adults. They found the major themes across investigations were a reduction of out-of-home activity, increased dependence on caregivers, loss of independence, loss of personal identity, lower life satisfaction, and increased risk of depression. Among the conclusions across studies were the need for better planning and increased access to alternative modes of transportation.

In Tompkins County alone, the percentage of trips per day using private vehicles has decreased among drivers of all ages from 80.5% to 66.2% from 2000 to 2017, while the percentage of those making use of public transportation has risen from 1% in 2000 to 4.2% in 2017. (Ithaca-Tompkins County Transportation Council 2019) In the meantime, Tioga County residents do not have any form of public transportation available to them, making it a natural point of comparison between the two. The current study will investigate whether access to public transportation is associated with better well-being assessment scores. In order to reach such minimum mobility objectives, especially in rural areas where access to basic needs involve traveling long distances, alternate forms of transportation such as public transportation or a caregiver’s network are areas worth exploring.

Social Engagement and Support Networks

Johnson (2008) analyzed the role of informal social support networks as a predictor in how likely people are to voluntarily give up driving and maintain their status as non-drivers. It identifies the key social concerns of 75 women over the age of 75 who had to give up driving using a demographic questionnaire, an interview, and the Lubben Social Network Scale (LSNS), a measure of the impact social support has on participant's likeliness to remain in a position in which they are willing to give up driving by providing information on the size and access to an individual's social support system. In interviews, all participants reported feeling unsafe behind the wheel, and all participants who maintained their decision to quit driving felt supported and valued by their friends and family, while participants who resumed driving did so because they reported feeling alone, unable to survive, or feeling like they needed to resume driving because someone in their social circle needed them.

Results show that in general, individuals who had more access to their social support network were significantly more likely to maintain their decision to stop driving, and felt better about this decision, while those with less access to this network felt as though they were forced to go back behind the wheel, be it for their own survival or comfort or to help their friends in need. This study shows the importance of social support systems as a factor of achieving a smoother driving cessation transition and provides an important variable when thinking about further research on the support factors in this transition. It indicates that some form of controlling variable for social support quantified by a tool such as the LSNS may be necessary in order to understand

the impact of access to alternate forms of transportation on the well-being of retired drivers.

One issue with counting on social support networks upon retiring from driving is the social isolation people experience once they no longer drive (Qin, Xiang, and Taylor, 2019). Many older adults who quit driving see themselves as being heavily impaired in terms of their mobility in an environment that increasingly depends on driving to meet with other people. The study collected data over two years from 6,916 Medicare beneficiaries aged 65 or above who were eligible drivers at the baseline and analyzed their risk towards falling into the category of social isolation as defined by their status of having a partner, living family or friends, and church or club participation. Results found that those who had given up driving in the two previous years were twice as likely to fall under the social isolation category than those who remained or resumed driving. These findings are an important addition to the studies that analyze how social support systems are an important predictor for older adults who abstain from driving and remain in that condition, hinting at a negative feedback loop for those who choose to stop driving, as they are both increasingly dependent on social support in order to fulfill their needs, but also tend to be more socially isolated if they remain in this condition.

Curl, Stowe, Cooney, and Proulx's (2013) examine longitudinal data from a sample of almost five thousand participants from seven waves of the Health and Retirement Study (from 1998 to 2010). They analyzed how productivity and social engagement can be negatively affected in participants after driving cessation. It found that productive engagement in the form of formal and informal volunteering and paid employment is severely negatively impacted by driving cessation, with non-volunteer or

work-related social engagement having a less immediately noticeable drop. They found negligible interaction from mediators such as physical and mental health affecting these relationships, suggesting that this decline in social engagement is indeed affected by driving cessation. Based on these findings, the authors emphasized that intervention programs aimed at helping this transition away from driving should focus less on general health and well-being and more on the availability of alternative forms of locomotion such as public transportation as a means of maintaining social engagement. While there are many different types of interventions for driving cessation, such as programs to provide some amount of social engagement virtually, there is also a certain amount of resistance from the population to adopting new technologies, particularly in the area this study is interested in. As such, the access to alternate forms of transportation as an important mediator on well-being of those undergoing driving cessation was seen as a key element to explore.

Gender and Driving Cessation

Burkhardt, Berger, and McGavock (2011) report that men are less likely to give up their licenses than women. They also reported that the number of people who retain their license at an advanced age is still growing, particularly among males. Since women are more likely to give up driving than men, studies such as Siren, Hakamies-Blomqvist, and Lindeman's (2004) look specifically at the health consequences of driving cessation on older women. This study took place in Finland, with an initial pool of 1,497 individuals above the age of 70 who had not renewed their driver's license and 1,497 individuals of the same age group who had. Participants were asked to complete a questionnaire asking them about their physical and mental well-being. To assess their

mental well-being, participants were asked to provide a baseline assessment of their health and were given a list of common symptoms associated with poor health conditions to denote if they noticed any. Assessments of mental health, life satisfaction, and a simple assessment of whether they were diagnosed with depression or not were used to analyze mental well-being status. Notably twice the number of participants who remained drivers returned their questionnaires filled out in comparison to the non-driving group; the authors suggest a stigma and negative emotions related to having to face their status as non-drivers, as well as the fact that non-drivers are more likely to present health or sensory limitations such as visual or motor problems that may make it difficult to fill in such surveys.

Results show that women who renewed their license had overall better mental and physical well-being than those who had not, though once again it is hard to tell if the driving cessation is what led to the health decline or was a consequence of it. Though these data were collected in Finland, this study can help guide future research in rural America on this subject, pointing to and modeling an interesting means of assessing life satisfaction. The focus on a specific gender is an interesting choice, as it helps control for factors such as societal gender roles, the difference in familial relationships between men and women, and how they tend to approach the notion of giving up some of their independence. Anecdotally, men tend to be far less likely to give up their license than women, particularly in the Western world where driving and cars have been historically tied with concepts of masculinity and status. Indeed, it is important to pay attention to the unique problems different elderly demographics may face, be it with regards to gender, their location, or even external factors such as changes to their environment.

COVID and Public Transportation

Most recently Abootalebi et al. (2021) studied the interaction between driving cessation and the COVID-19 pandemic, in which restrictive measures such as social distancing prevented elderly individuals from being able to access even their most basic needs. Researchers interviewed 15 retired drivers over the age of 60 in the region of Shiraz, Iran. The inability to use public transportation and the anxiety of becoming infected if they would even try to find rides was found to generate feelings of isolation, loneliness, depression, and was even associated with mortality or admission into long-term care. The themes identified in the interviews were mandatory preventative social isolation, exacerbation of emotional pains, warning of a sedentary lifestyle, narrowing of the circle of meaningful communication, gaps in transportation needs, as well as themes of adaptation, including acceptance of a new home-based lifestyle, strengthening intergenerational connections, building a supportive family network, and the development of a relationship with the internet. (Abootalebi et al. 2021)

In Choi, Adams, and Mezuk's (2011) study of driving cessation, one such model for analyzing the process of driving cessation was created through use of the stress-coping framework, with the hopes of helping guide future intervention programs to make the driving cessation transition less negatively impactful on the well-being of those who can no longer drive. In this framework, life transitions are analyzed through the components of stressors, buffering factors, and outcomes. (Choi, Adams, and Mezuk 2011) By conceptualizing driving cessation through this paradigm, one can easily drag and drop most of the issues and themes found in literature into one of these components. The health issues that lead them to stop driving, as well as the consequences of driving

cessation are seen in this model as primary and secondary stressors respectively, while support systems such as informal social support or public transportation systems may count as buffering factors. The outcomes in this scenario are whether individual older adults maintain their decision to quit driving or not and are all based on the ability of the buffering factors to keep the stressors from producing an unwelcome outcome. Temporal and sociodemographic factors are also important predictors of one's ability to cope with the stress of giving up their ability to drive. Such a framework can produce a useful way of looking at ways of diminishing the stress and decline in well-being that comes from driving cessation, by paying attention to specific buffers that may be beneficial to making it a smoother transition.

Mobility Needs

Musselwhite devised a different model for analyzing the impact of driving cessation on the elderly (2006) by looking at retired drivers' needs and the obstacles to them being met, rather than stressors and buffers. By analyzing common themes from responses former drivers give on issues related to driving cessation, it was found that driving is tied with feelings of independence, self-esteem, prestige, social status, convenience and avoiding physical effort, access to healthcare, shops, services and food, attendance to community events, the ability to fulfill the role people see for themselves in their social or familiar circles, and feeling like they are a part of society or 'normal'. It is also common among the elderly to find that the journey itself is an important part of why they enjoy having their car, they enjoy the scenery, driving by the coast, etc. as they feel it fulfills aesthetic needs. This study introduces a three-tiered model of mobility needs for drivers, ranging from the primary (utilitarian needs) to the tertiary (aesthetic needs).

Those who give up driving express feelings of not belonging, of being judged for using alternate forms of transportation and feeling anxiety over the rules and norms of such transportation, a lack of interest in the journey when it comes to taking public transportation, and anxiety with regards to walking in areas with car traffic. While this paper is mostly a review of previous work that has been done on the field, its proposal of using this three-tiered model for analyzing driver's needs when addressing how they will transition from driving to non-driving status is a useful tool in guiding how to devise a study on the issues affecting the retired drivers, particularly as a way to point out the impact non-primary needs can have on the well-being of individuals.

It is clear from the literature that further study into the support structures that exist to aid retiring drivers in the process of driving cessation is needed. In rural areas especially, the problems of isolation from society and decline in quality of life are apparent, and there is a wealth of evidence that systems that support people who no longer drive ameliorate the negative aspects of driving cessation. Setting aside the decline in popularity of public transit due to the COVID-19 pandemic, access to public transportation, the most easily accessible form of alternative transportation, should therefore positively predict higher levels of well-being, even when controlling for gender or support systems such as social networks and family.

