Expectations and Planning for Future Transportation-Related Mobility in Adults 55-84

by

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DEDICATION

This dissertation is dedicated to two Amazons who knew I would make it, even though they are not here to see it.

To my mother: I would trade all of my tomorrows for a single yesterday. Thank you for bringing me into such an incredible and enthusiastic family. You taught me how to survive without you and always believed I would be a good adult. I'm trying, Mom. I love you like a mother.

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ABSTRACT

Older adults must balance their needs for mobility with physical or cognitive changes that may reduce driving abilities and potentially increase driving-related risk. Unfortunately, older drivers often avoid planning for possible future mobility needs, despite being inundated with information from many sources. Preliminary qualitative interviews examined drivers' and other stakeholders' mental models of the issues involved in driving cessation. While interviewees recognized the need for planning, they also explicitly acknowledged that preparing for future mobility needs was rare and suggested several contextual factors as potentially important factors that influence older adult's driving decisions. Based on these interviews, a subsequent, quantitative survey examined behaviors and beliefs of middle-aged and older adults from two populations: predominantly Black respondents in Detroit, MI (*n*=445) and White respondents from the Ann Arbor, MI area *(n*=134*).* Overall, the results provide evidence that mobility planning is not a one-size-fits-all solution. For example, mobility planning appears to be as rare among older drivers as among middle-aged drivers, suggesting that mobility planning does not occur spontaneously as people age. However, respondents who had prepared for other future situations (e.g., retirement or healthcare needs) consistently reported more mobility planning as well. In these data, Black/African-American drivers reported more mobility planning than Whites/Caucasians, but it remains unclear whether these differences are due to race, urban context, or other potential differences. The total number of Cues to Action, or events that made people consider changing their driving, also significantly predicted mobility planning. However, regression model findings varied

depending on whether mobility planning was measured subjectively versus as a summed score of objective planning behaviors. Taken together, these findings indicate that mobility planning is indeed a multidimensional construct, one clearly associated with drivers' experiences on and off the road. The dissertation committee is comprised of Brian J. Zikmund-Fisher (chair, Health Behavior and Health Education), Cathleen M Connell (Health Behavior and Health Education), Thomas M. Meuser (extramural member, Gerontology, University of Missouri – St. Louis), and Ruth E. Dunkle (cognate member, Social Work).

CHAPTER 1

The Importance of Mobility

Transportation-related mobility, primarily tied to personal automobiles in the United States, is integral to remaining engaged and meeting one's needs across the lifespan (Dickerson, Molnar, Eby, Adler, Bedard, Berg-Weger, et al., 2007). In particular, community mobility, or how people navigate outside their homes, is especially important to older adults. Their dependence on the immediate area in which they live makes older adults more vulnerable to the impacts of environmental barriers than younger people (Clarke, Ailshire, & Lantz, 2009). Older adults themselves identify transportation and mobility as one of the six key ways for older adults to interact with their environments to promote aging with independence and dignity (Black, Dobbs, & Young, 2015).

Driving Dependence Among Older Adults

Researchers have argued that driving is ubiquitously important enough to qualify as one of the Instrumental Activities of Daily Living (IADL), as vital to independent functioning as being able to appropriately handle medications or cooking hot meals (American Occupational Therapy Association, 2014). In fact, Sherman (2006) goes so far as to describe driving as the "ultimate IADL" (p.9). For older adults, driving is the most valued activity for older adults after those required to meet basic functional needs, or Activities of Daily Living (ADLs) (Dickerson, Reistetter, & Gaudy, 2013; Katz, Ford,

Moskowitz, Jackson, & Jaffe, 1963; Noelker & Browdie, 2013). As a result, many adults continue to drive well into their later years. In fact, as of 2005 over 16% of all licensed drivers are 65 and older, a total of 35 million out of 41.4 million older adults (NHTSA, 2013).

Unfortunately, mobility is one of the first kinds of disabilities many older adults face (Fried, Bandeen-Roche, Chaves, & Johnson, 2000; Guralnik, LaCroix, Abbott, Berkman, Satterfield, Evans, & Wallace, 1993; Hirvensalo, Rantanen, & Heikkinen, 2000). The same physical and cognitive declines that make it difficult for some people to meet ADLs and IADLs, also makes it harder to continue driving safely (Dickerson, Meuel, Ridenour, & Cooper, 2014; Dickerson, Reistetter, & Trujillo, 2009; Sherman, 2006). Both on-road crash risk and risk of driving retirement are strongly associated with functional abilities, such as vision, ADL limitations, and cognition, rather than specific medical diagnoses or age (Campbell, Bush, & Hale, 1993; Foley, Heimovitz, Guralnik, & Brock, 2002; Foley, Masaki, & Ross, 2000; Marottoli, Ostfeld, Merrill, Perlman, Foley, & Cooney, 1993).

While driving is especially valued for the independence and convenience it offers older adults, managing multiple chronic conditions and adapting to subtler, progressive losses leave many people wondering how to balance their needs for mobility with safety (Coughlin & D'Ambrosio, 2012; Dickerson, Reistetter, & Trujillo, 2009; Dickerson et al, 2007; Owsley, 1997). Many older adults and those around them struggle with the same questions: *Am I a safe driver or do I put myself or others at risk when I drive? How do I know if or when I have to stop driving? How would I get around if I can't drive myself? What else will I lose if I stop driving?*

For some types of physical and cognitive declines, relatively minor, common-sense adaptations may allow the person to maintain safe personal mobility (Dickerson et al, 2007). For instance, a driver who has slowed reaction time can avoid busy roads or highways with higher speed limits than they are comfortable with. Drivers experiencing decreased night vision can choose to drive only during the daylight hours. These changes may be conscious choices or drivers may alter their behaviors to avoid uncomfortable situations without being aware of why (Bauer, Adler, Kuskowski, & Rottunda, 2003; Cobb & Coughlin, 1998; Forrest, Bunker, Songer, Coben, & Cauley, 1997; King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011). Both physicians and licensing authorities may recommend restrictions or adaptations as well (Levy, Vernick, & Howard, 1995; Martinez, 1995).

Few People Prepare for Driving Retirement

In the face of severe or accumulated challenges, complete driving retirement is a real possibility, if not likelihood, for many older Americans (Dellinger, Sehgal, Sleet, & Barrett-Connor, 2001). There is an especially steep drop in driving after age 70 (Foley, Heimovitz, Guralnik, & Brock, 2002). Despite being an increasingly common occurrence, *preparation for* driving retirement has been overshadowed in the literature by predictors of on-road safety, driving retirement, and outcomes for former drivers. Given the immediate concerns of identifying unsafe drivers prior to collisions and quantifying the multitude of negative outcomes associated with becoming a former driver, these research areas are simultaneously important and practical.

Most older adults identify driving retirement as one of the most frightening events that could happen to them, or, for former drivers, that has happened (King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011). This is true for former drivers in both rural and urban settings (Johnson, 1995, 1998, 2002). Although a minority of older adults describe relief associated with driving retirement, former drivers more commonly report overwhelmingly negative outcomes from the experience. Social activities, physical functioning, and general well-being decrease post-driving retirement, with depressive symptoms increasing (Dickerson et al 2007; Edwards, Lunsman, Perkins, Rebok, & Rother, 2009; Fonda, Wallace, & Herzog, 2001; Glass, Mendes de Leon, Marottoli, & Berkman, 1999; Marottoli, Mendes de Leon, Glass, Williams, Cooney, & Berkman, 2000; Ragland, Satariano, & MacLeod, 2004).

Challenges to Addressing Driving Retirement

Better preparation could help avoid unnecessary mental angst and negative health outcomes consistently associated with driving retirement. *The weight of decisions about continuing to drive is not lost on older adults, nor other stakeholders (King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011; Perkinson, Berg-Weger, Carr, Meuser, Palmer, Buckles, Powlishta, Foley, & Morris, 2005).* Choices about reducing or stopping driving completely are often made by older adults in conjunction with family, friends, or doctors (Johnson, 1995, 2000), although some older adults report making the decision alone (Persson, 1993). In extreme situations, families or even state licensing authorities make the decision without the older adults' agreement or consent (Johnson, 1998, 1999; Edwards, Lunsman, Perkins, Rebok, & Rother, 2009). These choices and

their repercussions not only impact the older adults, but everyone in their lives and on the road.

However, further understanding of how older adults forecast, go through, and recollect the process of driving retirement is needed to help discover underlying assumptions and causes of the fears and damages that seem inherent in "giving up the keys." Details about how long people expect to continue driving, perceptions of nondriving transportation alternatives, and confidence in meeting needs as a nondriver would offer new information about who plans for mobility transitions and why. Probing specifically for attitudes and beliefs encompassing the issue of driving reduction and retirement could illuminate critical similarities and differences in how people think and talk about older drivers and driving retirement. Taken together, intrapersonal and interpersonal dynamics may unearth potential intervention strategies, such as ways to improve communication, whether it contains contradictory information or is irrelevant to its target audience. Poor communication or other currently unknown barriers may be making decisions about safe driving unnecessarily confusing and stressful for everyone involved.

What remains unknown is in-depth information on how drivers approach the subject of driving retirement and realities of transportation-related mobility transitions. More information directly from the people dealing with these situations will ideally help stakeholders, including drivers themselves, find ways to prepare for and deal with transportation changes proactively (e.g., Adler & Rottunda, 2006; Connell, Harmon, Janevic, & Kostyniuk, 2013; King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011). In my own pilot interviews (discussed in more detail in Chapter 5), I found that

many stakeholders reported strong reactions to even broaching the subject, describing driving retirement as a sensitive topic on par with discussing sexual behaviors, financial matters, and even death. This collective silence often results in unnecessary stress, confusion, and ultimately avoiding making decisions until a sufficiently frightening or dangerous event occurs, indicating an unquestionable need for the older adult to stop driving.

Building a Better Approach to Driving Retirement

Part of the explanation for this unwillingness to broach the topic is that not everyone experiences the physical and cognitive health declines related to driving abilities. Those who experience them do so at a variety of ages, and even then, declines occur at different rates (Eby, Molnar, & Kartje, 2009). Individuals also vary in how they react to similar functional losses, with broader measures of self-rated health being more predictive of driving retirement (Anstey, Windsor, Luszcz, & Andrews, 2006; Dellinger, Sehgal, Sleet, & Barrett-Connor, 2001). The challenge is not only knowing how and when to draw the line between safe and unsafe driving, but also the question of who or what groups are ultimately responsible for decisions about driving retirement (Perkinson, Berg-Weger, Carr, Meuser, Palmer, Buckles, Powlishta, Foley, & Morris, 2005).

Both the government and special interest groups have increased their efforts to educate and engage older drivers and other stakeholders in discussing both individual- and society-level implications of maintaining older adults' community mobility (Stav, 2008). *Having more information does not necessarily result in more clarity* though. It is

possible that many older drivers feel inundated with information and opinions from an array sources when making decisions about their driving decisions. Others may tune out the messages completely, because they believe that they will continue driving until their deaths, that planning is not possible (usually due to lack of alternative transportation options), or that it would not make a positive difference in outcomes.

Unfortunately, few empirical articles exist on the social and environmental contexts in which driving decisions are made (Dickerson, et al 2007; Eby, Molnar, & Kartje, 2009). Similarly few studies compare different stakeholders' perspectives, patterns of communication that exist between them, or how older adults weigh the messages they receive (see Perkinson, Berg-Weger, Carr, Meuser, Palmer, Buckles, Powlishta, Foley, & Morris, 2005 for an exception focused on drivers with Alzheimer's Disease). We know that older adults *think* about driving changes or discontinuation, but we do not know the degree to which they *plan* for them. Planning for transportation changes in later life has been proposed as a possibly powerful intervention technique (Meuser, Berg-Weger, Chibnall, Harmon**,** & Stowe, 2013) and the field of mobility planning is growing.

Specific Aims

In this dissertation, I start by reviewing the extant literature regarding driving risks and driving retirement, identifying critical knowledge gaps in detail. I then discuss the potential usefulness of planning for the eventuality of driving retirement followed by an exploration of stakeholder beliefs about driving retirement in a pilot interview phase. These interviews directed the second and main research agenda, in which I developed

and conducted a quantitative survey of middle-aged and older drivers to find out more about how (or if) drivers plan for mobility changes later in life, specifically driving retirement.

At each stage in this process, this research seeks to achieve two complementary research aims:

Specific aim #1. *Elicit, compare, and contrast the conceptual understandings (i.e., mental models) that different stakeholders (experts and older adults 65+) hold regarding the transportation mobility challenges and decisions faced by older adults.*

Many stakeholders are involved in older adults' driving and transportation decisions, but stakeholders differ in their perspectives about these decisions (Perkinson, Berg-Weger, Carr, Meuser, Palmer, Buckles, Powlishta, Foley, & Morris, 2005). We cannot continue to simply assume that opinions of family and friends, advice from heathcare providers, or information in pamphlets are *effectively* reaching older drivers or helping them make decisions and plans about current and future driving behaviors. The interviews and survey data collected as part of this research provide a more global understanding of the beliefs, biases, and assumptions held by older adults and those around them who may have a hand in driving decisions. They illuminate stakeholders' perceptions of older driver safety and mobility transitions in later life, including:

- who is involved in the planning;
- beliefs about how much planning can and does occur; and
- what situations instigate thinking or preparing for driving retirement.

Specific aim #2. *Measure, compare, and predict middle-aged and older drivers' (ages 55-84) forecasting and preparation for their driving and nondriving futures, including their expectations of driving longevity, planning behaviors, and self-efficacy to meet transportation needs if they are no longer driving.*

Despite assertions that planning for mobility changes in later life could be an important intervention tool to help improve the process and outcomes of the driving retirement process, mobility planning is still a fundamentally inchoate construct. In this dissertation, I develop measures for both perceived and behavioral planning dimensions, as well as identify salient predictive characteristics for planning, including attitudes, environmental resources, and demographic information. I close by summarizing key insights derived from both the quantitative survey data and the qualitative interviews and discuss their implications for both future research on driving retirement decisions among older adults and the design of practical interventions to improve outcomes in this area.

CHAPTER 2

Encouraging Safe Mobility Across the Lifespan

The Increasingly Diverse Experience of Aging in the United States

Demographic shifts in the 20th Century continue to dramatically increase the number of people over 65 in the United States. In 2013, the United States had over 44 million residents 65 and older (National Center for Health Statistics, 2014). Many of these individuals have been drivers since their teens, relying as heavily on personal automobiles as their younger counterparts (Collia, Sharp, & Giesbrecht, 2003). Additionally, with more older adults living longer lives, former drivers often have more years after driving retirement where their transportation needs still need to be met. Men outlive their driving lives by an average of six years, women by ten years (Foley, Heimovitz, Guralnik, & Brock, 2002).

Not only are adults aged 65+ growing faster than any other age group, they are also increasingly racially diverse (Vincent & Velkoff, 2010). While the majority of adults 65 and over will still be White, the percentage of people of color is expected to more than double from 20% in 2010 to 42% in 2050 (Vincent & Velkoff, 2010). An incredible range of social and cultural experiences incoming generations of older adults accumulated between their births in the early- to mid-Twentieth Century up to the present day. Recognizing such differences is essential to any health research as interpersonal and structural forces strongly shape individual's health through resource

availability, including money, social capital, knowledge, and physical environments (Link & Phelan, 1995; Link & Phelan, 2000). Despite overall improvements to health and longevity, disparities in morbidity and mortality between people of color and Whites persist in the United States (CDC, 2013). Since medical problems are often cited as reasons for driving retirement (Dellinger, Sehgal, Sleet, & Barrett-Connor, 2001), aggregating driving data may be problematic. *Earlier health declines and death in people of color may hide the true impact of transportation disability in subpopulations, masked by research focused only on older adults or aggregated data.*

Discrepancies in Driving Retirement Patterns

The choice to reduce or stop driving does not happen the same way for all people. Life experiences, gender, and cultural influences all affect mobility through five key mobility determinants: cognition, physical functioning, environmental demands and resources, psychosocial context, and finances (Webber, Porter, & Menec, 2010). The twenty percent of adults over the age of 65 who are nondrivers are disproportionately females and persons of color who are in poorer health and of lower socioeconomic status (Collia, Sharp, & Giesbrecht, 2003). The gender gap in licensure is greatest among older adults (92% of males & 90% females under 65 compared to 90% males and 72% females 65 and over). This may be because females are more likely to stop driving in better health because of discomfort and lack of confidence. Another possible explanation is there are more older women than older men, thereby resulting in more female nondrivers because of sheer numbers.

Race and gender are two promising demographic groups with distinct identities that need to be considered separately, within their physical and social contexts, as opposed to continuing to aggregate data on older adults and driving. Without understanding the resources and expectations of older adults, our understanding of how, why, and when decisions about driving continuation are made is limited.

Race. Demographic shifts in the United States will soon result in not only an increasingly older population, but an unprecedented racially and ethnically diverse one. By 2042, more than half of all older adults in America will identify as people of color (Vincent & Velkoff, 2010). Compared to Whites, Blacks and other minorities experience earlier morbidity and mortality (CDC, 2013; House, Lepkowski, Kinney, Mero, Kessler, & Herzog, 1994). As described earlier, health declines and subsequent loss of functions related to operating a vehicle are strongly associated with driving retirement. Therefore, it is likely that people of color experience the driving challenges associated with older adults (65+) at an earlier age.

Due to ongoing social and health disparities between Whites and other racial groups (CDC, 2013a; CDC, 2013b), it is possible that people of color have a unique relationship to driving, with disparate needs and identities connected to the act of driving. Different experiences with transportation mobility may change their driving retirement process and reactions from the larger general group of older adults. Unfortunately, very little is known about how driving affects different groups, much less differences in driving, driving retirement, or the meanings of driving.

People of color living in areas of concentrated poverty in urban centers are particularly vulnerable to interactions that can limit their options and resources in a domino-like

effect (Cohen & Northridge, 2000; Geronimus, 2000). This is supported by the fact that risk of mobility disability goes up as income goes down (Shumway-Cook, Ciol, Yorkston, Hoffman, & Chan, 2005). However, older adults' perceptions of their communities and the resources available therein can in fact mediate the effect socioeconomic status has on health (Wen, Hawkley, & Cacioppo, 2006). Residents will not utilize resources in their communities if they feel it is unsafe, leading to social isolation (Krause, 1993). Self-restricted mobility may be the agent through which these perceptions affect activities in older adults.

In addition to perceptions of safety, perceptions of availability affect use of public transportation (i.e., buses, trains, light rail, subways, and paratransit), which is low or nonexistent in most parts of the United States. However, use of these options or even walking for transportation are also influenced by subtler characteristics of the physical environment. How well sidewalks, bus stops, and other common areas are maintained can inhibit their use (cracked pavement, litter, lack of seating options or shelters at stops), especially for individuals with limited physical function (Ritter, Straight, & Evans, 2002; Webber, Porter, & Menec, 2010).

Currently, very few driving or transportation studies acknowledge the potential for important racial / ethnic differences, lumping all older adults together both for ease and in order to have a large enough sample for sufficient statistical power. Therefore, certain subpopulations, such as low-income Black drivers living in concentrated areas of poverty, may have the greatest need for community mobility interventions (such as planning for a nondriving future) but the least resources to mitigate or avoid negative outcomes.

Valuable information relevant to improving outcome may be missed if the two groups are assumed to be similar and therefore are not compared beyond superficial descriptions of rates and prevalence. However, the vast majority of large research studies lack details on most driving behavior. Even the longitudinal Health and Retirement Study (HRS), considered a gold-standard for representative research on older adults (over 50) in America (Juster & Suzman, 1995), asks only four driving questions, and only of HRS respondents 65 and older. This means that the HRS provides no opportunity to explore racial/ethnic differences among adults younger than age 65 and only extremely limited data for adults 65+.

Gender. Early disparities in licensure and frequency of driving between men and women have been significant reduced (Burkhardt, Berger, Creedon, & McGavock, 1998; Hakamies-Blomqvist & Wahlström, 1998), but social roles and health patterning of men and women remain distinct (Rieker & Bird, 2000). While older male drivers are more likely to stop driving because they were told to, older female drivers are more likely to choose driving retirement for themselves, earlier and in better health than their male counterparts (Burkhardt, Berger, Creedon, & McGavock, 1998; Musselwhite & Haddad, 2007). After they stop driving, women live an average of ten years as former drivers, almost twice as long as men's six years post-driving retirement (Foley, Heimovitz, Guralnik, & Brock, 2002).The remaining nondriving years can be difficult personally, socially, and practically (Burkhardt, 1999).

While the relatively recent ubiquity of driving may be decreasing variance in licensure and driving rates between men and women, *what remains unknown is how gender colors meanings of being a driver, how and when people prepare for or expect*

mobility changes, and what resources are available to continue valued activities and roles. Historical trends and other gendered forces very likely shape how men and women approach driving and driving retirement, especially for incoming generations of older adults. For example, although older women may stop driving earlier than is deemed "necessary," they have more role continuation in later life than older men (Unger, Johnson, & Marks, 1999). Maintaining relationships may have an especially protective effect for older adults with limited community mobility, but the reasons for the known gender differences are unclear: Do older women prepare more for becoming a nondriver, or do the earlier retirement rates indicate less time or less need for planning? Do the meanings and roles associated with driving vary by gender, affecting the driving reduction process and ultimately resulting in different outcomes post-driving retirement? Exploring underlying reasons for possible protective factors can point to patterns of one group that may help inform interventions to help the other, as with role continuation by older women. At the same time, identifying differences in how men and women think about or approach mobility changes and challenges can reveal unique perspectives that allow interventions to be tailored to the specific needs of both genders.

The Importance of Context to Maintaining Community Mobility in Later Life

Throughout the 20th Century, driving dependence in the United States has been encouraged and molded through decades of federal and state investment in interstate highways and roads at the expense of more centralized, public transportation (Weingroff, 1996). Currently, most areas of the country do not have a comprehensive public transportation system, especially in low-density suburban and rural areas where

older adults tend to live (Forrest, Bunker, Songer, Coben, & Cauley, 1997; Glasgow, 2000; Kostyniuk, Shope, & Molnar, 2000; Kostyniuk & Shope, 2003). Even when available, older adults have a generally poor perception of nondriving transportation alternatives, including transit systems and specialty transportation programs (King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011; Kostyniuk, Shope, & Molnar, 2000; Transportation Research Board, 2000).

Mobility, or the ability to move, is vital to being active and engaged (Mackenbach, Borsboom, Nusselder, Looman, & Schrijvers, 2001). There are two general spheres of personal mobility. The first is *functional mobility* or individual locomotion that allows people to get around within a physical space, including walking gait and balance (Podsiadlo & Richardson, 1991). The second is *community or transportation-related mobility* which is how people navigate outside their homes to meet their physical, social, and spiritual needs and wants. These two kinds of mobility are related to one another, as the higher a person's functional mobility is, the easier it is to navigate within the physical environment and successfully utilize different methods of transportation-related mobility (Ritter, Straight, & Evans, 2002). However, many dimensions of environmental demands inhibit individuals' levels of community mobility, whether they are physically able or are living with disability (Shumway-Cook, Patla, Stewart, Ferrucci, Ciol, & Guralnik, 2002).

Community mobility is important at every age, but becomes more complicated in the face of functional declines. With a few exceptions (i.e., urban centers like New York City, Chicago, and Boston), there are currently two ways to remain mobile and engaged: driving and everything else. Driving is the most common and preferred form of

transportation in the United States where there are more older drivers on the road than ever before (Dickerson et al, 2007; NHTSA, 2013; Vincent & Velkoff, 2010). Because of the familiarity and convenience it offers, older adults want to keep driving as long as possible (Collia, Sharp, & Giesbrecht, 2003). Young-old adults (60-65) are especially likely to consider driving essential to maintain well-being and independence, having been car-dependent for most of their lives (Musselwhite & Haddad, 2007). Given the dependence on automobiles for the vast majority of older adults' travel (Collia, Sharp, & Giesbrecht, 2003), being unable to drive a car is a devastating possibility or reality (King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011; Kostyniuk & Shope, 1998).

History of Driving in the United States. To understand how the Americans reached this point of nearly complete driving dependence, one must start with the major historical and societal trends from the previous century that shaped and reified a nationwide culture of driving dependence. The Twentieth Century saw many changes in the lives of average Americans, especially with respect to health, urbanization, and personal transportation (McGuckin & Srinivasan, 2003), each of which significantly changed Americans' lives and expectations for aging. In the 1950s and 1960s, automobiles became more popular and affordable as families relocated to the newly constructed suburbs (McGuckin & Srinivasan, 2003). Federal contributions to build interstate highways both reflected and reinforced dependence on personal transportation, literally at the expense of maintaining and updating public options in urban areas (Weingroff, 1996). Older urban areas, especially those on the East Coast, were planned around public transportation. In comparison, newer cities built in the

Midwest and Western United States were developed around established interstate highways, with little to no investment in public transportation infrastructure (Weingroff, 1996). The combination of increased longevity, suburban development, and addiction to personal automobiles resulted in more older adults driving on America roads than ever before (Eby, Molnar, & Kartje, 200; NHTSA, 2013).

Effects of driving dependence on meeting older adults' transportation needs. Because of the preference and structured dependence on the personal automobile, driving-related physical and cognitive declines highly associated with aging are a pressing concern (Dickerson et al, 2007). Over half a million older adults stop driving each year (Foley, Heimovitz, Guralnik, & Brock, 2002). The personal automobile, whether as driver or passenger, is the most common and preferred mode of transport for Americans of all ages, used for 90% of all travel (Collia, Sharp, & Giesbrecht, 2003). By 2020, an estimated 80% of U.S. population will be or will have been licensed drivers; upon entering retirement, 60-90% of women and 100% of men are still driving (Rosenbloom, 2001; Evans, 1999; Burkhardt, Berger, Creedon, & McGavock, 1998). *With more older drivers on the road than ever before and more people aging into that group every day, finding ways to keep them and everyone else safe is becoming more pressing for everyone.*

Shifts in older adults' transportation needs. As people age, their transportation needs tend to shift as they move into retirement (McGuckin & Srinivasan, 2003) and adapt to physical or cognitive changes that often accompany aging. Maintaining transportation mobility is essential no matter what a person's age or destination is (Dickerson, et al, 2007; Musselwhite & Haddad, 2010). Compared to

younger adults who mostly drive to cart children around or commute to and from work, older adults' transportation needs are increasingly centered around remaining engaged within their communities (Collia, Sharp, & Giesbrecht, 2003). Instead of work and children, older adults focus on visiting friends and family, connections to social organizations, and community work (Collia, Sharp, & Giesbrecht, 2003). One out of every five trips older adults take is social or recreational, significantly more than their younger counterparts (Collia, Sharp, & Giesbrecht, 2003). Older drives average six trips per week, compared to older nondrivers who average only two trips (Burkhardt, 1999). Finding ways to keep driving or identifying nondriving transportation alternatives is key to maintaining roles, identity, and quality of life (Dickerson et al, 2007; Musselwhite & Haddad, 2010).

Keeping older adults engaged and active. Like people of all ages, older adults need to be socially and mentally engaged to remain healthy, a pattern that has been repeatedly documented (see Fiocco & Yaffe, 2010). Keeping older adults civically engaged has been recognized as worthy of large-scale policy efforts, stemming from the 1960s (Martinson & Minkler, 2006). One of the largest American policy efforts to encourage social engagement among older adults was passed in 2009. The Edward M. Kennedy Serve America Act encourages continued social participation by older adults by providing older adults with more volunteer opportunities (Edward M. Kennedy Serve America Act of 2009, 2010). However, older adults' continued social engagement depends on being able to get from one place to another (Dickerson et al, 2007). For older adults who struggle to get around within their communities, especially nondrivers,

increasing opportunities to volunteer or engage in other activities does not immediately translate into increased participation.

As stated previously, older adults have a generally poor perception of nondriving transportation alternatives, including transit systems and specialty transportation programs (King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011; Kostyniuk, Shope, & Molnar, 2000; Transportation Research Board, 2000).

Safe Driving at Any Age

The skills and abilities it takes to be a safe driver (at any age) have been fairly well established since the 1970s (Michon, 1985). For over half a century, the conversation in empirical literature has focused on driving impairments, perceptual limits, and differences between people (Lee, 2008). The list is long and varied but all the characteristics needed are based on functional abilities that allow the driver to:

- mechanically operate the vehicle,
- take in information about the driving environment, and
- react in an appropriate and timely manner (Dickerson *et al*, 2007).

Safety concerns are often the motivation for efforts (both on the policy and individual levels) to restrict older adults' driving. However, while there is some basis for this concern, the real issues are complex interactions between what is needed for safe driving (at any age) and the aging-related changes many older adults face. Individually or in combination, impairments of the skills or abilities below put drivers and those on the road with them at risk.

Visual elements of safe driving. One of the most obvious requirements for safe driving is being able to see or distinguish objects (Klavora & Heslegrave, 2002; Sivak, 1996). It is estimated that up to 90% of driving uses visual information (Hills, 1980). *Visual acuity*, or sharpness of shapes and figures, is vital to process road signs, observe the actions of other vehicles, and recognize when pedestrians or impediments are in the road (Eby, Molnar, & Kartje, 2009). Dynamic visual acuity, which tracks objects in space moving relative to each other, reliably predicts crash probability (Fox, 1989; Graca, 1986; Reuben, Silliman, & Traines, 1988), whereas static visual acuity has only a weak relationship to on-road risk (McClosky et al, 1994). *Contrast sensitivity*, or what allows a person to distinguish an object from its background between different levels of light and dark, is another important aspect of driving, especially in low light conditions such as night driving or inclement weather (Sturr, Kline, and Taub, 1990). *Visual field* quantifies the horizontal and vertical range of sight for each eye, which becomes increasingly important when an individual is distracted or performing a distracting task (Ball, Beard, Roenker, Miller & Griggs, 1988; Staplin, Lococo, Stewart, & Decina, 1999). “Blind spots” in the center or peripheral vision can indicate certain eye conditions (*e.g.*, macular degeneration), which makes it difficult to scan the driving environment around the vehicle for traffic or other oncoming impediments. *Depth perception* can be affected by presbyopia, which is a decreased ability for the lens of the eye to focus (Eby, Molnar, & Kartje, 2009). Problems with depth perception can make it difficult to judge how quickly to brake to avoid striking vehicles ahead, as well as how safe it is to turn through oncoming traffic.

Psychomotor elements of safe driving. At the most basic level, there are physical abilities necessary to mechanically operate a vehicle (Dobbs, 2005). Driving takes a certain amount of *strength* in drivers' hands, shoulders, and legs, even in modern automobiles (Marottoli & Drickamer, 1993). Drivers need to be able to grip and turn the steering wheel, exert adequate force on the brake and gas pedals, and switch from park into a driving gear (and back) (Staplin, Lococo, Stewart, & Decina, 1999). *Reaction time*, *i.e.*, how quickly a driver can respond to stimuli in the driving environment, is also critical (Klavora & Heslegrave, 2002). The speed at which the brain tells the muscles to move and the subsequent movement speed are both important aspects of reaction time. *Flexibility* of certain joints and muscles are necessary for safe driving movements, such as swiveling one's head and neck to observe the peripheral driving environment (Janke, 1994; Malfetti, 1985; Marottoli & Drickamer, 1993).

Cognitive elements of safe driving. Drivers need to be able to *cognitively process* the information their eyes and ears detect in order to understand changes and demands of the driving environment (Dobbs, 2005; Owsley, Ball, Sloane, Roenker, & Bruni, 1991). This involves prioritizing which pieces of information, or combinations thereof, are the most important to consider at any given time while driving. The four main functions are attention, memory, problem solving, and spatial cognition (Eby, Molnar, & Kartje, 2009). These steps often occur very quickly, without conscious effort, but are pivotal to responding safely to demands in the driving environment (Dobbs, 2005). Each requires *executive functioning*, which includes paying attention, remembering details, organizing, strategizing, planning, and executing by managing time and space.

Age-Related Changes that Threaten Driving Safety

While loss of the functions listed above can occur at any age, they are more common in older adults, increasing their risk for at-fault crashes (Wang, Kosinski, Schwartzberg, & Shanklin, 2003). Although age is a risk factor for retirement, the most reliable predictor is self-rated health (Anstey, Windsor, Luszcz, & Andrews, 2006). Normal age-related attenuations in movement, vision, and cognition can make it challenging for many older adults to drive safely (Dobbs, 2005; Llaneras, Swezey, Brock, & Rogers, 1993; Owlsley, 2004; Smiley, 2004; Wang, Kosinski, Schwartzberg, & Shanklin, 2003). Older adults usually list health and medical reasons to explain why they reduced or stopped driving (Carp, 1988; Dellinger, Sehgal, Sleet, & Barrett-Conner, 2001; Ragland, Satariano, & MacLeod, 2004).

Current Strategies to Maintain and Improve Abilities Required for Safe Driving

Assessments of driving safety. Ideally, well designed and implemented screening programs would accurately assess drivers' functional abilities to identify any red flags that might separate safe from unsafe drivers. Assessments of driving safety vary widely, including some or all of the following components: on-road evaluation, clinical evaluations, and recommendations (Association of Driver Rehabilitation Specialists (ADED), 2002; Carr, 2000; Kay, Bundy, Clemson, & Jolly, 2008). There is not currently a single or combination of tests that predict overall driving ability (Guerrier, Manivannan, Pacheco, & Wilkie, 1995; Odenheimer, Beaudet, Jette, Albert, Grande, & Minaker, 1994). Both assessments and personal experiences can call into question aspects of safe driving, however, both types of errors are possible: some safe drivers

are deemed unsafe, and unsafe drivers are considered safe to continue driving. This underscores how complicated driving safety is to measure and predict in many cases. It also emphasizes the challenge of facilitating self-management because there are few clear signals as to when an individual needs to stop driving.

Rehabilitation to improve driving safety. While still driving or transitioning to nondriving, there are multiple ways to maintain or increase safety as long as possible (Dickerson et al, 2007). Adaptations or modifications can be made in order to increase safe driving life for older adults, even in the face of physical health declines that compromise driving abilities (Stephens, McCarthy, Marsiske, Shechtman, Classen, Justiss, & Mann, 2005). Many older drivers consciously or unconsciously begin to adapt their behaviors to changes in skills or abilities (Hakamies-Blomqvist, 2004; Kostyniuk, Shope, & Molnar, 2000). For example, it is common for older adults to reduce their nighttime driving because they feel less comfortable, which is often a response to decreases in visual acuity and contrast. Limitations in terms of distance or driving to unfamiliar places are two other oft-reported adaptations of older drivers. Some states specify restrictions as part of driving licensure, such as distance or speed restrictions, or daytime driving only. The restriction options vary widely by state, and are often based on intuition and physicians' recommendations instead of empirical findings (Eby, Molnar, & Kartje, 2009).

Education. Certain special interest groups, such as AARP, offer refresher classes or additional educational training to help older drivers brush up on their skills or identify ways to adapt to their current needs to maintain or improve driving safety (Eby, Molnar, & Kartje, 2009). These classes are often available for a fee at senior centers or

online, and participants can receive auto insurance discounts in many states. To be most effective, Molnar and colleagues (2007) put forth the following criteria:

- evidence-based development and design, including age-related considerations and basic learning principles,
- marketing to inform the public of the program and encourage participation, and
- accessible to potential participants in a variety of settings.

Vehicle Design. In addition to changing driving behaviors, safety can be improved through vehicle design. Automobile manufacturers have started designing vehicles to address functional declines the increasing number of older drivers experience, such as noises to alert the driver of vehicles in their blind spots or warnings when vehicles in front of them slow down or brake suddenly. Older vehicles can be modified or adapted to compensate for common driving-related challenges, such as limited vision, flexibility, range of motion, and strength (Staplin, Lococo, Stewart, & Decina, 1999). The empirical research specifically addressing optimal design for such deficits remains sparse (Eby, Molnar, & Kartje, 2009; Shaheen & Niemeier, 2001), but integrated technologies to increase safety is becoming the norm in new vehicles. However, not all drivers are comfortable with these technologies such as route guidance, and the additional attention technologies require may cause more distractions that may actually decrease driving safety (Barham, Oxley, Ayala, & Alexander, 1995; Green, 2001; Musselwhite & Haddad, 2007).

The Challenges of Driving Retirement

Even with the various ways to improve and maintain driving safety, many older adults reach a point where they are no longer able to drive safely and comfortably. However, nondrivers face several compelling barriers to community mobility, as well as negative outcomes associated with becoming a former driver. For drivers trying to balance driving safety with community mobility, such challenges pressure some people to continue driving in the face of significant declines. Identifying and acknowledging the barriers at individual, community, and policy levels offer insight into which intervention strategies would most effectively promote community mobility for everyone.

Lack of nondriving transportation options. Older adults, especially those who do not drive, rely on their local communities for resources and transportation more than younger people (Clarke, Ailshire, & Lantz, 2009). Any type of transportation mobility heavily depends on physical functioning, physical environment in community, social support, and individual resources (Burkhardt, 1999; Glass, Mendes De Leon, Marottoli, & Berkman, 1999; Webber, Porter, & Menec, 2010). In other words, the physical environment in which older adults live provides important context that can expand or limit their mobility as a nondriver.