Tompkins and Tioga Counties

Tompkins and Tioga are neighboring counties with similar demographics. While Tompkins has almost double the estimated population (104,777 compared to Tioga's 47,772 residents), they both have a predominantly White demographic (76.8% and 94.3%

respectively). Both counties differ in amount of their population above the age of 65, with Tompkins reporting 16.4% and Tioga going as high as 22.3% when compared to the percentage in the rest of the country (17.3%), though much of Tompkins' lower average age can be attributed to the two large universities in Ithaca. (US Census Population Predictions, 2023) While very similar in the makeup of their populations, there is a vast difference in the amount of resources Tompkins County can afford to invest into public systems than its neighbor, as it has a much larger population and is home to two large institutes of higher learning (Ithaca College and Cornell University). This difference in potential investment leads this researcher to believe that Tompkins participants would be better served in terms of their mobility needs than residents of Tioga.

Both counties also follow the stereotypical layout of what is known as “car country”, where most individuals are not able to comfortably walk to locations where they would easily be able to purchase food, go to the pharmacy, or attend doctor’s appointments. While Tompkins County is considerably denser in population with 212.91 people per square mile compared to Tioga’s 92.34 (*Department of Health 2020*), this density is not enough to guarantee walkability. In many cases, elderly individuals are at the mercy of whatever form of transportation they can get, be it the more expensive taxi or ride-hailing apps, or by waiting for a friend or family member to be able to take them to where they need to be. In other cases, residents who are under Medicaid can request for Non-Emergency Medical Transit (NEMT) a week in advance in order to be able to make medical appointments. In more extreme cases, such as emergencies, a trip to the closest hospital can end up costing from \$3-\$6 a mile, as local taxis and Uber (the only available ride-sharing app in the area) are the only options..

Residents of Tompkins can make use of the TCAT (Tompkins Consolidated Area Transit) bus system in order to reach locations such as the city of Ithaca, and supermarkets such as Wal-Mart and Wegmans. The TCAT connects the more urban Ithaca to the surrounding towns of Lansing, Trumansburg, Danby, Dryden, Caroline, among others. This provides residents of this county with a network of transportation both in its main city and to a few of its neighboring municipalities. Some residents of the Ithaca area in Tompkins county are also able to make use of Gadabout, a voluntary transport service for older and disabled Tompkins County Residents. This allows for residents of the area to, depending on the schedule and availability of these services, be able to participate in some activities that would only be possible with vehicular transportation.

As of the writing of this paper, Tioga County does not have any form of formal internal public transportation system. While CTRAN (the Clark County Public Transit Benefit Area Authority) does provide one bus line connecting Newark Valley and Owego to Elmira and the Tioga Downs Casino (CTran 2019), most participants interviewed in Tioga had no idea of its existence or made use of it. Those who were familiar with the service stated that it was unsuitable for their daily needs, as its schedules were erratic or inconvenient, and it did not provide them with transportation to the necessary locations, as it is a longer-distance route not designed for local stops. The last internal public transportation system, Ride Tioga, was defunded in December 2014 and nothing else has been developed to take its place. As such, we believe there is a large population of underserved individuals who are not having their needs met due to lack of access to transportation. While there are certain local organizations such as Tioga Opportunities,

Inc. (TOI) that are applying for grants for projects to specifically tackle this issue, there is still much work to be done if we are to make sure this population is able to safely and comfortably participate in society and the local economy.

Research Aims, Goals, and Hypothesis

This study aims to explore the link between access to public transportation and the well-being of older adults, particularly those who are unable to drive. It also aims to collect data on the specific needs that are not being met for this population, from basic access to food and medicine to their ability to participate in leisure activities. As such, it will attempt to add to the literature by providing a mix of quantitative and qualitative data that can be used to inspire future research into this problem.

Specific goals of this study are (1) to ascertain whether there is a connection between access to public transportation and well-being; (2) to establish a need for further research into how access to public transportation affects the well-being of individuals; (3) to encourage further investment into research and development of transportation systems in rural areas.

The study's hypotheses are that (1) participants in Tompkins County will score higher in well-being assessments than those in Tioga County and (2) participants who make use of public transportations will score higher on well-being assessments than those that do not.

Chapter II

Materials and Methods

The methods used in this study are inspired by the previous works listed above concerning well-being in older adults and their access to transportation, but are also constrained by the limitations of the level of access to the population in question and their ability to comfortably complete the study in a timely and accurate manner. More specific details on the challenges and limitations of these methods will be described in Chapter III. In this chapter we will discuss the methods for recruitment, focus group and personal interviews, as well as data collection and statistical analysis.

Participants

The recruitment process for this study posed a variety of interesting challenges due to the specific population being studied and the relatively isolated condition they find themselves in. Tompkins and Tioga counties are rural areas of New York State, in which transportation normally requires ownership of a car, meaning most of the participants this study is interested in have severe limitations as to when and where they can perform the study. While an online survey would have been very efficient in providing more access to participants, we believe that in-person access was an important factor of this study, as the population we are interested in would have more difficulty with having access to the internet, particularly if they fit into the lower socioeconomic brackets.

The objective of this recruitment was to find 30 participants from each county, all over the age of 60, who did not have their own driver's license or had limited access to a

car and thus depended on public transportation or walking in order to fulfill their needs, from primary to tertiary. In order to account for the possibility of a low number of responses, as was expected based on the literature, the study attempted to recruit as many participants as possible due to the chance of some of them recusing themselves from completing the study, as well as design its survey so that it would be easy to complete and avoid overwhelmingly negative reactions from participants. The study fell short of this objective, being able to collect survey data on 17 participants, 10 from Tioga County and 7 from Tompkins County. While this may have been discouraging, from the perspective of an independent researcher, this anecdotal and qualitative data collected from personal interviews and focus group testing can provide useful information for future exploration on the subject.

In order to find participants for this study, the researcher unofficially partnered with the Ithaca Housing Authority, Tioga Opportunities, Inc., and Catholic Charities Tompkins/Tioga in order to gain access to certain assisted living/senior living and low-income housing facilities to perform focus groups, personal interviews, and hand out surveys. These partnerships were key factors in the completion of this study, particularly for facilitating the focus group and personal interview section; the majority of participants were highly motivated by that section of the study.

Visits were organized to five different assisted living/low income housing facilities in both counties in which the researcher met with residents in common areas to gather interest, explain the project, and collect qualitative information from focus groups and personal interviews to help better inform the survey questions. These were organized

by the organizations listed above alongside the researcher by printing out flyers and providing food and drinks for potential participants.

The study also made use of partnerships with local libraries and Veteran's Centers, as well as a few days of on-the-ground canvassing at local public events in both counties. These efforts combined provided the study with a fair amount of interesting qualitative evidence about the conditions participants are faced with when trying to obtain transportation, which will be covered in Chapter III.

Focus Groups and Personal Interviews

Multiple focus groups were held at five different locations, two in Tompkins County and three in Tioga County, all within assisted living/low income housing facilities. Multiple visits were made to each location in order to better accommodate participants who were limited in time, mobility, and health. These were normally one to two hours long, depending on the amount of participants who were present on each day, usually ranging from 8 to 15 people, and provided the study with plentiful information about how to conduct the survey and provided participants with a space in which they felt comfortable sharing their experiences regarding their access to transportation.

Personal interviews were also held individually in some cases when canvassing at local public events in Owego and Ithaca respectively. These varied from the rest of the participants due to their ability to make it to said events, something listed by participants in focus groups as a severe limitation due to lack of access to public transportation. Personal interviews were shorter than focus group sessions, lasting for around 15-30 minutes per individual, depending on their availability and interest in speaking on the subject. All participants requested that interviews be performed without any form of

audio recording, and as such the researcher wrote down the responses from all participants for each location for future analysis and exploration.

The questions for this section of the study were used as starting points for larger conversation, asking participants what activities they participate in that require some form of transportation, what activities they find themselves unable to do regularly due to a lack of said transportation, then probing further into recent events and situations in which participants found themselves able or unable to fulfill their needs due to their access to transportation. Participants were encouraged to express their satisfaction or dissatisfaction with the options they have available to them, as well as provide any other information on the subject they felt was relevant.

The focus groups also helped establish some limitations for how the survey would be structured, as most participants clearly stated that a) they did not want to take part in any form of digital survey collection, b) they were concerned that a study that lasted more than one week would be too cumbersome and would lead to participants forgetting or dropping out, and c) some participants were concerned about the length of the survey, as many stated having difficulty with filling out forms and experienced confusion when faced with too many numbered scales. A large number of interviewees also stated that they would like to have write-in sections in which they can write about their experiences. As such, the goal was for the survey to be structured in a way that would best address each of these concerns, while attempting to collect the most amount of information.

Survey Structure

The survey was structured in two parts. First, participants were given an initial questionnaire which collected their demographic information, followed by asking them about their transportation habits. This included whether they still had a driver's license, if they still drove sometimes, if they used public transportation, what alternative kinds of transportation they used (i.e. driven by friends or family), what activities they take part in that require public transportation and if there were any activities they would like to take part in but were unable to due to lack of proper transportation. They were also asked to complete the six-item Lubben Social Network Scale, used to assess the access to social support networks available to participants. Participants are asked to answer questions related to how many people they feel like they can rely on, both friends and family. Answers are weighted and added up to a score that ranges from 0-30, with a higher score indicating more social engagement. This scale has been validated with an internal reliability of .83 (Lubben et al. 2006)

After completing this first step, participants were asked to wait one week before filling out a second questionnaire, asking them how many times over the previous week they needed transportation for some activity, how many times they were unable to get it, and to rate how the week made them feel with regards to their ability to get around, all within a 1-5 rating scale. The scales for amounts of times participants needed or were unable to acquire transportation were scored as follows: 1: None, 2: Once, 3: Twice, 4: 3 to 6 times, 5: Every day. They were then asked to describe what it was that they were able to achieve with their access to transportation, what form of transportation they took, what

they were unable to do, the reason for why they were not able to perform those activities, and how they ended up spending their time instead.