Because the options in their communities strongly affect older adults, one of the largest challenges nondrivers and people considering giving up driving report is a consistent dearth of acceptable nondriving alternatives (Kostyniuk, Shope, & Molnar, 2000). When other transportation is required, mobility-challenged people perceive alternatives to driving as even less desirable or acceptable than others may see them (Ritter, Straight, & Evans, 2002). Getting rides with family or friends, the closest

approximation to driving oneself, requires coordination and dependence with others that removes two of the main benefits of driving: convenience and independence. The concerns of being burdensome or dependent increase with age and disability restrictions (Ritter, Straight, & Evans, 2002).

Older adults who do not have others to drive them or who want to avoid asking for transportation assistance are left with public options (buses, light rail, subways, etc.) or private alternatives (taxis, hired cars, etc.). These options, when available, require even more planning and effort to figure out routes and timing, as well as physical and cognitive demands of navigating such systems (Ritter, Straight, & Evans, 2002; Wang, Kosinski, Schwartzberg, & Shanklin, 2003). Many cities and towns across the country have little to no public or private transportation alternatives to driving (Kostyniuk, Shope, & Molnar, 2000). When available, older adults with low health and high disability status report more problems with public transportation than those with fewer functional mobility limitations (Ritter, Straight, & Evans, 2002).

The changes that often cause older adults to reduce or stop their driving also make it more difficult to access or use public transportation (Kochera, Straight, & Guterbock, 2005). Walking to and from bus stops can be difficult in the face of health impairments that limit endurance, strength, and breathing, as well as poorly-maintained or missing sidewalks. A lack of infrastructure at stops, such as benches or shelters, are issues for people who cannot stand for periods of time or those living in regions with extreme weather (Clarke, Ailshire, & Lantz, 2009). For those with cognitive difficulties, navigating a complicated intracity transportation system represents a whole other nightmare (Webber, Porter, & Menec, 2010).

Challenges to Social Identities. The challenges to driving reduction and retirement are not only functional, but social in nature. Even with compensations to extend one's driving life, changes to driving behaviors often occur after decades of relying on personal vehicles (Collia, Sharp, & Giesbrecht, 2003; Foley, Heimovitz, Guralnik, & Brock, 2002). Because of this, becoming a former driver can represent a significant shift in people's social roles and self-perceptions (Eisenhandler, 1990; Liddle, McKenna, & Broome, 2003; Ragland, Satariano, & MacLeod, 2004). Such shifts and negative views of aging threaten the core identities of many people. The value placed on autonomy and independence in America implies that asking for or requiring help is synonymous with being burdensome to others (Cohler, 1983). The fear of dependence is often cited by older adults, regardless of driving status (King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011).

Additionally, the process of driving retirement is often tied to other physical and social losses that accompany aging. The older one gets, the more likely they are to have experienced social losses, such as deaths of loved ones, as well as health declines that make continued engagement in fulfilling activities challenging (Steverink, Westerhof, Bode, & Dittmann-Kohli, 2001). Driving is synonymous with status, youthfulness, masculinity, and power (Siren & Hakamies-Blomqvist, 2005), and continuing to drive helps push back seeing oneself as truly "old" (Eisenhandler, 1990). Driving retirement often looms as the final nail in the proverbial coffin, removing the ability to visit in-person or attend events (King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011). Technology, such as cell phones, email, and video chatting make it easier than ever to stay in touch with people whom you cannot see personally.

However, older adults are slower adopters than younger counterparts, using fewer kinds of technology in their daily lives and with less frequency (Olson, O'Brien, Rogers, & Charness, 2011). While incoming cohorts of older adults will likely use more technologies more commonly, the current trend is still a significant limitation for many in the current group of older Americans, especially those with limited resources.

Individual differences in coping with driving retirement. Becoming a nondriver is associated with several negative outcomes, including further physical and mental health declines, social isolation, increased risk of nursing home placement, and even increased risk of mortality (Dickerson et al, 2007). While these circumstances are often devastating, people deal with driving retirement in a variety of ways. For example, a minority of former drivers report that the fear of driving retirement was actually worse than the process itself (Carp 1971; Glasgow & Blakely, 2000), a sentiment not all former drivers endorse (Johnson, 1999). Some former drivers, especially older women, say that not driving actually *decreases* emotional stress by avoiding the pressure from the many demands of driving (Glasgow & Blakely 2000; Rudman, Friedland, Chipman, & Sciortino, 2006; Hakamies-Blomqvist & Wahlstrom, 1998). Reduced financial burden, including costs of owning and maintaining a personal vehicle, is another possible silver lining to driving retirement (Eby, Molnar, & Kartje, 2009; Glasgow & Blakely, 2000; Rudman, Friedland, Chipman, & Sciortino, 2006).

Not much is known about the various strategies former drivers employ when dealing with similar community mobility struggles, which likely modify the impact of driving and retirement. Individual coping mechanisms are broadly divided into problem management and emotional regulation (Wenzel, Glanz, & Lerman, 2002), which can be

used alone or to complement one another. *Problem-management* can manifest as seeking information or developing possible solutions when faced with a problem or challenge, such as learning about alternative transportation sources available, or prioritizing social activities that they are able to get to and participate in without driving. In contrast, *emotional management* is more internal regulation about how a person feels or perceives a stressful event, including seeking social support or avoiding thinking about their mobility limitations. Individuals who use avoidance to cope may be more vulnerable to social isolation and depression than information seekers, as social support can be both protective and an important factor in coping (Vanderhorst & McLaren, 2005). A deeper understanding of the other protective factors can inform interventions to improve outcomes before and after driving retirement.

Impacts of Driving Retirement

Across the country, the impact of driving retirement can be severely deleterious to older adults' health (Edwards, Lunsman, Perkins, Rebok, & Rother, 2009). Even when personal health, concerns about safety, or, in extreme cases, legal actions convince a person to give up their keys, that choice can lead to (as one older adult described it) a life sentence to household imprisonment (King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011). Former drivers often experience the loss of roles and community involvement post-driving retirement (Lister, 1999). Nondrivers report reduced activities outside the home, with an average of two per week compared to six per week by current drivers (Burkhardt, 1999).

Numerous negative mental and physical health outcomes have been reported for former drivers. As Burkhardt stated (1999, p. 11): "The older person who reduces or

ceases driving bears the brunt of the changes that occur in terms of monetary, social, psychological, and emotional costs." Worsening depressive symptoms have been reported even when older adults simply limit their driving, and are even more severe after driving retirement (Fonda, Wallace, & Herzog, 2001). Driving retirement is associated with decreased general well-being and access to health care, as well as increases in depression, isolation, and dependence (Edwards et al, 2009; Fonda, Wallace & Herzog, 2001; Johnson 1998; Locher, Ritchie, Roth, Baker, Bodner, & Allman, 2005; Marotolli, Mendes de Leon, Glass, Williams, Cooney Jr., & Berkman, 2000; Marottoli, Ostfeld, Merrill, Perlman, Foley, & Cooney Jr., 1993; Ragland, Satariano, & MacLeod, 2005). Risk of nursing home placement (Freeman, Gange, Munoz, & West, 2006) and mortality rates (Edwards, Perkins, Ross, & Reynolds, 2009) are also higher among older non-drivers. Fear of these outcomes, rooted from the objective dependence on automobiles for transportation in America, causes decisions around driving retirement, as well as the process itself and resulting outcomes, to loom large for many older adults (Whelan, Langford, Oxley, Koppel, & Charlton, 2006).

Detroit, MI: A Case Study

Detroit, Michigan illustrates the complexities and interactions between contextual characteristics that influence the transportation decisions of older adults. Detroit is a classical industrial Midwestern urban city, and its story provides an especially powerful example of how the history of a place compounds the already challenging effects of being a nondriver. Limited transportation out to growing suburbs made it difficult to follow the jobs as businesses left the city, and suburban housing policies that

discriminated against Blacks and other groups kept them from moving out of the city. People who remained in the city were trapped in increasingly rundown neighborhoods, with low vehicle access in a region designed for automobiles-dependence (Grengs, 2010).

By the beginning of the 21st Century, over one in three Detroit residents lived below the poverty line (US Bureau of the Census, 2005) in a distressed urban core flanked by affluent suburbs. In terms of the contextual factors listed above, Detroit is more highly racially segregated than any other metropolitan area in the United States in a pattern described by the spatial mismatch hypothesis (Grengs, 2010; Kain, 1968). Like many urban areas in America, governmental and private sector policies resulted in concentrated poverty in urban cores that primarily restricted Black residents and other people of color from following the jobs to the developing suburbs (Farley, Danziger, Holzer, 2000; Massey, 1990). Poor neighborhood environments lead to fewer resources, more distrust, and increased social isolation in older adults (Krause, 1993). Transportation is a critical element to bridging these gaps, leaving nondrivers at higher risk for negative health, social, and physical outcomes (Dickerson et al, 2007).

How these different contexts play out for individuals is especially striking when looking at low-income areas where fresh healthy food is not available or not affordable. The United States Department of Agriculture Economic Research Service (USDA ERS) designates such areas as “food deserts,” wherein a significant portion of the population live farther than 1/2 mile (in urban areas) or 10 miles (in rural areas) from the nearest supermarket. The food desert boundaries expand to 1 and 20 miles (respectively) when vehicle access is considered, acknowledging the extent to which having an automobile

can facilitate procurement of food and other needs. The USDA ERS calculations imply that it is twice as hard to get groceries when using public or alternative means of transportation (ERS, 2015). It stands to reason that obtaining other resources to meet additional needs, such as healthcare, is as difficult when transportation is limited.

Preparing for Driving Retirement

In response to the combination of driving dependence and the dearth of tenable solutions to maintaining community mobility as a nondriver, few drivers prepare for future mobility transitions, despite the likelihood of living for years dependent on other forms of transportation (Foley, Heimovitz, Guralnik, & Brock, 2002; Kostyniuk & Shope, 1998). Of the 87% of older former drivers who stopped driving because of a catastrophic driving event (*e.g.*, a collision or near miss), only 27% older drivers reported they had planned at all for driving retirement (Beverly Foundation & American Public Transportation Association, 2007). Lack of planning leads to lack of awareness or access to transportation options, leaving former drivers who did not plan more prone to social isolation and depression post-driving retirement (Kostyniuk & Shope, 1998). Also, lack of planning affects society in many different ways through the negative outcomes for former drivers and the subsequent ripple effects on families, communities, and larger economies.

When people fail to plan and instead wait for an acute event to stop driving, they know less about the transportation options available to them and their quality of life suffers (Musselwhite & Haddad, 2010). Without other options, older adults feel forced to rely heavily on friends and families to meet their basic needs (Kostyniuk & Shope, 1998). Requests or demands for rides or deliveries cause feelings of being a burden

and dependent in older adults, as well as stress and resentment in their families and friends (Kostyniuk & Shope, 1998; Musselwhite & Haddad, 2010; Ritter, Straight, & Evans, 2002).

There is little work directly detailing who plans, how they define planning, and attitudes toward planning for possible mobility changes. An exception is Stowe and colleagues (2015), who developed an intervention for high-risk older drivers that included planning components, such as concrete planning and transportation alternatives. Some participants declined the planning elements, saying they were too young or functional for the planning to be helpful. The authors concluded that certain high-risk drivers would more easily transition to nondriving with facilitated planning. Another exception is King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo's (2011) qualitative study on individual mobility counseling, whimsically titled "Decoding the Miss Daisy Syndrome." Focus groups of older adults with various combinations of disability and life space restrictions explored the concept of mobility loss (not only driving retirement) and preparedness for change. Witnessing mobility loss in a person close to them made participants "somewhat more likely" to believe mobility-related planning was needed (p. 37). Few participants reported significant planning for mobility challenges, including driving retirement. From these focus groups, the Assessment of Readiness for Mobility Transition (ARMT), a validated measure of attitudinal and emotional readiness was developed (Meuser, Berg-Weger, Chibnall, Harmon, & Stowe, 2013).

Lack of planning may be caused in part by the fact that an individual's driving has ramifications for not only their lives, but the lives of those around them. Decisions about driving retirement are often handled poorly in part because it is a complex issue,

involving many stakeholders on many levels. These stakeholders have many different perspectives, opinions, and objectives when it comes to their roles with and messages to older drivers. Research on the issue is often focused on one group (or level), as opposed to considering the entire social context in which the older adult lives. With advice coming from different sources, each focused on its own perspective, the information can quickly become an unintelligible and at times contradictory cacophony.

Ecological model of driving decisions. When considering the question of their driving futures, older adults may receive information and opinions from many sources (Figure 1). Stakeholders can be close to the older adult, or only distantly connected. In older adults' immediate social environment are their family members, friends, and people in their surrounding communities. Physicians, other healthcare and social service providers, and lawyers are a step removed, but still directly involved in older adults' lives and individual decisions. Although there may be no direct contact with older adults, researchers, policymakers, law enforcement, car manufacturers, and other experts in fields broadly related to driving steer the conversations and policies that describe or affect older drivers.

Figure 1
Ecological Model of Driving Decisions

Unfortunately, little literature exists describing different stakeholders' perspectives, patterns of communication that exist between them, or how older adults weigh the messages they receive. Calls have been made to include a broad spectrum of stakeholders to help smooth the process of driving retirement (Molnar, Eby, St. Louis, & Neumeyer, 2007). However, stakeholders often report being unsure of their roles in these decisions and policies (Liddle & McKenna, 2003; Perkinson, Berg-Weger, Carr, Meuser, Palmer, Buckles, Powlishta, Foley, & Morris, 2005). The problem with this lack of training and direction is: what is emphasized, focused on, or (maybe more importantly) omitted in communications coming from each set of stakeholders may vary significantly.

Gaps in Knowledge About Driving Retirement

The three most important gaps in our knowledge about driving retirement are**:**

1) the lack of explicit information about how people conceptualize the driving retirement problem and its risks (i.e., people's mental models);
2) the lack of information about prevalence and type of planning for driving retirement; and
3) the lack of information about the beliefs and perspectives of stakeholders other than the older drivers themselves, as suggested by the social-ecological nature of Figure 1.

As a result, we do not know if the problem facing older drivers and their families is made unnecessarily complicated by contradictory statements and advice. What, if any, planning is occurring and how beneficial stakeholders perceive planning is similarly unknown.

CHAPTER 3

Mobility Planning as Intervention

Mobility planning may be a valuable intervention tool to mitigate the older driver's stress of driving retirement, as well as improve health outcomes post-driving retirement (King, Meuser, Berg-Weger, Chibnall, Harmon**,** & Stowe, 2011; Webber, Porter, & Menec, 2010). When older adults have planned and are aware of the nondriving transportation options in their communities, they can identify additional needs or barriers and can advocate for improvements. Planning helps on multiple levels beyond the individual. If there is an open discussion, the family can be prepared for what they will contribute to helping the older adult get around post-driving retirement. Communication can reduce defensiveness or push-back from the older driver, which may reduce the family's need to take over the situation. Physicians may be more likely to bring their insight to the discussion with less concern about losing patients or disrupting relationships (Wang, Kosinski, Schwartzberg, & Shanklin, 2003).

When conceptualizing interventions and working with older adults on mobility issues, researchers call for interdisciplinary teams and broad definitions of "mobility" (Webber, Porter, & Menec, 2010). Individualized mobility planning and counseling, such as the Assessment of Readiness for Mobility Transition (ARMT), are believed to be powerful ways to improve the process and outcomes of driving retirement (Meuser, Berg-Weger, Chibnall, Harmon, & Stowe, 2013). Developing complementary tools that

take the next step from measuring openness to actual, concrete planning is important (Stowe et al, 2015). In order to design mobility planning interventions, we need to understand what types of planning to use and why.

Goals of Planning for Community Mobility

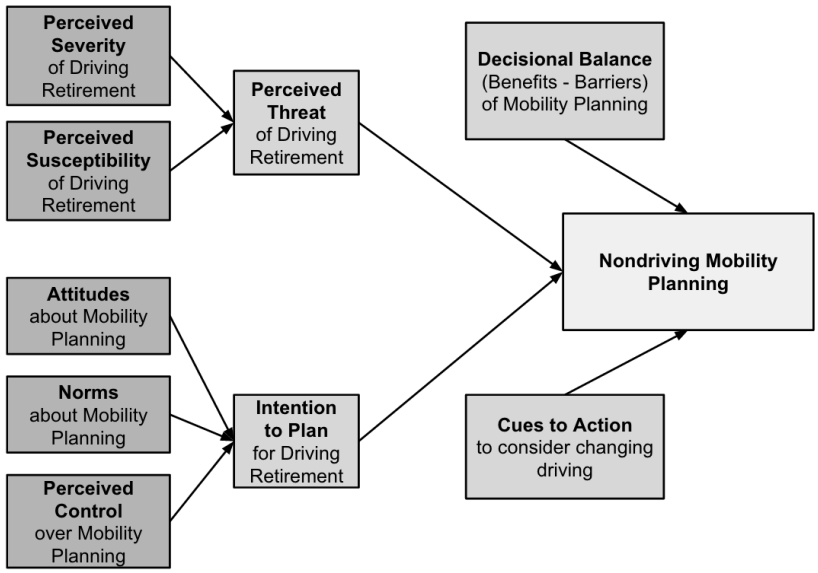
Although the term “planning” is commonly understood, actual planning processes can vary widely depending on the context and the individual. What the actual goal of planning is for each person is especially salient. Dickerson et al. (2007) stated “the idea of losing one’s driving privileges is inconceivable for many older adults.” (p. 579). In other words, there are no other acceptable, or even possible, transportation outcomes in the minds of older drivers.

Shifting the goal of driving mobility planning from maintaining independence through driving oneself to maintaining independence by utilizing different forms of transportation expands the discussion and intervention opportunities. However, this relies on both the driver themselves changing their underlying goals, as well as there being options available to continue transportation mobility without driving. Currently, driving retirement is a sensitive topic, considered taboo by many and awkward by almost everyone involved. A better understanding of how individuals think about their current transportation needs and expectations for the future is needed. For this, we turn to foundational theories of health behavior.

Conceptual Model of Community Mobility Planning

Based on the theoretical constructs discussed below, I developed the Behavioral Model of Nondriving Mobility Planning (Figure 2). Figure 2 is a model of *intrapersonal psychological constructs*, all of which occur in a complicated contextual environment that is not considered in classical analyses. These pieces may be important moderators that we need to be looking at every step in the process. Perceptions of severity and resources depend on context. This is not a linear model and relationships may be different in one person's model but not in another.

Figure 2
Behavioral Model of Nondriving Mobility Planning



Several psychological pieces need to be present for a person to plan for a given circumstance. Generally, people must believe there is a need to plan, planning will make a difference, they are able to carry out these plans, and that the benefits of planning outweigh the costs. These concepts map onto the relationships and constructs proposed in the Health Belief Model (HBM; Janz & Becker, 1984) and the Theory of Planned Behavior (TPB; Ajzen, 1985).

Health Belief Model (HBM) constructs.

Perceived threat. The two halves of Perceived Threat are Perceived Susceptibility and Perceived Severity. *Perceived Susceptibility* describes how likely individuals believe they are to experience the risk; the latter is how bad the person thinks the outcome would be (Champion & Skinner, 2008). Perceived Threat is often not an objective perception, based only on probabilities or statistics. A person's beliefs about his or her level of risk may be lower (meaning they are falsely optimistic about their chances) or higher (meaning they have a falsely pessimistic view of their chances). Those with an o*ptimism bias* have less fear or anxiety about a possible outcome, which often makes them less likely to plan or act to avoid or change it (Gouveia & Clarke, 2001). On the other side of the spectrum, *pessimism bias* causes people to experience more fear or anxiety (de Palma & Picard, 2009). The effects of these negative emotions have different effects on different people, not only because of personality diversity, but also because of how strong the emotions are. Some with pessimistic biases are more likely to plan, while others are overwhelmed and paralyzed by the peril they face.

Decisional Balance. In order for a person to act, there must be an implicit or explicit benefit to performing that behavior. These perceived benefits are compared to the perceived barriers, or the reasons it would be difficult or unfavorable when making a decision. Decisional Balance can be through increased positive consequences, or decreasing negative outcomes. It is important to note that some people choose to plan not in hopes of a better outcome, but to change or avoid a more immediate situation.

Cues to Action. Certain experiences can also cause behavior change by priming the individual to take action (Hochbaum, 1958). Cues can be internal (e.g.,

bodily changes or health events), or external (e.g., seeing a friend in a similar situation or reading an article in the newspaper) (Champion & Skinner, 2008).

Theory of Planned Behavior (TPB) constructs.

Intention. In TPB, Intention is the most reliable way to estimate actual behaviors when the behavior itself cannot or likely will not be reported accurately (Montaño & Kasprzyk, 2008). The *Intention* to plan for community mobility changes is related to individuals' *attitudes*, including what one believes planning will accomplish and how much that outcome is valued (Montaño & Kasprzyk, 2008); *norms*, or if a person believes important people in their lives want them to plan for their transportation future, along with how much powerful that person's opinion is to them (Fishbein, 2008); and *perceived control*, including if a person believes that they can develop and carry out a plan based on their self-efficacy and resources (Ajzen, 1991).

Barriers to Mobility Planning

Given the circumstances that older drivers and other stakeholders face, there are many combinations of these constructs that could reasonably motivate planning for a nondriving transportation future. However, there are distinct reasons that help explain why that does not often occur.

Reasons People Do Not Plan for Transportation Changes. The critical failure in the way driving retirement is currently handled is a generalized failure to plan across all levels of the ecological model. People avoid thinking or planning for driving retirement for two main reasons. First, there is a dearth of acceptable nondriving transportation options (Collia, Sharp, & Giesbrecht, 2003). If there are no alternatives to driving, there is no way to prepare. Second, becoming a nondriver signifies a steep

decline into dependence, a major event during a period of life where losses abound (Eisenhandler, 1990). These fears are shared by older drivers and those around them who are often parts of the process and solutions of reduced mobility (Kostyniuk & Shope, 1998). The perceived lack of options and fear make the topic taboo, compounding the issue by limiting communication about ways to maintain mobility and expectations on both sides (Stowe et al, 2015). When older adults are faced with driving retirement without prior planning, they and other stakeholders are caught off guard and struggle to meet the older adults' mobility needs without unnecessary harm to themselves or others (Kostyniuk & Shope, 1998).

Functional declines are often progressive and subtle. There may not be a trigger to plan for older adults who still perceive themselves as safe drivers and expect that to continue for the rest of their lives (Stowe et al, 2015). However, most of the driving-related functional changes that occur in older adults happen slowly, over a period of months or years. For example, it is difficult to realize how bad your vision is when the acuity decreases slightly each day. During this time, people find ways to adapt to the attenuated abilities, often without realizing the modifications they make (Meng & Siren, 2012). Because of their gradual nature, along with slight compensations older adults employ, the accumulated losses are difficult to detect (Wang, Kosinski, Schwartzberg, & Shanklin, 2003).

Without being on the road with them, concerned parties may not be sure of the older adult's actual driving safety. Because older drivers often drive alone (Kostyniuk & Shope, 1998), it is not always clear to those around them how safely the older adult is actually driving. Additionally, driving is probabilistic, or in other words,

concerning driving events do not necessarily happen every trip. With the exception of the most impaired drivers, passengers may feasibly miss seeing the driver in the types of situations that might be unsafe. Without direct experience, situations or behaviors that might be red flags can be dismissed or, in the other extreme, interpreted as a reason for the older adult to immediately stop driving. Both of these reactions are antithetical to planning. The first takes the discussion off the table by denying any reason to be concerned. The second unilaterally tries to cut off possible future danger, requiring an acute response, skipping over any preparatory planning.

Without firsthand experience, loved ones' concerns about driving are based on inferences or assumptions from information that either occurred when they were not present or from other contexts. If an adult child asks about a new dent in their parent's car, the answer "I wasn't paying attention while backing out of the driveway" may accurately describe a momentary distraction that any driver might experience, or be brushing off a more serious difficulty, such as decreased vision or neck flexibility to look behind them. Without witnessing the event, it may be impossible to know whether it is time to start discussing driving retirement or offer sympathy for an unfortunate situation.

Other indicators of driving safety may be noticed in non-driving contexts, such as older adults' behaviors around the house or when dealing with an unfamiliar situation. Difficulties walking or confusion could indicate declines in basic functions that also relate to driving safety (Eby, Molnar, & Kartje, 2009). Again, while there are correlations between these actions and activities that bring driving abilities into question, none of them are necessarily black and white reasons to make someone stop driving.

Bringing up an uncomfortable topic may damage relationships. Those close to older adults (including adult children, friends, and physicians) fear that even mentioning driving retirement would negatively impacted their relationships (Fritten, 1997; Kostyniuk & Shope, 1998; Wang, Kosinski, Schwartzberg, & Shanklin, 2003). The messenger of such bad news often becomes the focus of the older adult's frustration or be avoided, essentially cutting them out of further discussions. Older drivers may be aware of or even rely on this pressure to remain silent. In focus groups with older drivers (Kostyniuk & Shope, 1998), one participant went so far as to state his family "wouldn't dare say anything" to him about driving retirement (p.14).

Physicians struggle to balance professional responsibility and accountability with personal relationships, which may span decades (Fritten, 1997; Wang, Kosinski, Schwartzberg, & Shanklin, 2003). For physicians, the topic of driving is often triaged below more acute health concerns or chronic disease management during ever-shortening face-to-face time with patients. Both physicians and older adults choose to bring up other concerns that feel more pressing and safer to address rather than use their limited time together to discuss and plan for possible future community mobility changes.

Stakeholders may personally benefit from people continuing to drive. The people in Figure 1 are not only in a position to affect the older adults' driving decisions; they are also affected by the process and outcomes in different ways. How "safe" an older driver is believed to be depends on one's perspectives and needs, making what are thought to be appropriate reactions vary drastically.

Family members and friends consider how they would be impacted by the older driver's driving retirement (Connell, Harmon, Janevic, & Kostyniuk, 2013). Having or lacking adequate transportation fundamentally affects older adults' abilities to get groceries, visit healthcare professionals, and spend time with friends. These daily wants and needs, among others, do not stop when someone transitions from driver to former driver (Collia, Sharp, & Giesbrecht, 2003). Older nondrivers rely heavily on family and friends to provide rides or find other ways to assist the former driver in meeting their needs (Kostyniuk & Shope, 1998). The assumptions of the older adults may not match the level of assistance family and friends are able or willing to give, *i.e.*, former drivers report having expected family to help or visit more (Johnson, 1999).

Stakeholders in the outer, structural ring also have incentives or disincentives to address older driver safety. Legislators think about their voting constituents; car manufacturers want people to keep buying and driving vehicles as long as possible; and insurance companies raise premiums for drivers with poor safety records. As the socio-ecological model in Figure 1 suggests, people and decisions at each level affect the others in a dynamic system.

Lessons Learned From Other Types of Planning

Planning for uncertain events is not unique to driving decisions. Many Americans make plans for their future healthcare and end-of-life decisions. As previously mentioned, however, older adults and those around them consistently choose to avoid thinking about or planning for possible transportation needs (Kostyniuk & Shope 1998). It is worth examining how and why people plan for other future health events, as well as

similarities and differences when comparing relatively common planning topics with community mobility planning.

When considering the current problem of encouraging people to plan for driving retirement, several important lessons should be taken from the literature on other types of planning. However, distinctions remain between community mobility planning and other future considerations salient to middle-aged and older adults.

Not everybody plans. Planning or not planning may be a conscious choice, avoidance, or a result of lack of awareness or concern for a future event. Family structure and quality of relationships influence both engagement in and efficacy of Advanced Care Planning for healthcare needs (Carr & Khodyakov, 2007; Carr, Moorman, & Boerner, 2013; Kahana, Dan, Kahana, & Kercher, 2004; Kehl, Kirchhoff, Kramer, & Hovland-Scafe, 2009). Despite efforts by policy makers and practitioners, fewer than half (33-50%) of older Americans have an advance care plan (Carr & Khodyakov, 2007; Hopp & Duffy, 2000). Planning rates for health care, be it a living will, discussion about treatment preferences, and assigning a durable power of attorney for health care (DPAHC), are two to three times lower among Blacks than Whites (Gerst & Burr, 2008; Hopp, 2000; Hopp & Duffy, 2000). This pattern holds true even after adjusting for demographic and socioeconomic factors (Caralis, Davis, Wright, & Marcial, 1993; Gerst & Burr, 2008; Hopp & Duffy, 2000).

In current American culture, there are taboos surrounding the topic of end-of-life decisions or circumstances, similar to the negative view of discussions around driving retirement with older adults. Involving family members and others with whom older

adults have positive relationships may increase willingness to plan for driving retirement (Carr, Moorman, & Boerner, 2013).

Planning often happens too late. Older adults recognize the need to raise end-of-life concerns before they are seriously ill, but they often rely on family members and healthcare providers to broach the topic (Haisfield, McGuire, Krumm, Shore, Zabora, & Rubin, 1994). Waiting for an acute event, such as hospitalization, to discuss treatment preferences can make circumstances even more difficult as the family and older adult are often too distressed to make informed decisions (Johnston et al, 1995).

It is possible that experiencing or witnessing negative driving events could encourage earlier planning for driving retirement. Near-misses, actual collisions, and experiencing others' driving retirement may serve as similar incentives for healthy, middle-aged and older adults to begin considering their own future transportation needs (King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011). Experiences were predictive of end-of-life planning among young-old adults, with more planning reported by those who had been hospitalized in the past year and witnessed the painful death of a significant other (Carr & Khodyakov, 2007). As with healthcare decisions, community mobility planning can begin in middle age or even earlier, which might extend the period of intervention to younger groups who may integrate planning when preparing for other future needs.

Certain types of planning are more common and supported. Although planning rates are still not ideal (Carr & Khodyakov, 2007; Hopp & Duffy, 2000), planning for healthcare and financial needs in retirement has been normalized through policies and within employment contexts in the United States. There are no such structures that encourage transportation planning, making it less familiar and less

urgent. Additionally, money, health, and residence considerations are consistent throughout the lifespan, even if they are more salient in later life. Because so many rely solely on personal vehicles, community mobility considerations are not part of most day-to-day activities of American adults who drive (Collia, Sharp, & Giesbrecht, 2003). Bringing future transportation needs to the forefront with these other concerns could help increase planning and improve outcomes.

Not everyone experiences driving retirement. Although end of life decisions are avoided for reasons similar to driving retirement decisions, a major distinction exists. Physical death is an inevitable part of life, whereas not everyone who drives stops driving permanently. The additional layer of uncertainty ("I might be one of those people who drive until they die, so why plan?") gives a plausible excuse for many to not broach the subject or plan (Stowe et al, 2015). Additionally, those who do reduce or stop driving experience various rates of change and resources to adapt, making the process different for each person (Kostyniuk & Shope, 1998).

Making Better Plans for Driving Retirement

Despite the call for more guidance from all fronts in making driving decisions, and the knowledge we currently have about safe driving, people still fear the topic and avoid talking or even thinking about the possibility of becoming a nondriver. Assessment and education efforts have been growing (Kua, Korner-Bitensky, Desrosiers, Man-Son-Hing, & Marshall, 2007; Wang, Kosinski, Schwartzberg, & Shanklin, 2003), but these rarely consider the individual within their entire context. The taboo of driving retirement, combined with siloed thinking, causes unnecessary emotional distress, takes away

opportunities to carefully plan for future needs and organize potential resources, and keeps people from advocating for more viable options for nondrivers all over the United States.

CHAPTER 4

Using Mental Models to Explore Meanings of Mobility and Driving Retirement

There are pressing reasons to develop interventions to improve the process of driving retirement, which hopefully would also reduce negative outcomes. A better understanding of behaviors and beliefs of drivers 55-84 would allow development of more targeted interventions that are sensitive to how individuals' current transportation contexts, as well as their personal needs and preferences, affect decisions about driving. *However, while mobility planning might be able to help, there is a dearth of information about which drivers plan, when they plan, and what they consider planning for mobility change*. Specifically, there is a need to know more about:

- the process of driving retirement, including ways to intervene before and after a person stops driving;
- external factors, such as actual and perceived acceptable transportation alternatives to driving;
- internal or intrapersonal beliefs about driving and being a driver;
- how older adults think about their current and future mobility;
- whom older adults listen or talk to about mobility;
- the roles different stakeholders have in the driving retirement process;
- how or if some middle-aged adults plan for possible future changes to their community mobility; and

- who plans for future transportation needs.

Such research needs to study older drivers within their contexts in order to provide multidimensional understanding of the process of driving reduction and retirement. Such complexity has unfortunately been missing in most older driver research. As stated previously, contextual factors such as health, financial and social resources, and physical neighborhood environments all affect the decisions older adults can and do make about their transportation. The context also includes how different stakeholders interact with older adults about this issue. Improving such interactions, however, requires first understanding how different stakeholders generally think about older drivers and specifically regard the process of driving retirement.

A Mental Models Approach

We need a new, innovative approach to fully explore what people know or how they think about the process of driving retirement. Mental models, a research methodology founded in the risk communication field, describe how a person believes the world works under certain circumstances (Johnson-Laird, 1983; Morgan, Fischoff, Bostrom, & Altman, 2002). A mental models framework can be used to systematically capture beliefs about the magnitude of risk, who controls it, or if it can be managed at all. These beliefs guide expectations, behaviors, and how new information is interpreted (Johnson-Laird, 1983).

In risk communication (which includes the topic of driving safety), expert or other authoritative communicators often take information and present it to the public without necessarily considering if the audience shares their basic assumptions about the issue.

This leaves potentially salient gaps in what and how information is presented, which inhibits actual communication. Comparing mental models offers insight into important distinctions in what drivers and other stakeholders focus on or even incorrect information that is not being addressed in the current communication. If there are unstated or even unconscious differences, people may be using the same words but effectively speaking different languages. Because individuals' mental models are mutable, not stagnant, efficient and targeted communications can be a tool to improve how people think about a problem or its possible solutions (Morgan, Fischoff, Bostrom, & Altman, 2002).

The mental models framework has been employed in diverse fields of study to discern assumptions held by different groups that inhibit effective communication and collaboration. Comprehensively representing a system using combined expert and lay groups' perspectives improves understanding of the issue from all sides (Ozesmi & Ozesmi, 2004), enhances communication by comparing stakeholders' beliefs (Abel, Ross, & Walker, 1998), and ultimately results in better decision-making (Dray, Perez, Jones, Le Page, D'Aquino, White, & Auatabu, 2006).

Potential uses of mental models with driving most directly align with applications in natural resource management, as diverse stakeholders were interviewed to co-create meaning about a shared situation, as well as communicate key information and understanding (Etienne, Du Toit, & Pollard, 2011). Using the innovative approach of applying a mental models framework to the phenomenon of older driver safety and the associated risks can illuminate several important areas. Combing stakeholders' views of the whole context (or system) in which driving decisions are made can provide a holistic

view of the perspectives and experiences with the issue. We can also see where there are incorrect beliefs or contradictions that can be corrected, or areas of missing knowledge that can be filled. These determinations will help guide future communication from experts in fields related to older drivers and the older drivers themselves.

In a situation such as risk communication about older driver safety, the information from the literature that informs expert mental models may be correct but entirely different from the experiences or specific concerns of older drivers actually going through the process of driving retirement. This is important because it highlights two parallel goals of the dissertation research. The conclusions and suggestions derived from this research will not only indicate what older drivers may not know about driving retirement but will also identify focal points that researchers and other stakeholders communicating with them may be missing.

Design and Impact of Dissertation Research

In the first phase of this research, I conducted mental models interviews with a variety of expert stakeholders, as well as older adults (65+) in order to understand the experiences and changes they have already made about their transportation mobility. The specific purpose of these interviews was to examine the variance in stakeholders' perspectives about issues related to older drivers, as well as to identify key themes to focus on in the quantitative survey. Using the mental models interview approach, I elicited rich narratives regarding:

- stakeholders' knowledge about the process of older adults' driving and overall transportation-related mobility;

- how decisions concerning driving retirement are made;
- phenomena related to the driving retirement process (*i.e.*, planning, stress, fear);
- risks associated with older drivers; and
- relevant inferences about risk.

The findings from the mental models interviews informed a large-scale, quantitative survey that examined middle-aged and older drivers' (ages 55-84) forecasting and planning for future transportation needs. In particular, the survey assessed the prevalence of key beliefs about driving and driving retirement identified as core to people's mental models of this issue within a broad age range of middle-aged and older adults. This breadth of sample differs from past work, which has focused only on adults age 65 and older, thereby allowing this work to capture planning or transportation mobility changes that occur prior to reaching age 65. As a result, it increases our understanding of the complex mental models that people hold regarding how age, functional ability, generational cohort, and social contexts result in different expectations, perspectives and planning beliefs.