Data Collection

Data collection was performed by handing participants envelopes with the surveys and providing them with information on how to complete them both in written and verbal form. For the assisted living/low income housing facilities distribution of these envelopes varied between facilities, as some locales preferred to handle the material distribution themselves while others preferred to have them handed in personally by the researcher. These facilities would then collect the envelopes from participants and return them to the researcher after completion. Other surveys were also distributed at local libraries and churches, as well as handed out during public events, with mail-in address and postage included for participants to mail back to the researcher. Participants were also encouraged to call the researcher if they had any issues with filling in or returning the surveys.

While over 90 envelopes were handed out to potential participants, churches, and libraries, only 18 envelopes were returned. Within these, one of the envelopes contained incomplete data and was removed from the study. Further visits were made to all locations to ascertain why there was such little adherence to the study, and responses varied from the difficulty the participants had with following instructions to waves of COVID that affected all locations during the Fall season of 2023. Chapter IV will go into more detail as to the potential reasons as to why the study works with such a small data sample.

Data Analysis

Unpaired one-tailed t-tests compared the means of well-being scores of those with access to public transportation (Tompkins County) and those without (Tioga County).

The same test was used to compare the means of well-being scores of those who stated that they make use of public transportation and those who do not. SPSS version 29.0 was used for all statistical analysis of the data. Confidence levels of $p < .05$ were considered to be significant.

For the written sections of the survey, we analyzed the themes present in most responses and reported those that stood out as most frequent. This analysis looked into what activities they were unable to perform due to a lack of access to public transportation, how the experience made them feel, and what they did instead. This will provide a more detailed insight into what needs are not being met for residents of these counties and inform future steps on improving these conditions.

Chapter III

Results

In this chapter, we will look at the descriptive statistics and main findings of the research, as well as provide information on the overarching themes and obstacles to transportation discussed during focus groups, personal interviews, and reported in the survey.

Survey Results

Table 1 presents the descriptive information of participants from each county and all variables collected and used for the study. This consisted of 17 participants, 7 from Tompkins County and 10 from Tioga County between the ages of 60-85. All participants reported themselves to be Non-Hispanic white, and the vast majority of the participants were women at 82.4%.

Main Analysis of Hypotheses

A series of one-sided independent-sample t-tests were used to compare the means of well-being scores between participants from different counties, as well as between participants who self-reported to make use of public transportation or not. Further t-tests were also run to compare differences between mean scores based on gender and ownership of a driver's license. A one-way ANOVA test was used to define the significance of the frequency in which participants usually drove in relation to their well-being, as well as the impact their social support network had on their perceived

Table 1. Demographic Features of Participants by County

	Tompkins County	Tioga County	Total
Age (mean, range)	69.7(60-81)	71.5 (63-85)	70.8 (60-85)
Gender (N, %)			
Female	7 (100)	7 (70)	14 (82.4)
Male	0 (0)	3 (30)	3 (17.6)
Other	0 (0)	0 (0)	0 (0)
Living Situation (N, %)			
Lives alone	7 (100)	8 (80)	15 (88.2)
Lives with spouse	0 (0)	2 (20)	2 (11.8)
Lives with Family	0 (0)	0 (0)	0 (0)
Low income/assisted living (N, %)	6 (85.7)	9 (90)	15 (88.2)
Level of Education (N, %)			
HS or equivalent	4 (57.1)	4 (40)	8 (47.1)
Elementary School completed	0	2 (20)	2 (11.8)
AD or equivalent	3 (42.9)	0 (0)	3 (17.6)
BD or equivalent	0	1 (10)	1 (5.9)
Some college (not complete)	0	3 (30)	3 (17.6)
Income (N, %)			
0-15000	6 (85.7)	4 (40)	10 (58.9)
15000-30000	1 (14.3)	4 (40)	5 (29.4)
30000-60000	0 (0)	2 (20)	2 (11.8)
Has license (N, %)	5 (71.4)	7 (70)	12 (70.6)
Drives (N, %)			
Every day	1 (14.3)	2 (20)	3 (17.6)
Every other day	1 (14.3)	1 (10)	2 (11.8)
2x a week	0 (0)	2 (20)	2 (11.8)
Once a month or less	0 (0)	1 (10)	1 (5.9)
Not at all	5 (71.4)	4 (40)	9 (52.9)
Uses public transportation (N, %)	3 (42.9)	3 (30)	6 (35.3)

Demographic features by county (N, %). This table includes data from 17 participants. Data includes gender, income, level of education, living situation, whether they live in some form of low income or assisted living, as well as denoting participants who still have driver's licenses, drive sometimes, and which ones use public transportation.

well-being. Due to the small sample size and irregularity of the number of participants between the two groups, equal variance cannot be assumed when comparing means.

Well-being scores varied little between all groups being compared, with Tompkins participants showing a slightly higher mean for well-being scores (3.43, $N = 7$) when compared to Tioga (3.3, $N = 10$). Interestingly, participants who self-reported to use public transportation reported a lower mean well-being score (3.17, $N = 6$) in relation to those who did not make use of public transportation (3.45, $N = 11$). Participants who self-reported still having a driver's license scored on average slightly higher in the well-being scale (3.41, $N = 12$), than those who did not (3.20, $N = 5$). When comparing genders, males scored on average quite a bit higher (4, $N = 3$) than women (3.21, $N = 14$), though the small sample size for males brings into question the validity of this data.

When looking at both counties' responses with relation to the amount of times they were in need of some form of transportation, and how many times they were unable to successfully perform the activities, on average participants from both counties found themselves in need of some form of transportation around twice during the span of the week (2, $N = 7$ for Tompkins; 2.2, $N = 10$ for Tioga). When looking at their success rate in reaching their mobility goals, participants from Tompkins County found themselves on average to have half the failure rate of obtaining transportation (.71, $N = 7$) than those from Tioga County (1.4, $N = 10$). Also interestingly, when making the same comparison

between those who use public transportation and those who do not, people who did not make use of public transportation found themselves having less difficulty finding some form of transportation (.91, $N = 11$) than those who did (.15, $N = 6$). If we look at the visualization of the data, however, we find that participants who used public transportation had a much larger range between its scores than those who did not, pointing at the issue of the unreliability of the level of quality of the existing transportation systems available to them.

Statistical analysis of the data revealed non-significant differences between any of the groups being compared. The difference between average well-being scores from both counties proved to be non-significant at $t(15) = .185, p = .428$. The same can be said for the average well-being scores when comparing those who use public transportation and those who do not ($t(15) = .418, p = .682$), those who have a license and those who do not ($t(15) = .299, p = .384$), and gender ($t(15) = .932, p = .366$). Small Coen's d effect sizes on well-being were found for differences between counties (.094), whether they had a license (.159), and whether they used public transportation (.212).

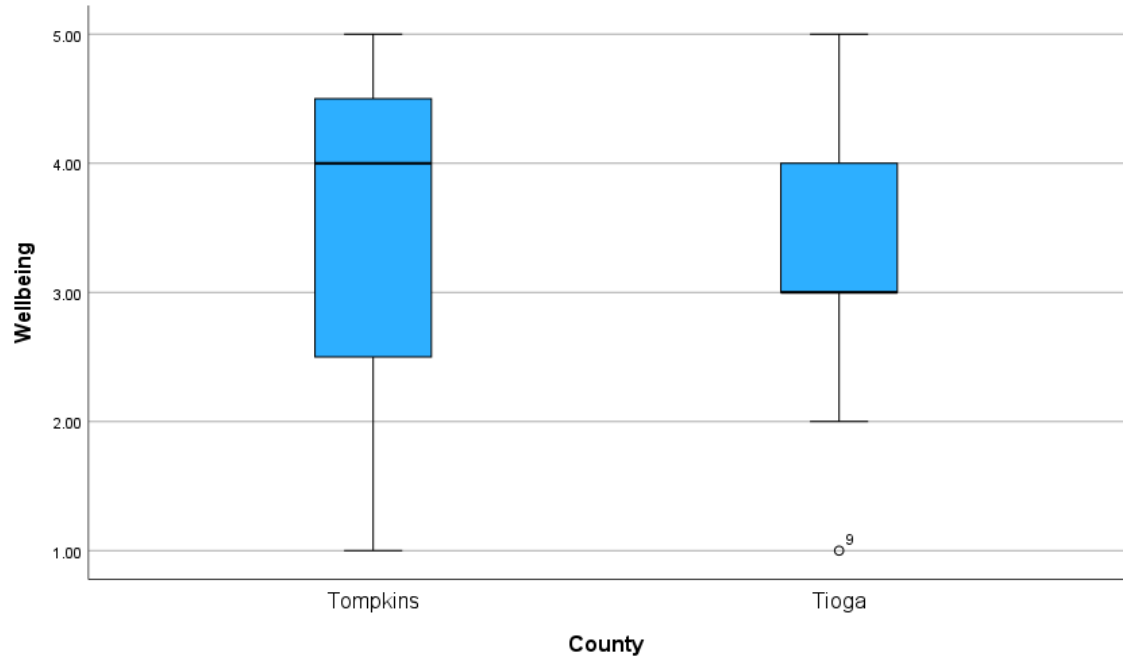


Figure 1. Comparison of scores between counties.

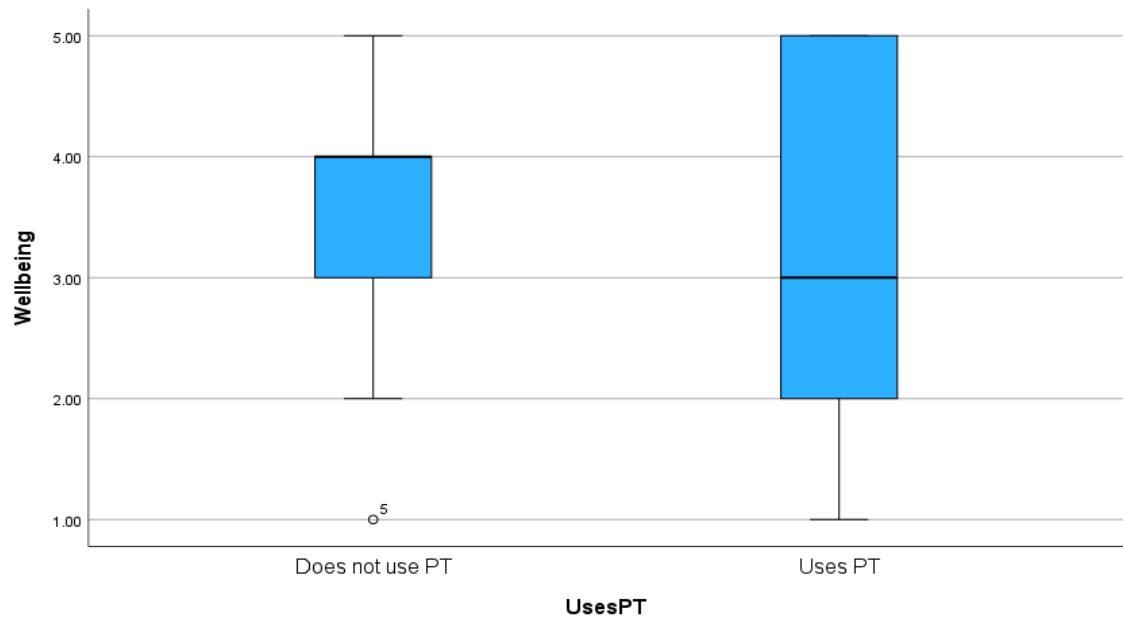


Figure 2. Comparison of scores between public transportation users and non-users.

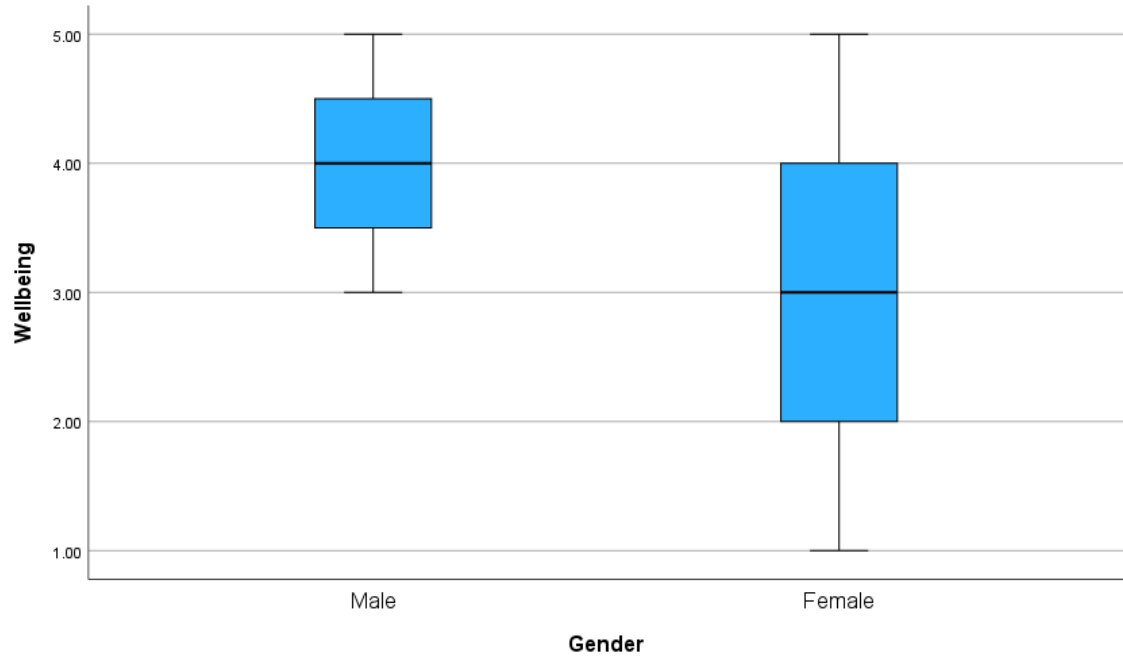


Figure 3. Comparison of scores between genders (male vs. female).

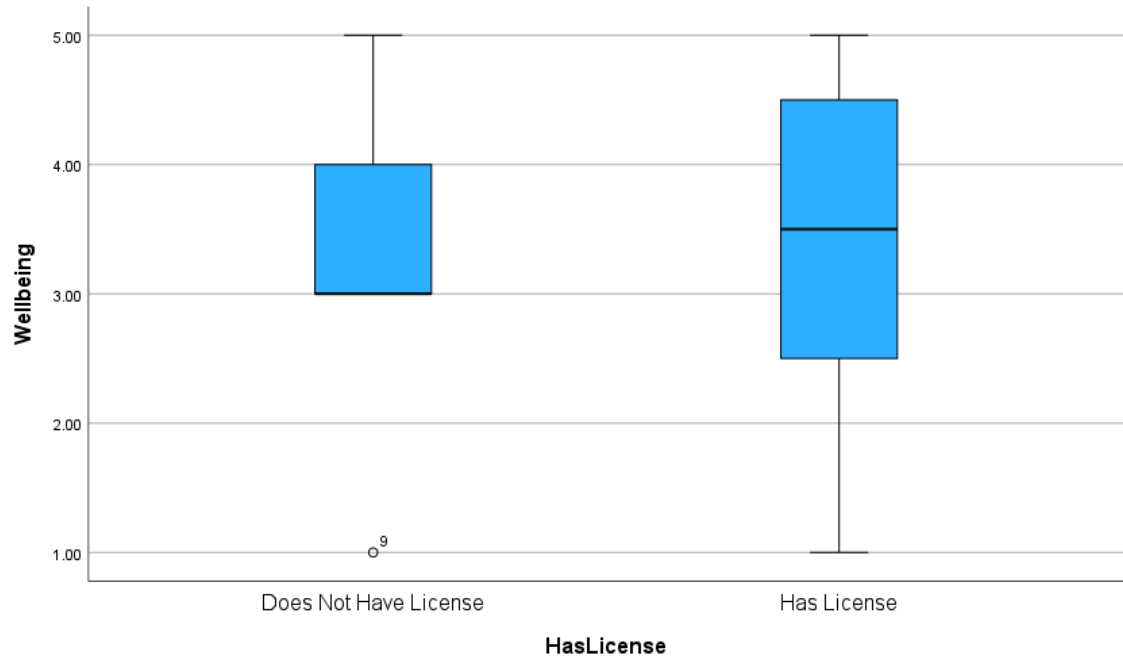


Figure 4. Comparison of scores between licensed and unlicensed participants.

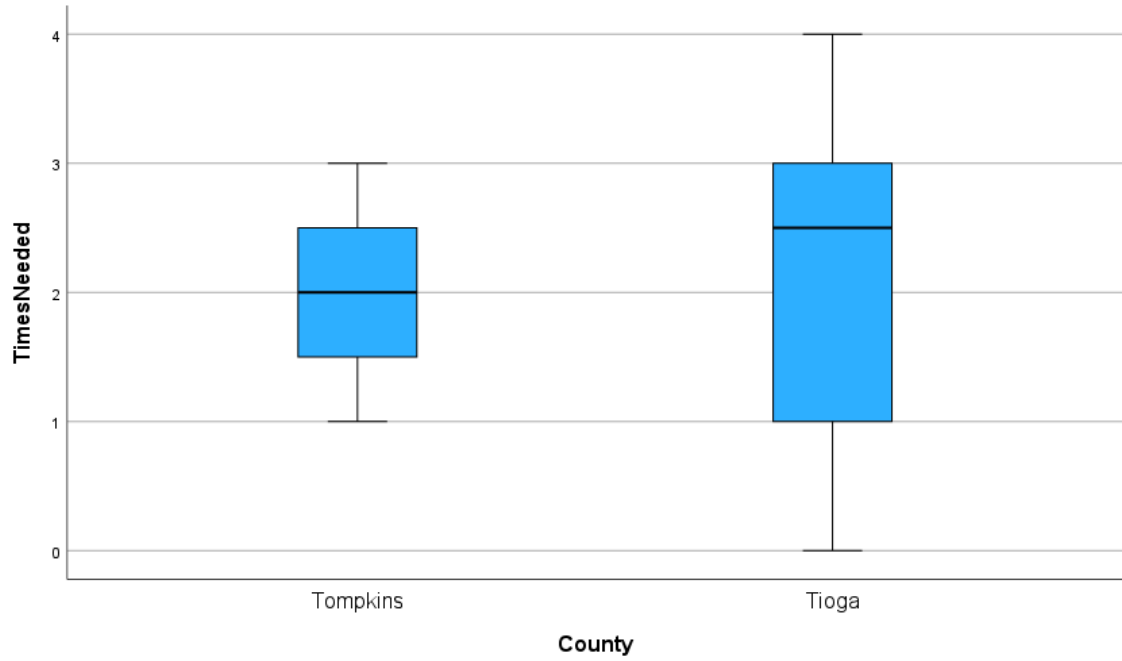


Figure 5. Comparison of scores between counties: times they needed transportation.