Another goal of this study is to begin to explore the potential for different racial/ethnic groups to hold different mental models of driving and driving retirement. As detailed in Chapters 6 and 7, this research sought, and was able, to include a large number of Black older adults from Detroit. This sample, which to my knowledge is highly unusual for mobility research, provides new information on differences in how and when race and/or ethnicity may influence how older adults see the mobility and driving problem and ultimately prepare for mobility changes. Given that Blacks people living in the United States consistently experience earlier morbidity and mortality compared to

Whites (CDC, 2013; House, Lepkowski, Kinney, Mero, Kessler, & Herzog, 1994), we can now explore how or if race and/or urbanicity influence the timing and process of driving retirement.

Information Needs. In concrete terms, this study seeks to address the following information needs:

If the ultimate goal is to develop and support initiatives to promote mobility planning, the first and perhaps most important required piece of knowledge is how people *define* planning. Mental models clarify what middle-aged and older drivers mean when they say planning, or hear when someone says the word to them, offering valuable insight into how extant approaches or interventions overlap with or even contradict with these assumed meanings (Johnson-Laird, 1983). Eliciting core underlying beliefs that stakeholders come to the table with will allow us to identify miscommunications regarding the character of planning, which is a first step to correcting them.

Second, among middle-aged and older drivers who do plan, there is a need to know, even generally, *when planning begins.* Simply asking older adults about their planning behaviors is not enough, since their mental conceptions of when planning should occur may not correspond to when it actually does occur. Understanding at what age planning does occur requires making inquiries to middle-aged drivers who might have begun planning efforts before significant functional declines have begun to threaten their driving safety. If such early planning either does or could occur, then interventions that focus exclusively on older adults may actually be too late.

Third, there is a need to explore *how useful* middle-aged and older drivers think planning would be. Understanding how planning fits into middle-aged and older drivers'

mental models can help identify salient motivators that would incentivize preparing for an uncertain driving future as well as misconceptions about planning that need to be corrected. Even if planning is highly valuable, it will not occur if drivers do not believe it will help.

Fourth, because there are currently no universally-accepted measures of planning for community mobility changes, there is currently no way to know *how much* planning occurs. Documenting the volume of current planning can identify both bright spots worthy of continued effort as well as the people or contexts most in need of interventions to support planning.

All of these details will combine to paint a more comprehensive picture of community mobility planning from the perspective of middle-aged and older drivers, relying again on their words and experiences as opposed to assumptions and values of researchers, policy makers, and interventionists. They also provide the answers needed in order to design targeted interventions that meet older adults where they are on the topic of driving retirement and mobility planning, instead of where we wish they would be.

CHAPTER 5

Pilot Interviews: Informing Quantitative Survey Using Stakeholders' Mental Models of Driving Retirement

To inform the development and implementation of the quantitative survey, I first conducted pilot, in-depth qualitative interviews using a mental models framework. This innovative approach expands the topic of older adults and driving retirement by being flexible enough to examine previously unexplored concepts, instead of narrowly focusing the topic domains to specific situations. Creating a holistic representation of people's mental boundaries and assumptions also illuminates the underlying beliefs that directly guide their actions.

Older adults' decisions about driving are made within the milieu of various external stakeholders, ranging from close family (spouses, adult children, etc.) to healthcare providers and law enforcement officers all the way up to politicians who make policies that affect driving (Figure 1). I targeted selected stakeholders, including older adults themselves, to interview using a mental models framework. Conducting mental models interviews with both older adult and "expert" (external) stakeholders allowed me to compare conceptual overlap among stakeholders, including important topics to explore in the quantitative survey.

I identified key issues to inform the development of the survey instrument in three distinct ways. First, I explored driving retirement from multiple stakeholders' perspectives. Second, I identified misconceptions and contradictions in these

viewpoints. Third, I found the key themes stakeholders commonly consider when thinking about community mobility for older adults.

Development of Interview Protocol Using a Mental Models Framework

Expert stakeholder interview protocol development. The overall goals of the expert interviews were to understand:

- experts' knowledge about the process of older adults' driving and overall transportation-related mobility;
- how decisions concerning driving retirement are made;
- phenomena related to the driving retirement process (*i.e.*, planning, stress, fear);
- relevant inferences about risk.

The mental models framework structured the interview protocol and elucidated the direct conceptual linkages in how experts think about older adults' driving behaviors and decision-making processes, as well as more abstract beliefs and assumptions. As opposed to strictly following the order of questions in the guide, I formatted the guide to allow questions and answers to be marked when they came up in the interview for each conversation to have its own path. Additionally, I took heed not to introduce certain information or lead interviewees' responses through the wording of questions or neutral follow-up prompts or probes. Ideally, this led to a more accurate representation of interviewees' mental models, with minimal bias introduced by the interviewer and interview process.

Drawing from the empirical literature and research questions, I created two main sections using an iterative process, each supporting the three purposes of the pilot phase. Section 1 approached the goals on the individual-level (i.e., intrapersonal or

interpersonal factors that influence older adults' driving and transportation-related decisions). Starting with general questions about how older adults meet their transportation needs ("What comes to mind when you think about how older adults get where they need or want to go?"), the section then transitioned to more specific thoughts or opinions about older drivers, including reasons why or when older adults would change their driving behaviors. I compiled a list of common reasons for driving retirement from the literature (*i.e.*, vision problems, diagnosis of a progressive illness, dementia, family members' concerns, doctor's recommendation, collisions/near misses, etc.), including blank spaces for additional answers not originally listed.

Section 2 of the guide was structured to prompt interviewees to list stakeholders who speak *directly to* older adults about driving or *indirectly about* older adults and driving. In other words, the second part of the interview elicited beliefs about the broader social and structural contexts in which driving behaviors and transportation-related decisions are made. The protocol included a general list to keep track of common stakeholders the interviewees listed (*i.e.*, family, friends, physicians, AARP, law enforcement, insurance companies, etc.), along with blank spaces for additional responses. For each group identified as communicating with or about older drivers, I asked participants three follow-up questions concerning the stakeholders' roles in providing information to older adults about driving retirement, older adults' decisions about driving retirement, and affecting policy about older adults and driving.

Time permitting, I ended the interviews with a series of questions focused on alternative transportation, how relationships with family or friends might facilitate or inhibit transportation mobility for nondrivers, and differences in reactions to driving

retirement among older adults. After each of two pilot interviews, modifications to the overall flow and minor word changes were made. After these changes, the guide was considered complete. Please see Appendix A for the Expert Stakeholder Interview Guide.

Older adult interview protocol development. The goals for the second set of interviews paralleled those of the expert interviews, only from the perspective of older adults themselves. Older adults provided details to flesh out the overall mental model and show where expert and older adult stakeholders differ, and which important parts they all agree about. This included:

- older adults' knowledge about the process of older adults' driving and overall transportation-related mobility;
- how decisions concerning driving retirement are made;
- phenomena related to the driving retirement process (*i.e.*, planning, stress, fear);
- associations evoked when older adults think about older drivers and their own driving experiences (when relevant); and
- relevant inferences about risk.

Based on my experiences conducting the expert stakeholder interviews, I slightly adapted the expert interview protocol described above. I also added direct questions on current and past driving behaviors, as well as items to capture older adults' salient demographic information. I kept the overall structure identical to the expert stakeholder interviews, i.e., the first part of the guide focused on older adults' transportation-related mobility and driving decisions, followed by the second section which gathered

information about stakeholders' roles. Please see Appendix B for the final Older Adult Stakeholder Interview Guide.

Pilot Qualitative Data Phase Overview

To understand the broad social and structural contexts in which driving decisions are made**,** I conducted two rounds of interviews: 1) Expert Stakeholders and 2) Older Adult Stakeholders. To recruit both groups, I chose an intentional maximal variation sampling process. By targeting fewer people with specific knowledge related to older adults and/or driving I could efficiently gather what I needed to know without unnecessary recruitment or data collection.

Expert Stakeholders. The expert stakeholder group included people directly or indirectly involved in individual older adults' lives (Fig. 1), who influence decisions regarding options for transportation-related mobility. *"Expert" here does not mean individuals who necessarily have the correct or more objective perspectives, but instead indicates people from whom older adults might receive messages about driving.* These stakeholders include those in older adults' immediate social environment (family members, friends), professionals in direct contact with older drivers (physicians, other healthcare and social service providers), and individuals in fields broadly related to driving who steer the conversation and policies that describe or affect older drivers (researchers, automobile manufacturing safety experts, law enforcement, etc.).

I used Perkinson and colleagues' 2005 article "Driving and Dementia of the Alzheimer Type: Beliefs and Cessation Strategies Among Stakeholders" (Perkinson, Berg-Weger, Carr, Meuser, Palmer, Buckles, Powlishta, Foley, & Morris, 2005) as a guide to identify the main groups of expert stakeholders who overlap either personally

or professionally with older drivers. Potential expert interviewees were identified using three purposive sampling techniques: professional networks, personal contacts and Internet searches to pinpoint individuals in other fields related to older adults and/or driving.

Telephone and email invitations were sent to potential interviewees, describing the overall study and interview logistics (*i.e.*, duration, structure of interview, location options, audio recordings of interviews for verbatim transcripts).

Older Adult Stakeholders. In order to provide first-hand reports of mobility, I also interviewed older adults themselves. For the qualitative data collection, I defined "older adult" as persons aged 65 and older. There were no other qualifications for older adult stakeholders to be interviewed, including driving status. I posted flyers in local senior centers to recruit volunteers interested in discussing how older adults get where they need and want to go. Interested individuals contacted me for more information and to set up interviews. Interviews were scheduled at the older adult interviewees' convenience.

Incentives. No incentive was offered expert interviewees. I offered a $10 gift card incentive to Kroger grocery store for older adults who completed an interview.

General interview contexts. I conducted all interviews one-on-one in private areas (professional offices, private rooms within academic or community buildings, or personal residences). Informed consent was obtained before beginning the interviews, which were recorded and transcribed verbatim by a professional transcription service for analyses. Due to professional restrictions of the interviewee's workplace and position, one interview was not audio recorded. To compensate, I kept detailed notes. Length of

the interviews was about an hour to an hour and a half. The University of Michigan Institutional Review Board Health Sciences and Behavioral Sciences (IRB-HSBS) granted Exempt status for the qualitative interviews.

Qualitative Analysis Approach

The goals of this work were to explore the concept of community mobility amongst older adults, identify key themes, and illuminate salient conflicts or contradictions among stakeholders. I analyzed the transcripts using a phenomonology approach in order to understand and describe how various stakeholders' perceive, conceptualize, and experience the process of mobility among older adults (Cohen, 1987). For this dissertation, I intentionally conducted an abbreviated phenomonological analysis of the qualitative data, choosing to abridge my analysis in lieu of a more in-depth qualitative approach (e.g., grounded theory).

Expert stakeholder interview analysis. To adapt the interview protocol for the older adult sample and to develop themes and items for the quantitative survey, I made a quick, albeit detailed list from memory of the main topics or concepts brought up during the expert interviews from memory. I kept a running list of topics, grouped by general themes (*i.e.*, communication, transportation alternatives, stakeholders), with subgroups under each. My goal was to both capture the specific content, as well as the overall gestalt of the interviews.

To complement the initial list, I read through each expert interview transcript briefly (15-30 minutes/interview), adding relevant information. At this point, I reviewed the master list to determine if each section was at an appropriate level of detail. I split

themes that were mentioned often or with several specific subthemes and combined sections that were talked about infrequently or without much specificity.

I performed a more detailed review of the transcripts to inform the development of the quantitative survey. At this point, I selected representative quotations from the interviews that illustrated the content and tone of each theme, including conflicting perspectives or opinions when present.

Older adult interview analysis. The analysis plan for the older adult interviews complemented that of the expert interview analysis. Starting with the main themes and subthemes identified in the expert interviews analysis, I combed through the older adults interviews employing a threefold process. First, I reviewed the transcripts to identify instances of themes previously identified through expert interview analyses. Second, I also assessed the degree to which themes were conceptually accurate. When appropriate, I combined or broke themes apart to reflect the complexities of mental models seen in older adults. Third, I added novel themes for issues not previously discussed in the expert interviews. Finally, I compared the content in overlapping themes between expert and older adult interviews to discern if the themes were discussed in the same or different ways based on their respective perspectives.

Overview of Interview Sample

Expert sample. The ten experts (6 females, 4 males) interviewed were part of one or more of the following groups: certified driver rehabilitation specialist (CDRS), occupational therapist (OT), social worker, geriatrician, elder law attorney, geriatric care manager, adult child of an older driver, transportation researcher, safety researcher at a

major car manufacturing company, U.S. Department of Veterans Affairs (VA), driving clinic assessor, state driver license examiner, police officer, and teacher of classes or assessments aimed at older driver safety (Table 1). All have experience directly with older adults or issues related to older adults, with varying degrees of focus on driving specifically. Although recruitment was based off a single identity, the majority of experts disclosed other roles during the interview (see Table 1). Interviews were conducted in professional offices (*n* = 8) or personal residences (*n* = 2). Interview length ranged from 44 to 110 minutes, averaging 83 minutes. No additional demographic information was collected from expert interviewees.

Older adult sample. Ten older adult participants (8 females, 2 males) were interviewed. The average age was 76 years old, ranging from 66 to 89 (Table 2). Two older adults were Black, one was Latino/Hispanic, and the remaining seven were White. Marital statuses were diverse, including individuals who were single (1), married (3), divorced (2), and widowed (4). At the time of their interviews, 9 were driving. Average driving tenure was 51.2 years (ranging from 33 to 70). The majority of the interviews (8 out of 10) were conducted at private rooms at senior centers, with the other 2 in the interviewees' homes, with an average interview length 79 minutes (ranging from 57 to 99 minutes).

Table 1
Characteristics of Expert Interviewees and Interviews

Expert Role (for Recruitment)	Other Relevant Roles	Gender	Interview Length	Interview Setting
State Driver License Examiner	Researcher Educator Counselor MS Gerontology	F	87 min	Personal Residence
Adult Child of Older Driver	Adult child	F	96 min	UM School of Public Health
Driving Safety Researcher	Occupational Therapist	F	110 min	Expert's Office
Geriatric Care Manager	—	F	108 min	UM School of Public Health
Geriatrician	—	M	44 min	Expert's Office
Geriatric Social Worker	Adult child	F	77 min	Expert's Office
Safety Researcher at Automobile Manufacturing Company	Adult child	M	80 min (Approx.)	Expert's Office
Elder Law Attorney	—	M	71 min	Expert's Office
Law Enforcement Officer	Older driver educator Adult child	M	86 min	Expert's Office
VA Driver Clinic Assessor	OT Researcher CDRS Adult child	F	92 min	Personal Residence

Table 2
Characteristics of Older Adult Interviewees and Interviews

Interviewees	Driving Status	Driving Tenure	Marital Status	Race	Interview Length
Female, 89	Current Driver	63 years	Widowed	White	61 min
Female, 86	Current Driver	70 years	Married	White	66 min
Male, 75	Current Driver	61 years	Married	White	57 min
Female, 67	Current Driver	49 years	Widowed	Black	88 min
Female, 71	Current Driver	56 years	Widowed	White	99 min
Female, 70	Former Driver (3 years)	51 years	Single	White	90 min
Male, 66	Current Driver	52 years	Divorced	White	92 min
Female, 79	Current Driver	40 years	Widowed	Latino/Hispanic	79 min
Female, 72	Current Driver	37 years	Divorced	Black	71 min
Female, 85	Current Driver	33 years	Married	White	91 min

Thematic Results

Theme 1: Early planning for community mobility changes would be ideal, but is rare for many complex reasons. In the interviews, stakeholders linked planning for community mobility changes, specifically driving cessation, to benefits for not only older adults, but other people in older adults' lives as well. Unfortunately, the advantages of older drivers planning for mobility changes are often outweighed by the barriers, such as older drivers and other stakeholders avoiding the topic, few acceptable alternatives to driving available to would-be planners, and the limitations of the inchoate discipline of mobility planning.

Stakeholders believed that older drivers can mitigate or avoid many common problems associated with driving retirement by planning for a

nondriving future. As discussed in previous chapters, older adults who stop driving often experience a broad range of negative outcomes. Both older drivers and expert stakeholders expressed various personal, contextual, and experiential motivations for mentally distancing oneself from any mention of a nondriving future. This reality feeds the anxiety of aging drivers, many of whom choose to completely deny even the possibility of driving retirement, believing they will be able to continue driving using will alone.

> *Yeah, I guess I don't really think about elderly drivers. I guess I refuse to be one. Elderly driver, yeah. I, myself, am very safety conscious and very conservation conscious and...I think other people should be too, so I want my elderly drivers as well as my younger drivers to be up on those items. I guess some elderly drivers can be sure that the world should do things their way and that they are entitled to have the world do things their way. And then again, there are some elderly people who have learned through their vast experience there are many ways to do things. Still, there are others who are inflexible and that can make it very, very difficult.* (Female, 71)

One commonly reported reason for such avoidance is inadequate transportation alternatives to driving. For some, however, the perceived lack of options is rooted in ignorance rather than objective limitations of their transportation environment. For these individuals, several stakeholders independently reported that awareness of nondriving options would likely reduce the stress and fear resulting from being unprepared when driving retirement occurs suddenly. (For people who believe they will never stop driving, "suddenly" is synonymous with "ever," no matter how inevitable driving retirement seems to those around them.)Illuminating previously unknown ways for nondrivers to navigate their communities is one consistently mentioned benefit of mobility planning.

> *If they know they have the options. They have other options for how to get where they need to go without feeling like a burden, then I think they take it better. If they don't know those options because they haven't been prepared for that day,*

then they have a terrible time with it. Because now what am I going to do? I'm sitting here. I can't drive home. What am I going to do? (Driver examiner/Counselor)

In the face of the spectre of future where they are isolated or a burden to others, continuing to drive feels like the only viable option. Having adequate options other than driving may provide a smooth transition to maintaining or improving community mobility as a nondriver. In contrast to automobile dependence forcing drivers to stay behind the wheel despite impairments, drivers who are questioning their driving safety or simply prefer to not drive themselves can shift smoothly and safely into a mobile nondriver. Stakeholders shared many stories of older drivers who were completely unprepared for a seemingly sudden driving retirement, leaving the new nondrivers feeling as though their lives were literally ending. Being prepared for changes to their driving longevity can avoid tragic outcomes for older drivers and all those around them.

I think [reducing the taboo] would make it easier to get people off the road because people—if you have—because what's happening now is no one is talking to them about driving. They are coming to see me. They fail. Boom! Their "life is over"! They can't drive anymore. Whereas, if you just kind of have the conversation over the years, it wouldn't be—I mean I've actually had people say I will commit suicide if I can't drive. I mean, right now it is not a good situation. So I think even if we can ease some of it, make it easier on the families—and on the providers because the providers are obviously having a hard time dealing with it too; either they don't want to or they don't want to be the bad guy—it would just be easier on everyone if we could make it more routine and we would get the dangerous people off the road, the people who drive through the middle of the Goodwill or drive the wrong way down the highway. (VA/OT)

Mobility planning is not a single experience that prepares drivers for a nondriving future, but a multidimensional combination of behaviors and events that prepare older drivers for a nondriving future. Although none of the stakeholders spoke directly about the complexity of mobility planning, nuances emerged while they

discussed the range of behaviors associated with mobility planning. Stakeholders elucidated various dimensions of mobility planning that may be employed by older drivers and those around them, ranging from simply thinking about a nondriving future to talking with others abstractly to researching the details and logistics of using local public transportation.

Stakeholders discussed how few older adults actively seek out information about driving retirement. There are, however, several indirect or passive ways older drivers can learn the information necessary to begin mobility planning. For example, older adults may chance upon an article about older driver safety in a magazine or online, or find themselves talking about how others get around their communities without driving. Such conversations may even be engineered by other stakeholders in order to subtly approach the sensitive topic, at times through a third party.

> [T]*here's family members that try to provide some information or maybe there's a situation in the media and so they take that opportunity to say, oh, my gosh! Did you hear about this older driver that ran through the fruit market and hit multiple people or you know whatever it might be. And you know I really worry about how safe you are and what do you think about getting evaluated. So I think people will take advantage of sort of those situations to kind of bring things up. They also will on the QT get ahold of the physician and say I'm bringing my parent in and they are unsafe driving. You really need to talk about this. So if they can sort of manipulate somebody else bringing up the topic when they are present and sort of having that be a safe way to open up a conversation, they will do that.* (OT/CDRS)

Older adult and expert stakeholder endorsed several approaches to safely "open up a conversation" about mobility planning in order to engage older drivers in the topic. Framing mobility planning as abstract preparation for a far-off future was one strategy to avoid immediate defensiveness or shutting down in the face of perceived criticism about the older adults' current driving. An additional, sometimes complementary, approach

stakeholders reported was to build upon previous driving adaptations the older adults have already experienced.

> *So I think we could talk about, yeah, maybe you could break down the driving into night driving. You know we noticed mom that you are pretty agreeable about not driving at night, so what made you decide that? And then go to—so highway driving, you are really not driving too much on the highway but you did when you had the chest pain. So you know how do you feel about driving on the highway now? What speed are you going on the highway? And you know low speeds can be just as dangerous as high speeds. And, I don't know, maybe that would be a good way to kind of bring up the ones that we are concerned about.* (Adult child)

In all of these scenarios, stakeholders felt that mobility planning should begin as early as possible. Ideally, stakeholders overall felt the topic of mobility planning should be broached before mobility loss is imminent. Currently, there is a tension between stakeholders wanting drivers to prepare before a plan is needed and the reality that decisions about driving retirement often occurs when the driver or those around them are in crisis, adding unnecessary pressure to the situation that could be reduced, if not avoided, by earlier planning. As such, the issue of driving retirement is as much about whether drivers plan as it is about *when* they start planning. Stakeholders believed that earlier planning was best, although any preparations for transitioning from driver to nondriver was seen as beneficial for older adults.

> *The difference is if they've been prepared, which most of them aren't, which is something we need to work on, for this time when they will no longer be driving, or they know they have a spouse who can take them where they need to go. Or maybe even a family member. I also think that the ones who have more of a list, I know I can do this still and I can go here this way and I can take the OATS bus to my whatever, my hair appointment. If they know that, then they have a better reaction. It's that person who is just caught cold, who has nothing, who has a really bad reaction.* (Driver examiner/Counselor)

There are dimensions of mobility planning that are similar to other types of planning, offering the opportunity to not only learn best practices and approaches from other disciplines, but also build upon familiar behaviors that encouraging older drivers who plan for other events to prepare for mobility changes. Although stakeholders agreed that mobility planning was rare, there were many examples of ways people prepare for, or help others through, challenging life stages. One expert stakeholder in particular suggested relatives who want to help older loved ones plan for a nondriving future apply tactics parents of young children use to consciously prepare their children for common childhood challenges. She underscored how early preparation (i.e., communication and action before there is even a concern about a problem) benefits both the drivers and their loved ones.

> *But certainly the older driver, I think it's imperative that even the healthy older driver that you have some sort of conversation with them to say how are you doing with this? … T. Berry Brazelton—he's a pediatric doctor, but he had a—oh, I know what it was called! He had a great way of helping parents and I think about this when I think about sort of the other end of the huge spectrum. He called it "anticipatory guidance". So, to me, that's the ideal thing, both from the medical realm of things as well as from a family standpoint, that you start those family conversations early when, hopefully, there aren't any concerns. But you start sort of the problem solving, sort of the self-awareness aspect of it before there becomes more difficulties, more argument about it; all of that. And I think when you do that, it just is a much more acceptable conversation when it becomes more of an issue.* (OT/CDRS)

While Brazelton helps parents navigate their children's early development (Brazelton, 1999), the connections between anticipatory guidance and planning for future community mobility are quite relevant. Brazelton himself described anticipatory guidance as "not just delivery of 'expert advice,' but having a dialogue, a shared discussion around how the parents feel and would react in the face of new challenges."

(Brazelton, 1999, p. S6). Much like talking with older adults about driving retirement, other stakeholders (as opposed to the parental role in Brazelton's examples) need to acknowledge the gray areas of driving safety as well as the physical and social needs of older adults. How these dialogues play out in each situation depends on past experiences and habits affect current communication.

Highlighting overlaps among mobility planning and preparations many older adults have already made for other, non-mobility spheres of later life can provide additional insight into approaches to facilitating planning for uncertain futures. Planning for one's retirement from work, financial investments, living arrangements, and healthcare needs can provide guidance in how to approach and navigate mobility planning. There may be commonalities between drivers who plan in one domain versus other domains that also influence predicting who is open to or engaging in mobility planning. People who reach older adulthood having done little to no preparation for any of their needs provide an important comparison to older adults who planned for every situation that could possibly occur.

Theme 2: Individual differences among drivers make it difficult to generalize mobility planning. Stakeholders cited several characteristics that likely affect older adults' mobility planning, including gender and location. In addition, stakeholders broadly discussed how older drivers' transportation-related resources and options are also affected by their past experiences, current contexts, and future expectations. These internal and external factors moderate how older adults reckon decisions about their driving future.

Differences in relationships with automobiles by gender. One of the most common distinction made when comparing older drivers was gender. According to the interviews, men are more likely to be interested in cars than women at every age and stage of life. Experts and older adults attributed these differences largely to cultural norms in the United States that associate things related to automobiles with masculinity and being a man. Several stakeholders suggested that men who conflate driving with being a man are generally more resistant to the topic of driving retirement. For these individuals, driving retirement represent a much larger threat to their quality of life.

> *I really believe that's in their minds: my masculinity depends on my ability to drive a car. … When they learn to drive, one of their goals as teenagers is to drive and own a car. You don't hear them talking about I'm going to get a bachelor's degree or my goal is to graduate from high school. They will tell you what car they prefer and they want to drive as soon as driving opportunities become available.* (Female, 85)

Differences in how location interacts with health. Stakeholders also consistently commented on the ways that health and geography combine to affect community mobility. They provided examples of ways people who experience physical or cognitive challenges have a harder time getting where they want and need to go compared to those without functional limitations. In this way, aspects of the physical environment provide valuable contextualization to the options older adults consider when facing driving retirement. Regardless of location, stakeholders felt that older adults with little to no experience with nondriving transportation options are unlikely to learn the skill in later life.

> [My mom] *lives in an area, actually, where she could walk to a lot of places. The church is a mile away. So her world has definitely closed in geographically more now but she has always—[town] has always been where she has done most of her grocery shopping, church; all that kind of stuff. So I don't think—so you've got*

a bus possibility; you've got walking; you've got driving and, really where she lives, those are the options. So it's not a commuter city and she's never been a city person so you're not going to start doing something really foreign to you when you are 88. You are going to—things are more scary than before. (Adult child)

I've been declared disabled... I still can't wrap my mind around the fact that I'm disabled. I mean I know I am, and it's not one of the real visible disabilities so a lot of people don't think it. And I think it's probably the same way with someone who have always driven and has maybe no experience taking alternate transportation, and they just feel like their life ends when they don't have a car anymore. Now, I don't feel that way and I didn't feel that way, but then I had the experience of taking alternate transportation. (Female, 70)

Differences in depths of meaning associated with driving. Stakeholders provided a long list of meanings older adults ascribe to driving above and beyond simply getting from place to place. In addition to masculinity, driving is repeatedly connected to life itself. Stakeholders felt that, for many older adults, driving retirement is the embodiment of their own looming mortality. The examples varied widely in the how deeply the connections were rooted in older drivers minds, the deepest of which were reinforced by examples of older drivers who literally died after driving retirement.

My mom's mom died when she was 81 or 82 and my mom says that she had—they took her driver's license away—and I don't know who "they" is—like a year before, and then she died. And she ties this—this is a big thing, actually...She has this connection between losing her driver's license and that being kind of the end. And I can—and whether that means you physically die or you just sort of emotionally and everything else happens. But I mean you know there is some truth to your independence being pretty important in your life. … I think the health part and being healthy, aging in a way that you really are still mobile and having—being ambulatory, really is going to—is a huge way to still feel independent. So I am not sure that she is even connecting all of that stuff. But I think it's as much the other things that she doesn't have control over as it is the driving. But she is seeing the driving as ***the*** *thing.* (Adult child)

In comparison, stakeholders cited specific older adults who decided to stop driving themselves before others intervened. Among this relative minority of drivers, safety concerns easily outweighed both the convenience and addition meanings that driving provided them.

> *Some of them stop driving because, you know, you get some who really understand, I shouldn't be driving. You know, those are few and far between, I think. My dad did. He had a little, small accident, and that was it. He said, I'm not driving anymore. I shouldn't be driving. He was probably only 75 at the time and in relatively good health. And I was always very proud of him for that. He knew when it was time to stop and I didn't have to go through what a lot of adult children have to go through with their parents. You know, my mom never drove, so that was a tough decision for him. (Driver examiner/counselor)*

Differences in how older drivers weigh confidence in their personal beliefs against others' opinions. In most circumstances, stakeholders felt that older drivers lacked the self-awareness and rated their own driving skills higher and relative risk lower than people around them. Several expert stakeholders who professionally evaluated driving safety consistently had older drivers tell them that no one had the right or justification to question their current skills and abilities after decades of driving experience. These individuals believed so staunchly in their own driving abilities that they would never consider a nondriving future, because that was impossible and unimaginable.

> *They have been driving for 65 years and they haven't—maybe not had an accident; what makes you think I'm going to have one now? But I think it's important for us as a healthcare provider to bring people's awareness to how that can affect their driving. They may know that they have no sensation in the bottom of their feet but they're not connecting that with the idea of being able to know, really well, how fast or how well they're maneuvering the pedal or the brake. So I think it's important for us to educate people about how just normal aging affects how well they're driving without frightening them into thinking that we're trying to take away their driver's license.* (Geriatric social worker)

Whether justified or not, high levels of confidence in current driving skills and abilities may reinforce older adults' natural inclination to not think about or prepare for a nondriving future. Even hearing concerns expressed from valued sources may not be enough to convince the driver to go against their own judgement, especially with the privilege of driving on the line.

> *Another source I would trust is my son. But when we're in my car together, he's usually driving because I enjoy being a backseat driver. I enjoy looking out the window so he drives and I relax. But there have been times when I've asked him to let me drive and asked him to comment on my driving. ...I don't know that there are any sources that I would respect enough to say you tell me I should not drive anymore and I respect your opinion.* (Female, 89)

Different affective experiences with driving. When considering the whole affective driving context, how confident or experienced an older driver currently feels is distinct from how driving currently makes them feel. Stakeholders talked about both positive and negative emotions older drivers associate with driving. Positive emotions included the enjoyment of driving itself in addition to the independence it provides. Linking driving to functional age was seen as especially important to older drivers living among other older adults, as it is a positive symbol of status relative to nondrivers, who are perceived as truly "old".

> *Well, her car is really important to her because that is her sense of freedom. And it's kind of funny because she lives in a senior living place now and I think there is sort of a hierarchy of adults. And I think the ones that do drive probably feel more independent and like they are still functioning on a higher level—and I'm just sort of reading into that but I think having a car does separate her from a lot of the other people that don't have cars—or she might be giving people rides even still, places. So I think that makes her feel like she's not as old as the other people.* (Adult child)

On the negative end of the emotional spectrum are feelings like stress caused by the demands of the driving environment, including other drivers. Stakeholders listed common stressors many older drivers experience while driving, including ones who also enjoy other aspects of driving. Driving slowly or other behaviors stereotypically associated with older drivers cause others' displeasure, whether or not the older driver is acting within the confines of the law. Stakeholders directly connected decisions about driving retirement with older drivers' positive emotional experiences (such as enjoyment), which are constantly weighed against the amount of negative emotional experiences that cause stress while driving. Whether enjoyment, stress, or the combination thereof inspire older drivers to prepare before making the decision to stop driving is not know.

> *[T]hat's one of the things that older adults have shared with me and said, you know I'm not comfortable out there. You know people are screaming up behind me and you know even if they are doing the speed limit—the older adults doing the speed limit—other people just want to go faster. And they don't want to go faster. So they are cautious and they are fearful of other drivers.* (Geriatric Care Manager)

Different evaluations of and reactions to driving red flags. In addition to fears of other drivers, stakeholders all listed several events or experiences that commonly motivate older drivers and those around them to consider if changes need to be made. Any act or experience can be a cue to action, as long as it triggers people thinking about changing, or actually changing their associated behaviors. As such, they are inherently subjective and personal. As the quote below embodies, older adult and expert stakeholders consistently emphasize that what affects one older driver may pass by another completely ignored. Individual events or overall number of cues to action may influence older adults to plan for a nondriving future before it becomes a reality.

> *So...we have to listen to the cues and the cues might be at a particular moment when you pulled out into an intersection and there was a red light going on and you were sitting at the red light and you pulled out when it was still red. What do you do with that? Dismiss it—immediately. And don't learn from it in the process. So this particular trip they might remember but the general anxiety [indiscernible] of their life may be such that it's going to come up again; it's going to come up again and it's going to come up again until, eventually, they get into an accident. I think...I think that there are some levels of some sorts of limitations that will occur over and over and people won't learn from them.* (Male, age 66)

Measuring the individual cues to actions or the collective number of cues necessary to inspire or predict mobility planning provides another level of insight into older drivers' mobility planning. Several stakeholders stated that the interview process itself prompted them think about their own or others' preparation for mobility transitions. One expert stakeholder resolved to be more open about her own driving with her children in hopes of avoiding replicating her family's struggles getting her mother to engage in the topic of driving retirement. While she hoped to be open to any concerns expressed about her current or future driving, she acknowledged the inability for anyone to truly know how they would react if faced with mobility loss. Interestingly, because there was not yet cause for concern, her daughter brushed off the stakeholder's request.

> *You know like I have already told my daughter, and she's laughing and saying, yeah, but you're not there yet, mom. And I said please let me know. I'm going through this with mom now. I want this to be something I'm going to remember for myself ...but I also don't know that that means anything in terms of what it's going to be like when I'm actually there.* (Adult child)

These past experiences influence their current mobility satisfaction, as well as expectations and preparation for a nondriving future. Expert and older adults I interviewed brought up older adults who believe that driving retirement threatens the

meanings associated with driving, ultimately affecting how satisfied older adults believe they will be as a nondriver. For some older drivers, mobility loss is universally associated with loss of independence, or its assumed flipside, being a burden. Personal expectations of who and what they would become if they stopped driving fundamentally shape if, when, and how older adults engage with the idea of mobility planning.

> *I had a lady not too long ago, we came back and she had run two stop signs and several other things were going on with her. So we came back and we talked about it and talked with her son and she was going to continue driving. It didn't matter to her. She still wanted to drive, she still wanted that independence, even though we gave her options, she didn't want to be a burden. And that was the big thing for her. She didn't want to be a burden for anyone.* (Driver examiner/counselor)

> *They don't want to be dependent. They have to rely on others. They want to be able to take care of themselves. I guess that's* [understandable]*. I want to be able to function as long as I am able to do what I am able to do. I don't want to get sick. I don't want to be bedridden and have someone taking care of me. I just want to go to sleep and die and not be a problem for anybody if I get old and can't take care of myself.* (Female, 67)

Older drivers who are certain that such devastating consequences of driving retirement are inevitable are often as unprepared as those who believe they can forestall mobility loss. Even older adult stakeholders who supported preparation for mobility planning focused on how other people need to prepare and be more self-aware. With the exception of the older adults interviewed who had experienced mobility loss and limitations previously, many older drivers felt both self-aware and that they are able to avoid driving retirement. The combination of these two beliefs creates an impenetrably illogical logic barrier.

> *And I also think the driver—it seems as if when they get there, it never crossed their mind that they may fail the driving evaluation. That's always been fascinating to me! And one of my students pointed that out to me when she was with me for like three months. And she said what did they think was going to happen? She had to start telling people that they didn't do well and it just seemed like if you or I were going into a situation like that, you would think of the different outcomes it might have, that failing might be one of the outcomes.* (VA/OT)

Summary

While mobility planning was explicitly discussed in the mental models interviews, several themes provide underlying reasons for who plans, when they plan, how they use the plan to prepare, and the course of their planning process. Stakeholders look *beyond* transportation needs to focus on affective or social meanings associated with driving and being a driver. Older drivers who have important social roles or salient experiences involving driving or being a driver are expected to have greater difficulty transitioning from driver to nondriver. For example, older drivers who provide rides for older or less functional friends can experience added pressure to continue driving for others' mobility, as well as give different perspectives about asking others for rides. The interviews brought to light several possible intangible motivations for older adults to continue or stop driving (e.g., enjoyment and stress of driving, expected difficulty believing they might become a nondriver in the future, and others' dependence on their driving for transportation) which further contextualize the multiple dimensions of driving.

Another interpersonal factor influencing decisions about driving continuation or cessation is the level of social support currently received, and expected in the future, from family, friends, and other stakeholders. Older adult interviewees emphasize that such assistance varies widely based on geographical proximity and relationship

dynamics. However, several stakeholders recognize that even people living in the same city or neighborhood can have a variety of perceptions of the nondriving transportation options available, *even for older adults living in the same city*.

In order to explore mobility planning, one must consider and, when appropriate, assess dynamics that affect mobility planning among older drivers. The pilot interviews and subsequent analyses illuminate individual differences in drivers themselves, as well as their social relationships and roles, all of which impact various dimensions of mobility planning. Additionally, the physical environments in older drivers' communities, including alternative transportation and walkability, add another layer to consider when talking about or to older drivers about their transportation futures.

CHAPTER 6

Methodology for Quantitative Mobility Planning Survey

As discussed in Chapter 5, the qualitative interviews conducted with stakeholders about transportation-related mobility and driving retirement brought one major theme to the forefront: planning. Many stakeholders believed earlier and more extensive preparation for mobility changes would help both the older adults and those around them practically and emotionally during the process of driving reduction and cessation. Planning allows older adults to identify ways to maintain transportation mobility as a reduced or former driver. Bringing the conversation out in the open facilitates exchange of information that can increase awareness of alternative transportation. At the same time, other stakeholders (family, healthcare providers, etc.) can be part of the conversation, or at least aware of the older driver's expectations and desires.

Interviews provided little evidence beyond vague anecdotal stories or common-sense beliefs about what kind and level of planning ideally would happen, how much was actually occurring, and why. Additionally, interviewees discussed a variety of personal and experiential contexts that affect how and when people make decisions to reduce or stop driving. Furthermore, little to no specific knowledge exists about how much planning middle-aged and older drivers do to prepare for a nondriving future, what kinds of planning behaviors occur, drivers' perceptions about benefits of planning, or if some groups are more likely to plan than others. To address these questions, I

conducted a large-scale, quantitative survey of older adults in Southeast Michigan designed to confirm and expand upon the themes from the pilot work. The primary research goals were to explore how much planning middle-aged and older adult drivers presently do, when planning occurs, and what kinds of planning are preferred.

Quantitative Survey Development

The goals of the quantitative survey derived directly from the topics identified in the qualitative interviews. To identify potential primary themes and issues needing clarification, I read through the transcripts of all of the older adult and expert stakeholder interview transcripts several times, developing a list of major themes and subthemes. To identify specific goals, Dr. Zikmund-Fisher and I then iteratively discussed these findings. Based on these discussions, I decided to focus my survey around how and when drivers prepare for driving retirement, also called mobility planning. The mobility planning theme included several salient subthemes, such as expectations about future mobility needs, self-efficacy to meet future mobility needs, and the stress or fear associated with planning for or going through driving reduction and cessation.

The first priority was to gather established questions used to measure how drivers approach preparing for driving retirement. However, after reviewing the empirical literature for mobility planning or related measures, I realized that the extant driving research focused on either assessing and predicting driving safety, or various outcomes after driving retirement. Planning was discussed only tangentially, if at all, and primarily in qualitative studies (e.g., King, Meuser, Berg-Weger, Chibnall, Harmon, & Yakimo, 2011; Kostyniuk & Shope, 1998). While these studies are among many that recommend

or support preparation for mobility changes, I was unable to find concrete items or scales to assess them.

The nearest approximation was the Assessment of Readiness for Mobility Transition (ARMT; Meuser, Berg-Weger, Chibnall, Harmon, & Stowe, 2013), which quantifies how older adults think and feel about possible changes to their future mobility. The ARMT was designed specifically to encourage and inform mobility planning among older adults by exploring opinions and attitudes about mobility. The ARMT is especially relevant for my analyses, as it captures the key concerns people experience when contemplating or dealing with mobility loss, such as anxiety, fears of being burdensome to loved ones, and a lack of acceptable alternatives.

Given the lack of directly applicable established measures to measure the other various dimensions of mobility planning, it was clear that I needed to develop most of the questions necessary to assess the level of preparation drivers do for future mobility needs, up to and including a time when they stop driving completely. As this work was exploratory, I drafted several individual items in order to capture various aspects and steps of mobility planning, such as beliefs about planning, preparatory planning behaviors, and distinct ways to take planning from the abstract to concrete behaviors.

Goal 1: Create measures of mobility planning. As discussed in Chapter 5, it was immediately clear from the review of the qualitative interviews that the mobility planning needed to be the primary focus of the survey. However, the complexity of the issues raised in the interviews made it clear that mobility planning is not a simple concept, but instead a multidimensional construct. Therefore, to comprehensively

explore mobility planning, I developed multiple approaches to measuring the different dimensions of mobility planning as a construct.

Because the interviews highlighted the fact that planning is an evolving process and not a single, distinct action, I not only created items that directly measured how much people had planned for their future mobility (e.g., “How much have you planned for a future when you are no longer driving?”), but also preparatory planning behaviors (e.g., thinking or about a nondriving future), expectations of future mobility (e.g., how long they expect to drive, projected mobility satisfaction as a nondriver), and beliefs about the advantages and disadvantages of planning for mobility changes (e.g., improve transportation mobility post-driving retirement, help transition emotionally to being a nondriver).

Questions about the prerequisite steps of planning were informed by concepts from outside traditional planning literature. From their 1980 artificial intelligence article “Conversation as Planned Behavior,” I used Hobbs and Evans’ five parts of a *planning mechanism* (p. 361). According to Hobbs and Evans, there must be 1) a shared formal language that can be used to express 2) a goal or set of goals to achieve, followed by 3) a set of actions that can be communicated through the formal shared language. These actions are motivated by a person’s 4) beliefs or axioms about “what causes or enables or tends to cause or enable what,” which inform 5) the planning process, or how the actions are sequenced to meet the stated goals.

To operationalize these steps into items quantifying the mobility planning mechanism, I developed questions that aimed to measure respondents’ actions and beliefs. I drew from literature describing preparation for other, more common types of

planning, such as end-of-life decisions, to develop constructs that capture mobility planning. In their 2013 article describing how end-of-life planning is affected by family relationships, Carr, Moorman, & Boerner categorize people as a) having made no preparations, b) having only formal plans (such as a living will), c) informal plans (discussing with others), or d), a two-pronged approach (both formal and informal). These classifications parallel mobility planning of older drivers: I needed to measure not only mobility planning directly, but also consider "formal" preparations (which I considered to be thinking internally about future mobility needs and taking concrete planning steps) and "informal" discussions with others. The combination of formal and informal planning in this context make up a substantial part of mobility planning. Again, because I did not find extant questions related to the family context for mobility planning, I developed items to directly measure both the informal and formal ways people may plan for mobility changes, informed by these four planning groups.

Much like end-of-life choices, decisions older adults make about driving are often made informally within a family context. During my pilot interviews, every stakeholder expressed how having supportive family members (especially adult children) living nearby could mediate the relationship between driving cessation and its multitude of associated negative outcomes. To measure how family fits into these informal planning processes, I created a set of questions that asked how much respondents had talked to others in their life about their mobility futures (have not talked, talked in passing, or seriously talked). This quickly became a stakeholder communication table, with additional questions added later to measure the theoretical construct Norms from the Theory of Planned Behavior.

I chose to separate out “family” into two separate categories: spouse/partner and adult children/grandchildren to capture differences in levels of intimacy. That is, talking with a spouse about driving concerns is different from bringing up the topic to your parents or grandparents. I also expanded the list to other relationships that inform or affect decisions about driving continuation or retirement. A category for healthcare providers/physicians was added, as physicians are thought to be the authoritative link between one’s health and functional abilities necessary to drive safely (Tuokko, McGee, Gabriel & Rhodes, 2007). In order to capture others outside of these three categories, I included an open “other” category at the end of the table.

Because these measures of mobility planning were novel, I had no knowledge of how they would correlate with each other. As a result, I planned an analytical strategy that would both consider using these planning variables individually and consider grouping related questions to create multidimensional scales of mobility planning based both on *a priori* content validity and observed correlations.

Goal 2: Developing additional measures focused on driving context. Additionally, the majority of interviewees discussed how important context is to individuals’ resources, including current and past driving experiences, giving or receiving transportation-related social support, self-assessments of current driving skills, and expectations of driving longevity. For most of the driving behavior questions, I identified relevant constructs commonly used in the existing literature, such as driving frequency, living with other drivers, being responsible for others’ transportation, driving history, and confidence in one’s current driving skill. Where possible, I identified and integrated established items and scales into the survey instrument to capture relevant

details of key concepts related to mobility planning to ensure that the survey instrument measured such issues.

The benefits of using extant measures goes beyond their previous validation or being commonly accepted. In fact, including parallel items from other surveys, especially Health and Retirement Study, or HRS, allows comparisons between other surveys and studies on older adults. As one of the oldest and most comprehensive longitudinal studies on Americans over 50, inserting ways to compare my sample to the HRS beyond demographic frequencies allows meaningful comparisons that could affect how generalizable my data are, as well as expand conceptual extrapolation to inform follow-up data analyses or collection. Therefore, I included the four driving items introduced in the 2006 wave of the HRS and continued presently, which describe current ability to drive, driving limitations, car availability, and driving recency.

Of the four items, only the car availability question was taken verbatim from the HRS. Minor changes were made to fit the other questions into the context of my survey. For instance, I added the word “currently” to the HRS’ “Are you able to drive?” question in order to clarify differences between never drivers, former drivers, nonrecent drivers, and current drivers. In the HRS, there is no distinction between people who are unable to drive because they have never been drivers and those who are former drivers. These two groups are different from one another, as are people who report being able to drive when they actively still drive compared to those who simply perceive that they are able to even if they do not currently. The item on driving limitations could be considered double-barrelled (“Do you limit driving to nearby places, or do you also still drive on longer trips?”), so I chose to separate the limiting to nearby places from driving on

longer trips. Finally, I specified if respondents had driven in “the last 30 days” instead of the “past month” from the recency question, and removed the word “car” to allow all types of vehicles to be included when considering responses.

As mentioned previously, I incorporated the Assessment of Readiness for Mobility Transition (ARMT; Meuser, Berg-Weger, Chibnall, Harmon, & Stowe, 2013) to explore the relationship between being open to mobility changes and actively preparing for them. Understanding the powerful and often uncomfortable reactions that accompany thinking or talking about mobility loss may provide a link between discussing mobility changes in the abstract and more concrete mobility planning and subsequent outcomes (Stowe et al, 2015). The ARMT has the added advantage of being non-specific about *driving* as the definition of or requirement for community mobility. Therefore, drivers and nondrivers alike were able to provide information on the concept of mobility loss. Such comparisons offer insight into the process of mobility loss and adaptations, as people who previously experienced mobility transitions may be more or less open to planning for more changes compared to current drivers with no limitations.

To go beyond driving behaviors into the meanings behind or supported by these actions, I needed to measure the experiential side of the driving context. This is a more subjective perspective about the personal emotional experiences and roles tied to driving decisions. To operationalize these constructs in predicting mobility planning, I developed two questions about respondents’ current affective reactions to driving, specifying both positive (enjoyment) and negative (stress) feelings. Additionally, interviewees continually discussed how experiences that threatened or actually limited

mobility was purported to be a concrete way to bring mobility changes (and the possibility of planning) to the forefront of drivers minds. Based on these findings, I decided to include questions asking if respondents had experienced common driving modifications that either threatened to or actually did limit their mobility, such as avoiding driving during the night or high traffic times of day, driving only with others in the car, and being temporarily unable to drive.

Goal 3: Identification of measures related to key constructs. Findings from the pilot interviews pointed to several different frameworks through which one could approach and predict mobility planning. For instance, in addition to the objective driving behaviors and their affective components, older drivers' mobility planning is likely influenced by their current use of alternatives to driving themselves, and what expectations they have for these options in a nondriving future. It is also useful to expand the construct of planning beyond mobility to consider how and when people plan for other common areas in later life to see if planning is a consistent behavior (i.e., people are likely to either plan for everything or nothing) or if mobility planning is in fact outside the acceptable future-oriented conversation topics. Given the opportunity to survey a large sample of older drivers, I chose to collect information on each of these additional dimensions for this dissertation and later analyses.

Interviewees often prefaced discussions about lack of acceptable nondriving transportation alternatives with statements about how previous or current use of public transportation affected people's comfort and willingness to use such options. Without understanding how much people currently use alternative ways of getting around besides driving, there is little relative meaning to how much they expect to use these

modes in the future. In order to understand relationships between current baseline transportation behaviors and future mobility expectations, I needed to collect information not only about driving, getting rides with others, and buses, but also less commonly considered forms of transportation, such as specialized transportation services, walking, and E-Hail apps.

To explicitly link current use of alternative transportations to future nondriving mobility expectations, I chose the same modes of transportation to ask drivers 1) how well their transportation needs could be met using each category, 2) how comfortable they would be using each option, and 3) how likely they would be to use these alternatives if they no longer drove themselves. Comparing the baseline measurement of current transportation use with future (nondriving) transportation expectations provides a relative perspective on how drivers' expectations or planning behaviors are influenced by use of nondriving alternatives. Following the suggestions from colleagues at a professional gerontological conference's Transportation and Aging Interest Group, I included two additional questions specifically to measure older adults' knowledge and use of "E-Hail apps," such as Uber or Lyft, to provide initial baseline rates that are not currently known.

I drew constructs from my conceptual model in Chapter 3 to measure theoretically-informed relationships between internal thoughts or assumptions and the behavior of interest. Specifically, I wanted to directly test the factors that directly influence mobility planning, as well as the relationships among the constructs. Here again, I found no extant ways to assess the constructs in a mobility planning framework, so I instead based wording on example questions in the Health Belief Model (HBM)

(Champion & Skinner, 2008) and Theory of Planned Behavior (TPB) (Montaño & Kasprzyk, 2008) chapters in the textbook *Health Behavior and Health Education: Theory, Research, and Practice Fourth Edition*, edited by Glanz, Rimer, Viswanath (2008). The qualitative interview transcripts were reviewed again to offer insight and additional finesse in adapting the example questions and developing response options to the topic of mobility planning.

From my model, I wanted to assess the theoretical constructs that illuminate the underlying dimensions and predictors of mobility planning. The HBM posits that the level of fear a person has about an outcome (Perceived Threat of driving cessation) affects what decisions they make about behaviors that increase or decrease that outcome (mobility planning). As in the HBM, I did not consider Perceived Threat to be a standalone, single construct, but instead as a combination of its two subcomponents: Perceived Susceptibility (if drivers believe they will ever have to stop driving) and Perceived Severity (how negatively drivers feel it would be to become a nondriver). The last HBM construct from my conceptual model is Cues to Action, or events that are commonly reported as red flags or triggers to change driving behaviors (e.g., collisions or a near miss, another person expressing concerns about their driving, or a health issue). The events that qualify as Cues to Action came directly from the interviews, which overlapped nicely with the literature on reasons people start to consider or eventually decide to stop driving. Because experiencing one of these events is not necessarily a Cue to Action in and of itself, I had to specify that the experience consciously made respondents aware of their driving and possible changes they needed to make.

Two additional constructs from the the TPB were directly linked to mobility planning in my conceptual model: Decisional Balance and Intention. Again drawing from Montaño & Kasprzyk (2008), I developed items to measure each construct individually. Decisional Balance is the mental list of reasons one uses to decide whether or not to perform a given behavior. A person who believes the benefits outweigh the costs or barriers has a positive Decisional Balance score, and they are theorized to be more likely to do the behavior (here, mobility planning) compared to people with a negative Decisional Balance score. Fortunately, I was able to select several individual items from the ARMT to double as measures of Decisional Balance instead of needing to create new ones. These questions asked respondents specifically about negative reactions one might have to limited mobility, such as feeling like a burden to others, difficulty asking others for help, or feeling depressed at even the thought of mobility loss. The 5-point Likert response options for the ARMT instrument range from Strongly Disagree to Strongly Agree, allowing the Decisional Balance scores to be calculated on a scale of -2 to +2.

Like Perceived Threat, Intention is a mediator between Norms, Attitudes, and Control Beliefs. For my survey, I wanted to not only assess how these three constructs inform the theoretical constructs of Intention, but also include a direct question to measure respondents' intention to plan more in the future. I prefaced the direct Intention item with a disclaimer asking respondents how much more transportation planning they intended to do in the future *regardless of how much planning they have or have not done to that point* in order to not limit responses based on drivers' current level of planning.

The first of the three constructs that inform theoretical Intention to Plan is Norms. Norms are the perceptions and investment a participant has in stakeholders' opinions about participant's transportation-related mobility planning, which further contextualize those conversations and the relative weight of messages from different sources. To assess respondents' Norms about mobility planning, I kept the list of stakeholders from the communication table described above (spouse/partner, Adult Children/Grandchildren, Healthcare Providers/Physicians) and developed the same two questions for respondents to answer for the person or people in each category: 1) if the respondent thought these individuals or groups wanted them to plan more for a nondriving future, as well as 2) how much the respondent cared if individuals or groups wanted them to plan more.

Where Norms are people's external perceptions of what others want or do, Attitudes affect Intention through people's own internal beliefs about the outcome one expects or assumes if a given behavior is performed. Here, the attitudes about mobility planning are measured by how much respondents believe that planning for a nondriving future in the present would be beneficial at a later point (or not). In this context, I drew from the interviews to ask drivers about the two most suggested outcomes of mobility planning: 1) making it easier or more likely that nondrivers can meet their transportation needs and 2) helping drivers transition emotionally into nondriver status.

The last theoretical construct from the TPB that informs Intention to Plan from my theoretical model is Control Beliefs, or how sure people are that they can perform a given behavior under certain conditions. In this context, I wanted to measure if people who still drive believe that there is even a possibility of getting where they need and

want to go without driving. To do this, I created a question asking directly how confident current drivers were that they could meet their mobility needs if they were no longer driving.

Finally, I added a section into my survey measuring respondents' levels of planning for other future needs to test if people who plan for other eventualities are more likely to prepare for mobility changes. From the interviews, I culled a list of other types of planning in later life that are more institutionalized and asked respondents how much they had planned for each type. I specified six other planning categories for these comparisons: general healthcare needs, financial matters, housing or living arrangements, personal healthcare, end-of-life decisions, and estate planning and/or will.

Goal 4: Assembling Demographic and Background Variables. In the final step, I inserted demographic questions at the end of the survey and drafted a cover letter. The demographic section included standard items (e.g., age, race, marital status, income, urbanicity), drawing question wording and response options again from the HRS for sample comparison purposes. I saved demographic items for the end of the survey for two reasons: first, because the topic of mobility loss is often upsetting, I did not want to end my survey with questions that could disturb participants, and demographic questions are commonplace and expected in social surveys. Second, because race was a core part of this research, I wanted to avoid bringing up topics that might influence respondents' subconscious interpretation of questions and thereby their responses.

Structural Design. The primary challenge of designing the survey was the need to balance a desire to measure all relevant constructs versus the need for brevity and clarity to limit respondent burden. Throughout the survey development process, Dr. Brian Zikmund-Fisher and I iteratively revised the original items, simplifying and clarifying wording in the questions, response options, and instructions. For most original items, I chose to use a five-point Likert scale with labels on either endpoint but the three middle boxes blank (to maximize the potential for questions to provide interval data about respondents beliefs).

Another challenge was the need to develop a survey that could be taken efficiently by non-drivers while still collecting complete data from respondents with extensive driving experience. Initial drafts organized questions by type (i.e., current driving behaviors, driving history), which necessitated several complicated skip patterns for nondrivers throughout the survey. Based on feedback from Dr. Zikmund-Fisher and others, I reorganized questions to facilitate a single skip pattern for respondents who were not currently able to drive, as well as those who had not driven in the past 30 days. Current drivers were then able to simply proceed linearly through the survey.

Piloting. Once the initial draft was complete, I circulated the document to my committee members for feedback. Based on their comments, I (a) condensed the questionnaire and (b) clarified the connections from the conceptual model to the survey items representing each construct. To further winnow and focus the survey after my committee members' suggested revisions, I asked for content and survey development feedback from four fellow doctoral students, two of whom had experience with older driver research. After that point, I invited both expert and lay reviewers to provide

feedback and suggestions from their respective perspectives. When the suggested changes were finished, I sent the survey to several family members and friends for an informal lay review of face validity, any lingering typographical errors, and clarity. I also filled it out myself from a respondent perspective. At that point, the survey was considered complete and final.

Survey Structure. The survey instrument consisted of seven sections (Table 3). Section 1 asked all respondents about current transportation behaviors. Sections 2 and 3 were asked only of people with driving experience. Section 2 collected information about driving history, experiences, and planning from participants who had ever been drivers. At the end of Section 2, respondents who were not *currently* able to drive were asked skip to Section 4. Section 3 asked Current Drivers about their recent driving experiences and future mobility expectations.

Sections 4-7 were asked of all respondents. Section 4 consisted of the Assessment of Readiness for Mobility Transition (ARMT; Meuser, Berg-Weger, Chibnall, Harmon, & Stowe, 2013) measure. Section 5 provided a table of common events people plan for in order to determine how much participants had planned for other aging possibilities. Physical and mental functional health was covered in Section 6. The survey instrument ended with Section 7, which consisted of basic individual and household demographic questions. Please see Appendix C for full survey instrument.

Table 3
Quantitative Survey Structure

Topic Domain	Item #	Example Question
Section 1: Current Transportation (Everyone)		
Current Transportation (pp. 1-2)	Q1-Q9	*How much are your current transportation needs being met using each of the following transportation methods?* -Never Drivers skip to ARMT (p. 12) -Ever Drivers progress to next section (p. 3)
Section 2: Driving History, Experiences, and Planning (Ever Drivers)		
Driving History, Experiences, and Planning (pp. 3-4)	Q10-Q20	*Are you currently able to drive?* -Former Drivers skip to ARMT (p. 12) -Current Drivers progress to next section (p. 5)
Section 3: Recent Driving Experiences and Future Mobility Expectations (Current Drivers)		
Driving Experiences and Future Mobility Expectations (pp. 5-7)	Q21-Q40	*How easy do you believe it would be for you to meet your transportation needs if you are no longer driving yourself?*
Specific Transportation Alternatives (pp. 8-10)	Q41-Q43	*How likely would you be to use this option* [*i.e.*, buses] *if you were not driving in the future?*
Talking with Others About Nondriving Future (p. 11)	Q44-Q47	*How much have you discussed a possible nondriving future with this person or people?*
Section 4: Readiness for Mobility Transition (Everyone)		
Readiness for Mobility Transitions (ARMT) (pp. 12-13)	Q48 (a-x)	*I shudder to think of a time when I am less mobile than I am now.*
Section 5: Planning for Other Future Needs (Everyone)		
Planning for Other Future Needs (p. 14)	Q49-Q54	*To what extent have you planned for your future general healthcare needs?*
Section 6: Physical Functioning and Well-Being (Everyone)		
Physical Functioning and Well-Being (pp. 15-17)	Q55-Q66	*In general, would you say your health is excellent, very good, good, fair, or poor?*
Section 7: Background Demographics (Everyone)		
Demographics (pp. 17-18)	Q67-Q76	*How would you describe your current employment status?*

Quantitative Survey Sample

In order to achieve a large-scale data collection in finite time, I conducted a mailed paper and pencil survey. Based on the interviews, preparation for mobility transitions ideally begins before concerns arise, making drivers under 65 especially relevant when exploring mobility planning. Therefore, unlike the qualitative interviews of older adults 65 years and over, age eligibility for the quantitative planning survey was restricted to 55-84 years. Most drivers are still driving at age 55 with little to no restrictions, while most 84-year-olds have had to actively reduce or adapt their driving in response to physical, cognitive, and social changes. Focusing on middle-aged and older drivers was intended to capture the planning behaviors and expectations of drivers both before and during the driving reduction and cessation process.

Recruitment. The sampling frames for recruiting participants were two local volunteer registries of older adults located mainly in southeastern Michigan who indicated interest in being contacted with invitations to be part of research projects. The first registry is housed at the University of Michigan (UM) (IRBMED HUM00045309) as part of the Claude D. Pepper OAIC in the Geriatrics Center, an NIA-funded center, and supported by The Human Subjects and Assessment Core (HSAC). The second registry, the Healthier Black Elders Center (HBEC), is housed at Wayne State University and is part of the University of Michigan and Wayne State University's Center for Urban African American Aging Research (MCUAAAR), a National Institutes of Aging Grant Program. Both registries are available to IRB-approved studies, with an additional application process through the Community Advisory Board (CAB) at HBEC. Information on health and function is collected from volunteers in the registry, as well as

traditional demographic data, which allows screening on those characteristics. No driving or transportation information is currently collected in either registry. At the time of this research, there were 2210 volunteers combined in both registries. Participants from the UM registry are largely White older adults, whereas almost all those in the HBEC list are Black volunteers.

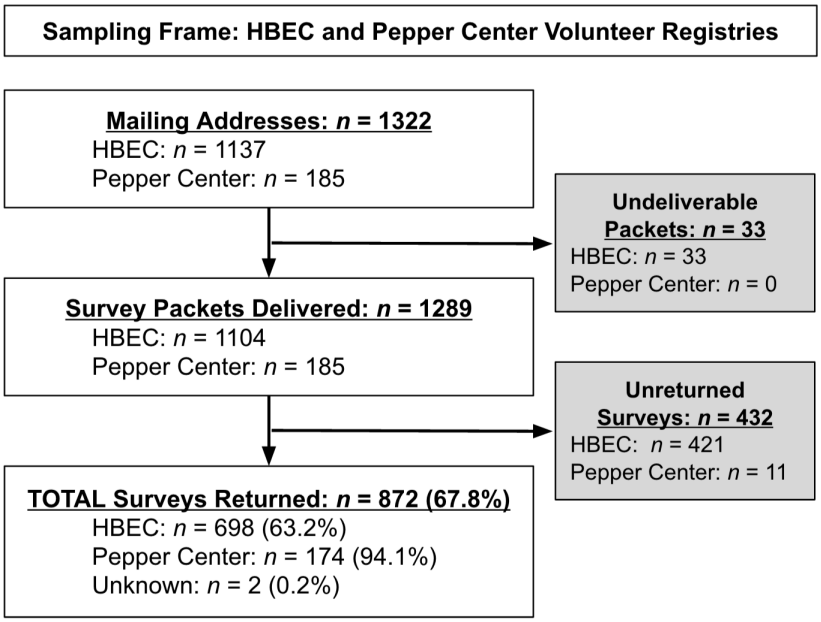
Planning Survey Eligibility Criteria. Because driving status was not a screening question for either registry, my inclusion criteria was primarily age-based (55-84) in order to capture the planning behaviors and expectations of drivers both before and during the driving reduction and retirement process. A precursor criterion, being able to read and write English, was assumed for all respondents who returned a completed survey.

Survey Administration

After screening for age (55-84), the registries provided names and contact information for 1322 potential respondents (185 UM, 1137 HBEC). Each registrant was sent a survey packet, consisting of a cover letter explaining the research and inviting them to participate, the survey instrument, and a return envelope (no postage required) addressed to myself at the UM School of Public Health. Each survey packet included a small pre-incentive ($2 bill) to increase response rate. I also used stamps on the survey packets instead of metered postage to help the survey packet look personal rather than automated. Together, these measures were intended to make packets more noticeable so that potential respondents would pay attention when packets were delivered and not dismiss them as originating from a mass mailing from a large local university.

Quantitative Survey Sample. A total of 1322 surveys were mailed to potential participants (Figure 3). Most recruitees were contacted through the Healthier Black Elders Center (HBEC) at Wayne State University in Detroit, MI (1137/1322, 86.0%; Figure 3). The remaining 185 addresses (14%) came from the University of Michigan Claude E. Pepper Research Center in Ann Arbor, MI. In total, 874 respondents returned completed surveys by the data collection deadline (approximately 4 months from the time of the mass mailing). Thirty-three survey packets were returned to sender as a result of outdated or incorrect addresses, dropping the response-rate denominator to *n*=1289 (1322-33). Two people returned their surveys with the ID number removed, leaving recruitment origin is unknown. These individuals were not included in the dissertation sample or analyses, resulting in a final response-rate denominator of *n*=1287. Therefore, the overall response rate was 67.8% (872/1287), with 94.1% of the Pepper Center registry participating (174/185) and 63.2% (698/1104) from HBEC.

Figure 3
Recruitment Flowchart for Quantitative Survey



Subject tracking. I created a master Google Sheet spreadsheet with the names and addresses provided by the volunteer registries and assigned unique ID numbers for my study, as well as for tracking:

- who returned the surveys;
- the dates surveys were returned;
- the date surveys were sent to the data entry company; and
- notes on any relevant information or contact with participants.

Each survey had a stamped identification number in the lower left corner of the first page, connecting returned surveys to the appropriate names and addresses through the master Google Sheet. This system minimized the links between anonymized data and contact information while still being able to send the post-incentive to respondents. As there was no place on the survey asking for the participant's name or other contact information, several individuals included either a handwritten or address label specifying who was returning the survey in order to make sure they received the $20 post-incentive gift card. Such identifiable surveys served as random checks to make sure that the study IDs and participant information indeed matched. Personal information was removed or redacted prior to being sent to data entry.

Data Management

Data storage and protection. Subject information and data from the surveys were stored in password-protected electronic files. Hard copies of the returned surveys were stored in a secure location in the Health Behavior and Health Education

department at the U of M School of Public Health before and after data entry. Only Dr. Zikmund-Fisher, the doctoral student hired to assist with the project, and I had access to the electronic file and the file cabinet keys to ensure anonymity and data security.

Data entry. Data Direction, Inc. (Southfield, MI) performed the survey data entry, using a verification process where two people enter data from each survey and compare their results for discrepancies. Any differences identified were sent to the verification operator for final verifications. I arranged and oversaw the data entry, creating a sample SPSS file to provide a coding framework and providing variable information and value labels.

Instructions to Data Direction included details about how and when to clean data as they are being entered, how to indicate missing data points, and how to handle open-ended sections. I instructed them to do minor data cleaning (i.e., if answer was written to the side instead of an identical response option chosen, choose higher value if more than one answer was marked for an ordinal value). We chose to create binary variables (0/1) for questions that could reasonably have multiple answers (e.g., race or work status), so that each individual option could be endorsed without overriding others. Binary variables were used when a response was written in after any of the seven items with an “Other” option. For these, Data Direction did not transcribe the actual text, but simply indicated when and where they were present. Three questions with open-ended sections especially relevant to my dissertation research were transcribed verbatim.

While this dissertation focuses on current Drivers’ planning and expectations, covariates such as the forms of transportation participants currently use, self-reported health, and basic demographics were asked of the entire sample wherever possible.

Former and nonrecent drivers were asked for the last time they drove and why they stopped driving. Never drivers answered current transportation questions, an index assessing readiness for mobility change, a functional health scale, and demographic measures. These items provide additional data for future analyses regarding comparisons with former and never drivers, as well as important descriptive and analytical information on nondrivers generally.

The first of three open-ended items transcribed by the data entry company was the follow-up to “Are you responsible for anyone else’s transportation?” (Q18) asking the respondents who replied yes to please describe. The second asked former drivers why they stopped driving (Q20). I limited the text transcription to 75 characters for both of the first two. The third open-ended question I had transcribed asked “When do you think you’ll stop driving completely?” (Q31). This question had a higher transcription character limit (225) as I was most interested in the metrics and descriptions used. These data will be used in future analyses.

Ethical Considerations

This study was reviewed and granted exempt status approval (HUM00097845) by the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board (IRB-HSBS) prior to commencing recruitment and data collection. I also answered a series of questions concerning the applicability, appropriateness, and participant protection of this study in order to gain approval of the community advisory board (CAB) before being allowed access to the MCUAAAR/HBEC registry.

CHAPTER 7

Dissertation Measures and Analysis Plans

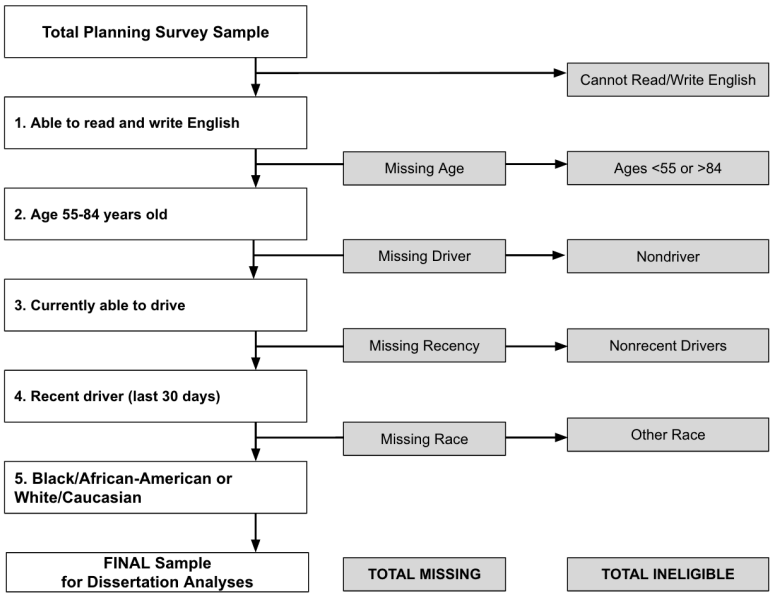
This chapter will analyze the results of the mobility planning survey dataset described in Chapter 6. As stated previously, there is currently a dearth of information on specific mobility planning behaviors and prevalence, as well as no concrete way to measure community mobility planning. I addressed these gaps through two distinct analytical approaches: descriptive exploration of mobility planning and regression tests to find predictors of planning.

In order to be eligible for inclusion in my dissertation analyses, planning survey respondents had to meet four criteria. The first two, English literacy (reading and writing) and age (55-84), were criteria for inclusion in the planning survey sample. I used two additional items for eligibility in the dissertation analyses: being currently able to drive (based upon Q20) and having driven in the past 30 days (based upon Q35). Figure 4 describes the steps of eligibility criteria for the dissertation analyses.

Analytical Measures

The first step of exploring mobility planning and related constructs is to assemble variations of core constructions that will be the main descriptive and predictive variables in the analyses. The purposes of developing, quantifying, and testing various mobility planning measures are twofold:

Figure 4
Eligibility Criteria for Dissertation Analyses



1. to provide baseline data of community mobility planning as a concept; and
2. to test how well these pieces predict self-perceived planning either individually or in concert among drivers 55-84.

For these dissertation analyses, community mobility planning includes how middle-aged and older drivers' (ages 55--84) forecast and prepare for their driving and nondriving futures. More specifically, I assess expectations of mobility satisfaction if no longer driving. For analytical purposes, I combine multiple items from the mobility planning survey into scales to measure these constructs.

Mobility planning measures.

Self-perceived current amount of mobility planning. I identified two measures of self-perceived planning both to provide baseline information regarding perceptions of mobility planning and to serve as the primary outcomes in the regression analyses.

Self-Reported Mobility Planning. A single item directly asking the subjective level of planning respondents felt they had done.

(Q40) *How much have you planned for a time in the future when you may no longer be driving?* (5-point Likert, Not at all (0) - A lot (4), ordinal)

Total Mobility Planning Score. To create a multidimensional scale of objective planning behaviors, I combined three types of objective mobility planning behaviors to calculate respondents' Total Mobility Planning Score: information seeking (3 items, 0-12 points possible), concrete planning (4 items, 0-12 points possible), and intention to do more mobility planning in the future, regardless of how much respondents had already done (1 item, 0-4 points possible). I summed these subscores to create a Total Mobility Planning Score, resulting in possible scores ranging from 0-28.

- *Information seeking about safe driving and alternative transportation (scored 0-12).* One fundamental precursor to mobility planning is gathering information about older driver safety and nondriving options. This learning can take many forms, including talking to others, attending events, or reading about transportation-related issues incidentally or on purpose.

  (Q6) *How much or often have you talked to friends or others to get ideas or information for your possible future transportation needs?* (5-point Likert, 0 (Not at all) - 4 (A lot), ordinal)

  (Q14) *How many meetings, lectures, or classes have you attended to learn information about aging and driving?* (5-point Likert, 0 (Not at all) - 4 (A lot), ordinal)

  (Q15) *How much information about safe driving for older adults have you sought out from magazine articles, brochures, guides, or other sources (either printed or on the Internet)?* (5-point Likert, 0 (Not at all) - 4 (A lot), ordinal)

- *Concrete plans for future nondriving transportation needs (ordinal, scored 0-12).* I used four survey questions to explore different ways middle-aged and older drivers may take the step from gathering information to making actual plans.

  How much have you done each of the following actions to make your future transportation plans more concrete?

  (Q8a) *Tell other people about your plans* (4-point Likert, None (0) - A Lot (3), ordinal)

  (Q8b) *Write your plans down* (4-point Likert, None (0) - A Lot (3), ordinal)

  (Q8c) *Figure out the routes, schedules, and other logistical details of getting rides with others or on public transit* (4-point Likert, None (0) - A Lot (3), ordinal)

  (Q8d) *Practice the plan to become more comfortable or familiar with it* (4-point Likert, None (0) - A Lot (3), ordinal)

- *Intention to plan more for future transportation needs (ordinal, scored 0-4).*

  (Q16) *Regardless of how much transportation planning you have or haven't done, how much planning about your transportation do you intend to do in the future?* (5-point Likert scale, ranging from Not at all (0) - A lot (4), ordinal)

Measures of current transportation context. Considering drivers' baseline behaviors, perceptions, and expectations provides a much-needed frame of reference for the mobility planning measures. The transportation context includes current transportation-related behaviors, how respondents feel about their current mobility and driving skills, and how long they expect to continue driving. Additionally, it is important to closely consider respondents' driving contexts, such as living with other drivers or having driving-related responsibilities, which also impact transportation options and decisions.