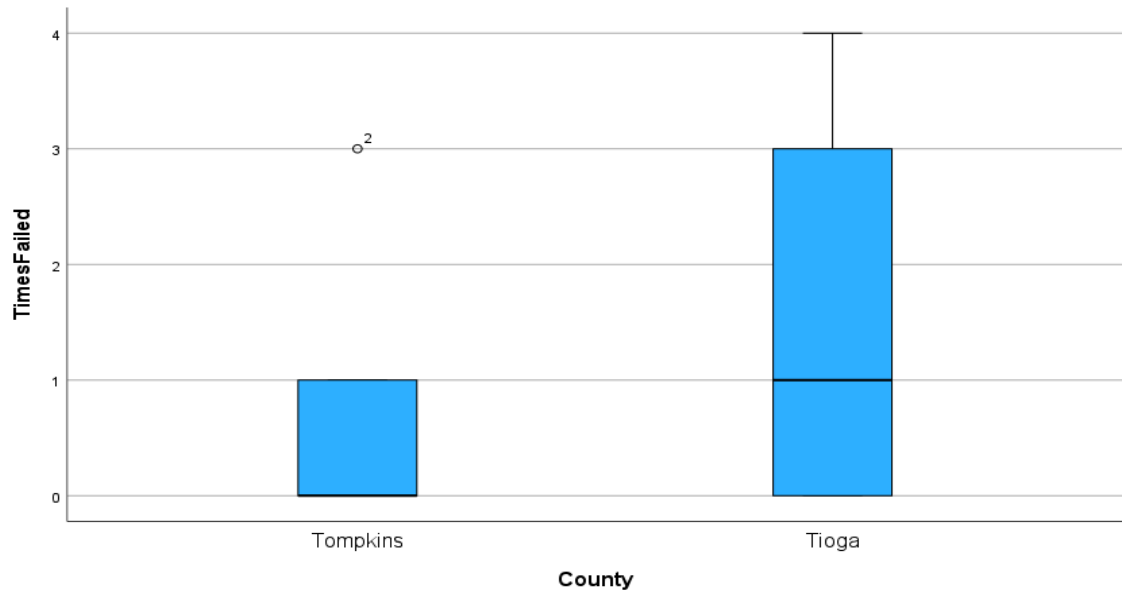


Figure 6. Comparison of scores between counties times: unable to find transportation.

Table 2. Success rates for obtaining access to transportation between both counties.

	Tompkins	Tioga	Total
Times when participant needed transportation (N, %)			
Never	0 (0)	1 (10)	1
Once	2 (28.6)	3 (30)	5
Twice	3 (42.9)	1 (10)	3
3-6 times	2 (28.6)	3 (30)	5
Every Day	0	2 (20)	2
Times when participant was unable to get transportation (N, %)			
Never	4 (57.1)	5 (50)	9
Once	2 (28.6)	0 (0)	2
Twice	0	2 (20)	2
3-6 Times	1 (14.3)	2 (20)	3
Every Day	0	1 (10)	1

Major Themes and Obstacles to Transportation

Though the statistical analysis of the quantitative data proves to be non-significant, a fair amount of qualitative data was collected in order to provide more nuanced and specific context to the problem. These were collected from the focus groups, personal interviews, and write-in sections of the survey in order to provide participants with a space to “tell their stories”, as well as give us a better understanding of the setting, the obstacles participants have to transportation, the types of needs being unmet by lack of access, and the impact it can have on the economy not only of individuals, but of the county itself.

Mobility Needs Unfulfilled

When asking participants what were the activities they required public transportation for, three primary (basic) needs were identified as recurring issues for most participants: grocery shopping, doctor's appointments, and pharmacy visits. A large number of the participants in this survey require consistent doctor's visits and access to medication, and often these are time-sensitive, as appointments sometimes need to be scheduled months ahead and have cancellation policies which may include fees. For some participants, particularly in Tioga County, this reality means that they often find themselves having to pay exorbitant fees in cab fares when alternate transportation systems are not available or reliable in order to remain a patient at their preferred provider.

Even participants who have a driver's license and have access to their own car find themselves in situations in which driving is not a possibility. Reasons given varied from cost (lack of gas or repair money), to personal safety and health. Participants who drove stated that they have "good days" and "bad days" for driving, with some listing dizziness, confusion, and anxiety as reasons to why they find it unsafe to drive. As such, they often find themselves needing to make use of alternate transportation methods, usually being driven by a friend or family member.

Participants repeatedly mentioned that existing alternate transportation systems such as NEMT and Gadabout are unreliable, sometimes even going as far as forgetting to properly schedule rides or leaving the passenger at the location they were dropped off without a return trip. Given the fragile condition of most participants, this puts them in dangerous situations of having to find their way back to their residence either by walking

or depending on friends and family, which are not always available. Many participants reported situations in which they were forced to reschedule physical therapy or doctor's appointments with such little notice that they not only had to reschedule but were charged a cancellation fee. Understanding the situation they find themselves in, participants stated that they have to "pile up" doctor's appointments all within the same day in order to try to make use of the little amount of transportation they have available to them. This exacerbates the issue whenever the systems in place are unable to fulfill the needs of their passengers; residents are forced to reschedule multiple appointments, and repeat the process all over again.

Participants from both counties have reported that when alternative and public transportation methods fail they are forced to walk across busy highways and other areas that they consider to be 'dangerous' for someone their age (i.e. forested areas around town). Participants who are more deeply involved in the local community, either by participating in the local parish or as school staff, often find themselves having to carry a cart with their belongings and purchases in order to perform errands for these groups, at times walking through uneven sidewalks and crossing poorly-signalized roads. This is limited of course to participants who have the physical ability to walk longer distances, something which is not common in this subset of the population. In Tioga County, this was considered to be a "normal occurrence" during warmer seasons, as there would be no other option for residents to make their way to the local stores or pharmacies for their basic needs. Participants from Tompkins County frequently stated a fear of walking due to the higher number of vehicles on the road, as well as the more urban environment. In some cases, participants mentioned having to cross busy highways or taking long, up to

half-hour detours to reach their destinations. During one group session, the researcher was informed that the previous year a resident of Titus Towers had been run over while attempting to cross the road, while another individual had his walker hit by a car while attempting to cross the same road.

The most common tertiary (social) needs that were identified as being unmet were: visiting family members, going to church, and participating in local public events. With regard to mobility needs and psychological well-being, tertiary does not necessarily mean less impactful; previous studies (Abootalebi et al. 2021 and Qin, Xiang, and Taylor, 2019) show that lack of involvement in social activities can lead to feelings of depression and isolation. This has also shown to have a snowball effect in which people who have already undergone driving cessation are less likely to participate in social interactions, and feelings of social isolation lead individuals to feel uneasy, uncomfortable, or anxious about having social interactions (Curl, Stowe, Cooney, and Proulx, 2013) . This can also have a negative impact on their social support networks, as they isolate themselves from friends and family due to an inability to visit them, the level of support they can expect from those relationships erodes over time.

Unreliability of Existing Transportation Systems

Upon exploring this problem through interviews and group conversations, it became clear that both populations in question were being underserved when it came to their access to transportation. While there is a vast difference in the actual level of access between both groups, it seems as though elderly populations in particular are finding themselves in situations where transportation is not easily accessible, whether there is an existing public transportation system within close reach of their residence or not. Based

on the information collected, it is fair to say that even though Tompkins County provides a formal bus line system of public transportation for its residents both within Ithaca and surrounding areas, the access to said bus line is reportedly very limited to many residents of senior living/low income housing.

Tompkins County's TCAT system claims to provide transportation to residents within Ithaca and neighboring towns. However, due to the layout of the city and a widely-perceived prioritization of its University student populations, many of the most actively served bus lines revolve around Ithaca College and Cornell University. Residents of Titus Towers, a low income housing building in Ithaca, repeatedly stated that a bus line that used to be easily available to them had been cut back significantly, available only between the hours of 8:30am and 11:30am, and only on weekdays. Schedule change information is also reported to be inconsistent, with older citizens who are not used to technology or smartphones finding themselves unable to find said changes as the information is no longer available printed on most bus stops and is exclusively digitally accessible online. Tompkins participants also complained that the buses themselves had poor accommodations for residents with accessibility issues, and often found themselves having to argue with bus drivers in order to be given access to the accessibility ramp available on most buses.

When it came to discussing alternate forms of transportation not mediated by a government-funded bus line system, participants had a variety of opinions on their available options. Gadabout, which is available in Tompkins County exclusively, has shown to have good service but difficult scheduling, with passengers having to call multiple times to confirm whether they had been scheduled or not, and sometimes

receiving the response that the person who took their call had “forgotten” to put them on the schedule. When it comes to picking up passengers, most participants echoed the same problem: they would have to wait for hours for their ride back to appear, if at all. Many reported to have called the service asking where their ride was and were left without a satisfactory answer, needing to get a taxi or call a friend or family in order to make it back home. In one reported case, a participant had a doctor’s appointment at 11am, and was only able to make it back to his residence at 8pm of the same day.

This situation is exacerbated in Tioga County, where residents are dependent on much less resource-rich non-profit organizations in order to obtain their necessary transportation. Participants from this region reported having extreme difficulty with the available transportation options provided by Tioga Opportunities, Inc., sometimes having to call multiple times in order to simply get their call answered, and cases similar to Gadabout in which passengers were “forgotten” to be included in the scheduling. When calling again to get more information on what went wrong, two participants reported that “the person who took (their) call must have forgotten”, with no further explanation as to why. As such, the most common attitude towards these systems has been one of distrust. Residents have attempted to make use of the taxi and ride-hailing services available through Uber in the region, but have stated that all were too exorbitantly expensive. In a particularly notable interview statement, a participant who was African American (who participated in the group discussion sessions but did not turn in a survey upon follow up) stated that they called a taxi to pick them up from the hospital at night and noticed that the car simply drove away after approaching the hospital entrance.

Since most participants of this survey live in senior/low income housing, it would be fair to assume that they have access to some form of vehicular transportation provided by the organization managing the building for their mobility needs. While every three of the five locations visited had their own vehicle (a small van), they were unable to make use of it due to the lack of volunteer drivers. This has been a problem echoed by the organizations responsible for managing transportation for those in need, as there has been a huge downturn in the number of able and certified volunteers in the area over the past years.

Isolation and Inactivity

When participants were unable to obtain any form of transportation, the most reported activity they took part in as an alternative to their plans was “nothing” or “waiting”. Other activities reported included “reading”, “watching television”, and “spending all day canceling and rescheduling appointments”. This provides important information on the reality that residents of these counties have to face: if unable to obtain access to transportation, their time ends up being “wasted”. When asked how performing these activities made them feel, they expressed feelings of boredom, isolation, and helplessness.

A common complaint from participants is how their inability to obtain proper transportation for activities interferes heavily with their ability to make plans, going as far as claiming that “it screws up your whole life”. One of the major complaints from all populations was a feeling of lack of freedom, as they feel like their dependency on the systems available to them make them unable to have any spontaneity to their daily activities. Beyond their difficulties with planning for their administrative and primary

needs activities (shopping, banking, medical appointments), they often report having to cancel activities with their relatives and friends due to such issues, and as such some participants have reported that they no longer plan ahead as much as they used to in order to not feel disappointed or disappoint others.

Based on these statements, it is clear that these individuals find themselves in situations that are not healthy for their mental well-being. Inactivity and isolation are consistent predictors for depression and cognitive degradation, particularly in older adults. The inability to participate in society, even within their smaller social circles, promotes an unhealthy loop of further isolation and feelings of not belonging and being forgotten.

Fear and anxiety were common themes found among the responses from most participants, with regard to their future, their ability to participate in society, and their general outlook on life. A number of participants reported feeling humiliated due to their dependence on family, and feeling like they were “a burden” on whomever they depended on for their transportation needs. Participants mentioned feeling like they were “inconveniencing someone else”, “interrupting someone’s life for their own needs”, or even feeling “so depressed (they) feel like why bother trying.” Indeed, participants and interviewees have stated that they stopped depending on family due to feeling embarrassed, preferring to rely on their friends in similar situations who are still able to drive, many of which have stated that they are unable to drive every day due to medical or financial concerns.

This fear and anxiety was also present in potential participants’ attitudes towards participating in this survey. This was particularly apparent with male participants of the

focus groups and personal interview sessions, as they were comfortable speaking about their issues and problems in less formal sessions, but when asked to provide responses in the formal survey, a common response heard was “I don’t want my story to paint a worse picture of the problem than it actually is.” Female participants were much more likely to take part in the entirety of the study, yet there was still a small number who excused themselves from the survey due for the same reasons. The gender difference found here points to an issue with the way men in this area address the problems they face. Typical to rural areas in America, men in this area are expected to “tough it out” and not express their feelings or difficulties with their life, as they are expected to handle their issues themselves, observations that were echoed by many of the female participants and even some male participants admitted to.

When looking specifically at Tompkins participants, there was a subset who also expressed fear and anxiety regarding making use of public transportation. Beyond the aforementioned issues with accessibility, participants stated feeling “unsafe” or “humiliated” to be in public transportation, and some participants with memory issues stating that they commonly are “confused” by the bus lines available to them, sometimes finding themselves unable to find their way back from a bus trip or missing their stop. This was not unanimous, as there was another distinct subset of participants from Tompkins who stated that they felt “lucky” to have any form of public transportation system, though they felt like it could be improved considerably.

Participants from both locations reported feelings of disillusionment with local organizations and their abilities to provide effective, affordable services to meet their mobility needs. Those in Tompkins County stated that any improvement to or investment

in local public infrastructure is focused on locations near Cornell University and Ithaca College; this feeling is exacerbated by the recent changes to bus lines that reportedly have deprioritized participants' access to transportation in order to prioritize the needs of university students. Participants from Tioga County repeatedly stated that they feel "invisible", "underserved", and "forgotten" by local organizations such as TOI due to their perceived inability to provide transport services to those in need. This is also compounded by the fact that most Tioga residents still remember the existence of Ride Tioga, the transportation program formerly held in partnership between Tompkins and Tioga counties, discontinued in December 2014. As such, when asked about participating in the survey, the main response from potential participants varied between "why bother" and "nothing will come of it, but at least someone will hear my story". These attitudes help explain to some level the low level of adherence to the survey process within this population.

Economic Impact

Participants also reported negative experiences with local taxi companies and Uber drivers; according to participants, these parties take advantage of their "helplessness" to charge "exorbitant amounts" for short trips to hospitals or doctor's offices. Some participants claimed that trips from Nichols, NY, to Owego, NY (a 10-mile trip) cost them around \$60. Other participants from Tioga County reported cab fees of \$67 (one-way) to visit the hospital, and \$37 (one-way) to do so through Uber.

When unable to obtain proper transportation for their appointments, another large financial impact felt by participants is the payment of cancellation and rescheduling fees for medical and physical therapy appointments. Participants have mentioned that on days

in which their transportation services fell through or were unavailable at the scheduled time, they were made to pay upwards of \$42 as cancellation fees in order to reschedule their appointments. Since the vast majority of these appointments are not optional given their current health conditions, participants are often forced to pay these fines in order to continue living a functional life.

Another interesting theme found in relation to the economic impact of this problem is the fact that a large number of responses participants gave on what they would like to do if they had better access to transportation involve participating in the local economy. Beyond the amount of responses stating that they find themselves unable to go to the grocery store or the pharmacy, a large number of participants stated a desire to “go out to dinner”, “watch shows”, and “going antiquing” both in- and out-of-town. While the demographics of the population in question show that there isn't a vast amount of disposable income available to be put into the community, it still shows that there is a subset of the population whose income is not being reintegrated into the local economy.

COVID-19

Concerns related to COVID and other infectious diseases are still very present within the communities looked at, with several participants mentioning feeling uneasy about making use of public transportation due to a risk of potential infection. Particularly when speaking to participants who lived in certain senior/assisted living housing, there were also concerns about contracting diseases within the community, as some of the facilities do not allow for windows to be opened in public spaces. As such, participants mentioned feelings of cabin fever and anxiety whenever they would notice neighbors have contracted some form of illness, as they would usually not have easy options of

places to go to feel safe from potentially contracting a disease. During the process of collecting data for this survey, a large amount of COVID cases were reported in the area during the months of August and September. Due to this, all locations visited were forced to close their doors to visitors for a month-long period, as every one of them reported COVID cases within their facilities.

Chapter IV

Discussion

The study of the effects of driving cessation on the elderly has been explored through various lenses, with the access to public transportation being one such lens that we believe is still underexplored in the field. To address this particular issue, we collected data on individuals above the age of 60 who did not have a driver's license or did not have the ability to drive their own car, be it due to cost limitations or health concerns. In an attempt to control for the level of access to public transportation, populations from two neighboring counties were compared, one which has access to public transportation and one that does not. The research shows that participants from both counties are in fact in a more fragile situation regarding their mobility needs than expected. No significance was found in any of the statistical analyses for the data. When performing analysis, neither county of residence nor access to public transportation were significant predictors for well-being. The qualitative information collected points towards a number of themes commonly found in other studies in the field.

Isolation, helplessness, and disillusionment are common themes found when researching individuals undergoing the driving cessation process. Similar to previous studies (Abootalebi et al. 2021, and Qin, Xiang, and Taylor, 2019), we found that participants who found themselves unable to obtain proper transportation for their needs expressed feelings of being forgotten, isolated, and that they had little recourse to make their voices heard due to their locomotion limitations. Lack of independence and lack of control were major themes recorded in responses with regards to how participants felt about their ability to perform activities. These findings are in line with the exploration of

the process of driving cessation (Liddle, Turpin, Carlson, and McKenna, 2008), as individuals are commonly finding themselves weighing their options between their own safety and their independence and ability to act spontaneously. Interviewees and participants that still made use of their vehicle stated that they drove even though they felt like it was unsafe, and most of those who had given up driving did so due to legal or medical intervention, or due to an incident that made them feel like it was no longer safe for them to drive.

Another major element of stress that both populations suffer is the fact that, due to the nature of American rural towns, older residents find themselves unable to perform daily administrative activities or even fulfill basic needs such as accessing food, medical treatment, or medicine. This echoes the findings of Hansen, Newbold, Scott, Vrkljan, and Grenier (2020), in which residents of such areas are too geographically isolated from most services they need to continue living a comfortable life and participating in society. The common complaint that “everything revolves around driving” is ever-present in Tompkins and Tioga counties, and those who are not able to obtain transportation, be it through the existing public transportation or alternate means, are unable to perform time-sensitive and sometimes even scheduled activities.

Alternate forms of transportation, be it through participants’ social support system or through existing organizations that provide volunteer or publicly-funded ride services, proved to be less reliable than at first expected. While most participants echoed that having some form of transportation system is better than none, most of those available to residents of these counties were reported to be unreliable. When it came to their reliance on friends and family to fulfill their mobility needs, though participants reported feeling

extremely grateful to be able to rely on at least one person for their transportation needs, most reported that this comes with severe negative emotional impact. Feelings of infantilization, humiliation, and of feelings of being “cumbersome” or “a bother” to those in their social circles were all reported by interviewees and participants. This provides us with useful information about the complexity of the problem, as the controlling variables chosen for this study were not nuanced enough to provide complete information on the various intervening factors and coping mechanisms available to individuals who are undergoing driving cessation.

Another key aspect that has been underexplored in the field due to the recency of the rise of COVID-19 is the impact of the perceived risk of contracting infectious diseases when making use of public transportation. Participants reported a fear of using public transportation due to their recent experiences with the pandemic, as well as the fact that most of them still feel like they are at risk of contracting illness. This was proved to be correct during the study, as all locations were forced to shut down due to COVID concerns. When asked how these limitations made them feel, they expressed fear, anxiety, and feelings of sedentarism. This is in line with previous studies conducted by Abootalebi et al. (2021), showing that the prevalence of infectious diseases must be taken into account when considering how people feel about their access to transportation.