Behavioral driving context. I utilized the following item to measure current driving frequency:

(Q24) *In the past year, how many days (on average) did you drive each week?* (days/week)

Social driving context. I selected one item to assess being responsible for others' transportation, a functional role commonly brought up in the interviews.

(Q18) *Are you responsible for anyone else's transportation?* (Yes/No)

Experiential driving context. To assess the experiential or emotional parts of driving, I measured how current drivers rated themselves in four aspects of driving: level of experience as a driver, respondents' confidence in how they are driving currently, negative emotions (stress) while driving, and positive emotions (enjoyment) associated with driving. In addition, I included a general item measuring current mobility satisfaction, along with an parallel item asking about expected mobility satisfaction as a nondriver.

(Q11) *How experienced do you feel you are as a driver?* (5-point Likert scale, Not At All Experienced (0) to Very Experienced (4), ordinal)

(Q36) *How confident are you in your current driving skills and abilities?* (5-point Likert scale, Not At All Confident (0) to Very Confident (4), ordinal)

(Q26) *How stressful is driving for you currently?* (5-point Likert scale, Not At All (0) to Very (4), ordinal)

(Q27) *Whether or not driving is stressful to you, how enjoyable is it for you currently?* (5-point Likert scale, Not at all (0) - Very (4), ordinal)

(Q1) *How satisfied are you with your current transportation mobility? In other words, how easily can you get where you need or want to go?* (5-point Likert scale, Not at all Satisfied (0) - Very Satisfied (4), ordinal)

(Q28) *If you were no longer able to drive, how satisfied do you think you would be with your transportation mobility?* (5-point Likert scale, Not at all Satisfied (0) - Very Satisfied (4), ordinal)

Current use of transportation modes. I also measured to what degree people are already using different modes of transportation. For analytical purposes, I condensed the use of alternatives to driving oneself into two dichotomous variables. The first indicates complete driving dependence (no other forms of transportation) or reliance on any other modes of transportation. The second removes the option of rides with other drivers, signifying use of any nondriving alternative transportation.

(Q2a-h) *How much are your current transportation needs being met using each of the following transportation methods?* (5-point Likert, None (0) - All (4), ordinal)

*Driving Yourself
*Rides with other drivers (family, friends, etc.)
*Buses
*Taxis/Cabs
*Mass Transport (light rail, trains, etc.)
*Specialized Transport (medical transport, disabled/senior shuttles, etc.)
*Walking (for transportation, NOT for enjoyment or exercise exclusively)
* “E-Hail Apps (such as Uber or Lyft) on a smartphone or tablet
*Other (Please specify)

Measures related to mobility planning. Other characteristics of middle-age and older drivers may offer insight into subjective and objective mobility planning levels above and beyond direct measures of planning.

(Q48a-x) ***Readiness for mobility transition (ARMT) total score***. I used the average score from the 24-item ARMT scale to assess how open respondents were to the topic of future transportation needs. Lower scores indicate more openness to the concept or possibility that while their current transportation uses may change in the future, this transition does not necessarily represent a devastating loss of mobility. To

allow more consistent comparison of these scores with other measurements in my survey I shifted the ARMT scales down one point (from 1-5 to 0-4). According to the ARMT Scoring Guide, when using the original 1 to 5 scale, ARMT scores below 2.13 are classified as indicating *low* readiness for mobility transition, whereas a total ARMT score above 3.57 is *high*. This translates into low scores defined as below 1.13 and high as above 2.57. (scored 0-4, continuous)

(HBM) Perceived Threat of driving retirement (scored 0-16). I chose several theoretical concepts and relationships from Figure 2 in Chapter 3 to more deeply examine what drivers are thinking. From the Health Belief Model (HBM; Janz & Becker, 1984), I sought to measure levels of perceived threat about driving retirement. Calculated by multiplying how likely a person believes an event to be(Q25 Perceived Susceptibility) by how negative they believe the outcome from the event would be in their lives (Q48a Perceived Severity). (Q25 x Q48a) *(*scored 0-16, ordinal)

> (Q25) *How difficult is it for you to believe that you may become a nondriver someday?* (5-point Likert, Not at All Difficult (0) - Very Difficult (4), ordinal)
>
> (Q48a) *Mobility loss can be sudden or progressive, but it is always devastating.* (5-point Likert, Strongly Disagree (0) - Strongly Agree (4), ordinal)

(HBM) Decisional Balance (scored -8 - +8). Whether or not middle-aged and older drivers chose to plan for future mobility changes is also affected by how much is expected to be gained by planning, and at what cost. I selected a second HBM construct, decisional balance, to measure how respondents weigh the possible benefits or facilitating factors versus potentially negative factors or barriers to mobility planning. (summed -8 to +8, ordinal)

> (Q48c) *I am a burden if I ask others for help with transportation.* (5-point Likert, Strongly Disagree (-2) - Strongly Agree (+2), ordinal)

(Q48d) *I avoid thinking about losing my mobility.* (5-point Likert, Strongly Disagree (-2) - Strongly Agree (+2), ordinal)

(Q48w) *I feel self--conscious if mobility needs concern others.* (5-point Likert, Strongly Disagree (-2) - Strongly Agree (+2), ordinal)

(Q48x) *It is not easy for me to ask for help with transportation*. (5-point Likert, Strongly Disagree (-2) - Strongly Agree (+2), ordinal)

***(HBM) Cues to Action (scored 0-10)*.** Cues to Action, the third HBM construct included in dissertation analyses, identifies events that trigger respondents to consider changing their driving. I summed the total number of endorsed events from a list of ten common occurrences that older drivers report as reasons to think about whether or not driving themselves is still a safe option. (summed 0-10, continuous)

(Q32) *In the past year, have you experienced any events <u>that made you consider changing your driving</u>?* (Yes/No, dichotomous)

IF YES, *please mark what kind of events occurred* (please select all that apply):
*Car accident or collision
*Near miss
*Someone you know stopped driving
*New diagnosis
*A conversation about your driving
*Health issue
*Backing up into objects
*Finding unexplained dents or dings in your vehicle
*Hearing about older driver safety or unsafe older driver stories
*Other (please describe)

***(TPB) Intention to Plan (scored 0-4)*.** Finally, I included several items measuring levels of planning for other common areas of future planning to test if planning for other future possibilities increases the likelihood of mobility planning. In TPB, Intention to perform a behavior is the explicit step between psychological constructs and personal circumstance that best predict completing the actual behavior of interest (community mobility planning). Here, I used a direct, self-reported measure of

Intention to Plan, which is also included in the Total Mobility Planning Score sum (scored 0-4, ordinal)

(Q16) *Regardless of how much transportation planning you have or haven't done, how much planning about your transportation do you intend to do in the future?* (5-point Likert, Not at all (0) - A lot (4), ordinal)

Planning for other future needs. Participants were asked about their current level of planning for six common areas of (non-transportation) planning for later life: general healthcare needs, financial matters, housing or living arrangements, personal care, end-of-life decisions, and estate-planning and/or will. Each individual item was scored on the same 5-point Likert scale (Not at all (0) - A lot (4), ordinal), then summed for analyses into a single score (scored 0-24, continuous).

How much have you planned for your possible future...
(Q49) ...*healthcare*
(Q50) ...*financial matters*
(Q51) ...*housing or living arrangements*
(Q52) ...*personal care*
(Q53) ...*end-of-life decisions*
(Q54) ...*estate planning and/or will*

Background and demographic variables. The mobility planning survey also gathered information on personal and environmental characteristics of respondents:

(Q67) ***Age.*** Years (continuous)

(Q71) ***Race.*** A dichotomous race variable was used in the analyses: White (reference) and Black. (dummy)

(Q69) ***Education.*** Education was measured by the highest degree obtained by participants (less than high school, high school diploma or equivalent, some college, bachelors degree, masters degree, or doctoral/terminal professional degree). (ordinal)

(Q75) ***Income.*** Participants were asked to report their annual household income within eight ranges (less than $10,000, $10,000 to $14,999, $15,000 to $24,999, $25,000 to $49,999, $50,000 to $99,999, $100,000 to $149,999, $150,000 to $199,999, and $200,000 and above). Note: These categories are based on those in the HRS. (ordinal)

(Q74) ***Employment.*** For regression analyses, current employment status was collapsed into two categories: Not Working (including temporarily laid off, unemployed and looking for work, disabled and unable to work, retired, and homemaker) (reference) and Working (full-time or part-time). (dummy)

(Q76) ***Marital status.*** Relationship status was collapsed into two categories: Not married/partnered (includes single/never married, widowed, and separated/divorced) (reference) or married/partnered. (dummy)

(Q70) ***Gender.*** Gender was dichotomized as male (reference) or female. (dummy)

(Q55) ***Health.*** Respondents' current rating of their own health was also collected. (Excellent (1); Very Good (2); Good (3); Fair (2); or Poor (5), ordinal).

Describing and Predicting Mobility Planning: Analytic Approaches

I analyzed the data to both describe and predict mobility planning among my sample. To start, I analyzed the data descriptively to explore and describes the types and levels of planning middle-aged and older drivers engage in regarding their future mobility changes and needs. I employed univariate and bivariate (Spearman correlational) analyses determined frequencies, distributions, and types of mobility planning, as well as relationship strength. Additionally, I tested the significance of planning differences using t-tests to compare mean levels of self-reported mobility planning by gender (comparing females to males) and race (comparing Blacks to Whites). To identify relationships by current age, I used Oneway ANOVA to compare means among the six five-year age groups (55-59, 60-64, 65-69, 70-74, 75-79, and 80-

84). Having these descriptive data about mobility planning offer the first insight into a more refined understanding of planning for community mobility transitions.

I had two descriptive research hypotheses. The first research hypothesis purported differences in driving context predict middle-aged and older drivers' planning for a nondriving future based on key demographics: gender, race, and age. I quantified and compared the relationships using crosstabs of mobility planning by gender (male or female) and race (Black or White), followed by Oneway ANOVA to determine if the levels of planning differ significantly among the six age categories. The second hypothesized that participants' planning for other types of future circumstances would predict mobility planning. In other words, people who plan more for other events may plan more for mobility transitions than those who are less prepared.

To identify predictors of mobility planning, I developed four models to test for predictors of mobility planning (both self-report and summed mobility planning scores). The first model contained only background/contextual variables, which were all included in the three subsequent models as well. The second model compared predictive power of personal experiential driving characteristics, whereas the third tested how well psychological readiness for mobility transitions affect actual preparation for such changes. Finally, the fourth model tested how selected theoretical constructs from foundational health behavior theories predict mobility planning.

Model 1: Baseline Demographic Information

The following variables were included as background/contextual information in each model, as they are associated with or theorized to be associated with mobility and

mobility planning: age, race, education, income, employment, marital status, gender, health, and other planning behaviors.

Model 2: Experiential Driving Characteristics

In addition to the individual factors in the first model, Model 2 examined how subjective or affective components of the driving experience influence planning for future mobility needs. This included self-rated driving variables (how experienced respondents feel as drivers, confidence in their current driving skills and abilities), measures of mobility satisfaction (currently and expected as a nondriver), positive and negative emotions while driving (enjoyment and stress), as well as being responsible for another person's transportation and personal use of transportation modes outside of driving oneself.

Model 3: Incremental Effect of Assessment of Readiness for Mobility Transition (ARMT)

To further analyze people's planning and adaptations to mobility, Model 3 tested the predictive power of a scale of readiness for transportation changes. The ARMT is a 24-item questionnaire measuring "emotional and attitudinal readiness to cope with mobility change and loss associated with advancing age," which has been found to be stable over time (Meuser, Berg-Weger, Chibnall, Harmon, & Stowe, 2013). This index was developed as a clinical questionnaire to facilitate mobility change and planning. In Model 3, I assessed the incremental contribution of the ARMT in predicting both perceived and behavioral aspects actual planning for mobility change. Quantifying the relationship between openness to planning and planning itself *above and beyond demographic characteristics* provides valuable information about how much (or if)

readiness to discuss the topic in abstract leads to concrete steps to prepare for the possibilities of future mobility loss, or the realities of current mobility loss.

Model 4: Incremental Effect of Theoretical Behavior Change Constructs

Model 4 added behavior change constructs to the baseline characteristics. I combined salient constructs from two foundational behavior change models, the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB), in order to provide theoretical understanding of decisions related to planning for driving community mobility planning. Both theories included constructs that paralleled both the way individuals talk about mobility changes, as well as descriptions in the literature.

I included Intention as a predictor only with self-reported mobility planning (4a), as the same item is part of the Total Mobility Planning Score (4b). Model 4 contained several individual items from the ARMT used in Model 3, but not the ARMT Total Score itself. Including either the ARMT Total Score or Intention to Plan in Model 4 would cause problems with statistical collinearity between predictor and outcome variables.

Analytical Details.

Statistical significance. Estimates with $p \leq .05$ or confidence intervals that do not include the null value were considered statistically significant. Those with a *p*-value $\leq .10$ are described as nearing statistical significance, and highlighted when the implications of the findings are meaningful and appropriate.

Statistical software. Analyses were performed using SPSS v23.

CHAPTER 8

Descriptive Results from the Mobility Planning Survey

For the dissertation analyses, I limited the full sample (*n*=872) based on the four eligibility criteria established in Chapter 7 (Figure 4). The first, being able to read and write English, was assumed if the survey was returned completed. Despite restricting the ages of potential recruits from the volunteer registries, 28 individuals were ineligible based on age (either missing response for age or outside the 55-84 age range), leaving *n*=844. Only respondents who were able to drive made the third cut, bringing the sample down to *n*=668. Of these individuals, *n*=606 had driven recently (in the past 30 days).

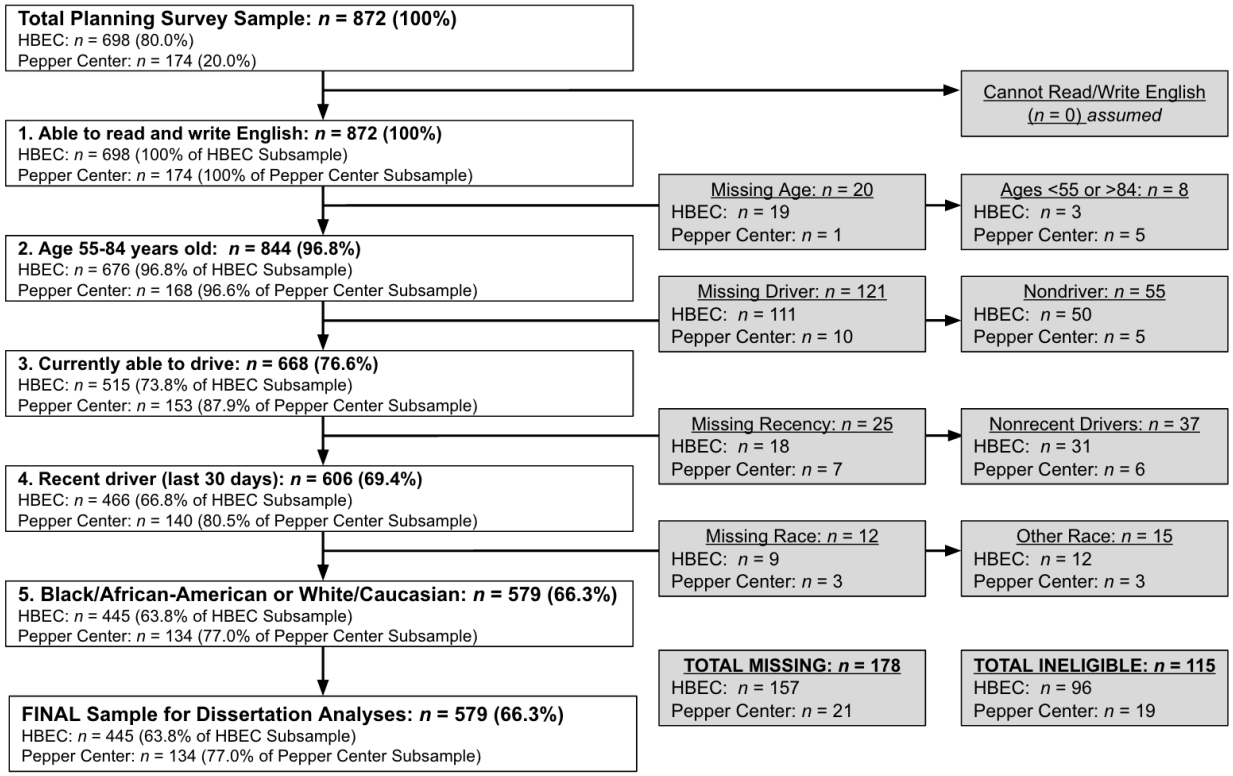
A fifth eligibility requirement was added post-hoc based on the demographics of the planning survey sample. I included only middle-aged and older drivers who identified as Black or White, as there were not enough respondents in other racial groups (*n*=27) to have statistically meaningful comparisons. The final sample for these dissertation analyses was *n*=579 (Figure 5).

Dissertation Sample Demographic Results

Race. Of the 579 respondents included in dissertation analyses, three quarters (76.9%; *n*=445) of the respondents were contacted through the HBEC. The other 23.1% (*n*=134) were registered with the UM Pepper Center. Race and registry almost completely overlapped, with only one White volunteer out of the 445 HBEC respondents

and six Black volunteers from the 134 Pepper Center respondents. Correspondingly, the dissertation sample primarily identified as Black (*n*=450; 77.7%), with a much smaller White subgroup (*n*=129; 22.3%).

Figure 5
Dissertation Sample Eligibility



Gender. The overall sample and all subgroups were similarly skewed by gender. Women made up 82.0% of the total sample (*n*=475), with only 15.2% males (*n*=88). Although similar in absolute numbers, males were proportionally three times more prominent among White respondents (*n*=46; 32.6%) than Black respondents (*n*=42; 10.2%).

Age. As shown in Table 4, the average age of the total sample was 72.0±7.00 years. The sample age was relatively normally dispersed, with more respondents in the older range (70-84) than the younger (55-69). This resulted in a slight skew (-0.19) to the left.

Table 4
Age of Dissertation Sample by Gender and Race

		Gender		Race	
	Total Sample	Female	Male	Black	White
Sample Size	*n*=579 (100%)	*n*=475 (82.0%)	*n*=88 (15.2%)	*n*=450 (76.9%)	*n*=134 (23.1%)
Mean Age (SD)	72.04 (7.00)	71.91 (6.92)	72.40 (7.46)	71.86 (6.69)	72.66 (7.95)
55-59	23 (4.0%)	17 (3.6%)	5 (5.7%)	16 (3.6%)	7 (5.4%)
60-64	75 (13.0%)	64 (13.5%)	11 (12.5%)	53 (11.8%)	22 (17.1%)
65-69	106 (18.3%)	93 (19.6%)	12 (13.6%)	91 (20.2%)	15 (11.6%)
70-74	156 (26.9%)	126 (26.5%)	25 (28.4%)	130 (28.9%)	26 (20.2%)
75-79	119 (20.6%)	100 (21.1%)	13 (14.8%)	95 (21.1%)	24 (18.6%)
80-84	100 (17.3%)	75 (15.8%)	22 (25.0%)	65 (14.4%)	35 (27.1%)

Education. As shown in Table 5, the sample was quite well educated. Only 16.2% (*n*=94) reported having only a high school diploma or less education, and 51.6% (*n*=299) reported at least a bachelor's degree. In addition, 194 respondents (33.5%) attended at least some graduate or professional school. White respondents were somewhat more educated on average than Black participants. For example, 65.9% of Whites respondents reported being a college graduate compared to 47.6% of Black respondents. There were no differences in education by gender.

Employment. As expected with a sample of primarily older adults, four out of five respondents were retired (461/579, 79.6%). The proportions of retirees were similar among subgroups by race and gender (Table 5). Only 14.9% of respondents were working full-time or part-time, with Whites respondents significantly more likely to be working (*n*=28, 20.1%) than Blacks respondents (*n*=58, 12.9%; X^2 (1, *n*=560) = 5.90, p=.02). Among this sample, men and women work status did not differ.

Table 5
Demographic Characteristics of Dissertation Sample

	Total (*n*=579)
What is the highest grade of school or year of college you completed?	
Less than High School	10 (1.7%)
High School Diploma	84 (14.5%)
Some College	185 (32.0%)
College Graduate	105 (18.1%)
Some Graduate/ Professional School	53 (9.2%)
Master's/Professional Degree	128 (22.1%)
Doctorate	13 (2.2%)
How would you describe your current employment status?	
Full-Time	36 (6.2%)
Part-Time	50 (8.6%)
Unemployed	5 (0.9%)
Disabled	25 (4.3%)
Retired	461 (79.6%)
Homemaker	15 (2.6%)
Which best describes your yearly income?	
Less than $10,000	17 (2.9%)
$10,000 to $14,999	43 (7.4%)
$15,000 to $24,999	84 (14.5%)
$25,000 to $49,999	220 (38.0%)
$50,000 to $99,999	125 (21.6%)
$100,000 to $149,999	35 (6.0%)
$150,000 to $199,999	8 (1.4%)
$200,000 and above	2 (0.3%)
How would you describe the area where you live?	
Urban (City)	376 (64.9%)
Rural	30 (5.2%)
Suburban	154 (26.6%)
In general, would you say your health is:	
Excellent	47 (8.1%)
Very Good	226 (39.0%)
Good	222 (38.3%)
Fair	71 (12.3%)
Poor	5 (0.9%)

Income. Table 5 also reveals that nearly 60% of the total sample belonged to two mid-range household income groups: $25,000-$49,999 (*n*=220, 38.0%) and $50,000-$99,999 (*n*=125, 21.6%). This pattern is consistent between genders; however, differences were clear by race. Over two-thirds of White respondents (69.4%, *n*=93) had a household income between $25,000-$99,999, compared to just over half of Black respondents (56.0%, *n*=272). Among Black participants, 29.6% were living in households making less than $25,000 annually, compared to only 8.2% of Whites participants.

Urbanicity. Approximately two-thirds of the total sample (*n*=376, 64.9%) described the area in which they live as an urban or city environment, with another quarter of respondents (*n*=154, 26.6%) in suburbs and only 5.2% (*n*=30) in rural areas (Table 5). This pattern varied widely by racial groups, with over three quarters of Blacks respondents (*n*=342, 76.0%) in cities compared to only a quarter of Whites respondents (*n*=34, 26.4%). More than twice the proportion of Whites lived in suburban environments than Blacks (51.9% vs 19.3%).

The overlap of race and urbanicity was directly related to locations of the volunteer registries used for recruitment. Three-quarters of respondents from the HBEC registry lived in urban (or city) environments (*n*=339), and were 99.8% Black. In contrast, only about a quarter of Pepper Center respondents lived in cities, and 95.5% respondents self-identified as White. Although Detroit and Ann Arbor are separated by less than 50 miles, they are racially and economically distinct areas. This geographical distinction is also tied directly to the income disparities noted between racial groups.

Health. The total sample was healthy overall (Table 5), averaging 3.42±0.84 on a 1-5 scale, where higher scores indicating better health. Although only 8.1% (*n*=47) reported they were in Excellent health, over three-quarters of respondents reported being in Very Good (*n*=226, 39.0%) or Good health (*n*=222, 38.3%). Only 12.3% described their health as Fair (*n*=71), and a scant 0.9% endorsed the Poor health response (*n*=5). Blacks participants reported significantly lower mean health scores compared to Whites participants (3.32±0.81 vs 3.74±0.87, $t(569)=5.10$, $p<.001$). No differences were observed by gender or age categories in mean self-reported health scores.

Relationship status. Table 6 shows a third of the sample was either married/partnered (*n*=213, 36.8%), with another third reporting being currently single (*n*=218, 37.7%). A quarter of the overall sample was widowed (*n*=139, 24.0%). Relationship patterns differed by gender and race. Males (*n*=67, 76.1%) were significantly more likely to report be married/partnered (compared to single/never married, divorced/separated, and widowed) than females (*n*=144, 30.3%; χ^2 (1, *n*=86) = 68.72, p <.001). Two-thirds of White participants were married/partnered (*n*=87, 67.4%), significantly more than among Black participants (*n*=126, 28.0%; χ^2 (1, *n*=570) = 67.68, p <.001).

Total Other Planning Score. The sample averaged 16.41±5.74 on the 0-24 point Total Other Planning Score scale, indicating that respondents overall had a strong level of planning for other later life concerns, such as financial needs and living

Table 6
Relationship Status by Gender and Race

		Gender**		Race**	
	Total (*n*=579)	Female (*n*=475)	Male (*n*=88)	Black (*n*=450)	White (*n*=134)
What is your current relationship status?					
Single/Never Married	43 (7.4%)	37 (7.8%)	4 (4.5%)	39 (8.7%)	4 (3.1%)
Married/Domestic Partnership	213 (36.8%)	144 (30.3%)	67 (76.1%)	126 (28.0%)	87 (67.4%)
Divorced/Separated	175 (30.2%)	156 (32.8%)	12 (13.6%)	162 (36.0%)	13 (10.1%)
Widowed	139 (24.0%)	132 (27.8%)	3 (3.4%)	116 (25.8%)	23 (17.8%)

*$p \leq .05$ **$p \leq .01$

arrangements. Black respondents' average Total Other Planning Score was 15.98±5.88, slightly below the sample average and significantly lower than Whites' 17.87±4.98 ($t(561)=3.29$, $p<.001$). There was no difference in other planning levels by gender or age category.

Current Transportation Context Results

Moving beyond demographic characteristics, I compared how respondents currently get where they need and want to go. Without understanding the baseline characteristics and behaviors, asking middle-aged and older drivers about their future expectations or planning removes important contextual details about how that is similar or different to what they currently do. As with the demographics section, each item will be reported for the overall sample, as well as three subgroup comparisons (gender, race, and age categories).

Mobility satisfaction. I measured middle-aged and older adults current levels of mobility satisfaction in order to frame their future mobility expectations. On a scale of 0-4, respondents were very satisfied with their current transportation mobility, averaging 3.67±0.78. Approximately 70% of the total sample (*n*=406) reported the highest level of mobility satisfaction. Another 10.7% (*n*=62) reported the second-highest satisfaction level and only 1.4% (*n*=8) were not satisfied at all.

In the total sample, as with all the subgroups, respondents reported very high mobility satisfaction, and therefore lack of variation that would indicate meaningful differences. No mobility satisfaction differences were evident among race or gender groups, and, more surprisingly, when comparing different age groups.

Driving responsibility. Nearly a quarter of the total sample (*n*=137) were responsible for another person's transportation, The proportion was similar among men (*n*=24), women (*n*=113), and Black respondents (*n*=113), but significantly lower among White respondents (*n*=24, 18.6%; χ^2 (2, *n*=570) = 6.19, p =.045). With an average age of 70.10±6.81, drivers who were responsible for others' transportation were significantly younger than those who were only in charge of their own (72.63±6.98; (t(572)=3.78, p<.001). Thirty-four percent of the 55-59-year-olds (*n*=8) were responsible for others' transportation, more than twice the percentage among 80-84-year-olds (*n*=14).

Self-rated driving. With an average of 3.80±0.49 out of 4, respondents rated themselves as highly experienced drivers, with 96% (*n*=556) of drivers rating themselves in the top two experience levels. In terms of their confidence in current driving skills and abilities, 94.5% of the total sample (*n*=547) said they were at one of the two highest possible confidence levels, resulting in a mean confidence score of

3.64±0.61. Drivers reported more enjoyment of driving than stress, with enjoyment ratings averaging two points higher than that of stress (2.86±1.14 vs 0.86±0.99).

Each subgroup had significant differences in one of the four self-rated driving questions. Men rated themselves significantly more experienced than females rated themselves (3.89±0.39 vs 3.78±0.50, t(555)=2.29, p=.02). A different experiential driving item significantly differed by race, with Blacks drivers reporting more confidence in their current skills and abilities than their White counterparts (3.69±0.58 vs 3.49±0.69, *t*(184.62)=-3.00, *p*=.003). No differences were found between age groups in self-rated driving experience, confidence, stress, or enjoyment.

Current use of transportation modes. On average, respondents drove 5.47±1.73 days a week. Males drove slightly but significantly more frequently driving than females (5.88±1.61 vs 5.40±1.74, *t*(550)=2.40, *p*=.02). There were no differences in driving frequency between Black and Whites respondents, or among age groups. Among the total sample and all subgroups, over 71.5% (*n*=414) relied on driving themselves to meet most or all of their current transportation needs. Although both subgroups were near the top of the 0-4 scale, Blacks drivers were slightly but significantly more dependent on driving themselves than White drivers (3.62±0.80 vs 3.40±0.82, *t*(572)=2.40, *p*=.01). There were no differences in driving dependence between men and women or among the six age categories.

Among the total sample, 70.1% of respondents (*n*=414) reported that driving themselves met all their current transportation needs. Yet, Table 7 also shows that 73.2% (*n*=424) of respondents currently used at least one other mode of transportation, including rides with others, buses, mass transport, taxis/cabs, specialized transport,

walking, and E-hail apps. This proportion dropped by about 40% when rides with others was removed (*n*=199, 34.4%), highlighting the strong preference for the personal automobile over any other mode of transportation. There were no differences in use of nondriving transportation use by gender, race, or age categories whether rides with others was included or not.

In the past year, only 18.1% (*n*=105) experienced one or more common event that made them consider changing their driving behaviors (Table 7). Overall, middle-aged and older drivers experienced 0.32±0.83 events on the 0-10 scale, individually experiencing between 0-7 cues to action. Men and women averaged similar numbers of events, as did Whites and Blacks.

Table 7
Current Transportation Use

How much are your current transportation needs being met using each of the following transportation methods? (0=None, 4=All)	Mean (SD)
Driving Yourself	3.57 (0.80)
Rides with Others (family, friends, etc.)	1.64 (1.35)
Buses	0.25 (0.70)
Taxis/Cabs	0.14 (0.55)
Mass Transport (light rail, trains, etc.)	0.24 (0.76)
Specialized Transport (medical transport, disabled/senior shuttles, etc.)	0.20 (0.72)
WALKING (for transportation, NOT for enjoyment or exercise exclusively)	0.35 (0.84)
E-HAIL APPS	0.06 (0.40)
In the past year, how many days (on average) did you drive each week?	5.41 (1.70)
In the past year, have you experienced any events that made you consider changing your driving? (% Yes)	105 (18.1%)

Interestingly, no significant variations were found among the six age categories either (Table 8).

Table 8
Current Transportation by Age Group

Sample Size	Total (*n*=579)	Age Categories 55-59 (*n*=23)	60-64 (*n*=75)	65-69 (*n*=106)	70-74 (*n*=156)	75-79 (*n*=119)	80-84 (*n*=100)
How much are your current transportation needs being met DRIVING YOURSELF? (0=None, 4=All)	3.57 (0.80)	3.78 (0.52)	3.59 (0.74)	3.61 (0.82)	3.60 (0.81)	3.54 (0.79)	3.48 (0.88)
Respondents reporting "4-All"	414 (71.5%)	19 (82.6%)	51 (68.0%)	80 (75.5%)	115 (73.7%)	82 (68.9%)	67 (67.0%)
Use of one or more modes of alternative transportation	424 (73.2%)	16 (69.6%)	59 (78.7%)	77 (72.6%	110 (70.5%)	88 (73.9%)	74 (74.0%)
Use of one or more NONDRIVING modes of alternative transportation	199 (65.6%)	9 (38.1%)	29 (38.7%)	33 (31.1%)	53 (34.0%)	40 (33.6%)	35 (35.0%)
Events that made respondent consider changing their driving (Cues to Action)	105 (18.1%)	7 (17.4%)	12 (16.0%)	18 (17.0%)	30 (19.2%)	20 (16.8%)	21 (21.0%)

*$p \leq .05$ **$p \leq .01$

I used the Assessment of Readiness for Mobility Transitions (ARMT) scores to quantify current drivers' fear of mobility loss. On average, respondents scored 2.19±0.75 on the ARMT, which is mid-range on the 0-4 scale where scores above 3.57 are "high" and below 1.13 are "low". As with the overall sample, each subgroup had mean ARMT total scores indicating they feel some threat when faced with the idea of future mobility loss, but not to an extent that would likely cause them to reject any discussion of changes or planning for possible future mobility needs. Men had slightly but significantly higher ARMT scores compared to women (2.35±0.71 vs 2.16±0.75, $t(504)=2.09$, $p=.04$). There were no significant differences in overall readiness for mobility transition by race or age categories.

Expected mobility satisfaction as a nondriver. For some drivers, the fear of mobility loss is rooted in the assumption that mobility loss inevitably limits mobility satisfaction, or how easily someone can get where they need or want to go. On a 0 (Not At All Satisfied) to 4 (Very Satisfied) scale, the overall sample averaged 1.31±1.23. Interestingly, while there were no consistent differences by age or gender in expectations of nondriving mobility satisfaction, there were significant differences by race. With an average of 1.39±1.29, Black respondents had significantly higher mean scores than White respondents (1.02±0.96) for expected mobility satisfaction as a nondriver ($t(568)=-3.55$, $p<.001$).

Theoretical Construct Results

The sample averages for three of the four theoretical constructs were around the midpoint of each variable's scale. On average, participants reported a mean Perceived Threat of driving cessation scale score of 7.19±6.19, just below the halfway mark on the 0-16 scale. Mean Decisional Balance was 0.52±3.96 on the -8 - +8 scale. On a scale of 0-4, middle-aged and older drivers' intention to plan more for their future transportation needs was 1.99±1.25.

The only skewed theoretical construct was Cues to Action, with only 105 respondents (18.1%) having experienced any events that made them consider changing their driving in the last year. From a list of 10 common cues to action, the sample's average was 0.32±0.83 events. For those who had experienced Cues to Action, the average number of events was 1.77±1.12.

Intention to Plan was the only construct with mean differences by race and gender. Black intended to plan significantly more than the White subgroup (1.52±1.12

vs. 2.13±1.25; t(566)=-4.97, p<.001), and females) reported significantly higher intention to plan than males (2.05±1.23 vs. 1.53±1.23; t(551)=-3.63, p<.001). There were no significant differences among the six age categories.

Mobility Planning Results

Domains and levels of mobility planning. First, I asked about self-perceived amount of planning for a nondriving future. Respondents reported how much they had planned for possible nondriving futures, averaging 0.75±1.06 on a 0-4 scale. Over half (*n*=333) of the full sample reported they had done no planning for a nondriving future. Although no gender differences were apparent, Black respondents reported significantly more planning for a time when they no longer drive at all, again ahead of White respondents (0.80± 1.10 vs 0.58±0.89; *t*(251.27)=-2.11, *p*=.02). When comparing self-reported planning by the five-year age categories, no significant differences were apparent in planning for a nondriving future.

Mobility planning behaviors.

Information seeking. Table 10 exhibits data on information seeking (talking to others to get information or ideas, attending meetings, lectures or classes, and reading magazine articles, brochures, or guides). Average scores for all three items were very low, clustered around 1 on the None/Not at All (0) to All/A Lot (4) scales (Table 9). Literature was the most common source of information (1.03±1.24), followed by talking to others (0.80±1.15). With an average of 0.75±1.19, attending meetings or lectures to learn about aging and driving was a close third.

Females were more likely than males to have attended meetings, lectures, or classes (F=0.79±1.19 vs M=0.40±0.87; *t*(156.66)=-3.66, *p*<.001), as well as reading

Table 9
Information Seeking by Gender and Race

		Gender		Race	
	Total (*n*=579)	Female (*n*=475)	Male (*n*=88)	Black (*n*=450)	White (*n*=129)
How much or often have you talked to friends or others to get ideas or information for your possible future transportation needs? (0=Not at All, 4=A Lot)	0.80 (1.19)	0.81 (1.15)	0.59 (0.97)	0.85* (1.21)	0.62* (0.92)
Respondents reporting "0-Not at All"	333 (57.5%)	270 (56.8%)	56 (63.6%)	255 (56.7%)	78 (60.5%)
How many meetings, lectures, or classes have you attended to learn information about aging and driving? (0=None, 4=A Lot)	0.75 (1.19)	0.79** (1.19)	0.40** (0.87)	0.89** (1.26)	0.26** (71)
Respondents reporting "0-None"	366 (63.2%)	289 (60.8%)	70 (79.5%)	257 (57.1%)	109 (84.5%)
How much information about safe driving for older adults have you sought out from magazine articles, brochures, guides, or other sources (either printed or on the Internet)? (0=None, 4=A Lot)	1.03 (1.24)	1.09** (1.25)	0.55** (0.88)	1.14** (1.32)	0.63** (0.80)
Respondents reporting "0-None"	272 (47.0%)	210 (44.2%)	55 (62.5%)	204 (45.3%)	68 (52.7%)

*$p \leq .05$ **$p \leq .01$

about safe driving or driving retirement options for older adults (F=1.09±1.25, M=0.55±0.88; $t(160.42)=-4.93$, $p<.001$). The only category of information seeking with no gender differences was in talking to others to get ideas or information.

All three information seeking categories were significantly different when comparing mean scores by race (Table 9). Compared to White respondents, Black respondents reported more talking to others to get information or ideas (0.85±1.21 vs 0.62±0.92; $t(265.22)=-2.30$, $p=.02$). When asked about attending meetings, lectures, or classes on transportation mobility, Black respondents again reported attending more driving safety meetings or lectures than their White counterparts (0.89±1.26 vs 0.26±0.71; $t(370.78)=-7.34$, $p<.001$). This pattern continues with the final category, reading magazine articles, brochures, or guides where, on average, Black drivers

reported 1.14±1.32 out of 4, compared to 0.63±0.80 among White drivers (t(342.42)=-5.46, p<.001).

As shown in Table 10, older drivers were more likely to read literature on driving safety than younger ones (Oneway ANOVA, F=6.07, df=5, p<.001). However, this was the only information seeking items that differed by age. Current drivers did not report significantly different amounts of talking to others about how they get around without driving or going to meetings and lectures to learn about older driver safety (Table 10).

Table 10
Information Seeking by Age Group

		Age Categories					
	Total (n=579)	55-59 (n=23)	60-64 (n=75)	65-69 (n=106)	70-74 (n=156)	75-79 (n=119)	80-84 (n=100)
How much or often have you talked to friends or others to get ideas or information for your possible future transportation needs? (0=Not at All, 4=A Lot)	0.80 (1.15)	0.48 (0.95)	0.77 (1.02)	0.79 (1.19)	0.79 (1.21)	0.93 (1.17)	0.80 (1.15)
Respondents reporting "0-Not At All"	333 (57.3%)	16 (69.6%)	39 (52.0%)	65 (61.3%)	92 (59.0%)	61 (51.3%)	60 (60.0%)
How many meetings, lectures, or classes have you attended to learn information about aging and driving? (0=None, 4=A Lot)	0.75 (1.19)	0.52 (1.38)	0.55 (1.01)	0.72 (1.08)	0.63 (1.11)	1.00 (1.32)	0.87 (1.28)
Respondents reporting "0-None"	366 (63.2%)	20 (87.0%)	54 (72.0)	63 (59.4%)	105 (67.3%)	63 (52.9%)	61 61.0%
How much information about safe driving for older adults have you sought out from magazine articles, brochures, guides, or other sources (either printed or on the Internet)? (0=None, 4=A Lot)	1.03 (1.24)	0.35 (.89)	0.52 (0.78)	1.14 (1.26)	0.95 (1.22)	1.33 (1.31)	1.18 (1.36)
Respondents reporting "0-None"	272 (47.0%)	18 (78.3%)	47 (62.7%)	45 (42.5%)	75 (48.1%)	44 (37.0%)	43 (43.0%)

*p≤.05 **p≤.01

Concrete planning. Information seeking is only the second step in planning. Once people have details about mobility planning and transportation options, they can choose whether or not to develop more tangible strategies to meet their current and future mobility needs. To measure how much concrete planning the middle-aged and older drivers had done, I used four concrete planning items: telling others the plan, writing the plan down, figuring out logistics (routes, schedules, costs, etc.), and practicing the plan.

As previous literature indicated, the majority of middle-aged and older drivers had done little to no concrete planning for their mobility futures. Among the total sample and subgroups, more than half reported no planning on each concrete planning item (Table 11). On a 4-point scale ranging from None (0) to A Lot (3), average scores for all four items were well below 1. The highest score was for telling other people your plans (0.59±0.85), followed by figuring out logistics (0.44±0.78), practicing the plan (0.30±0.66), and writing plans down (0.26±0.69).

Age and gender comparisons showed differences in one of the four concrete planning measurements. Writing plans down was the only item affected by age (Oneway ANOVA, F=2.58, df=5, p=.03). Table 11 shows females were more likely to tell others their plans than males, the only significant concrete planning category by gender (0.61±0.87 vs 0.43±0.72; t(139.25)=-2.05, p=.04). No other concrete planning items' means differed by age or gender.

As with the other comparisons, race differences were most striking (Table 11). Here again, Black participants reported significantly higher rates of concrete planning compared to White participants in all areas except figuring out the logistics. On average,

Table 11
Concrete Plans by Gender and Race

		Gender		Race	
	Total (*n*=579)	Female (*n*=475)	Male (*n*=88)	Black (*n*=450)	White (*n*=129)
How much have you done each of the following actions to make your future transportation plan more concrete? (0=None, 3=A Lot)					
Tell Others Your Plans	0.59 (0.85)	0.61* (0.87)	0.43* (0.72)	0.64* (0.89)	0.41* (0.71)
Respondents reporting "0-None"	353 (61.0%)	286 (60.2%)	61 (69.3%)	263 (58.4%)	90 (69.8%)
Write Plans Downs	0.26 (0.69)	0.27 (0.71)	0.15 (0.49)	0.32** (0.75)	0.06** (0.30)
Respondents reporting "0-None"	488 (83.4%)	395 (83.2%)	79 (89.8%)	361 (80.2%)	122 (94.6%)
Figure Out Logistics	0.44 (0.78)	0.44 (0.78)	0.41 (0.77)	0.46 (0.79)	0.38 (0.74)
Respondents reporting "0-None"	404 (69.8%)	332 (69.9%)	65 (73.9%)	309 (68.7%)	95 (73.6%)
Practice Plans	0.30 (0.66)	0.29 (0.65)	0.27 (0.66)	0.34** (0.71)	0.16** (0.46)
Respondents reporting "0-None"	457 (78.9%)	377 (79.4%)	71 (80.7%)	344 (76.4%)	113 (87.6%)

*$p \leq .05$ **$p \leq .01$

Black respondents scored 0.64±0.89 (on a 0-3 scale) on telling others about their mobility plans, significantly higher than White respondents' 0.41±0.71 ($t(254.41)=-3.01$, $p=0.01$). Writing was very uncommon in both groups, with Black respondents' 0.32±0.75 score on average topping the mean White score of 0.06±0.30 ($t(516.60)=-5.81$, $p<.001$). Black drivers also reported practicing their mobility plans more than White drivers in this sample (0.46±0.79 vs 0.38±0.74; $t(317.04)=-3.41$, $p<.001$).

Planning Intention. Measuring how much people expect to plan at a future time, independent of the amount of planning done up to a given point, provides both an additional dimension of mobility planning and information about general openness to

mobility planning. When asked about how much mobility planning respondents intended to do in the future, scores were much higher than those on self-reported and actual planning behaviors (Table 12). The average Intention to Plan score was 1.99±1.25 on the None (0) to A Lot (4) scale, which did not differ significantly by age. This finding indicates that middle-aged and older drivers generally believe they will plan more for mobility changes at a later time. However this number may be inflated due to social desirability (i.e., "I have not reported much mobility planning on this survey, but I can say that I will in the future."). The 1.99±1.25 average may also (or instead) support the idea that middle-aged and older drivers are open to the idea of mobility planning, but may need more direction or aid in transitioning from thinking or intending to plan to actual planning.

Table 12
Intention to Plan More by Gender and Race

		Gender		Race	
Sample Size	Total (*n*=579)	Female (*n*=475)	Male (*n*=88)	Black (*n*=450)	White (*n*=129)
Regardless of how much transportation planning you have or haven't done, how much planning about your transportation do you intend to do in the future? (0=None, 4=A Lot)	1.99 (1.25)	2.05** (1.23)	1.53** (1.23)	2.13** (1.25)	1.52** (1.12)
Respondents Reporting "0-None"	85 (14.7%)	62 (13.1%)	21 (23.9%)	57 (12.7%)	28 (21.7%)

*$p \leq .05$ **$p \leq .01$

Planning intentions did, however, differ by gender and race subgroups (Table 12). At 2.05±1.23, females reported significantly higher mean Intention to Plan score compared to males' 1.53±1.23 ($t(551)=-3.63$, $p<.001$). Black respondents also intended to mobility plan in the future more than their White counterparts (2.13±1.25 vs 1.52±1.12; $t(566)=227.10$, $p<.001$). These findings continued the pattern of Black

drivers planning more for mobility changes and expecting more results from mobility planning in general.

Total Mobility Planning Score. In addition to comparing one aspect or type of mobility planning at a time, I created the Total Mobility Planning Score by summing all the dimensions of mobility planning described above into one comparable score. A total of 12 points are possible for information seeking (three items), 12 points for concrete planning (four items), and 4 points for intention to plan more (one item), resulting in the Total Mobility Score Index ranging from 0-28. For more information on this process, please refer to the Total Mobility Score section in Chapter 7.

On the scale of 0-28, the total sample scored around the lowest one-third of the scale, averaged 6.13±4.99 in a sum totaling of all three objective mobility planning behaviors (information seeking, concrete planning, and intention to plan more). This score indicates that the middle-aged and older drivers in the sample generally had not done much preparation for their future mobility needs. Here again, only minimal differences were found among the six age groups (Oneway ANOVA, F=2.22, df=5, p=.51).

Total Mobility Planning Scores did, however, differ by gender and race. As with planning measures described above, females and Black respondents report significantly more overall mobility planning than males and White respondents. Specifically, females averaged 6.36±4.94, well above males' 4.31±4.17 (t(550)=-3.65, p<.001). The spread between race groups is even more striking: White respondents averaged a total 4.03±3.67, nearly three points lower than Black respondents' mean of 6.74±5.17 (t(-6.65)=288.52), p<.001).

Comparing mobility planning behaviors with planning for other future events. To test if drivers 55 and up who plan for other future situations will be more likely to plan for mobility changes, I ran correlations between respondents' Total Mobility Planning Score and Total Other Planning Score (described previously in this chapter). On average, respondents reported a Total Mobility Planning Score of 6.13±4.99 and 16.41±5.74 for Total Other Planning Score. These two indices were weakly, albeit significantly, positively correlated (r=0.18, n=552, p<.001), showing that the more middle-aged and older adults planned for other future circumstances, the more likely they were to plan for mobility changes.

CHAPTER 9

Mobility Planning Regression Results

I developed four distinct regression models to test which personal characteristics, such as driving behaviors, beliefs, and expectations, predict mobility planning. Each model utilized two mobility planning outcomes: a single item of self-reported mobility planning and a Total Mobility Planning scale created by combining several items measuring objective planning behaviors. This information provides insight into which variables, or combinations of variables, lead to more mobility planning among middle-aged and older drivers.

- **Model 1** quantifies the effects of background characteristics
- **Model 2** incorporates experiential factors to explore how past, present, and future driving contexts influence preparing for future mobility needs.
- **Model 3** looks to see how much readiness for mobility transition (measured by total scores from the Assessment of Readiness for Mobility Transition, or ARMT) predicts drivers' mobility planning.
- **Model 4** focuses on mobility planning beliefs translated into parallel constructs from two foundational health behavior theories, the Health Behavior Model (HBM) and Theory of Planned Behavior (TPB).

Models 1-4 serve the final portion of my Specific Aim #2: to predict middle-aged and older drivers forecasting and preparation for their driving futures.

Models 1 and 2 explore demographic and contextual factors. Models 3 and 4 examine both individual and combinations of mobility-planning predictors to investigate the two remaining research hypotheses.

Demographic variables from Model 1 are included in all subsequent models in order to show the increased predictive power of the additional variables. However, as several items measured in the ARMT (Model 3) are used as theoretical constructs in my mobility planning model (Model 4), these models are not hierarchical. Models 1a, 2a, 3a, and 4a regressed the individual self-reported mobility planning item. Models 1b, 2b, 3b, and 4b use the same variables to predict the Total Mobility Planning Scores.

Primary Regression Variables Results

Prior to running the regression models, I checked all dependent and independent variables for normality (Table 13), as well as correlations to avoid breaching the assumptions of linear regression tests (Table 14). Despite the nonrandom sampling techniques, no patterns of concern were identified.

Missing Data

Overall, a third of respondents were missing at least one response for the variables included in the regression models (*n*=195). Only one of the two primary outcome variables, Total Mobility Planning Score, had any missing data. Only 2.2% of respondents had a missing Total Mobility Planning Score (*n*=13). All

respondents answered the single item measuring self-reported mobility planning, resulting in no missing data.

Table 13
Statistics of Primary Regression Outcomes

	Mean	Median/Mode	Min-Max	Skewness	Kurtosis
Self-Reported Planning (0-4)	0.75 (1.06)	0/0	0-4	1.36	1.10
Black (*n*=450)	0.80 (1.10)	0/0	0-4	1.29	0.80
White (*n*=129)	0.58 (0.89)	0/0	0-4	1.61	2.42
Total Mobility Planning Score (0-28)	6.13 (4.99)	5/2	0-25	1.09	0.98
Black (*n*=438)	6.74 (5.17)	6/2	0-25	1.00	0.68
White (*n*=128)	4.03 (3.67)	3/0	0-17	1.16	1.21
Information Seeking (0-12)	2.56 (2.65)	2/0	0-12	1.09	0.58
Black (*n*=446)	2.87 (2.79)	2/0	0-12	0.91	0.09
White (*n*=128)	1.50 (1.74)	1/0	0-9	1.66	3.86
Concrete Planning (0-12)	1.58 (2.32)	0/0	0-12	1.71	2.54
Black (*n*=444)	1.75 (2.44)	1/0	0-12	1.59	2.02
White (*n*=128)	1.02 (1.71)	0/0	0-8	2.04	3.98
Intention to Plan (0-4)	1.99 (1.25)	2/2	0-4	0.02	-0.89
Black (*n*=440)	2.13 (1.25)	2/2	0-4	-0.10	-0.87
White (*n*=128)	1.52 (1.12)	2/2	0-4	0.30	-0.64

Table 14

Correlation Matrix of Regression Variables.

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	Independent																							
1	Age	---																						
2	Black/AA (vs White/C)	-0.06	---																					
3	Education Level	-0.02	-0.16**	---																				
4	Annual Household Income	-0.06	-0.31**	0.41**	---																			
5	Work Status	-0.33**	-0.10*	0.15**	0.15**	---																		
6	Relationship Status	-0.06	-0.35**	0.12**	0.45**	0.10*	---																	
7	Gender	-0.03	0.25**	-0.02	-0.12**	-0.01	-0.35**	---																
8	Self-Reported Health	-0.04	-0.21**	0.20**	0.28**	0.15**	0.12**	-0.01	---															
9	Total Other Planning Score	0.06	-0.14**	0.15**	0.20**	-0.07	0.09*	0.01	0.11**	---														
10	Model 2: Self-Rated Driving Experience	-0.10*	0.00	0.04	0.03	0.01	0.00	-0.09*	0.17**	0.08	---													
11	Model 2: Confidence in current driving	-0.12**	0.15**	-0.02	0.00	0.07	-0.01	0.00	0.16**	0.08*	0.38**	---												
12	Model 2: Current Mobility Satisfaction	-0.03	-0.01	0.04	0.21**	0.10*	0.14**	0.06	0.25**	0.08	0.21**	0.30**	---											
13	Model 2: Current Driving Enjoyment	-0.02	0.00	0.00	0.02	0.08	0.03	-0.06	0.14**	0.14**	0.22**	0.34**	0.17**	---										
14	Model 2: Current Driving Stress	0.00	-0.09*	0.01	0.01	-0.03	-0.01	0.05	-0.17**	-0.14**	-0.25**	-0.44**	-0.22**	-0.42**	---									
15	Model 2: Responsible for others' transportation (Y/N)	0.15**	-0.04	-0.03	0.01	-0.01	-0.11*	0.03	0.00	0.05	-0.05	-0.04	-0.02	0.00	0.02	---								
16	Model 2: Expected Mobility Satisfaction as Nondriver	0.03	0.11*	-0.08*	-0.11*	0.00	0.07	-0.05	-0.03	0.08*	-0.02	-0.04	0.08	0.05	-0.06	-0.04	---							
17	Model 2: Use Any Alternative Transportation	-0.02	-0.06	-0.02	-0.14**	0.00	-0.04	-0.04	-0.08	-0.07	-0.16**	-0.16**	-0.25**	-0.10*	0.16**	-0.03	0.04	---						
18	Model 3: ARMT Total Score	-0.05	0.00	-0.12**	-0.08	-0.03	-0.02	-.094*	-0.15**	-0.03	0.00	-0.02	-0.05	-0.05	0.02	-0.01	-0.39**	0.02	---					
19	Model 4: Perceived Threat	-0.04	-0.04	-0.04	.094*	-0.04*	-0.01	0.05	-0.05	0.02	0.02	0.03	0.00	0.02	-0.03	-0.08	-0.28**	-0.03	0.45**	---				
20	Model 4: Cues to Action	0.01	-0.04	0.07	0.04	-0.06	0.02	-0.02	-0.14**	0.02	-0.12**	-0.30**	-0.18**	-0.21**	0.26**	-0.07	0.00	0.16**	0.05	-0.03	---			
21	Model 4: Decisional Balance	0.00	-0.06	-0.02	-0.07	-0.03	-0.03	-0.08	-0.10*	-0.01	-0.04	-0.08	-0.09*	-0.07	0.09*	0.04	-0.33**	0.04	0.87**	0.36**	0.08*	---		
22	Model 4: Intention	0.01	0.21**	0.01	-.108*	-0.13**	-0.11**	0.16**	-0.11**	0.10*	-0.03	-0.05	-0.18**	-0.04	0.10*	0.02	0.08	0.12**	-0.04	-0.04	0.08*	-0.01	---	
	Dependent																							
23	Self-Reported Mobility Planning	0.11*	0.07	-0.04	-0.11*	-0.10*	-0.08*	0.04	-0.12**	0.21**	-0.12**	-0.19**	-0.18**	-0.03	0.13**	0.03	0.22**	0.12**	-0.08	-0.08	0.09*	-0.04	0.24**	---
24	Total Mobility Planning Score	0.05	0.24**	-0.03	-0.20**	-0.16**	-0.24**	0.17**	-0.17**	0.17**	-0.08*	-0.09*	-0.25**	-0.03	0.08	0.01	0.12**	0.20**	-0.10*	-0.05	0.12**	-0.06	0.67**	0.43**

The independent regression variables were missing relatively little data as well. The two variables missing the most data measured current mobility satisfaction (*n*=68, 11.7% missing) and the 24-item Assessment of Readiness for Mobility Transition (ARMT) Total Score (*n*=62, 10.7% missing). Both variables measure concepts related to immobility that could be very uncomfortable for respondents to consider, a common reason for skipping items.

The missing data for the outcome Total Mobility Planning Score (*n*=13) did not significantly vary between the two race groups. However, compared to White respondents, significantly more Black respondents were missing one or more regression predictor (X^2=10.7, df=1, *p*<.001).This pattern continues when looking at the variables individually. Black respondents had marginally more missing data on three independent variables: income (*n*=45, 7.8%; X^2=4.06, df=1, *p*=.06), Perceived Threat (*n*=38, 6.6%; X^2=10.7, df=1, p=.07), and Decisional Balance (*n*=32, 5.5%; X^2=10.7, df=1, p=.07). However, it is important to note that few Whites (*n*≤5) were missing data for each variable, making statistical comparisons less reliable.

I chose pairwise deletion because the regression models contained nine or more predictors. Listwise deletion would have unnecessarily lowered the *n* for the regression models, especially given the seeming randomness to missing data patterns. Although 195 respondents were missing data, 58% (*n*=113) of those were missing only one response. Given the relatively low level of missing data and nonrandom patterns, I did not use multiple imputation to complete the dataset.

Regression Model Test Results

Model 1: Baseline Demographic Information Results. Model 1 used multiple linear regression to test if basic demographic information significantly predicts mobility planning (in both self-reported and the mobility planning index). Results from Models 1a and 1b are displayed in Table 15.

Table 15
Model 1 Baseline Regression Model

	Model 1a: Self-Reported Mobility Planning		Model 1b: Total Mobility Planning Score	
Variables	β	*t*	β	*t*
(Constant)	—	-0.31	—	1.67
Age	0.07	1.62	0.01	0.24
Black (vs White)	0.07	1.40	0.15**	3.25
Education Level	-0.02	-0.33	0.03	0.62
Income	-0.09†	-1.67	-0.14**	-2.70
Working	-0.01	-0.13	-0.07†	-1.66
Partnered	-0.04	-0.78	-0.09†	-1.83
Female (vs Male)	0.00	0.02	0.07	1.60
Self-Reported Health	-0.11**	-2.49	-0.10*	-2.42
Total Other Planning Score	0.29**	6.60	0.24**	5.67

† $p \leq .10$ * $p \leq .05$ ** $p \leq .01$

Model 1a-Self-Reported Mobility Planning (0-4). The baseline Model 1a significantly predicted 11% of the variance in how much people planned for a nondriving future ($R^2_{Model\ 1a}$=0.11, $F(9, 511)=7.12$, $p<.001$). However, the effect appears driven by two of the 11 independent variables in Model 1a: self-reported health (β_{Health}=-0.11, $p=.01$) and Total Other Planning Score (β_{TOPS}=0.29, $p<.001$) were the only statistically significant predictors of self-reported mobility planning (Table 15). The negative valence on the β_{Health}-coefficient indicates that respondents in poorer health did more self-reported mobility planning than those

in better health. In other words, people who were in worse health and those who planned for other types of future needs actually did more mobility planning.

In this first model, as with the other five, certain variables hovered around the set significance level ($p \leq .05$), either right above or right below depending on small changes to the regression models (i.e., listwise vs pairwise deletion, when Urbanicity was included instead of race as a predictor, and whether the age variable was continuous or ordinal). As this is a standard yet somewhat arbitrary benchmark, predictors at the $p \leq .10$ level can also provide meaning to the puzzle of who plans for mobility changes. In Model 1a, one such predictor with a nonsignificant trend was annual household income ($\boldsymbol{\beta}_{Income}$=-0.09, p=.10), indicating that people with lower incomes planned more than respondents with higher incomes. This is likely related to the income inequalities among Blacks in Detroit and Whites in Ann Arbor.

Model 1a-Race Comparisons. Split sample analyses among White and Black respondents showed differences in predictors of self-reported mobility planning among the two race groups. Model 1a significantly predicted self-reported 11% of mobility planning among Blacks ($R^2_{Model\ 1a\text{-}Black}$=0.11, F(8, 389)=6.76, p<.001) and 16% among Whites ($R^2_{Model\ 1a\text{-}White}$=0.16, F(8, 114)=2.69, p=.01). The only consistent predictor among the full sample and both race subsamples is Total Other Planning Score, which significantly influenced self-reported planning among Black respondents ($\boldsymbol{\beta}_{TOPS\text{-}Black}$=0.30, t=6.15, p<.001) and was marginally significant for Whites ($\boldsymbol{\beta}_{TOPS\text{-}White}$=0.17, t=1.90, p=.06). While self-reported health reached significance for the total sample and the Black

subset ($\beta_{Health\text{-}Black}$=-0.11, *t*=-2.18, *p*=.03), it was non-significant for Whites ($\beta_{Health\text{-}White}$=-0.08, *t*=-0.93, p=.35). Additionally, single Whites planned more than their White married/partnered counterparts ($\beta_{Partnered\text{-}White}$=-0.27, *t*=-2.80, p=.01).

Note on Effect of Total Other Planning Score. Total Other Planning Score was a consistently strong predictor of mobility planning in the regression models. In order to make sure one strong variable was not masking salient relationships other predictors may have with the outcome, I removed Total Other Planning Score from the independent variables and re-ran all regression models. Each model was significantly weaker without the Total Other Planning Score, however, parameter estimates for other regressions variables and their probabilities barely wavered. Therefore, multicollinearity did not appear to be a concern and the Total Other Planning Score remained in all models.

Model 1b-Total Mobility Planning Score (0-28). Model 1b regresses Total Mobility Planning Scores on the same predictors as Model 1a. With the Total Mobility Planning Scores as the planning outcome, a greater amount of variance was accounted for in the baseline *a* model ($R^2_{Model\ 1b}$=0.16, *F*(9, 511)=11.01, *p*<.001; Table 15). Here, different demographic characteristics come to the forefront of the model. While Total Other Planning Score (β_{TOPS}=0.24, *p*<.001) and self-reported health (β_{Health}=-0.10, *p*=.02) are still significant predictors in Model 1b, two other demographic characteristics also come to the forefront of the model: race and annual household income. In this baseline model, Black respondents planned significantly more for their mobility futures than their White counterparts (β_{Black}=0.15, *p*<.001). Additionally, as household

income increased, mobility planning decreased (β_{Income}=-0.14, p<.001). Being partnered/married was also associated with lower total mobility planning scores, but neither relationship reached the chosen $p \leq .05$ significance level ($\beta_{Partnered}$=-0.09, p=.07; $\beta_{Working}$=-0.07, p=.10).

***Model 1b-Race Comparisons*.** In a split sample analysis by race, Model 1b remained significant for both Blacks ($R^2_{Model\ 1b\text{-}Black}$=0.11, F(8, 389)=6.10, p<.001) and Whites ($R^2_{Model\ 1b\text{-}Black}$=0.18, F(8, 114)=3.21, p=.003). Among Blacks, respondents in worse health and with lower incomes had higher total mobility planning scores ($\beta_{Health\text{-}Black}$=-0.11 t=-2.14, p=.03; $\beta_{Income\text{-}Black}$=-0.13, t=-2.27, p<.02). Here again, Total Other Planning Score significantly influenced mobility planning among Blacks ($\beta_{TOPS\text{-}Black}$=0.26, t=5.26, p<.001), and was marginally significant among Whites ($\beta_{TOPS\text{-}White}$=0.16, t=1.72, p=.09). The only additional predictor to reach even marginal significance among White respondents was being married or partnered, which reduced mobility planning behaviors ($\beta_{Partnered\text{-}White}$=-0.18, t=-1.85, p=.07).

Model 2: Incremental Effect of Experiential Driving Measures.

Model 2a-Self-Reported Mobility Planning (0-4). When added to the baseline model**,** subjective measures of mobility accounted for significantly more variance in self-reported mobility planning, increasing the R^2 from 11% to 19% ($R^2change_{Model\ 1a\text{-}2a}$=0.08, F(8, 452)=5.80, p<.001). In addition to Total Other Planning Score (β_{TOPS}=0.28, t=6.23, p<.001), both current mobility satisfaction ($\beta_{CurrentSatisfaction}$=-0.15, t=-3.06, p<.001) and expected mobility satisfaction as a

Table 16
Model 2 Experiential Regression Results

	Model 2a: Self-Reported Mobility Planning		Model 2b: Total Mobility Planning Score	
Variables	β	*t*	β	*t*
(Constant)	—	0.37	—	1.39
Age	0.05	1.18	0.01	0.23
Black (vs White)	0.08	1.54	0.17**	3.55
Education Level	-0.01	-0.19	0.02	0.47
Income	-0.05	-0.83	-0.07	-1.30
Working	-0.01	-0.16	-0.07	-1.62
Partnered	-0.05	-0.87	-0.08	-1.52
Female (vs Male)	0.01	0.30	0.10*	2.25
Self-Reported Health	-0.04	-0.91	-0.04	-0.78
Total Other Planning Score	0.28**	6.23	0.24**	5.56
Model 2 Variables				
Self-Rated Driving Experience	0.02	0.37	0.03	0.58
Confidence in Current Driving	-0.09†	-1.74	-0.01	-0.19
Current Mobility Satisfaction	-0.15**	-3.06	-0.23**	-4.99
Current Driving Enjoyment	0.02	0.35	0.01	0.26
Current Driving Stress	0.08†	1.68	0.04	0.81
Responsible for Others' Transportation	0.01	0.26	-0.02	-0.45
Expected Mobility Satisfaction as Nondriver	0.20**	4.50	0.12**	2.73
Use of Any Alternative Transportation	0.03	0.55	0.15**	3.57

† $p \leq .10$ * $p \leq .05$ ** $p \leq .01$

nondriver ($\boldsymbol{\beta}_{ExpectedSatisfaction}$=0.20, t=4.50, p<.001) were statistically significant predictors of self-reported mobility planning (Table 16). Whereas more planning for other aspects of later life and expected satisfaction as a nondriver both increased self-reported mobility planning, current satisfaction had the opposite effect. People with lower confidence in their current driving skills and those who report more stress associated with driving reported more mobility planning at a

marginally-significant level ($\beta_{Confidence}$=-0.09, t=-1.74, p=.08; β_{Stress}=0.08, t=1.68, p=.09).

Model 2a-Race Comparisons. In split sample analyses, Model 2a significantly improved the baseline models for both subgroups, accounting for 19% of Black respondents (R^2=0.19; $R^2change_{Model\ 1a\text{-}2a\text{-}Black}$ =0.08, F(8, 343)=5.55, p<.001) and 29% of White respondents self-reported planning ($R^2change_{Model\ 1a\text{-}2a\text{-}White}$ =0.13, F(8, 93)=2.18, p=.04). In both subsamples, the Total Other Planning Score significantly predicted mobility planning ($\beta_{TOPS\text{-}Black}$=0.28, t=5.49, p<.001; $\beta_{TOPS\text{-}White}$=0.25, t=2.56, p=.01) (Table 17).

Table 17
Model 2a Regression Results by Race

	Blacks: Self-Reported Mobility Planning		Whites: Self-Reported Mobility Planning	
Variables	β	*t*	β	*t*
(Constant)	—	0.72	—	0.06
Age	0.05	0.96	0.02	0.24
Education Level	-0.03	-0.58	0.09	0.93
Income	-0.02	-0.35	-0.09	-0.89
Working	-0.02	-0.36	0.03	0.24
Partnered	0.00	0.00	-0.26**	2.51
Female (vs Male)	0.01	0.10	0.00	-0.02
Self-Reported Health	-0.05	-0.89	-0.04	-0.42
Total Other Planning Score	0.28**	5.49	0.25**	2.56
Model 2 Variables				
Self-Rated Driving Experience	-0.01	-0.19	0.13	1.32
Confidence in Current Driving	-0.05	-0.87	-0.23†	-1.98
Current Mobility Satisfaction	-0.17**	-3.09	-0.03	-0.31
Current Driving Enjoyment	0.01	0.19	0.06	0.50
Current Driving Stress	0.08	1.40	0.14	1.19
Responsible for Others' Transportation	0.01	0.19	-0.04	-0.42
Expected Mobility Satisfaction as a Nondriver	0.20**	3.97	0.17†	1.88
Use of Any Alternative Transportation	-0.01	-0.23	0.14	1.50

† $p \leq .10$ * $p \leq .05$ ** $p \leq .01$

Respondents with higher expected levels of mobility satisfaction as a nondriver had planned more among both groups, although it was only marginally significant among White drivers ($\beta_{\text{Expected Satisfaction-Black}}$=0.20, t=3.97, p<.001; $\beta_{\text{ExpectedSatisfaction-White}}$=0.17, t=1.88, p=.06). For White respondents, being married/partnered and having greater confidence in their current driving skills and mobility were both associated with *less* mobility planning, albeit again just above the set significance level for the latter ($\beta_{\text{Partnered-White}}$=-0.26, t=-2.51, p=.01; $\beta_{\text{Confidence-White}}$=-0.23, t=-1.98, p=.051)

Model 2b-Total Mobility Planning Score (0-28). The experiential driving variables also strengthened the second measure of mobility planning, Total Mobility Planning Scores ($R^2change_{Model\ 1b\text{-}2b}$ =0.10, F(8, 452)=7.28, p<.001). In this model, several demographic and experiential driving variables increased the amount of objective planning behaviors reported. Respondents who identified as Black (β_{Black}=0.17, t=3.55, p<.001), female (β_{Female}=0.10, t=2.25, p=.03, and those with higher Total Other Planning Scores (β_{TOPS}=0.24, t=5.56, p<.001) all had higher Total Mobility Planning Scores than Whites, males, and people who did little to no other planning. Higher expected mobility satisfaction as a nondriver ($\beta_{\text{ExpectedSatisfaction}}$=0.12, t=2.73, p=.01) and current use of any transportation other than driving oneself ($\beta_{\text{AnyAltTrans}}$=0.15, t=3.57, p<.001) also both increased Total Mobility Planning Scores. However, current mobility satisfaction had a huge effect in the opposite direction, as people plan less for future mobility changes when they report presently being satisfied in getting where they need and want to go ($\beta_{\text{CurrentSatisfaction}}$=-0.23, t=-4.99, p<.001).

Model 2b-Race Comparisons. The experiential predictors in Model 2b improved the baseline model significantly for both groups in split-sample analyses, accounting for 22% of Blacks' ($R^2_{Model\ 2b\text{-}Black}$=0.22; $R^2change_{Model\ 1b\text{-}2b\text{-}Black}$ =0.10, F(8, 343)=5.70, p<.001) and 38% of Whites' mobility planning behaviors ($R^2_{Model\ 2b\text{-}White}$=0.38; $R^2change_{Model\ 1b\text{-}2b\text{-}White}$ =0.19, F(8, 93)=3.55, p<.001). Among both groups, the same three predictors significantly increased mobility planning: higher Total Other Planning Scores ($\beta_{TOPS\text{-}Black}$=0.25, t=4.89, p<.001; $\beta_{TOPS\text{-}White}$=0.21, t=2.27, p=.03); higher expected mobility satisfaction

Table 18
Model 2b Regression Results by Race

	Blacks: Total Mobility Planning Score		Whites: Total Mobility Planning Score	
Variables	β	*t*	β	*t*
(Constant)	—	1.93	—	-0.33
Age	0.01	0.16	-0.03	-0.30
Education Level	0.01	0.21	0.07	0.84
Income	-0.05	-0.82	-0.05	-0.50
Working	-0.06	-1.19	-0.13	-1.25
Partnered	-0.07	-1.20	-0.19†	-1.94
Female (vs Male)	0.08	1.63	0.14	1.47
Self-Reported Health	-0.03	-0.57	-0.16†	-1.74
Total Other Planning Score	0.25**	4.98	0.21*	2.27
Model 2 Variables				
Self-Rated Driving Experience	0.01	0.19	0.12	1.24
Confidence in Current Driving	0.01	0.15	-0.08	-0.68
Current Mobility Satisfaction	-0.28**	-5.17	0.10	1.04
Current Driving Enjoyment	-0.01	-0.09	0.13	1.25
Current Driving Stress	0.02	0.44	0.20†	1.90
Responsible for Others' Transportation	-0.02	-0.40	-0.06	-0.70
Expect Mobility Satisfaction as a Nondriver	0.11*	2.14	0.19*	2.24
Use of Any Alternative Transportation	0.12*	2.26	0.33**	3.77

† p≤.10 *p≤.05 **p≤.01

as a nondriver ($\beta_{ExpectedSatisfaction\text{-}Black}$=0.11, *t*=2.14, *p*=.03; $\beta_{ExpectedSatisfaction\text{-}White}$=0.19, *t*=2.24, *p*=.03), and use of any alternative transportation to driving oneself significantly increased respondents' mobility planning behaviors ($\beta_{AnyAltTrans\text{-}Black}$=0.12, *t*=2.26, *p*=.03; $\beta_{AnyAltTrans\text{-}White}$=0.33, *t*=3.77, *p*<.001; Table 18). Expected mobility satisfaction as a nondriver was positively and significantly predicted mobility planning behaviors among Blacks ($\beta_{ExpextedSatisfaction\text{-}Black}$=0.20, *t*=3.97, *p*<.001) and reached marginal significance among Whites ($\beta_{ExpectedSatisfaction\text{-}White}$=0.17, *t*=1.88, *p*=.06). Whites' who were single planned significantly more than their married/partnered counterparts ($\beta_{Partnered\text{-}White}$=-0.26, *t*=-2.51, *p*=.01), while confidence in their current driving abilities reached marginal significance ($\beta_{Confidence\text{-}White}$=-0.23, *t*=-1.98, *p*=.051).

Three additional predictors reached marginal significance only among Whites: being married/partnered, self-rated health, and level of stress currently associated with driving. As with previous White-only analyses, being married/partnered drivers was associated with fewer mobility planning behaviors ($\beta_{Partnered\text{-}White}$=-0.19, *t*=-1.94, *p*=.06), as was being in better health ($\beta_{Health\text{-}White}$=-0.16, *t*=-1.74, *p*=.09). White respondents who experienced more stress driving currently also reported more mobility planning ($\beta_{Stress\text{-}White}$=0.20, *t*=1.90, *p*=.06).

Model 3: Incremental Effect of Assessment of Readiness for Mobility Transition (ARMT). Model 3 utilizes multiple regression to test openness to the topic of future mobility changes actually translates into mobility planning. I added the Assessment of Readiness for Mobility Transition (ARMT) total scores (ranging from 0-4) to the regression model as the predictor of interest, along with

all the baseline independent variables from Model 1 as control variables in Model 3. Results from Models 3a and 3b are displayed in Table 19.