Gender was, as expected, a significant factor predicting whether individuals would be likely to take part in the study. As Burkhardt, Berger, and McGavock (2011) have stated, women are much more likely to give up their license than men. Similarly, women were much more likely to be open to speak on this issue, regardless of whether they had given up driving or not, than men. While most of the group sessions and

interviews tended to have a 60-40 split between female and male participants, only 3 men returned the questionnaires to researchers, while 14 women participated in the survey and returned the questionnaire filled out. This is a little surprising given that the populations for both counties are fairly evenly divided by gender (50.8% for Tompkins County and 49.8 for Tioga, according to the US Census Bureau population estimates). When asked about why they chose to excuse themselves from participating in the study, most men responded that “felt like it wouldn’t amount to anything” or they “didn’t want to complain too much.” These gender differences are particularly acute in rural environments, where traditional gender norms and expectations are more rigid and less challenged than in urban environments.

Both hypotheses being tested in this study proved to be statistically non-significant. While participants from Tompkins county on average recorded slightly higher scores for well-being, and reported fewer times in which they were unable to obtain the transportation necessary for their needs, the small data sample makes this information less useful to extrapolate to other populations. Most interestingly, we found that people who self-reported to use public transportation on average recorded lower well-being scores, and on average had a more difficult time obtaining transportation for their activities than those who did not use public transportation, though they had a more varied range of scores. Some of this can be attributed to the fact that some participants reported still having a license and access to a car, though mediated by financial and health limitations. The data does point to the issue that simply being in a county which has public transportation does not guarantee a higher level of mobility and as such, cannot be a predictor for well-being. The quality and level of access of transportation

systems must be taken into account when analyzing how it can have an effect on an individual and their community. Another potential question to explore is the specific role that social support systems such as friends and family have on the well-being of these individuals, as this factor may be even more important and effective at improving well-being than public transportation, even when accounting for the negative emotional effects mentioned previously of “feeling like a burden”. While the statistical analysis of the data proved to be non-significant, the qualitative data collected can help inform future research in the area and in similar rural areas in the United States.

Limitations

While this is the first study to compare Tompkins and Tioga counties in relation to their ability to obtain proper transportation, there are various limitations that make it difficult to use the statistical results of this study to make any sort of concrete conclusion. The small sample size is the most glaring limitation of the study, making it much less powerful and significant than it would have been able to be with more data, and as such cannot be used to extrapolate effectively on the effects that access to public transportation has on the overall population. The current study is exploratory in nature, attempting to provide better information on the area and its intrinsic issues for future studies to make use of. As such, a more robust study with more participants and a longer timeframe would be the logical next step for research in this area.

Demographic limitations should also be considered when extrapolating any results to other areas. Both counties have predominantly White, non-Hispanic populations, and there were few interviewees and group members who identified as non-white. Most participants also fell under the 0\$-15000\$ average income bracket, with

few participants reporting having slightly higher socioeconomic status. Future studies should attempt to obtain information on a wider variety of socioeconomic backgrounds in order to better control for the impact income and resources have on well-being and transportation. As such, studies in areas with this type of population demographics are unsuitable for use to predict well-being scores and the impact of public transportation in areas with more diverse communities. For all future studies regarding public transportation, it is recommended that the robustness and effectiveness of said public transportation systems, especially how they provide access to less densely populated areas.

Time constraints were another limiting factor for this study, impacted by the surge in COVID-19 cases in August-September of 2023. In order to obtain more information and have more participants for the study, a larger time frame is recommended, and systems should be established between researchers and the organizations they partner with in order to limit the impact that infectious diseases can have on the data collection. Financial and resource constraints were also a factor in this study, as it was conducted by an independent researcher with unofficial partnerships with local organizations. Due to the nature of how the data had to be collected (physical documents to be hand-delivered), there were cases of participants mentioning not receiving their envelopes at the same time as neighboring participants, as well as moments of inefficiency in communicating to residents in low income/senior living centers about when and where these studies were to be filled out and delivered. Though we are very grateful for all the help offered by Tioga Opportunities, Inc., the Ithaca Housing Association, and Catholic Charities Tompkins/Tioga, these are mostly non-profit organizations that work to mission, and are

limited in their ability to allocate resources and manpower to assist in studies. This, in combination with the current safety and disease prevention measures they have in place for visitors to their facilities, made it more difficult to collect substantial data on participants.

Another limitation of the study comes from the design, informed by conversations with potential participants, which perhaps over-corrected for the comfort of those interested in taking part of the study. In attempts to simplify the questions and provide as little burden as possible to those who would complete the survey, more abstract scales for well-being and assessing their access to transportation had to be used, and a number of them still expressed anxiety about the length of the survey. While this was well-received by participants who did take part in the study, who expressed anxiety when faced with more robust well-being assessments, it still yielded a small number of responses. Other participants also expressed “forgetting” about the survey once receiving it, losing their envelopes, or having issues with mailing the surveys back to the researcher. Even when envelopes were collected by the management of the locations in which participants were residing, reports from management were that participants would forget about filling it out and hand in the envelope with no materials inside. This also brings into question the validity of self-reported studies with such a population. Memory and cognitive issues were self-reported by participants who were interested in the study, with participants expressing fear of forgetting to fill out the survey or forgetting about the events that took place over the previous week related to their transportation. Participants were encouraged to make notes of moments in which they found themselves with difficulty obtaining proper transportation, though this wasn’t something we had the ability to enforce.

Future Directions

Despite its numerous limitations, this study provides useful information for future studies on the subject and in the area in question. Studies on transportation and well-being specific to this area are infrequent, as are investments into the infrastructure and the systems in place to provide proper transportation for those in need. This study hopes to provide some guidance on finding better methods to obtain the necessary information for more robust and powerful research.

Recruitment is probably the most pressing challenge for future studies. As was exemplified by the present study, there is a severe barrier of access to potential participants, both in terms of physical access to meeting said participants and in their ability or willingness to respond. As was predicted by Siren, Hakamies-Blomqvist, and Lindeman's (2004), there are negative emotional connotations associated with being a non-driver in this area. It is important for future researchers to take into account the fact that many potential participants may be too negatively affected by the topic they are being asked about that they would give up on participating. When asking potential participants, they also mentioned that financial remuneration for participants would have gone a long way to gather more interest in participating in the study, though this was beyond the scope of the current study. It is also recommended that, when partnering with local organizations, a more formal partnership should be established with a memorandum of understanding (MOU) between the researchers, the institutions backing them, and these organizations. As such, more resources would be able to be allocated to assisting with the research, beyond simply providing access to certain potential participants and their residences.

Study length should also be a consideration when looking at performing further studies on the matter. A longitudinal study on the matter may provide better temporal information on the issue, providing specific details on which days and seasons participants find themselves with difficulty accessing transportation. This can help provide policy makers with better directions for what to focus their limited resources on for investment in transportation services. This would be possible under a longer timeframe, but researchers should be careful to keep each of the individual questionnaires that are handed out to participants shorter in length in order to guarantee more retention and better quality of responses.

Future studies should also pay closer attention to the quality of the public transportation systems available to residents of their area, and not only take into account the existence of a public transportation system for a population. Among the most pressing findings of this study was the fact that, even though Tompkins ostensibly has a system of transportation available to the vast majority of its residents, there are still specific limitations that older adults face when it comes to making use of these systems. There is still much to explore on the impact that public transportation has on the well-being of individuals who are in the process of driving cessation, especially when it comes to populations living in rural areas such as this one. While the results may prove inconclusive for this particular research question, we have uncovered a definite need for more in-depth exploration of this problem in both counties.

Appendix 1.

Focus Group Questions

1. What are activities you take part in that require some form of automotive transportation?
2. Are there any activities you would like to do that you are unable to due to lack of proper transportation?
3. What are some recent activities you took part in that needed some form of transportation?
 - a. How did you get there?
 - b. How was it like?
 - c. What were the steps you needed to take in order to have access to it?
4. What's a recent example of when you wanted to do something but were unable to due to lack of access to transportation?
 - a. What were obstacles to your access?
 - b. How did that make you feel?
 - c. What did you do instead?

Appendix 2.

Demographic Information

Gender:

- Male
- Female
- Other: _____
- I'd rather not say

Race:

- African American or Black
- American Indian or Native Alaskan
- Asian
- Native Hawaiian or Pacific Islander
- White
- Some other race: _____

Do you identify as being of Hispanic, Latino, or Spanish origin?

- **No**, not of Hispanic, Latino, or Spanish origin
- Yes, Mexican, Mexican American, Chicano
- Yes, Puerto Rican
- Yes, Cuban
- Yes, other: _____

Which of these best describes your current living situation:

- I live alone
- I live with a spouse or partner
- I live with **one** family member
- I live with **more than one** family member
- I live with friends/roommates

Do you currently live in some form of Senior Living or Assisted Living community?

- Yes
- No

Level of Education:

- No formal education
- Elementary school completed (Grade 8 or equivalent)

Preferred language: _____

- Some High School (did not graduate)
- High School graduate or Certificate of equivalency
- Occupational Program graduate (Technical certificates, etc)
- Some college (did not graduate)
- Associate's Degree or equivalent
- Bachelor's Degree or equivalent
- Master's Degree or equivalent
- PhD or Postdoctoral

Average yearly household income:

- \$0 - \$15,000
- \$15,001 - \$30,000
- \$30,001 - \$60,000
- \$60,001 - \$100,000
- \$100,000 or more

Appendix 3.

Initial Questionnaire

1. Do you currently have a valid driver's license?

- Yes
- No

1a. If you answered **Yes** to question 1, how often do you drive?