Table 19
Model 3 ARMT Regression Results

	Model 3a: Self-Reported Mobility Planning		Model 3b: Total Mobility Planning Score	
Variables	β	*t*	β	*t*
(Constant)	—	0.35	—	2.27
Age	0.07	1.48	0.01	0.14
Black (vs White)	0.06	1.24	0.14**	3.01
Education Level	-0.02	-0.49	0.02	0.38
Income	-0.09	-1.62	-0.14**	-2.62
Working	-0.01	-0.17	-0.08†	-1.65
Partnered	-0.04	-0.80	-0.09†	-1.83
Female (vs Male)	-0.01	-0.14	0.06	1.34
Self-Reported Health	-0.12**	-2.62	-0.12**	-2.61
Total Other Planning Score	0.28**	6.30	0.24**	5.41
Model 3 Variables				
ARMT Total Score	-0.08†	-1.86	-0.10*	-2.23

† $p \leq .10$ * $p \leq .05$ ** $p \leq .01$

Model 3a-Self-Reported Mobility Planning (0-4). Compared to the predictive power of the baseline Model 1a, adding ARMT scores into Model 3a does not significantly strengthen the regression model by adding to the baseline variables' combined predictive power ($R^2change_{3a\text{-}1a}$=0.01, F(91, 470)=3.46, p=0.06). Model 3a's significance is driven by the predictive powers of self-reported health (β_{Health}=-0.12, t=-2.62 p=0.01) and Total Other Planning Score (β_{TOPS}=0.28, t=6.30, p<0.001) (Table 19), as we saw in Model 1a. The addition of ARMT scores was not significant and did not alter the effect size of the other variables.

Model 3a-Race Comparison. As in the total sample, adding the ARMT Total Score to Model 1a did not have a significant effect among Blacks (R^2 $change_{Model\ 1a\text{-}3a\text{-}Black}$=0.00, F(1, 355)=0.80, p=.37; Table 20). However, the ARMT did significantly improve the model over baseline results for Whites, altogether predicting 23% of self-reported mobility planning (R^2 =0.23; R^2 $change_{Model\ 2a\text{-}White}$=0.07, F(1, 106)=9.74, p=.002). The lower drivers' ARMT score (and the associated lower levels of fear associated with mobility loss), the more mobility planning these respondents reported ($\beta_{ARMT\text{-}White}$=-0.28, t=-3.12, p<.001) compared to drivers with higher scores. Again, single Whites also reported higher scores than those who were married or partnered ($\beta_{Partnered\text{-}White}$=-0.30, t=-3.06, p<.001). For the first time, Total Other Planning Score was non-significant in predicting mobility planning among the full sample and both subsamples.

Table 20
Model 3a Regression Results by Race

	Blacks: Self-Reported Mobility Planning		Whites: Self-Reported Mobility Planning	
Variables	β	*t*	β	*t*
(Constant)	—	0.06	—	1.58
Age	0.08	1.53	0.00	0.02
Education Level	-0.05	-0.87	0.10	1.16
Income	-0.08	-1.25	-0.07	-0.79
Working	-0.01	-0.20	-0.01	-0.08
Partnered	0.01	0.21	-0.30**	-3.06
Female (vs Male)	-0.01	-0.09	-0.06	-0.61
Self-Reported Health	-0.12*	-2.20	-0.10	-1.07
Total Other Planning Score	0.30**	5.89	0.14	1.51
Model 3 Variables				
ARMT Total Score	-0.05	-0.90	-0.28**	-3.12

Model 3b-Total Mobility Planning Score (0-28). In contrast to Model 3a, the addition of the ARMT significantly improved the baseline model in predicting Total Mobility Planning Scores (R^2 *change*$_{Model\ 1b\text{-}3b}$=0.01, F(1, 470)=4.99, p=.03). The same four background predictors (race, income, self-reported health, and Total Other Planning Score) in the baseline *b* model remain significant, joined by ARMT total scores. Being Black (β_{Black}=0.14, t=3.01, p<.001) and planning for other future events (β_{TOPS}=0.24, t=5.41, p<.001) significantly increased objective mobility planning among respondents, as did those with lower incomes (β_{Income}=-0.14, t=-2.62, p<.001) and in worse health (β_{Health}=-0.12, t=-2.61, p<.001). Both relationship and status reached marginal significance, with working ($\beta_{Working}$=-0.08, t=-1.65, p=0.10) and married/partnered ($\beta_{Partnered}$=-0.09, t=-1.83, p=.07) respondents planning less for their future mobility than those who were single and not working.

Model 3b-Race Comparisons. As in Model 3a, the addition of the ARMT significantly improved Model 3b only among White drivers, predicting 23% of Total Mobility Planning Scores ($R^2_{Model\ 3b\text{-}White}$*=0.23;* R^2 *change*$_{Model\ 1b\text{-}3b\text{-}White}$=0.05, F(1, 106)=6.77, p=.01), not the full sample or the Black subsample (R^2 *change*$_{Model\ 1b\text{-}3b\text{-}Black}$=0.01, F(1, 355)=2.19, p=.14). As in previous models, being single (as opposed to married or partnered) was associated with more mobility planning among White drivers ($\beta_{Partnered\text{-}White}$=-0.20, t=-2.05, p=.04). Having more attitudinal readiness for mobility changes (measured by the ARMT) was associated with more planning behaviors as well ($\beta_{ARMT\text{-}White}$=-0.09, t=-1.83, p=.07).

MODEL 4: Incremental Effect of Theoretical Behavior Change Constructs

Constructs. In Model 4, I tested the incremental difference of theoretical constructs from the Health Behavior Model (HBM) and the Theory of Planned Behavior (TPB) on mobility planning by middle-aged and older drivers. Three constructs from the HBM informed the development of items to measure the Perceived Threat of driving retirement (made up of how likely people believe driving retirement is for them and how damaging it would be to stop driving), Cues to Action that make people think about changing their driving, and the Decisional Balance of the advantages and disadvantages of planning for future mobility needs. Finally, I used the primary predictor of health behaviors in TPB to evaluate respondents' Intention to Plan more for mobility changes in the future. All the baseline variables from Model 1 were included in Model 4 as control variables. Because the same item measuring the theoretical construct Intention to Plan was used in the summed Total Mobility Planning Score, Intention was not included in Model 4b. The results are displayed in Table 21.

Model 4a-Self-Reported Mobility Planning (0-4). In Model 4a, 15% of the variance in self-reported planning was explained by baseline demographic variables, as well as select theoretical constructs ($R^2_{Model\ 4a}$=0.16, p<.001). The addition of theoretical constructs in Model 4a does in fact significantly improve the baseline model, increasing the predictive power five percentage points compared to Models 1a and 4a ($R^2change_{4a\text{-}1a}$=0.05, F(4, 485)=6.45, p<.001). This effect is driven by five significant independent variables (Table 21). The first is Total Other Planning Score, a significantly powerful predictor in all regression

Table 21
Model 4 Theoretical Regression Results

Outcome	Model 4a: Self-Reported Mobility Planning		Model 4b: Total Mobility Planning Score	
Variables	β	*t*	β	*t*
(Constant)	—	-0.63	—	1.60
Age	0.08†	1.68	0.01	0.27
Black (vs White)	0.04	0.78	0.15**	3.16
Education Level	-0.05	-0.96	0.01	0.25
Income	-0.06	-1.12	-0.13**	-2.55
Working	0.01	0.25	-0.07	-1.58
Partnered	-0.05†	-0.90	-0.09†	-1.87
Female (vs Male)	-0.01	-0.17	0.08†	1.69
Self-Reported Health	-0.09*	-1.99	-0.10*	-2.13
Total Other Planning Score	0.25**	5.80	0.23**	5.49
Model 4 Variables				
Perceived Threat†	-0.08†	-1.68	-0.040	-0.86
Cues to Action*	0.09*	2.14	0.11*	2.55
Decisional Balance	-0.02	-0.39	-0.06	-1.23
Intention to Plan	0.17**	3.91	—	—

† $p \leq .10$ * $p \leq .05$ ** $p \leq .01$

models ($\boldsymbol{\beta}_{TOPS}$=0.25, p<.001). As in the previous two significant *a* models, self-reported health was a significant predictor in Model 4a ($\boldsymbol{\beta}_{Health}$=-0.09, p=.05). The HBM construct Cues to Action also significantly predicted self-reported mobility planning, with those who report more Cues to Action planning more ($\boldsymbol{\beta}_{Cues}$=0.09, t=2.14, p=.03). The fourth and final significant predictor for Model 4a, Intention to Plan more for future mobility changes, comes from TPB. Respondents who reported more Intention to Plan averaged higher self-reported planning levels than those who had weaker or no intention to prepare for a nondriving future ($\boldsymbol{\beta}_{Intention}$=0.17, p<.001). While slightly above the selected significance level of $p \leq 0.05$, age may actually have a slight but positive effect on self-reported

mobility in Model 4a (β_{Age}=0.08, *p*=.09). Perceived Threat also reached marginal significance, where people reporting higher threat of driving retirement planning less (β_{Threat}=-0.08, *t*=-1.68, *p*=.09). Additional analyses are needed to fully understand the true effects of age when combined with theoretical constructs.

Table 22
Model 4a Regression Results by Race

	Blacks: Self-Reported Mobility Planning		Whites: Self-Reported Mobility Planning	
Variables	β	*t*	β	*t*
(Constant)	—	-1.32	—	0.15
Age	0.08	1.47	0.01	0.13
Education Level	-0.06	-1.05	0.01	0.15
Income	-0.06	-0.97	-0.06	-0.77
Working	0.01	0.26	0.11	1.22
Partnered	0.00	-0.01	-0.26**	-3.12
Female (vs Male)	0.00	0.05	-0.11	-1.30
Self-Reported Health	0.07	1.27	0.06	0.80
Total Other Planning Score	0.27**	5.35	0.15†	1.77
Model 4 Variables				
Model 4: Perceived Threat	-0.08	-1.41	-0.09	-0.98
Model 4: Cues to Action	0.09†	1.73	0.12	1.55
Model 4: Decisional Balance	0.05	0.91	-0.16†	-1.90
Model 4: Intention to Plan	0.12*	2.35	0.41**	4.99

† *p*≤.10 **p*≤.05 ***p*≤.01

Model 4a-Race Comparisons. While adding theoretical constructs only marginally improved baseline model among Blacks (R^2change $_{Model\ 1a\text{-}4a\text{-}Black}$=0.02, *F*(4, 366)=2.32*, p*=.06), Model 4a remained significant for Whites (R^2change$_{Model\ 1b\text{-}4b\text{-}White}$=0.24, *F*(4, 107)=10.52*, p*<.001), predicting 40% of self-reported mobility planning ($R^2_{Model\ 4a\text{-}White}$=0.40). Single White drivers had higher self-reported mobility planning levels ($\beta_{Partnered\text{-}White}$=-0.25, *t*=-2.92, *p*<.001), as did individuals with a higher Intention to Plan more for their mobility futures

($\boldsymbol{\beta}_{\text{Intention-White}}$=0.44, t=5.25, p<.001). In addition, higher Decisional Balance scores negatively influenced mobility planning. In other words, the more respondents believed the advantages of mobility planning outweighed its disadvantages, the *less* likely they were to report mobility planning ($\boldsymbol{\beta}_{\text{DecisionalBalance-White}}$=-0.18, t=-2.12, p=.04).

Model 4b-Total Mobility Planning Score (0-28). In Model 4b, the control variables and theoretical constructs predicted 18% of the variance in Total Mobility Planning Scores ($R^2_{Model\ 4b}$=17.9, F(12, 486)=8.82, p<.001). Adding the theoretical constructs significantly improves the baseline models, increasing the predictive power of the regression model by 2% ($R^2change_{Model\ 1b\text{-}4b}$=0.16, F(3, 486)=3.24, p=.02). As in Model 4a, experiencing more Cues to Action positively influences Total Mobility Planning Scores ($\boldsymbol{\beta}_{\text{Cues}}$=0.11, t=2.55, p=.01; Table 21). Among respondents, people in better health and more income planned significantly less ($\boldsymbol{\beta}_{\text{Health}}$=-0.10, t=-2.13, p=.03; $\boldsymbol{\beta}_{\text{Income}}$=-0.13, t=-2.55, p=.01). Unlike previous *b* models, Blacks averaged higher planning scores compared to Whites ($\boldsymbol{\beta}_{\text{Black}}$=0.15, t=3.16, p=.002). Total Other Planning Score was the final significant and strongest predictor in Model 4b ($\boldsymbol{\beta}_{\text{TOPS}}$=0.23, t=5.49, p<.001).

In Model 4b, there was again a nonsignificant trend worth noting. Married/partnered respondents planned marginally less than their single counterparts ($\boldsymbol{\beta}_{\text{Partnered}}$=-0.09, t=-1.87, p=.06). Female respondents also reported marginally more mobility planning behaviors than male respondents ($\boldsymbol{\beta}_{\text{Female}}$=0.08, t=1.69, p=.09).

Model 4b-Race Comparisons. In split sample race analyses, the additional theoretical constructs in Model 4b did not improve the predictive power over the baseline model among Black participants ($R^2_{Model\ 4b\text{-}Black}$=0.12; $R^2change_{Model\ 1b\text{-}4b\text{-}Black}$=0.01, F(3, 367)=1.23, p=.30). In contrast, adding theoretical constructs did strengthen predictions of mobility planning behaviors among White participants, from 10% to 16% ($R^2_{Model\ 4b\text{-}White}$=0.16; $R^2change_{Model\ 1b\text{-}14\text{-}White}$=0.08, F(3, 108)=3.87, p=.01). The White subsample had only one significant predictor: relationship status. Single White respondents reported more mobility planning behaviors ($\beta_{Partnered\text{-}White}$=-0.27, t=-2.77, p=.01). Among the White subsample, Total Other Planning Score was positively albeit marginally significant in predicting Total Mobility Planning Scores ($\beta_{TOPS\text{-}White}$=0.71, t=1.85, p=.07), while higher Perceived Threat resulted in marginally less objective mobility planning ($\beta_{PerceivedThreat\text{-}Black}$=-0.16, t=-1.69, p=.10).

Table 23
Model 4b Regression Results by Race

	Blacks: Total Mobility Planning Score		Whites: Total Mobility Planning Score	
Variables	β	*t*	β	*t*
(Constant)	—	-0.27	—	0.82
Age	0.08	1.55	0.02	0.22
Education Level	-0.05	-0.96	0.06	0.63
Income	-0.07	-1.12	-0.07	-0.70
Working	-0.01	-0.13	-0.01	-0.07
Partnered	0.01	0.13	-0.27*	-2.77
Female (vs Male)	0.01	0.16	-0.02	-0.16
Self-Reported Health†	-0.10†	-1.93	-0.09	-0.97
Total Other Planning Score	0.30**	5.92	0.17†	1.85
Model 4 Variables				
Perceived Threat	-0.05	-0.97	-0.17†	-1.69
Cues to Action	0.08	1.58	0.15	1.65
Decision Balance	0.00	-0.01	-0.15	-1.56

† $p \leq .10$ * $p \leq .05$ ** $p \leq .01$

CHAPTER 10

New Understanding of Mobility Planning and Suggestions for the Future

Deeper Insights into the Challenges of Mobility Planning

This work offers new insight into the attitudes and behaviors of older adults regarding planning for future changes in their community mobility. Until now, planning for driving reduction and retirement has been researched obliquely, in mostly qualitative studies. This dissertation illuminates relationships between psychological, demographic, and environmental characteristics, providing a more comprehensive insight into how and why middle-aged and older drivers make choices about driving continuation or retirement.

In broad terms, the findings from my qualitative interviews illuminated the differences in contexts and individuals' attitudes about driving reduction or full driving retirement, including the following:

- the meanings of driving and driving retirement, ranging from basic transportation needs to a representation of social roles and relationships to a visible symbol of functional health;
- fear of losing mobility and thereby giving up freedom, which translates to becoming dependent or a burden if they are no longer able to drive;
- distaste for and distrust of nondriving transportation alternatives; and

- lack of confidence concerning when and how to make decisions about driving retirement for themselves or loved ones.

Interviewees highlighted several factors that directly and indirectly influence older adults' driving decisions, including individual characteristics, family dynamics, and the availability and acceptability of transportation options other than driving themselves. Each driver brings a unique combination of these domains and resources, which provides valuable insight into drivers' current and expected community mobility. Therefore, the quantitative planning survey aimed to capture not only the types and levels of mobility planning, but also the contextual factors that influence preparation for a nondriving future. Consistent with the interviews, middle-aged and older drivers in my sample were highly dependent on driving themselves, and had planned little for their upcoming transportation needs. However, the in-depth survey data illuminated several key findings that can inform and direct the field of mobility planning.

Key Findings

Key Finding 1: Age may not be the most important factor in middle-aged and older drivers' mobility planning. On the surface, thinking about when someone needs to stop driving seems intimately linked to age. As noted in Chapter 2, declines in cognitive, physical, and mental functioning associated with age are linked to increased driving risk (Dickerson et al 2007). Yet, contrary to research hypothesis #2Ai, *one of the primary findings of this research is that age does not seem to play a strong role in when or how preparations for driving discontinuation occur*.

Overall, the lack of differences in driving patterns and mobility planning was consistent, despite approaching it from two sides: respondents' current age to try to

capture the changes that occur as a developmental part of aging, as well as comparing cohort effects among six five-year age categories. As described in Chapter 8, using a continuous or categorical age variable did not reveal consistently significant relationships between how much middle-aged and older drivers in this sample plan for their mobility futures. The robust nature of this finding was further demonstrated when testing regression models in Chapter 9: in all eight models, including age as a continuous measure, as the categorical six age groups, or as both does not meaningfully change the model fit statistics, significant variables, and their □-coefficients.

Therefore, age is an important and related, but not defining, characteristic for preparing for or predicting driving retirement. Anstey, Windsor, Luszcz, and Andrews (2006) reported similar findings, as age was only weakly predictive of driving retirement. In fact, the most reliable predictors for driving retirement in their study were self-rated health and cognitive functioning, not age or medical conditions. This finding contextualizes why even though stakeholders discussed age generally in the interviews, they actually focused more on declines in physical and cognitive functioning which have been found to be the real threats to safe driving (Campbell, Bush, & Hale, 1993; Foley, Heimovitz, Guralnik, & Brock, 2002; Foley, Masaki, & Ross, 2000; Marottoli, Ostfeld, Merrill, Perlman, Foley, & Cooney, 1993). Taken together, my findings and driving retirement literature suggest that tailoring driving retirement conversations to middle-aged and older drivers' individual abilities, preferences, and resources would be beneficial.

According to the small but growing literature, focusing on issues broader than age is also important to current drivers, emphasizing engagement and tailoring to preparing older drivers for a nondriving lifestyle. For example, in the Australian UQDRIVE (University of Queensland Driver Retirement Initiative), participants reported that the most helpful features of the group intervention involved thoughtful preparation, including identifying alternatives transportation and peer support through the process (Gustafsson, Liddle, Lua, Hoyle, Pachana, Mitchell, & McKenna, 2011). Older adults in this program appreciated the recognition of the loss and stress associated with driving cessation (Gustafsson, Liddle, Lua, Hoyle, Pachana, Mitchell, & McKenna, 2011). However, these studies are limited in sample size and diversity. As the field of mobility planning further develops and improves, comparing subgroups will provide more meaningful ways to approach preparing drivers for nondriving futures.

Key Finding 2: Comparing subgroups reveals important differences in mobility planning. While a handful of studies compared differences in driving and driving retirement by gender (e.g., Hakamies-Blomqvist & Wahlström, 1998) and urbanicity (e.g., Johnson, 1998, 1999), racial differences remain largely unexplored. As discussed in Chapters 2 and 4, Black Americans and White Americans experience disparate direct and indirect social forces across the lifespan that affect a wide variety of resources, including finances, information, and individual health and functioning (Link & Phelan, 1995; Link & Phelan, 2000). Despite the fact that where people live, and thereby their transportation options and decisions, are connected to their race, researchers commonly aggregate their data for a variety of reasons, the most common of which is small samples of people of color. In contrast, the present survey sample was

predominantly made up of Black residents of Detroit, providing the first in-depth look into the challenges faced by older adults living in a particularly complex transportation environment. Despite being a major urban area, Detroit is an extremely car-dependent city (Grengs, 2010). As shown in Chapters 8 and 9, consistent differences were found by race in the survey data, showing that within this sample, there are in fact differences in mobility planning.

Compared to White participants, Black participants reported more objective planning behaviors. Black respondents also expected to be more satisfied with their mobility if they were to stop driving. These and other differences underline the point that *mobility planning is not a one-size-fits-all solution.* People who have transportation challenges throughout their lives, like many older adults living in Detroit, may come to mobility planning with a familiarity of nondriving options and different skills to meet their mobility needs.

However, these data do not allow us to ascertain if these patterns are unique to the population (primarily Black females between 55-84), the place (urban Detroit and suburban Ann Arbor), or a combination thereof. As stakeholders discussed in the qualitative interviews, individual needs and preferences that allow them to age in place are shaped by the resources available in the physical environment (Scharlach, 2012). Older adults in urban areas where public transportation is common may also be more apt to mobility plan or be confident they can meet their needs as a nondriver due to the availability and familiarity with nondriving options. Without further research, the differences cannot be attributed unequivocally to urbanicity or race. Nonetheless, these data provide baseline evidence suggesting significant mobility planning differences by

race and/or urbancity, making it reasonable to search for other important differences that may exist among subgroups as well.

Key Finding 3: How we ask about mobility planning matters. In addition to patterns of mobility planning by individual characteristics such as age and race, the current research also identified an important methodological issue that affects the validity of research about driving discontinuation: the two measures of mobility planning (as a single, self-reported item and a multidimensional scale of objective planning behaviors) are, in fact, distinct. Results from my survey show that middle-aged and older drivers provide substantially different information depending on if they are asked to simply rate their current level of mobility planning ("How much have you planned?") or if asked about specific, objective mobility planning behaviors ("Have you talked to other people about how to get around as a nondriver?" or "Have you gathered information about how to deal with these changes?").

While Black participants reported more of both types of mobility planning than White participants, a gender difference is only clear with Total Mobility Planning Score. That means that differences between males and females are only obvious when looking at the broader, objective index of planning behaviors. *Relying on the simple self-report measure masks discrepancies among subgroups.*

Similarly, while self-reported mobility planning and Total Mobility Planning Scores shared a handful of significant predictors, more salient characteristics were highlighted when using the latter multidimensional planning score as the outcome. For example, Total Other Planning Score significantly predicted both measures of mobility planning in all models. Both experiential models (2a and 2b) were predicted by current

transportation satisfaction, expected transportation satisfaction as a nondriver, and use of any (nondriver) form of transport. Here again, self-reported planning averages were the same between Blacks and Whites, while Total Mobility Planning Scores were significantly different. The ARMT improved the predictive power for Model 3b only, highlighting race, income, and health as predictors for the Total Mobility Planning Score. Finally, in Model 4, both mobility planning outcomes were predicted by Cues to Action and Intention to Plan, along with the ubiquitous Total Other Planning Score. Being partnered, however, only significantly influenced Total Mobility Planning in Model 4b.

Therefore, when we talk to older adults and other stakeholders, we need to be clear about what we are asking and why. When broaching the subject of mobility planning for the first time, starting with a question related to self-reported mobility planning may provide a less-threatening and non-judgmental beginning . After the introduction to the topic is complete, discussing objective planning behaviors (i.e., information seeking or steps to make plans more concrete) focuses the conversation on the individual's preferences, resources, and specific ways they may or may not have planned. The wider range of the Total Mobility Planning Score also more clearly shows differences among subgroups that are not obvious when asking about self-reported planning. *However, it is vital that the two dimensions or measures of mobility planning are not conflated. Each has unique predictors and elicits distinct responses, and therefore are not interchangeable.*

Key Finding 4: Planning for other future events is significantly related to mobility planning among middle-aged and older drivers. On the other side of the spectrum is Total Other Planning Score, which was not only significant in all models but

a consistently strong predictor, implying that people with higher amounts of other kinds of planning experience vastly different mobility planning outcomes. To demonstrate the magnitude of Total Other Planning Score's effect, I multiplied its β-coefficient by the total difference between Total Other Planning Scores one standard deviation below the mean (16.41-5.74=10.67) and one above the mean (16.41+5.74=22.15). In Model 3b ($\beta_{\text{Total Other Planning Score3b}}$=0.24), the difference between these two groups is 2.76 points (16.41*0.24=5.32; 16.41*0.24=2.56), which corresponds to a 10% change in the 0-28 Total Mobility Planning scale.

While other planning behaviors have a significant impact on mobility planning, Total Other Planning has a much stronger impact on the 0-4 self-rated planning scale than on actual planning behaviors.In Model 1a, where $\beta_{\text{Total Other Planning Score1a}}$=0.16 translates into a 1.84-point difference *on a scale of 0-4*. In other words, people with Total Other Planning Scores one standard deviation above the mean had self-reported mobility planning over 200% higher than those with scores one standard deviation below the mean.

These drastically diverging outcomes have meaningful implications for both research and practice. The research implication is methodological, as this finding again underscores the underlying differences between the two measures of mobility planning. In practice, understanding that people who plan for other future possibilities (e.g., healthcare, finances, living arrangements) also plan more for mobility changes may provide a point of intervention: by building mobility planning into preparing for retirement or other needs in later life, people may be primed to discuss mobility transitions.

Key Finding 5: Using theory significantly increases our understanding of which factors influence mobility planning among middle-aged and older drivers. The inclusion of theoretical constructs to the baseline models in Model 4 significantly improved the models for all respondents. Results from the Model 4 regression tests showed that two of the four selected theoretical constructs from the Health Behavior Model (HBM) and Theory of Planned Behavior (TPB) had significant predictive power on both measures of mobility planning. Although respondents' Perceived Threat and Decisional Balance scores did not reach significance, experiences that made them consider changing their driving (Cues to Action) and Intention to Plan more for their nondriving futures were associated with both self-reported planning and objective planning behaviors. Although the significant relationship of the TPB construct Intention to Plan was a logical and expected finding in both Model 4a and Model 4b, it still provides important information from an intervention design standpoint.

Because many people do follow through from intention to action, interventions with the ultimate goal of increasing mobility planning may be best served when intention is targeted directly. By working through this mediator by changing underlying attitudes, mobility planning may be more enduring than if middle-aged and older drivers were simply guided through the steps of mobility planning. A similarly valuable albeit expected finding was higher mobility planning levels among respondents who experienced more recent events that made them consider changing their driving (Cues to Action).

Key Finding 6: Initiating discussions about future mobility early and impersonally may not only increase awareness of nondriving transportation

alternatives, but also provide a way around the taboos talking about, and planning for, driving retirement. In the interviews, older adult and expert stakeholders emphasized the common practice of avoiding the awkward and often ambiguous topic of driving retirement, to the point of categorizing the social prohibition as a taboo. The way stakeholders in the pilot data collection discussed mobility planning emphasized the vague impressions people, especially experts, have of what it takes to prepare for future transportation needs or adapt to becoming a nondriver. While transportation alternatives were talked about in general, few expert stakeholders knew details of what was available in their area for nondrivers. Older adult stakeholders, on the other hand, were concerned not only with the availability of alternative transportation options, but also discussed at length the perceived limitations, such as the inconvenience of planning and waiting for rides.

Perceptions play significant roles not only in older adults' use of nondriving transportation options, but in when and how older drivers and those around them communicate about transportation mobility. In the pilot interviews, both expert and older adult stakeholders talked about benefits for older drivers and their loved ones if they prepared (individually or collectively) for a future when the older adult no longer drives. The main advantages stakeholders associated with mobility planning were mitigating anxiety and confusion before, during, and after driving reduction and retirement, along with increasing older adults' familiarity with nondriving transportation options available. In survey findings, drivers who currently use any nondriving alternative transportation reported more mobility planning than those who relied on driving or rides from others.

Building awareness into mobility planning intervention provides concrete steps to maintain mobility as a nondriver.

An interesting albeit unexpected finding was that volunteers for both the qualitative and quantitative phases were affected by the experience of talking about mobility and mobility planning. Both expert and older adult stakeholders mentioned that discussing mobility planning during the interviews swayed them into thinking about their own mobility futures. Additionally, a handful of survey respondents included personal notes with their returned surveys expressing the same sentiments. Asking about older drivers or mobility in general offers a possible loophole around the taboo of talking about individual's driving safety, a significant barrier identified in the literature (Liddle, Gustafsson, Mitchell, & Pachana, 2016) and interviews. An additional significant advantage of such an approach is that it can begin at much younger ages, planting the seeds for mobility planning at a time when there are fewer immediate concerns about driving retirement.

Limitations

Although this research has provided substantial new insights into both older drivers' beliefs about mobility and the barriers to mobility planning, limitations to this work must be acknowledged. The most relevant limitations stem from the nonrandom recruitment strategies utilized my data collection. By using two university volunteer registries for survey recruitment, I was able to access hundreds of middle-aged and older adults at one time. The tradeoff was a nonrepresentative sample: respondents lived in suburban and urban areas in Southeastern Michigan, and were primarily older

Black women living in Detroit who had volunteered to be part of research study databases.

Therefore, these findings are valuable and in-depth, but not necessarily generalizable to other parts of the country or populations. However, this fact is both a limitation and a strength, as it underscores how specific mobility planning is to individuals' environments and resources. Above and beyond racial patterns in where people live, driving (mostly synonymous with community mobility) is largely a place-based issue. Retiring and former drivers in face very different challenges depending on if they live in urban centers, suburban areas, or the rural expanses of the United States. However, even within these three common urbanicity categories are worlds of differences to be explored. A plethora of details, including population density, how integrated retail space is with where people live, quality of public transit, and distance to key locations all can have distinct effects on community mobility for people of all ages. While the data of this dissertation offer very focused insight into two specific populations in two distinct locations, they are not representative. Therefore, further data collection is necessary to explore these larger issues beyond the present sample.

Additionally, other persons of color, along with rural and male drivers, experience very different social and physical contexts, so overgeneralization is a real concern. Moving forward, it is reasonable to compare how members of other subgroups' unique experiences shape how they think about and carry out community mobility. People who volunteer for university research may be predisposed to consider or talk about uncomfortable subjects such as current and future transportation needs. *Prevalence, attitudes, and predictors of mobility planning may differ widely among groups not well*

represented in this sample: rural drivers, males drivers, non-volunteers, and people who self-identify as a race other than White or Black.

A direct byproduct of the skewed sample highlights a drawback of exploratory work: given the dearth of empirical guidance and the specific sample, it is likely that not all dimensions or definitions of mobility planning were included in the mailed survey. While the pilot interviews were conducted in order to minimize such gaps, the sample of older adult stakeholders (adults 65 and older living suburban and urban areas in Southeast Michigan) was also nonrandom. Here again, subgroups not included in my sample may define mobility planning differently in response to their specific needs and resources.

Ultimately, as discussed in previous chapters, the recruitment process resulted in a conspicuous overlap between race and urbanicity in this sample. Because the majority of the respondents were Black residents of Detroit, the dissertation data do not allow the unique effects of either characteristic to be discerned. This was especially visible in the regression models, where including both race and urbanicity would cause multicollinearity issues. It is possible that the higher levels of planning among middle-aged and older Black drivers is not due to racial differences, but instead a product of living in an urban environment where being a nondriver and/or using nondriving transportation alternatives are much more common. If that is the case, survey respondents' mobility planning may simply be caused by familiarity with public or other nondriving transportation options and therefore not wholly attributable to racial differences. A more diverse sample of middle-aged and older drivers is needed to disentangle the potentially unique effects of urbanicity and race.

In addition to the Gordian Knot of race, urbanicity, and health, there were unexpected findings related to mobility planning that are worth examining. Defying expectations, middle-aged and older drivers' openness to talking about their transportation futures (as measured by scores on the Assessment of Readiness for Mobility Transitions, or ARMT) did not significantly influence the full sample's self-reported mobility planning. This lack of effect may be explained in several ways, including construct measurement, how the instrument itself was developed, and/or the increased need to consider subgroups among the 65 and older population included in most driving research.

One reasonable explanation is that the ARMT measures readiness, a psychological construct, whereas the two mobility planning outcomes rely on self-perceived and objective behaviors. A person's openness to the topic of mobility loss does not mandate any actual preparation is likely mediated by other factors. In other words, if the lack of effect is due to measurement, there is a critical bridge between readiness and mobility planning that has not been identified yet.

However, this argument does not explain the findings of the split sample analyses, which showed that ARMT scores were strongly predictive for White drivers, but not Black drivers (who were the majority of this study's participants). Given that the mainly White older adults were involved in the development and validation of the ARMT instrument (Meuser, Berg-Weger, Chibnall, Harmon, & Stowe, 2013), it was not especially surprising that it was a more powerful predictor for White respondents in this sample. However, the strength of the difference between race subgroups highlights the

need to consider to what degree the constructs being measured in the ARMT need to be assessed differently in different populations.

Similarly, the consistent lack of age effects further supports an expanded view of what role individual factors play in older adults' driving decisions. Historically, age has been used as a criterion for function, although actual measurement of functional abilities related to driving is a better predictor of driving retirement than age itself. Here, self-reported health was significant in many, but not all, regression models, indicating that it was an acceptable, albeit imperfect, proxy for function when predicting mobility planning outcomes. This suggests a need to focus explicitly on functional health more than age when studying driving among older adults, along with less traditional predictors such as Cues to Action (discussed in more detail below).

While the ARMT and age were the most obvious examples, certain other hypothesized predictors of mobility planning surprisingly lacked predictive power as well. For instance, both Perceived Threat of driving retirement and Decisional Balance were counterintuitively nonsignificant in the theoretical regression model (Model 4). How much older adults expect becoming nondrivers will affect their lives and the list of pros and cons of mobility planning are both theoretically and logically linked to their planning behaviors. Here, it is possible that the social and mental taboos about driving retirement, combined with a lack of examples of how to plan for a nondriving future and the lack of resources with which to plan, caused older drivers in this sample to simply opt out of the process. Instead of moving from how they feel about driving retirement (e.g., how it could help them in the future) to preparation (mobility planning), participants may have compartmentalized or just ignored their feelings because of the perception

that there was nothing they could do about it. Further research is necessary to understand which, if any, of these explanations are at the root of the counterintuitive findings.

Next Steps: Research and Practice Implications for Public Health

The findings of this dissertation are relevant beyond the sphere of older adult driving literature to the level of pressing public health discourse. Driving status and health are clearly linked among older adults (CITATION), and older adults are a growing portion of the population in the United States and many other countries. This combination has created a clear public health issue that can and should be addressed at every level (APHA CITATION). At the top, we need policies that support preparation for mobility changes as well as funding and attention to increasing alternative transportation in all communities. Individual cities and towns need to maximize the benefits of helping older residents age in place by supporting efforts to facilitate community mobility (CITATION Scharlack). More immediately, we need to invest in research and empirically-informed, practical interventions to improve outcomes before, during, and after driving retirement.

Future research needs: Building upon current findings. More than anything else, this work reinforced the complexity of older adults' driving decisions and highlighted distinctions that are essential to improving the relevance and efficacy of future research. Driving research is heading in the right direction, with a nascent literature acknowledging the process of driving retirement as well as heterogeneity among older adults (Weeks, Stadnyk, Begley, & MacDonald, 2013).

However, to my knowledge, prior to this dissertation no one had empirically quantified middle-aged and older drivers' planning for their future mobility needs, much less gathered the diverse data necessary to test for differences in mobility planning and its predictors by subgroups. Many of the key themes discussed here suggest the need for specific research to clarify and/or expand upon this work's findings.

Research need 1: Explore lack of age effects on mobility planning. Mobility planning appears to be as rare among older drivers as among middle-aged drivers, suggesting that mobility planning does not occur spontaneously as people age. However, it is unclear *why* there are so few differences by age, and several possible explanations exist. One possibility is that people have general assumptions about their driving futures, either consciously or not, that are not added to once defined. A second hypothesis is that the currently comparable planning rates may be accurate, but only a snapshot of a relationship that may change over time. Because younger respondents are more likely to have faced questions about driving safety with their parents, they may be primed to start planning earlier and continue doing so as they age. A third option is that the measures of mobility planning used in this dissertation are not comprehensive or sensitive enough to capture extant differences. Future work is necessary to explore these and other possible explanations for the lack of age effects on mobility planning.

Research need 2: Test the generalizability of differences in mobility planning between Black and White drivers. Another future area for mobility planning research based on these findings is testing how generalizable the differences by race/urbanicity are. In these samples, Black drivers reported more subjective and objective mobility planning compared to White drivers. As stated previously, the

volunteer registries that served as sampling frames tightly linked race and location. Therefore, while we know there are differences between the two groups, it is less clear if the divergence is due to race, urbanicity, or a combination of race and urbanicity. Additionally, the variations observed may (or may not) be specific to the unique environments of Detroit and Ann Arbor. Each possibility has its own ramifications for research and practice, further justifying future research testing how generalizable these findings are among broader populations.

More generally, the differences observed among certain subgroups highlighted in this dissertation (but not others, such as age) support a call to pay attention to the broad range of characteristics and identities that may be relevant to driving decisions. In this sample, mobility planning and other relevant contexts were clearly different between Black and White drivers, with fewer differences observed between men and women. While race and gender are the most common binaries used to categorize research participants, neither may be the most critical characteristic in this context. Independently exploring other subgroups (e.g., various levels of urbanicity or mobility satisfaction) may further our understanding of contextual and experiential factors that influence decisions about driving retirement.

Research need 3: Elucidate the relationships between mobility planning and other, more common types of future preparation. The single most consistent predictor of mobility planning was the amount of planning drivers reported for more common types of planning (e.g., retirement or healthcare needs in later life). Now that the significant overlap between planning domains is established, future research can focus on directly linking mobility planning with other planning. The link between different

types of planning offers promising ways to connect mobility planning with existing planning behaviors under the umbrella of future planning. For example, do discussions about financial planning represent potential opportunities for initiating mobility planning discussions?

Research need 4: Measure and compare other stakeholders' triggers for mobility planning. Because the survey focused solely on the perspectives of middle-aged and older drivers, the impact of other stakeholders and their experiences on mobility planning remains unclear. The best example is in Cues to Action, or events that generate thinking about possible behavior change, which predicted mobility planning among middle-aged and older adults. However, the survey only measured events that the drivers themselves recognized as having influenced their beliefs or behaviors. Yet other stakeholders (e.g., family members, medical personnel) may experience their own Cues to Action that may encourage them to broach the topic of mobility planning, either with the driver or simply in their own minds. Research measuring and comparing which events spark awareness among older adults and other stakeholders could help identify which events are significant to everyone, as opposed to those events that resonate with one group or another.

Advice for practice: Develop interventions to start mobility planning ASAP. In addition to an enhanced research agenda, this research suggests valuable practice implications that can help public health professionals, gerontologists, and social service providers facilitate mobility planning among middle-aged and older drivers.

Idea 1: Engage drivers at ALL ages in efforts to increase planning, since there is no age when this happens spontaneously. These data show that age is not

a significant factor for the few people who currently plan for mobility transitions. If people are not planning no matter what age they are, it is vital for targeted mobility planning interventions to start early and continue through a person's life, especially after they stop driving. Tailoring is critical, as conversations with 84-year-olds who expect to keep driving for another five years are very different from talking with a 60-year-old who has decades of driving ahead of them. Recognizing the various needs and motivations for individuals to prepare for a nondriving future requires targeting changeable, individual-level attitudes and expectations that directly boost mobility planning. Current drivers may be more receptive to conversations about mobility planning when they are framed as prevention as opposed to intervention Betz, Jones, Petroff, & Schwartz, 2013), further emphasizing the need to start conversations about mobility planning as early as possible.

Idea 2: Develop interventions support mobility planning through recognition of salient factors identified by older adults (e.g., Cues to Action). The regression models indicate several rich targets for motivating mobility planning among current drivers. Building on the reasons mobility planning is relevant, possible, and pressing can also structure a directed discussion about the benefits and cost of mobility planning. For example, a Cues to Action intervention would promote awareness of common red flags about safe driving, either recently or in the future, which can prime people to be more cognizant of their own behaviors and abilities. Helping drivers to self-identify their individual priorities and barriers will personalize interventions, thereby making them more enduring.

Idea 3: Leverage awareness of the need for planning among groups with greatest need (e.g., Blacks drivers in urban contexts). The survey data clearly show that our sample of primarily Urban Black females were significantly more engaged in mobility planning, despite, or perhaps because of, being in the most challenging environment. For people who are already preparing for mobility transitions on their own, interventions need to focus on planning tools, not motivation. Helping drivers collect more information about their own resources and barriers to mobility planning will likely result in not only more planning, but more efficient preparations as well.

Conclusion

The findings from this research provide new information about how people conceptualize mobility and mobility planning in later life, as well as vital insights into the attributes that are associated with more or less mobility planning. When you talk to people about older adults' driving mobility, age is the first topic they focus on. However, when you really listen to what they are saying and come to a more nuanced understanding of their mental models, they both frame concerns in practical terms such as physical declines (e.g., vision to see their surroundings) and cognitive concerns (e.g., being able to process what is seen and react in an appropriate and timely manner) and highlight the need to maintain driving despite these concerns (e.g., due to beliefs that mobility needs will not be well met if they do not drive). This tension between acknowledged concerns and mobility needs underlies older adults' willingness to consider changes to their driving patterns.

Although mobility planning is generally low among drivers 55-84, there are still important characteristics that consistently predict planning for future mobility needs.

While some of these characteristics are structural (e.g., race and urbanicity), other constructs drawing from Health Behavior theories (e.g., Cues to Action) represent opportunities for targeted interventions. These include priming people to recognize events that can be Cues to Action, which in turn motivates mobility planning. Another avenue to explore is how can we get people to acknowledge that there is a reason to prepare for a nondriving future without reaching a point where the fear is paralyzing. Because people who intend to plan appear to follow through, interventions should focus on sparking that interest. What is most clear, however, is that mobility planning has multiple individual-level determinants, and leveraging these factors in a coordinated way could improve outcomes for older drivers, their family and friends, and society as a whole.

APPENDIX A
Expert Stakeholder Interview Guide

Principal Investigator: Annie Harmon, MS
Faculty Advisor: Brian Zikmund-Fisher, PhD

Interviewee:_____

Date:_____

Start Time:_____

End Time:_____

Introduction

Thank you again for participating in this interview. This should take between 60-90 minutes. During the first part, I will use general questions to better understand how you think or talk about different issues. You are free to discuss topics you feel are related that may not be part of the original question. I'll be taking notes as you answer to make sure we cover all the questions, in case you answer a question before I ask it. I'd like to remind you that there are no right or wrong answers to these questions. Do you have any questions before we begin?

Step 1: Opening Question.

I'd like for you to just talk to me about how older adults get around. What comes to mind when you think about what it takes for older adults to get where they need or want to go?

General Q's on Older Adults and Driving
(MAKE SURE TO ASK ALL OF THESE EVENTUALLY)

___*Can you tell me more about older adults and driving?*

___*What are some reasons an older adult might reduce or stop driving?*

___*What might affect when an older adult reduces or stops driving?*

___*What are some other ways for older adults to get where they need to go without driving?*

Date/Initials:_____

Follow-ups

Can you tell me more about how _____ might affect whether, or when, an older adult would keep driving or stop driving? (USE THEIR WORDS)
MARK ONCE WHEN MENTIONED, TWICE WHEN ASKED/DONE

___Safety (in general)

___Vision

___Physical abilities (e.g., strength, endurance)

___Reaction time

___Memory / Cognition

___Mental health / abilities

___Confidence

___Enjoyment of driving

___Driving experience

___Collisions / near misses

___Laws or policies

___Media images / stereotypes

___Spouse / family pressure

___Medical professional recommendation / pressure

___Availability of transportation options

___Social roles:

___Skill level:

___Other:

___Other:

___Other:

___Other:

___Other:

___Other:

___Other:

Experts / Messages

___What types of people or organizations directly talk to or send messages to older adults about driving?

MARK TYPES BELOW THEN USE PROMPT BELOW FOR EACH

Can you tell me more about what kinds of messages _____ give to older adults about driving?

___There are other people and organizations interested in the questions about older adults and driving, but they may not be talking directly to them. Who are these people?

MARK TYPES BELOW AND GO TO STAKEHOLDER QUESTIONS RUBRIC (3-6)

_____Spouse	_____Family	_____Friends
_____Physicians	_____Healthcare providers	_____Social workers
_____CDRSs	_____Physical Therapists	_____Occupational Therapists
_____Policymakers	_____Law enforcement	_____Licensing bureau evaluators
_____Lawyers	_____AARP	_____AAA
_____Insurance agencies	_____Carmakers	_____Media
_____Other drivers	_____Media	

_____Other:

_____Other:

_____Other:

___As a [EXPERT TYPE], what do you see as your role in this issue?

Stakeholder Follow-Up Matrix

Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?

Date/Initials:____________________

Alternate Transportation

Can you tell me more about how _____ would allow older adults to get where they need to go without driving? (USE THEIR WORDS)
MARK ONCE WHEN MENTIONED, TWICE WHEN ASKED/DONE

___Family

___Friends

___Public transportation

___Transportation services (taxis, volunteer driving, etc.)

___Relocation

___Behavior changes (e.g., new doctor)

___Other:

___Other:

___Other:

___What affects how easily people can get around without driving?
___*How does where older adults live influence how easily people can get around without driving?*

___How might other people in their lives make it <u>easier</u> for people who no longer drive to get where they need to go?
___*How might other people in their lives make it <u>harder</u> for people who no longer drive to get where they need to go?*

___Different people might respond differently to no longer driving. What do you think are reasons that some people to react differently than others?
Can you tell me more about how _____ would change how people react to not no longer driving? (USE THEIR WORDS)

___How might an older adult's personality affect how he or she responds to not driving?

APPENDIX B
Older Adult Stakeholder Interview Guide

Principal Investigator: Annie Harmon, MS
Faculty Advisor: Brian Zikmund-Fisher, PhD

Interviewee:_____

Date:_____

Start Time:_____

End Time:_____

Introduction

Thank you again for participating in this interview. This should take between 60-90 minutes. During the first part, I will use general questions to better understand how you think or talk about different issues. You are free to discuss topics you feel are related that may not be part of the original question. I'll be taking notes as you answer to make sure we cover all the questions, in case you answer a question before I ask it. I'd like to remind you that there are no right or wrong answers to these questions. Do you have any questions before we begin?

Step 1: Opening Question.

I'd like for you to just talk to me about how older adults get around. What comes to mind when you think about what it takes for older adults to get where they need or want to go?

General Q's on Older Adults and Driving
(MAKE SURE TO ASK ALL OF THESE EVENTUALLY)

___*Can you tell me more about older adults and driving?*

___*What are some reasons an older adult might reduce or stop driving?*

___*What might affect when an older adult reduces or stops driving?*

___*What are some other ways for older adults to get where they need to go without driving?*

 Date/Initials:_____

Follow-ups

Can you tell me more about how _____ might affect whether, or when, an older adult would keep driving or stop driving? (USE THEIR WORDS)
MARK ONCE WHEN MENTIONED, TWICE WHEN ASKED/DONE

___Safety (in general)

___Vision

___Physical abilities (e.g., strength, endurance)

___Reaction time

___Memory / Cognition

___Mental health / abilities

___Confidence

___Enjoyment of driving

___Driving experience

___Collisions / near misses

___Laws or policies

___Media images / stereotypes

___Spouse / family pressure

___Medical professional recommendation / pressure

___Availability of transportation options

___Social roles:

___Skill level:

___Other:

___Other:

___Other:

___Other:

___Other:

___Other:

___Other:

 Date/Initials:_____

Experts / Messages

___What types of people or organizations directly talk to or send messages to older adults about driving?

MARK TYPES BELOW THEN USE PROMPT BELOW FOR EACH

Can you tell me more about what kinds of messages _____ give to older adults about driving?

___There are other people and organizations interested in the questions about older adults and driving, but they may not be talking directly to them. Who are these people?

MARK TYPES BELOW AND GO TO STAKEHOLDER QUESTIONS RUBRIC (3-6)

_____Spouse	_____Family	_____Friends
_____Physicians	_____Healthcare providers	_____Social workers
_____CDRSs	_____Physical Therapists	_____Occupational Therapists
_____Policymakers	_____Law enforcement	_____Licensing bureau evaluators
_____Lawyers	_____AARP	_____AAA
_____Insurance agencies	_____Carmakers	_____Media
_____Other drivers	_____Media	

_____Other:

_____Other:

_____Other:

___As a [EXPERT TYPE], what do you see as your role in this issue?

Date/Initials:_____

Stakeholder Follow-Up Matrix

Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?
Stakeholder	✓	***What do you see as (the stakeholder's) role in…***
		…providing information to older adults and other stakeholders about driving?
		…how older adults make decisions about driving?
		…affecting policies about older drivers?

Date/Initials:____________________

Alternate Transportation

Can you tell me more about how _____ would allow older adults to get where they need to go without driving? (USE THEIR WORDS)
MARK ONCE WHEN MENTIONED, TWICE WHEN ASKED/DONE

___Family

___Friends

___Public transportation

___Transportation services (taxis, volunteer driving, etc.)

___Relocation

___Behavior changes (e.g., new doctor)

___Other:

___Other:

___Other:

___What affects how easily people can get around without driving?
___*How does where older adults live influence how easily people can get around without driving?*

___How might other people in their lives make it <u>easier</u> for people who no longer drive to get where they need to go?
___*How might other people in their lives make it <u>harder</u> for people who no longer drive to get where they need to go?*

___Different people might respond differently to no longer driving. What do you think are reasons that some people to react differently than others?
Can you tell me more about how _____ would change how people react to not no longer driving? (USE THEIR WORDS)

___How might an older adult's personality affect how he or she responds to not driving?

 Date/Initials:_____

Driving Reduction & Cessation Experience

___*Have you changed your driving for any reason in the past or currently?*

(if yes)

___*What did you hear or see around this time that might have influenced your thinking on this?*

___*Did anyone talk to you specifically about your driving in any way?*

___*While you were thinking about making changes to your driving, was there anyone, or any group or organization, from whom you would have liked to have received more information or guidance?*

(if no) ___*Have you considered how you would handle a situation where you reduced or stopped driving?*

___*Have you had friends or family who have changed their driving?*

(if yes)___*How was that similar or different from your experience? [OR] How did that compare to your experience with driving changes?*

(if no) ___*Was/Is this someone whose driving affected/concerned you in any way?*

(all)____*What was that experience like for you, watching another older adult make those decisions?*

Alternate Transportation

Can you tell me more about how _____ would allow older adults to get where they need to go without driving? (USE THEIR WORDS)

MARK ONCE WHEN MENTIONED, TWICE WHEN ASKED/DONE

___Family ___Friends __Public transportation ___Relocation

___Transportation services (taxis, volunteer driving, etc.) ___Behavior changes

___Other ___Other: __Other

___**What affects how easily people can get around without driving?**

___*How does where older adults live influence how easily people can get around without driving?*

___**How might other people in their lives make it <u>easier</u> for people who no longer drive to get where they need to go?**

___*How might other people in their lives make it <u>harder</u> for people who no longer drive to get where they need to go?*

___**Different people might respond differently to no longer driving. What do you think are reasons that some people to react differently than others?**

Can you tell me more about how _____ would change how people react to not no longer driving? (USE THEIR WORDS)

___**How might an older adult's personality affect how he or she responds to not driving?**

 Date/Initials:_____

Demographic Information (If not yet answered)

___**Age:** _____years

___**Marital Status:**

Have you ever considered yourself a driver? ___Yes ___No

(If yes, ask questions below)

___ (If no) Do you currently live with another driver?

When did you start driving?

Do you still consider yourself a driver? ___Yes ___No

___ (If yes) How many days do you drive in an average week?
___ Are you the main driver in your home?

___ (If no) About how long ago did you stop driving?

How do you think you'd respond to driving limitations or cessation?

 Date/Initials:_____

APPENDIX C
Mobility Planning Survey

DIRECTIONS: Please respond to as many questions as possible. If you are unsure, please pick the closest response or guess.

To begin, we'd like to ask you a few questions about how you get wherever you need to go, both now and what you expect in the future.

1. *How satisfied are you with your current transportation mobility? In other words, how easily can you get where you need or want to go?*

   Not at All Satisfied ☐ ☐ ☐ ☐ ☐ **Very Satisfied**

2. *How much are your current transportation needs being met using each of the following transportation methods?*

a. *DRIVING YOURSELF*	☐ ☐ ☐ ☐ ☐ **None** **All**
b. *RIDES WITH OTHER DRIVERS* (family, friends, etc.)	☐ ☐ ☐ ☐ ☐ **None** **All**
c. *BUSES*	☐ ☐ ☐ ☐ ☐ **None** **All**
d. *TAXIS/CABS*	☐ ☐ ☐ ☐ ☐ **None** **All**
e. *MASS TRANSPORT* (light rail, trains, etc.)	☐ ☐ ☐ ☐ ☐ **None** **All**
f. *SPECIALIZED TRANSPORT* (medical transport, disabled/senior shuttles, etc.)	☐ ☐ ☐ ☐ ☐ **None** **All**
g. *WALKING* (for transportation, NOT for enjoyment or exercise exclusively)	☐ ☐ ☐ ☐ ☐ **None** **All**
h. *"E-HAIL" APPS* (such as Uber or Lyft) on a smartphone or tablet	☐ ☐ ☐ ☐ ☐ **None** **All**
i. OTHER Please specify:_____	☐ ☐ ☐ ☐ ☐ **None** **All**

3. *How much do you know about "E-Hail" apps (such as Uber or Lyft) for smartphones or tablets that can help arrange rides?*

☐ None ☐ A Little ☐ Some ☐ A Lot

4. *How much have you used "E-Hail" apps (such as Uber or Lyft) on a smartphone or tablet to arrange rides?*

☐ None ☐ A Little ☐ Some ☐ A Lot

5. *How much have you planned for your possible future transportation needs? This includes how you may need to change or adapt how you get around outside your home and new needs for transportation that you may have in the future.*

Not at All ☐ ☐ ☐ ☐ ☐ **A Lot**

How much or often have you talked to friends or others...

6. *...to get ideas or information for your possible future transportation needs?*	☐ ☐ ☐ ☐ ☐ **Not at All** **A Lot**
7. *...about how <u>they</u> get around without driving?*	☐ ☐ ☐ ☐ ☐ **Not at All** **A Lot**

8. How much have you done each of the following actions to make your future transportation plans more concrete?

a. *Tell other people about your plans*	☐ **None** ☐ **A Little** ☐ **Some** ☐ **A Lot**
b. *Write your plans down*	☐ **None** ☐ **A Little** ☐ **Some** ☐ **A Lot**
c. *Figure out the routes, schedules, and other logistical details of getting rides with others or on public transit*	☐ **None** ☐ **A Little** ☐ **Some** ☐ **A Lot**
d. *Practice the plan to become more comfortable or familiar with it*	☐ **None** ☐ **A Little** ☐ **Some** ☐ **A Lot**

9. *Have you <u>ever</u> been a driver?* ☐ Yes ☐ No

↓

*If you have **<u>NEVER</u>** been a driver, please skip to page 12, question 48.*

Next, we have more questions about your driving experiences.

10. *How old were you when you learned to drive?* _____ years old

11. How experienced do you feel you are as a driver?

Not at All Experienced ☐ ☐ ☐ ☐ ☐ **Very Experienced**

12. *For how many years did you drive intensely on a regular basis, that is, driving frequently and/or long distances for your work or personal life?* _____ years

13. *At any point in your driving history, have you modified your driving in any of the following ways* (please select all that apply)*:*

☐ Drive only with others in the car
☐ Avoid left-hand turns
☐ Avoid peak traffic hours
☐ Stay within familiar areas
☐ Temporarily been unable to drive
☐ Drive slower than you used to
☐ Drive only during daylight
☐ Avoid busy intersections
☐ Avoid highways/interstates

☐ Other (please describe):

For the next set of questions, we will focus on people or places where you might get information about safe driving.

14. *How many meetings, lectures, or classes have you attended to learn information about aging and driving?*	☐ ☐ ☐ ☐ ☐ **None** **A Lot**
15. *How much information about safe driving for older adults have you sought out from magazine articles, brochures, guides, or other sources (either printed or on the Internet)?*	☐ ☐ ☐ ☐ ☐ **None** **A Lot**
16. *Regardless of how much transportation planning you have or haven't done, how much planning about your transportation do you intend to do in the future?*	☐ ☐ ☐ ☐ ☐ **None** **A Lot**

17. *Have you talked to family, friends, or others about how <u>they</u> plan to get around <u>if they stop driving</u>?*

Not at All ☐ ☐ ☐ ☐ ☐ **A Lot**

18. *Are you responsible for anyone else's transportation?*

☐ Yes ☐ No

↓

<u>IF YES</u>, please describe:

19. *How many drivers live with you (<u>not including yourself</u>, if you currently drive)?*_____ drivers

20. *Are you currently able to drive?*

☐ Yes ☐ No

↓

*<u>IF NO</u>, how many years has it been since the last time you drove?*_____ years

↓

<u>IF NO</u>, why did you stop driving?

*If you are **<u>NOT</u> CURRENTLY** able to drive, please skip to page 12, question 48.*

21. *Do you have a car available to use when you need one?* ☐ Yes ☐ No

22. *Do you limit your driving to nearby places?* ☐ Yes ☐ No

23. *Do you drive on longer trips?* ☐ Yes ☐ No

24. *In the past year, how many days (on average) did you drive each week?*

_____ days/week

25. *How difficult is it for you to believe that you may become a nondriver someday?*

Not at All Difficult ☐ ☐ ☐ ☐ ☐ **Very Difficult**

26. *How stressful is driving for you currently?*	☐ ☐ ☐ ☐ ☐ **Not at All Very**
27. *Whether or not driving is stressful to you, how enjoyable is it for you currently?*	☐ ☐ ☐ ☐ ☐ **Not at All Very**
28. *If you were no longer able to drive, how satisfied do you think you would be with your transportation mobility?*	☐ ☐ ☐ ☐ ☐ **Not at All Very**

How much would thinking now about a time when you're no longer driving…

29. *...help you to meet future transportation needs?*	☐ ☐ ☐ ☐ ☐ **Not at All** **A Lot**
30. *...help make a future transition to nondriver easier emotionally?*	☐ ☐ ☐ ☐ ☐ **Not at All** **A Lot**

31. *When do you think you will stop driving completely?*

32. *In the past year, have you experienced any events that made you consider changing your driving?*

☐ Yes ☐ No

↓

IF YES, please mark what kind of events occurred (please select all that apply)*:*

☐ Car accident or collision
☐ Near miss
☐ Someone you know stopped driving
☐ New diagnosis
☐ A conversation about your driving
☐ Health Issue
☐ Backing up into objects
☐ Finding unexplained dents or dings in your vehicle
☐ Hearing about older driver safety or unsafe older drivers stories

☐ Other (please describe):

33. *How easy do you believe it would be for you to meet your transportation needs if you were no longer driving yourself?*

Not Easy at All ☐ ☐ ☐ ☐ ☐ **Very Easy**

34. *How long do you expect to continue driving?*_____ years

35. *Have you driven in the last 30 days?*

☐ Yes ☐ No

↓

IF NO, how many years has it been since the last time you drove?
(Please write "0" if you drove in the last year.) _____ years

Next, please tell us more about your current and future transportation.

36. *How confident are you in your current driving skills and abilities?*	☐ ☐ ☐ ☐ ☐ **at All Confident** **Not Very Confident**
37. *How confident are you that you could meet your transportation needs if you were no longer driving yourself?*	☐ ☐ ☐ ☐ ☐ **at All Confident** **Not Very Confident**

38. *How much have you thought about a possible future time when you are still driving, but drive less than you currently do?*	☐ ☐ ☐ ☐ ☐ **All** **Not at A Lot**
39. *How much have you thought about a possible future time when you are no longer driving at all?*	☐ ☐ ☐ ☐ ☐ **All** **Not at A Lot**
40. *How much have you planned for a time in the future when you may no longer be driving?*	☐ ☐ ☐ ☐ ☐ **at All** **Not A Lot**

41. *If you were no longer driving yourself, how well could <u>your future transportation needs be met</u> using each the following transportation methods?*

a. *RIDES WITH OTHER DRIVERS* (family, friends, etc.)	☐ ☐ ☐ ☐ ☐ **Not Well at All** **Very Well**
b. *BUSES*	☐ ☐ ☐ ☐ ☐ **Not Well at All** **Very Well**
c. *MASS TRANSPORT* (light rail, trains, etc.)	☐ ☐ ☐ ☐ ☐ **Not Well at All** **Very Well**
d. *TAXIS/CABS*	☐ ☐ ☐ ☐ ☐ **Not Well at All** **Very Well**
e. *SPECIALIZED TRANSPORT* (medical transport, disabled/senior shuttles, etc.)	☐ ☐ ☐ ☐ ☐ **Not Well at All** **Very Well**
f. *WALKING* (for transportation, <u>NOT</u> for enjoyment or exercise exclusively)	☐ ☐ ☐ ☐ ☐ **Not Well at All** **Very Well**
g. *"E-HAIL" APPS* (such as Uber or Lyft) on a smartphone or tablet	☐ ☐ ☐ ☐ ☐ **Not Well at All** **Very Well**
h. OTHER Please specify:_____	☐ ☐ ☐ ☐ ☐ **Not Well at All** **Very Well**

42. *How comfortable would you be using each of the following transportation methods in the future if you were no longer driving?*

a. *RIDES WITH OTHER DRIVERS* (family, friends, etc.)	☐ ☐ ☐ ☐ ☐ **Not at All Comfortable** **Completely Comfortable**
b. *BUSES*	☐ ☐ ☐ ☐ ☐ **Not at All Comfortable** **Completely Comfortable**
c. *MASS TRANSPORT* (light rail, trains, etc.)	☐ ☐ ☐ ☐ ☐ **Not at All Comfortable** **Completely Comfortable**
d. *TAXIS/CABS*	☐ ☐ ☐ ☐ ☐ **Not at All Comfortable** **Completely Comfortable**
e. *SPECIALIZED TRANSPORT* (medical transport, disabled/senior shuttles, etc.)	☐ ☐ ☐ ☐ ☐ **Not at All Comfortable** **Completely Comfortable**
f. *WALKING* (for transportation, NOT for enjoyment or exercise exclusively)	☐ ☐ ☐ ☐ ☐ **Not at All Comfortable** **Completely Comfortable**
g. *"E-HAIL" APPS* (such as Uber or Lyft) on a smartphone or tablet	☐ ☐ ☐ ☐ ☐ **Not at All Comfortable** **Completely Comfortable**
h. OTHER Please specify:_____	☐ ☐ ☐ ☐ ☐ **Not at All Comfortable** **Completely Comfortable**

43. *How likely would you be to use each of the following transportation methods if you were not driving in the future?*

a. *RIDES WITH OTHER DRIVERS* (family, friends, etc.)	☐ ☐ ☐ ☐ ☐ **Not at All Likely** **Very Likely**
b. *BUSES*	☐ ☐ ☐ ☐ ☐ **Not at All Likely** **Very Likely**
c. *MASS TRANSPORT* (light rail, trains, etc.)	☐ ☐ ☐ ☐ ☐ **Not at All Likely** **Very Likely**
d. *TAXIS/CABS*	☐ ☐ ☐ ☐ ☐ **Not at All Likely** **Very Likely**
e. *SPECIALIZED TRANSPORT* (medical transport, disabled/senior shuttles, etc.)	☐ ☐ ☐ ☐ ☐ **Not at All Likely** **Very Likely**
f. *WALKING* (for transportation, NOT for enjoyment or exercise exclusively)	☐ ☐ ☐ ☐ ☐ **Not at All Likely** **Very Likely**
g. *"E-HAIL" APPS* (such as Uber or Lyft) on a smartphone or tablet	☐ ☐ ☐ ☐ ☐ **Not at All Likely** **Very Likely**
h. OTHER Please specify:_____	☐ ☐ ☐ ☐ ☐ **Not at All Likely** **Very Likely**

In addition to what you are doing, we are interested in learning how much have you talked to other people about a time when you are no longer driving.

	a. *How much have you discussed a possible nondriving future with this person or people?*	b. *Do you think they want you to plan <u>MORE</u> for a nondriving future?*	c. *How much <u>do you care</u> about if they want you to plan more?*
44. Spouse/ Partner	☐ Have not talked ☐ Talked in passing ☐ Seriously talked ☐ Do not have a spouse/partner (*If not, please move on to question 45.*)	☐ Not at all ☐ A little ☐ Some ☐ A lot	☐ Not at all ☐ A little ☐ Some ☐ A lot
45. Adult Children/ Grandchildren	☐ Have not talked ☐ Talked in passing ☐ Seriously talked ☐ Do not have adult children/grandchildren (*If not, please move on to question 46.*)	☐ Not at all ☐ A little ☐ Some ☐ A lot	☐ Not at all ☐ A little ☐ Some ☐ A lot
46. Healthcare Providers (including primary care physicians, eye doctors, nurses, etc.)	☐ Have not talked ☐ Talked in passing ☐ Seriously talked ☐ Do not have healthcare providers (*If not, please move on to question 47.*)	☐ Not at all ☐ A little ☐ Some ☐ A lot	☐ Not at all ☐ A little ☐ Some ☐ A lot
47. Others Please specify:	☐ Have not talked ☐ Talked in passing ☐ Seriously talked	☐ Not at all ☐ A little ☐ Some ☐ A lot	☐ Not at all ☐ A little ☐ Some ☐ A lot

If you are skipping forward from page 2 or 4, please start again here.

Consider what would happen if you could not get yourself to valued destinations and activities independently. Maybe this is occurring already in your life; maybe it could happen in the future.

48. Read each statement and consider if you agree or disagree and how strongly. Mark your answer by circling the appropriate number to the right. Respond to all items if possible.

	Strongly DISAGREE				**Strongly AGREE**
a. *Mobility loss can be sudden or progressive, but it is always devastating.*	**1**	**2**	**3**	**4**	**5**
b. *Asking others for help with mobility means that I am losing my independence.*	**1**	**2**	**3**	**4**	**5**
c. *I am a burden if I ask others for help with transportation.*	**1**	**2**	**3**	**4**	**5**
d. *I avoid thinking about losing my mobility.*	**1**	**2**	**3**	**4**	**5**
e. *I wish others would stop talking to me about my mobility.*	**1**	**2**	**3**	**4**	**5**
f. *Asking for a ride creates an inconvenience for others.*	**1**	**2**	**3**	**4**	**5**
g. *Other people simply don't understand what it's like to have limited mobility.*	**1**	**2**	**3**	**4**	**5**
h. *It is devastating for older people to have someone take away their car keys.*	**1**	**2**	**3**	**4**	**5**
i. *I do not like to ask others for a ride.*	**1**	**2**	**3**	**4**	**5**
j. *I feel depressed at the thought of being limited in my mobility.*	**1**	**2**	**3**	**4**	**5**

	Strongly DISAGREE				Strongly AGREE
k. *Moving to a retirement community is too restrictive for my desired mobility.*	**1**	**2**	**3**	**4**	**5**
l. *When I see older people with significant limitations in mobility, I fear that I will end up like that too.*	**1**	**2**	**3**	**4**	**5**
m. *There is no way to plan for loss of mobility in aging.*	**1**	**2**	**3**	**4**	**5**
n. *A big loss of mobility would really hurt my self-esteem.*	**1**	**2**	**3**	**4**	**5**
o. *Loss of mobility is very isolating and depressing.*	**1**	**2**	**3**	**4**	**5**
p. *I shudder to think of a time when I am less mobile than I am now.*	**1**	**2**	**3**	**4**	**5**
q. *I refuse to accept that I might lose my mobility in the future.*	**1**	**2**	**3**	**4**	**5**
r. *My future independence hinges on my ability to get myself around.*	**1**	**2**	**3**	**4**	**5**
s. *I have not thought much about my future mobility before today.*	**1**	**2**	**3**	**4**	**5**
t. *I've seen others become frail and immobile in older age, and I am determined to avoid this fate at whatever cost.*	**1**	**2**	**3**	**4**	**5**
u. *It really frustrates me when I have difficulty getting around.*	**1**	**2**	**3**	**4**	**5**
v. *I feel angry when I think about losing my mobility.*	**1**	**2**	**3**	**4**	**5**
w. *I feel self-conscious when my mobility needs become a concern for others.*	**1**	**2**	**3**	**4**	**5**
x. *It is not easy for me to ask for help with transportation when I need it.*	**1**	**2**	**3**	**4**	**5**

Please share how much you have planned for the following future needs. Mark the appropriate box for each topic below.

How much have you planned for your possible future...

49. *...general health care needs?*	☐ ☐ ☐ ☐ ☐ **Not at All** **A Lot**
50. *...financial matters?*	☐ ☐ ☐ ☐ ☐ **Not at All** **A Lot**
51. *...housing or living arrangements?*	☐ ☐ ☐ ☐ ☐ **Not at All** **A Lot**
52. *...personal healthcare?*	☐ ☐ ☐ ☐ ☐ **Not at All** **A Lot**
53. *...end-of-life decisions?*	☐ ☐ ☐ ☐ ☐ **Not at All** **A Lot**
54. *...estate planning and/or will?*	☐ ☐ ☐ ☐ ☐ **Not at All** **A Lot**

Finally, we'd like to know some more general information about you.

55. In general, would you say your health is:

- ☐ Excellent
- ☐ Very Good
- ☐ Good
- ☐ Fair
- ☐ Poor

The following two questions are about activities you might do during a typical day. Does YOUR HEALTH NOW LIMIT YOU in these activities? If so, how much?

56. *MODERATE ACTIVITIES, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf:*

- ☐ Yes, Limited A Lot
- ☐ Yes, Limited A Little
- ☐ No, Not Limited At All

57. *Climbing SEVERAL flights of stairs:*

- ☐ Yes, Limited A Lot
- ☐ Yes, Limited A Little
- ☐ No, Not Limited At All

During the PAST 4 WEEKS have you had any of the following problems with your work or other regular activities AS A RESULT OF YOUR PHYSICAL HEALTH?

58. *ACCOMPLISHED LESS than you would like:* ☐ Yes ☐ No

59. *Were limited in the KIND of work or other activities:* ☐ Yes ☐ No

During the PAST 4 WEEKS, were you limited in the kind of work you do or other regular activities AS A RESULT OF ANY EMOTIONAL PROBLEMS (such as feeling depressed or anxious)?

60. *ACCOMPLISHED LESS than you would like:* ☐ Yes ☐ No

61. *Didn't do work or other activities as CAREFULLY as usual:* ☐ Yes ☐ No

62. *During the PAST 4 WEEKS, how much did PAIN interfere with your normal work (including both work outside the home and housework)?*

- ☐ Not At All
- ☐ A Little Bit
- ☐ Moderately
- ☐ Quite A Bit
- ☐ Extremely

The next three questions are about how you feel and how things have been DURING THE PAST 4 WEEKS. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the PAST 4 WEEKS –

63. *Have you felt calm and peaceful?*

- ☐ All of the Time
- ☐ Most of the Time
- ☐ A Good Bit of the Time
- ☐ Some of the Time
- ☐ A Little of the Time
- ☐ None of the Time

64. *Did you have a lot of energy?*

- ☐ All of the Time
- ☐ Most of the Time
- ☐ A Good Bit of the Time
- ☐ Some of the Time
- ☐ A Little of the Time
- ☐ None of the Time

65. *Have you felt downhearted and blue?*

- ☐ All of the Time
- ☐ Most of the Time
- ☐ A Good Bit of the Time
- ☐ Some of the Time
- ☐ A Little of the Time
- ☐ None of the Time

66. *During the PAST 4 WEEKS, how much of the time has your PHYSICAL HEALTH OR EMOTIONAL PROBLEMS interfered with your social activities (like visiting with friends, relatives, etc.)?*

- ☐ All of the Time
- ☐ Most of the Time
- ☐ A Good Bit of the Time
- ☐ Some of the Time
- ☐ A Little of the Time
- ☐ None of the Time

67. *What is your current age?* _____ years old

68. *To what age do you expect to live?* _____ years old

69. *What is the highest grade of school or year of college you completed?*

- ☐ Less than high school
  *IF LESS THAN HIGH SCHOOL, what was the last grade you finished?*____
- ☐ High school diploma
- ☐ Some college
- ☐ College graduate
- ☐ Some graduate/professional school
- ☐ Master's/Professional degree
- ☐ Doctorate

70. *What is your gender?* _____

71. *What race do you consider yourself to be? Please mark all that apply.*

- ☐ White/Caucasian ☐ Black/African-American
- ☐ Other (Please specify):_____

72. *Do you consider yourself Hispanic or Latino?* ☐ Yes ☐ No ☐ Not sure

73. *How would you describe the area where you live?*

☐ Urban (City) ☐ Rural ☐ Suburban

74. *How would you describe your current employment status?*

☐ Working full-time
☐ Working part-time
☐ Temporarily laid off
☐ Unemployed and looking for work
☐ Disabled and unable to work
☐ Retired
☐ Homemaker
☐ Other (please describe):_____

75. *Which best describes your yearly household income?*

☐ Less than $10,000
☐ $10,000 to $14,999
☐ $15,000 to $24,999
☐ $25,000 to $49,999
☐ $50,000 to $99,999
☐ $100,000 to $149,999
☐ $150,000 to $199,999
☐ $200,000 and above

76. *What is your current relationship status?*

☐ Single (never married)
☐ Married/Domestic partnership
☐ Divorced/Separated
☐ Widowed

Thank you for completing the survey! Please mail it back in the envelope included in the package. You should get your $20 gift card within 3-4 weeks after we receive your survey.

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