- Never
- Once a week
- Two to three times a week
- Every other day
- Every day

2. Do you use public transportation?

- Yes
- No

2a. If you answered **No** to question 2, please describe why not:

2b. If you answered **Yes** to question 2, how often?

- Once a month or less
- Once a week
- Two to three times a week
- Every other day
- Every day

2c. If you answered **Yes** to question 2, please describe what you use public transportation for (for example: where do you go, how long does it take, etc.)

3. If you answered **No** to questions 1 and 2, please indicate which best describes the method of transportation you use:

- Friends and Neighbors Network
- Tioga Center - Volunteers
- Gadabout
- ADA Paratransit
- Lansing Senior Transportation
- Comfort Keepers
- I am driven by a family member
- I am driven by a friend
- I use a ride-hailing service (for example: Uber, Lyft, etc.)
- I use taxis
- I walk
- Other, please specify:

4. Briefly describe the activities you take part in that require some form of automotive transportation (for example: car, bus, taxi, etc):

5. Are there any activities you **would like to do** that you are unable to due to lack of proper transportation? If so, please describe them below:

Appendix 4.

Second Week Questionnaire

1. How many days over the last week did you need some form of transportation?
 - Once
 - Twice
 - 3-6 times
 - Every day

2. How many times over the last week did you find yourself unable to go somewhere or do something due to lack of transportation?
 - Once
 - Twice
 - 3-6 times
 - Every day

3. Which would best describe the last week for you in terms of your ability to do things that required transportation?
 - It was a great week
 - It was a good week
 - It was an average week
 - It was a below average week
 - It was a bad week

4. Briefly describe where you **went to** and **what you did** in the days you were **able to obtain transportation**:

5. In the days you were **able to obtain transportation**, please briefly describe what form of transportation you took (for example: driven by a family member, a friend, Senior Community Transportation, taxi, walked, etc.)

6. Briefly describe what you **wanted to do** and where you **wanted to go** on the days you were **unable to obtain transportation**:

7. On days in which you were unable to obtain transportation for your plans, what was the reason for not being able to obtain transportation?

8. On days in which you were unable to obtain transportation for your plans, what did you end up doing?

References

- Abootalebi, M., Delbari, A., Abolfathi Momtaz, Y., Kaveh, M. H., & Zanjari, N. (2021). Facing double jeopardy: Experiences of driving cessation in older adults during COVID-19 pandemic. *Journal of Transport & Health*, *23*, 101285. <https://doi.org/10.1016/j.jth.2021.101285>
- Burkhardt, J., Berger, A. M., & McGavock, A. T. (2011). The mobility consequences of the reduction or cessation of driving by older women. *PsycEXTRA Dataset*. <https://doi.org/10.1037/e736202011-024>
- Chihuri, S., Mielenz, T. J., DiMaggio, C. J., Betz, M. E., DiGuseppi, C., Jones, V. C., & Li, G. (2016). Driving cessation and health outcomes in older adults. *Journal of the American Geriatrics Society*, *64*(2), 332–341. <https://doi.org/10.1111/jgs.13931>
- Choi, M., Adams, K. B., & Mezuk, B. (2011). Examining the aging process through the stress-coping framework: Application to driving cessation in later life. *Aging & Mental Health*, *16*(1), 75–83. <https://doi.org/10.1080/13607863.2011.583633>
- CTran. (2019). *Route #10 - Elmira to Owego Service effective 6/3/19*. 10 Elmira-Owego. <https://ridectran.com/index.php/en/10-tioga-downs>
- Curl, A. L., Stowe, J. D., Cooney, T. M., & Proulx, C. M. (2013). Giving up the keys: How driving cessation affects engagement in later life. *The Gerontologist*, *54*(3), 423–433. <https://doi.org/10.1093/geront/gnt037>
- Department of Health. Table 2: Population, Land Area, and Population Density by County, New York State - 2020. https://www.health.ny.gov/statistics/vital_statistics/2020/table02.htm
- Freund, B., Colgrove, L. A. A., Petrakos, D., & McLeod, R. (2008). In my car the brake is on the right: Pedal errors among older drivers. *Accident Analysis & Prevention*, *40*(1), 403–409. <https://doi.org/10.1016/j.aap.2007.07.012>
- Hansen, S., Newbold, K. B., Scott, D. M., Vrkljan, B., & Grenier, A. (2020). To drive or not to drive: Driving cessation amongst older adults in rural and small towns in Canada. *Journal of Transport Geography*, *86*, 102773. <https://doi.org/10.1016/j.jtrangeo.2020.102773>
- Harrison, A., & Ragland, D. R. (2003). Consequences of driving reduction or cessation for older adults. *Transportation Research Record: Journal of the Transportation Research Board*, *1843*(1), 96–104. <https://doi.org/10.3141/1843-12>
- Ithaca-Tompkins County Transportation Council (2019). *2040 Long Range Transportation Plan*, 25-46.

- Johnson, J. E. (2008). Informal social support networks and the maintenance of voluntary driving cessation by older rural women. *Journal of Community Health Nursing*, 25(2), 65–72. <https://doi.org/10.1080/07370010802017034>
- Kahneman, D., & Riis, J. (2005). Living, and thinking about it: Two perspectives on life. *The Science of Well-Being*, 284–305. <https://doi.org/10.1093/acprof:oso/9780198567523.003.0011>
- Liddle, J., Turpin, M., Carlson, G., & McKenna, K. (2008). The needs and experiences related to driving cessation for older people. *British Journal of Occupational Therapy*, 71(9), 379–388. <https://doi.org/10.1177/030802260807100905>
- Lubben, J., Blozik, E., Gillmann, G., Iliffe, S., von Renteln Kruse, W., Beck, J. C., & Stuck, A. E. (2006). Performance of an abbreviated version of the Lubben Social Network scale among three European Community-dwelling older adult populations. *The Gerontologist*, 46(4), 503–513. <https://doi.org/10.1093/geront/46.4.503>
- Qin, W., Xiang, X., & Taylor, H. (2019). Driving cessation and social isolation in older adults. *Journal of Aging and Health*, 32(9), 962–971. <https://doi.org/10.1177/0898264319870400>
- Musselwhite, C. (2011). The importance of driving for older people and how the pain of driving cessation can be reduced. *Signpost: Journal of Dementia and Mental Health*, 15(3), 22-26.
- Siren, A., Hakamies-Blomqvist, L., & Lindeman, M. (2004). Driving cessation and health in older women. *Journal of Applied Gerontology*, 23(1), 58–69. <https://doi.org/10.1177/0733464804263129>
- Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., Parkinson, J., Secker, J., & Stewart-Brown, S. (2007). The Warwick-Edinburgh mental well-being scale (WEMWBS): Development and UK validation. *Health and Quality of Life Outcomes*, 5(1). <https://doi.org/10.1186/1477-7525-5-63>
- Crowe, C. L., Kanno, S., Andrews, H., Strogatz, D., Li, G., DiGuseppi, C., Hill, L., Eby, D. W., Molnar, L. J., & Mielenz, T. J. (2020). Associations of frailty status with low-mileage driving and driving cessation in a cohort of older drivers. *Geriatrics*, 5(1), 19. <https://doi.org/10.3390/geriatrics5010019>
- Johnson, J. E. (1995). Rural elders and the decision to stop driving. *Journal of Community Health Nursing*, 12(3), 131–138. https://doi.org/10.1207/s15327655jchn1203_1
- Johnson, J. E. (1998). Nursing assessment of older rural drivers. *Journal of Community Health Nursing*, 15(4), 217–224. https://doi.org/10.1207/s15327655jchn1504_3
- Johnson, J. E. (1998). Older rural adults and the decision to stop driving: The influence of family and friends. *Journal of Community Health Nursing*, 15(4), 205–216. https://doi.org/10.1207/s15327655jchn1504_2

- Johnson, J. E. (2002). Why rural elders drive against advice. *Journal of Community Health Nursing, 19*(4), 237–244. https://doi.org/10.1207/s15327655jchn1904_04
- Kenntner-Mabiala, Ramona & Kaussner, Yvonne & Hoffmann, Sonja & Volk, Madeline. (2016). Driving performance of elderly drivers in comparison to middle-aged drivers during a representative, standardized driving test in real traffic. *ZVS, 62*, 73-76.
- Liddle, J., Gustafsson, L., Mitchell, G., & Pachana, N. A. (2016). A difficult journey: Reflections on driving and driving cessation from a team of clinical researchers. *The Gerontologist, 57*(1), 82–88. <https://doi.org/10.1093/geront/gnw079>
- Liddle, J., & McKenna, K. (2003). Older drivers and driving cessation. *British Journal of Occupational Therapy, 66*(3), 125–132. <https://doi.org/10.1177/030802260306600307>
- Mezuk, B., & Rebok, G. (2008). Regarding Sims and colleagues' "Self-reported health and driving cessation in community-dwelling older drivers". *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 63*(8), 892–892. <https://doi.org/10.1093/gerona/63.8.892>
- Oxley, P. R., Heraty, M., & Shaw, T. (2022). The role of London's transport services in catering to the needs of elderly and disabled people. *Mobility and Transport for Elderly and Disabled Persons, 1053–1060*. <https://doi.org/10.4324/9781315075525-111>
- Sims, R. V., Ahmed, A., Sawyer, P., & Allman, R. M. (2007). Self-reported health and driving cessation in community-dwelling older drivers. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 62*(7), 789–793. <https://doi.org/10.1093/gerona/62.7.789>
- U.S. Census Bureau quickfacts: Tioga County, New York. (2023) <https://www.census.gov/quickfacts/fact/table/tiogacountynewyork/PST045223>
- U.S. Census Bureau quickfacts: Tompkins County, New York. (2023) <https://www.census.gov/quickfacts/tompkinscountynewyork>